LITERACY DEVELOPMENT THROUGH KNOWLEDGE BUILDING TECHNOLOGY IN CANADA'S EASTERN ARCTIC: EDUCATORS' PERSPECTIVES

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TABLE OF CONTENTS

CHAPTER PAGE

CHAPTER PAGE

6. (Continued)

Abstract

Educators in the Eastern Arctic have been involved in a research project exploring implementation of the computer software program, Knowledge Forum®. As an educator involved in that implementation, interest grew in how the software potentially enhanced knowledge building while impacting literacy development. Educators who work with Inuit students are ideally located to examine the relationship between Knowledge Forum® and literacy development. Literacy development is not an implicit aim of Knowledge Forum® so a review of what constitutes literacy for northern educators became a starting point. Interviews were conducted with volunteer educators, who also participated in the databases with their students. In the course of analyzing the data, it became evident that changing educational influences, perceptions, issues, roles and practices must be interwoven throughout this study. This study suggests that educators view a positive relationship between use of CSILE/Knowledge Forum, knowledge building and literacy development in northern communities.

LIST OF ABBREVIATIONS

BDEC	- Baffin Divisional Education Council
CSILE	- Computer Supported Intentional Learning Environment (pronounced see-sill)
ESL	- English as a Second Language
EFL	- English as a First Language
IDEA	- Iqaluit District Education Authority
NWT	- Northwest Territories
OISE	- Ontario Institute for Studies in Education, Toronto, ON

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and her peers in Grade 4/5 T.

Nakurmiq!

Chapter One: Introduction

The Landscape

Go to the people. Learn from them. Live with them. Love them. Start with what they know. Build with what they have. But the best of leaders when the job is done, when the task is accomplished, the people will all say we have done it ourselves (Lao Tzu, 604 BC).

Throughout the Eastern Arctic of Canada, dotted intermittently across the treeless landscape of the tundra, travelers have found carefully constructed rock pile formations known as inuksuit, meaning "in likeness of man" in Inuktitut, the language of the Inuit. In essence, these inuksuit were among the first uses of technology as symbolic representations of knowledge and communication. They were, and are, erected to be read and interpreted by others, signals of directions others have traveled, often providing information about the location of caribou herds, a main source of sustenance. As such, they are voices of the past, designed in the present, to direct and guide the future. They have stood the test of time, as symbols of knowledge-building and communication that have led to the survival of a culture, often through turbulent times of rapid change.

For Inuit in the Eastern Arctic, change has become a way of life in the last half a century as they moved from being primarily nomadic to living in coastal communities that had their origins with the Hudson's Bay Company and the federal government. They have also made the transition from being an oral culture to one that values both oral and written communication. In recent times, thanks to the advances of technology, change in communication styles has been accelerated in Arctic communities. The computer has become the means of communicating with the rest of the world whether through E - mail, Internet web sites, faxes or shared databases. The computer, however, is a symbol of different cultures, ones that are changing the landscape of the North in whole new directions. Although there is widespread recognition that the culture of the Inuit and their predecessors predates all others in the North, there is the potential danger that their culture will be supplanted by others as the computer, as a cultural change agent, widens its impact. With the emergence of computer technology and some of the possibilities that it offers, the community can potentially communicate, share and build the knowledge of multiple cultures. "Schools that have brought issues relating to cultural and linguistic diversity from the periphery to the center of their mission are more likely to prepare students to thrive in the interdependent global society in which they live" (Cummins, 1996, p.236). Thus, much like the inuksuit, computers are beginning to represent a communication link to the past, via the present, to the future for classrooms in Iqaluit.

Purpose

Although born and raised in the Maritimes, for over a decade I chose to call Nunavut my home. This resulted in a desire to ensure that the students in the North have learning opportunities comparable to their counterparts elsewhere in the world. As a result, I have, in conjunction with other northern educators, continually sought out new ways to try to meet the needs of the youth taught every day. The use of technology, such as computers, in meaningful ways seemed to be a way of ensuring the place of Inuit students in a global society.

My northern educational experiences led me to involvement in charitable literacy organizations at local/territorial levels and adult upgrading course creation and instruction. Such involvements demonstrated to me that there needs to be a review of what constitutes literacy within the eastern Arctic, particularly while validating Inuit culture after decades of Eurocentric domination. Although there are conscious efforts to promote multilingual literacy in the general public, they barely touch the lives of youth dealt with each day in northern classrooms. One of the most crucial places for the reexamination of what it means to be literate therefore appears to be within the educational system. The expansion of the use of computers in education resulted in further personal reflection on the roles computers could potentially play in literacy development.

One of the new ways of possibly meeting northern students' literacy needs through the use of computers was introduced in Iqaluit in 1992 by Sandy McAuley. McAuley was returning from educational leave at Ontario Institute for Studies in Education (OISE) to his position as Baffin Divisional Board of Education (BDBE)

Consultant. McAuley demonstrated the CSILE (Computer Supported Intentional Learning Environment) software and explained the corresponding research project which originated from the work of Marlene Scardamalia, Carl Bereiter, R.S. McLean, J. Swallow & Earl Woodruff in 1987 at OISE. I was, as Junior High Assistant Principal and Program Support Teacher at the time, attracted initially to CSILE's potential in combining authentic computer usage with BDBE's programming directives of Piniaqtavut (1989) and the various abilities of northern youth. "Piniaqtavut advocated classrooms where language was used in meaningful ways, where children were engaged in interactive learning, where Inuit language and cultur were at the center of the program" (Tompkins, 1998, p.131). The open-ended framework offered by the computer software of CSILE seemed to provide a promising match with the kind of learning advocated by Piniaqtavut so Iqaluit became a research site for this project.

The range of my experiences in Iqaluit's CSILE research project over a period of ten years included being the administrator who supported the project in the junior high to a homeroom-based classroom teacher who implemented, in a variety of grades and settings, both CSILE and its second generation version, Knowledge Forum®. (Knowledge Forum® was released commercially in 1996 by Learning in Motion, California.) As a participant at the classroom level, there has been a personal evolution, from learning the program along with students to supporting other educators as they implement it in their classrooms, whether in Iqaluit or other communities, north and south. In the process, I have become a learner along with other participants, sharing in the databases with them. My level of involvement in

the project expanded over time to include being part of the Knowledge Forum® international research team, which in turn, has been enhanced through participation in workshops around the continent with researchers, programmers, cognitive scientists, educators and other participants in fields such as health and municipal affairs. In addition I have been a mentor and participant in other Knowledge Forum® databases around the country, through Internet access.

The more I became involved as learner, teacher, team member and researcher in the local and broader Knowledge Forum® educational communities, the more I wondered if enhancing literacy development is an incidental part of the knowledge-building process that forms the foundations of technology such as Knowledge Forum®. The software of Knowledge Forum® was not designed originally as a specific means of developing literacy skills. Rather it was "initially developed for university and graduate level students . . . [who] were being encouraged to think more about how they process and reprocess thoughts" (Scardamalia et al., 1987).

Little has been written on the impact of technological software for Inuit who are learning English as a second language. More specifically, the relationship between Knowledge Forum® and literacy development for Inuit youth has not been researched so bears exploration. Educators are ideally located to examine the relationship between technology and literacy development as they work closely with these students every day. This research therefore explores the question:

What are the perspectives of educators regarding the relationship between the knowledge-building technology of Knowledge Forum® and literacy development for Inuit students in Iqaluit, Nunavut?

To guide this research the following questions were explored to determine the perspectives of these northern educators:

How is literacy defined and valued - in traditional Inuit culture?

- for today's youth?

How does Knowledge Forum® support knowledge-building for Inuit students?

In what manner does Knowledge Forum® support culturally relevant learning in both literacy development and knowledge construction?

Explanations to these questions by educators could shed light on the potential benefits and barriers, especially in regards to multicultural literacies, derived from the use of Knowledge Forum® with second language learners in the North. The research findings could offer suggestions to educators on how to increase linguistic and cultural success in school for youth. In the process, insight could be gained into how to enable youth to be better equipped to deal with a multitude of other events that affect their lives. Northern youth are deeply impacted by the higher than national average number of suicides, and teenage pregnancies, along with exposure to alcohol drug, sexual, physical, emotional abuses that many have to contend with, many of which adversely affect their current linguistic and cultural success in school. Added to these stressors is the rapid change that has occurred in the last half a century in the north as Inuit moved from small family group nomadic life into government communities.

Part of my personal motivation to explore an understanding of literacy development for northern youth stems from witnessing students' self-esteem slide as they are sometimes made to feel like second class citizens in their own

communities just because of the level of their language abilities in the increasingly dominant English language. Far too many have been frustrated by their lack of success communicating and responding to written language, whether in their first, or second language of Inuktitut, English, or French in the trilingual community. Within the current educational system, students experiencing difficulties stemming from cultural and linguistic differences are too frequently labeled as 'general' students by some educators, starting at an early age, just because they are learning in another language.

Underestimating the capabilities of young second language learners simply because they cannot speak English is a common occurrence. Early streaming based on a mastery of English demonstrates that those making such decisions ignore that second language capability does not reflect cognitive ability or academic potential.

> If young learners' cognitive development in their [first language] is not recognized, and these learners are. . .taught in English with no consideration to further development of thinking, then it is little wonder that second language learners in our schools are disproportionately represented in lower streams and ultimately do less well academically than their native English speaking peers (Dufficy & Gummer, 1991, p. 81).

Generally the ability to communicate orally, in first or second language, has not been perceived to be a problem due to the oral traditions of the Inuit culture, exposure to media such as cable television and the trend of oracy traditionally preceding literacy in many of our North American cultures. In my experience, it is with written communication that many Inuit students are most frustrated. In some

cases personal experience has shown such frustration presenting itself as behavioural problems. Over time, I have realized that such difficulties likely had very little to do with intelligence levels and more to do with confidence and ability in first and second language literacy development. "Success in literacy for second language learners. . must begin with the realization that not speaking English, or not being familiar with the discourse patterns of the classroom, are not indicators of intelligence or learning potential" (Dufficy & Gummer, 1991, p. 110). Thus exploration of literacy development through technology may assist in better understanding how to establish a process to increase success rates for northern youth, particularly in their broader education as members of a global society.

Contextual Framework

Iqaluit, a physically isolated Baffin Island community of approximately 6000 people, became the capital of Nunavut, Canada's third territory, on April 1, 1999. In this northern community, 85 % of the students are Inuit, who are a unique blend of traditional and modern ways of living. It has been said that Inuit have come from the Stone Age to the Computer Age in one generation. The dramatic change in generational experiences of the Inuit is evident during parent orientation sessions when students share their collaborated, computer-based research and graphics on the history, government, and resources of the North with family members who had been born out on the land, often in igloos, with little or no formal, albeit Eurocentric, schooling (Tumblin, November 20, 1996). These family members are well educated in traditional cultural values and skills, such as surviving in the harsh northern

climate, representing a form of education that has served the Inuit well for centuries. Thus the significance of current multicultural, literate communications becomes as powerful for the present generations as the inuksuit have been for past generations.

With the creation of Canada's newest territory, and in spite of the many obstacles faced in times of rapid change, came desires within the regional educationa system to ensure that Inuit students in the Eastern Arctic are as prepared as possible to be full partners in a global society. Integral to the foundations for such enhanced participation are: literacy development in first and second languages; the ability to construct knowledge cooperatively, as their ancestors have done in different contexts; and competence in utilizing the computer as a tool for learning and communication, even in isolated, fly-in- only communities.

One of the challenges for northern educators is how to make the computer learning experiences of participants culturally relevant while ensuring that literacy development is enhanced. The task becomes even more daunting where technology is utilized when the language of instruction is primarily English. However a potential could exist through the use of the collaborative knowledge-building software program of Knowledge Forum®.

Knowledge Forum® is a unique computer software program introduced in over ten countries around the world. When Iqaluit became one of the eight original North American CSILE research sites, students, educators and other experts with logins were able to contribute text and graphic notes to a public database through the collaborative construction of knowledge. Participants in Knowledge Forum® databases explore specific areas of interest under the umbrella topics introduced;

choose one of several scaffolds to frame their discourse, such as the process of devising a problem, developing theories, posing additional questions, planning, researching new information from a variety of sources; represent new learning through text and graphics; devise a better theory; or participate in focused discussion topics. Topics are tailored to meet specific local curricula and interests/needs of the students as each site starts with an empty database on their server.

In the Iqaluit Knowledge Forum® research project, topics have ranged from Marine Environment to Indigenous People of the World, from Weather and Space to Northern History, Geography and Resources, with special interest areas such as Suicide and Racism explored in between. Students, educators and external resource people with logins contribute to the database on client computers to construct knowledge as a community, allowing for continual modification, building on each other's ideas, constructing knowledge, whether individually or in groups. Using the technology of Knowledge Forum® to build knowledge that is culturally relevant while promoting a more global view has the potential of being motivating for young Inuit children. Such software framework could enable students to start with what they know, and from where they are in their language development in their first and second languages, thereby enabling a comfort level with learning and technology that is not readily available in most commercialized resources for Northern youth. As so many northern students have artistic strengths, another potentially motivating factor is the software's ability to incorporate graphics as well as text generated by Northern youth. By having a school-based database, the audience is more authentic and non-threatening as people known and trusted are the primary participants in the

database. This is very different from northern educational practices in the last century.

History of Northern Education

Prior to 1930's, "culture [was] informally [taught] throughout the daily process of living and socializing within a community" (Oakes, 1988, p. 41). Children learned through observation of the techniques their elders modeled. Generally, asking questions was not part of the process. "Education was geared toward the moulding of *inummariit* ('full individuals'), that is, socially and economically responsible adults able to survive in the arctic environment" (Dorais, 1995, p. 300). Until 1876, when Bishop E. J. Peck used Horden's and Watkin's adaptation of Cree syllabics to translate Biblical passages into Inuktitut, oral language was the primary means of communicating with others. The responsibility for teaching written Inuktitut, whether in syllabics or Roman orthography, thus rested mainly with the missionaries for decades, who combined such teaching with sessions on religion when Inuit came to the trading posts or the missionaries traveled to the Inuit family camps. Due to the simplicity of syllabics, with the three rotations of fourteen main symbols, and the grammatical regularity of Inuktitut, some acquisition of written Inuktitut likely occurred through informal teaching.

By the 1950-1960's, with the government-forced move of Inuit into more permanent communities, the focus in Northern education had shifted to learning English and acquiring job related skills. "Cultural replacement was the norm rather than culture education" (Oakes, 1988, p. 43). The Inuit culture was devalued, given

the history of "colonial domination deliberately undermining the cultural values of Indigenous people through assimilative, and later integrative, educational policies" (Maina, 1997, p. 294). Inuit youth were shipped off to residential schools, away from their families for the bulk of the year. They were often punished for speaking in Inuktitut or practicing traditional cultural activities, which exemplifies the assimilation tactics utilized in the name of education. Cummins (1996) notes "in the past, schools have required that subordinated groups deny their cultural identity as a necessary condition for success in the 'mainstream' society" (p. 144). Unfortunately such practices had negative results for many as "students became marginalized in both cultures because they lost familiarity with practices, traditions and languages of their own culture" (Hamme, in Maina, 1997, p. 297). Inuit language, philosophies, culture and previous experiences were devalued within the educational system and in society as a whole. "The school environment encouraged competitiveness and individual academic, athletic and extra-curricular achievement rather than generosity and working together for the benefit of the group" (p. 43). Inuit would not have survived in the harsh Arctic environment for centuries without an emphasis on cooperative efforts. Thus students' school experiences were in conflict with their traditional cultural experiences. Cummins also states "When students' language, culture and experience are ignored or excluded in classroom activities, students are immediately starting from a disadvantage" (1996, p. 2).

By the 1970's, the initial seeds for the creation of a separate territory where Inuit would be in the majority were planted, spurring many former Inuit residential students and others to take leading roles in ensuring the culture of Inuit was reflected

within the school system and society as a whole. "When men and women realize that they themselves are the makers of culture, they have accomplished . . . the first step toward feeling the importance, the necessity and the possibility of owning reading and writing. They become literate, politically speaking" (Freire, 1998, p. xi). Thus there was more demand for Inuktitut and Inuit culture in the classrooms.

In an effort to ensure the presence of traditional Inuit culture in schools, in some cases members of the community were hired to teach 'culture classes'. Although this was a step in the right direction, it was not without problems, given the traditions of teaching survival skills through observation and one-on-one instruction. The whole notion of teaching large classes, within set timetables, with few resources, often resulted in cancellation of culture classes. There was definitely a dilemma in "trying to regain both knowledge and understanding of . . [Inuktitut] language and [Inuit] culture within a European model of education" (Leavitt, 1995, p. 125). Such changes in educational practices were called cultural inclusion, but such isolating practices in schools could be perceived as further examples of cultural exclusion, given the location of culture classes in classrooms separate from the rest of students' programs.

Some members of school communities felt that culture would be better taught as an integrated aspect of the curriculum, both in and out of the classroom, rather than as a separate subject. Schools in the North began to change, particularly with the creation of local and regional school boards in the 1980's, in an effort to accommodate a more integrated approach. Current practices of having students attend school in their first language for the first few years of elementary school

recognizes that "Native language instruction in schools can be an important factor in ethnic communities shedding their minority status by sharing power with the dominant group" (Ruiz, 1991, p. 217).

Current Educational Framework

When the Eastern Arctic was part of the Northwest Territories, there were eleven official languages. In the new territory of Nunavut, although Inuktitut, English and French are the only three official languages, regional dialects of Inuktitut, and the commutability of people from across the North, make it seem as though Nunavummiut (See Appendix A:'Glossary of northern terms') are dealing with as many languages as the Northwest Territories has in the past. As a result, maintaining aboriginal languages such as Inuktitut in larger communities is itself a constant struggle, particularly in the presence of the more dominant world languages such as English and French.

> Native and second languages. . . .occupy different positions in the local culture. Spoken and written English is preferred by younger generations to communicate with the outside world, and, at least to some extent, to chat among themselves while spoken Inuktitut is used for dealing with older people and . . . to express feelings and thoughts linked to their cultural and local identities. As for written Inuktitut, its use seems to be limited to the classroom and the church . . . .[F]or the older generation, spoken and written Inuktitut still constitutes the . . . means of communication (Dorais, 1995, p. 296).

Due to satellite communications, and the increasing prevalence of the media,

English and French continue to be the dominant languages, which further complicates the issue of maintaining aboriginal language and culture. Current indications are that Inuktitut and its regional dialects are playing leading roles in the new territory of Nunavut, while at the same time acknowledgement continues about the place English, and French, have in the more global community. The focus on multilanguages is also a priority in the current educational system.

As a result of the increased focus on strengthening all languages, and belief in the bilingual language acquisition research of Jim Cummins (1994), students in Baffin schools can enter kindergarten in either the Inuktitut or English language classes. (In Iqaluit, if at least one parent is Francophone, the child could also enter a French First Language class at one school.) These divisions continue until the intermediate grades in many northern communities. In Iqaluit, grades four to six, depending on the availability of Inuit teachers, are transition years for Inuit students as they move from being taught in their first language of Inuktitut to being taught predominantly in English. As an elementary educator who has spent many years with the Transition Year Class (a misnomer in itself as transition, where one's first language is maintained and added to while developing and enriching a second language takes more than one year), it has been very important during these transition years to respect, support and build on students' first language and culture while developing competence in English literacy.

> Educators who see their role as helping students to add a second language and cultural affiliation while maintaining their primary language and culture are more likely to create interactional conditions of empowerment than those who see their

role as replacing or subtracting students' primary language and culture in the process of assimilating them to the dominant culture (Cummins, 1996, p. 147).

At the elementary level in Iqaluit, whether the language of instruction is primarily Inuktitut or English, multiculturalism is now reflected in the curricula, in part due to the creation of documents such as Piniaqtavut (BDBE, 1989) and Inuuqatigiit: The Curriculum From The Inuit Perspective (GNWT, 1996). Starting with the elementary levels, progress is being made in providing culturally relevant instruction in Eastern Arctic schools. As noted in the document Inuuqatigiit, "Inuit know their children need to take the best of the past and the best of the present to create a future for themselves based on a solid sense of who they are. . . by having a balance between what students need to learn and what it is they want to know" (GNWT, 1996, p. 2). The involvement of elders in the schools, most of whom are unilingual, Inuktitut speaking, is being promoted as a link between the past and the present. This is a step in recognizing the role of traditional oral culture in learning. Other community members are encouraged to become involved in the school as well. As Oakes (1988) notes, "An effective method of developing vocabulary and an understanding of elders' conceptual thought processes would be to teach courses in Inuit history, anthropology, mythology, religion, drama, dance, medicine, geography, nutrition or fashion from an Inuit perspective" (p. 47).

Unfortunately, with the changes in elementary education and the rigidity of the current high school programs, the junior high years have become the bridge between often opposing educational views in Iqaluit. As a result, the Iqaluit junior high programming has gone from being more like the high school on a rotary, subject-

based system, to more homeroom, thematic based like the elementary, and back to a more high school format, on a semester system. In recent years, for a variety of reasons, at the local high school there have been no Inuit teachers, and therefore no Inuktitut program. Due to the public outcry, the school hired the custodian, an elder in the community, to do part-time to work with students on cultural projects, particularly at the junior high level, thereby treating Inuktitut and Inuit culture as a separate subject once again.

The high school itself has been tied to Alberta curricula for decades so students must write Alberta provincial exams in grade twelve. "Teachers in many Nunavut classrooms, under pressure of teaching all the curriculum, often in a second-language situation, try to ram content and skills into students without allowing the necessary time for students to really learn" (Tompkins, 1998, p. 53). Thus the importance of Inuktitut language and Inuit culture, that is so prevalent in the early years, is undermined when, for the most part, English is the sole language of instruction, and southern curricula are the foci in students' senior high years.

There appears to be a need for greater awareness that the "child's culture, home, family and community form the sociocultural backdrop for school learning. The classroom must be sensitive to these multiple histories, which are the ways of knowing and learning that students bring" (Diamond & Moore, 1995, p. 18). With such increased awareness comes the realization that current high school system does little to recognize the Inuit culture and language, which may only have been developed to a certain point due to lack of human resources in the upper grades. When coupled with the relative absence of written text in Inuktitut as they reach

higher levels in the education system and in society as a whole, students are receiving mixed messages. On the one hand, Inuktitut and Inuit culture are valued in early elementary school years, on the other, English and a more Eurocentric focus are necessary for success in programs at the high school level. "Matters of language and culture . . . lie at the heart of most debates about economics, politics and education in the north. The pivotal question . . . is what role [will] the Inuit language and culture . . play in the North of the future?" (Taylor & Wright, 1989, pp. 86-87). Given what Taylor and Wright suggest, examination of the potential links between technology and literacy development could prove to be essential for future educational development in the North.

According to recent literacy indicators, northern literacy development continues to be a challenge. NWT Literacy Council Vice President, Sandy Kusugak reported that, "literacy levels remain the lowest in Canada - 36 percent of the population have less than a Grade 9 education and although . . . high school graduation rate is increasing, it stands at approximately 35 per cent" (1998, p. 1). Of course this statement must be considered in the context of a world where formal (Eurocentric) schooling is less than fifty years old. Even so, high school graduation rates continue to be relatively low when compared with the number of students who enter the schools in Grade 7. "If schools and society are genuinely committed to reversing this pattern of school failure, with its massive and social costs to the nation, the interactions between educators and students in schools must actively challenge the historical patterns of disempowerment" (Cummins, 1996, p. v).

There has been growing recognition of the critical role schools play in

determining students' future opportunities. Following curricula that do little to allow for the cultural and linguistic diversity in the North, particularly as students proceed through the grades, may unwittingly contribute to the low literacy and educational success rates in the North, necessitating a review of what constitutes 'culture' and 'literacy' within our current educational system. Variations in language proficiency in both their first and second languages, and lack of cultural relevance in the curricula can adversely affect students' success in school. "Many children and adolescents are falling through the cracks in . . schools because of the discrepancy between cultural values and beliefs of school and home" (Nixon-Ponder, 1998, p. 56). Recognition of the possible origin of many cultural and literacy difficulties as being in the education system could enable educators to be proactive, rather than reactive, in facing these challenges. "Classroom teaching and curriculum have to engage with students' own experiences and discourses, which are increasingly defined by cultural and subcultural diversity and the different language backgrounds and practices that come with this diversity" (New London Group, 1996, p. 88). Failure to do so often has negative implications.

> Series of academic failures over time tend to distort the students' self image and lower their aptitude to maintain a positive attitude towards learning. Their linguistic barrier . . . depriv[es] them of the possibilities to fulfill their real potential. The lack of funds and adequate remedial services accentuate the feeling of loss experienced by these particular students who, after a while, give up trying, and unwillingly contribute in increasing the number of school dropouts (Mitiche, 1993, p. 132).

In recent years, due in part to such relatively low success rates in high schools, the current policy of designating the upper elementary grades as language transition years has come under fire by some parents, educators, students and the Iqaluit District Education Authority (IDEA). Questions have been raised over whether students should learn Inuktitut and then English, both simultaneously in all grades, or just English. The underlying rationale for the current Board policy for Inuktitut First Language learning only in the early years of elementary school has been, as noted previously, based primarily on the work of Jim Cummins who theorizes that if students have a good grounding in their first language, and support is provided, the transfer to their second language in education should take approximately five years if educators do not allow the second language to take over. In Baffin, current practices seem to demonstrate a belief that students should be able to 'catch - up' by the time they reach high school, and the Alberta exams. However, it would appear that such transfer is not happening for the majority of Inuit students for a variety of reasons - educational, economic, social and cultural. As they proceed through the grades in the school system, personal experiences have demonstrated that fewer and fewer of the Inuktitut as First Language [IFL] learners stay in school in spite of their abilities. "Exiting children prematurely from ESL or bilingual support programs may jeopardize their academic development, particularly if the mainstream classroom does not provide an environment that is supportive of language acquisition" (Cummins, 1994, p. 44).

In more recent work, Cummins (1996) differentiates between types of language (contextualized and decontextualized language) and language acquisition for

voluntary and involuntary minorities, dealing with several misconceptions about language proficiency which could assist in clarifying this issue. He notes that although conversational second language proficiency generally occurs in approximately two years, this should not be interpreted as students not requiring further assistance in becoming more proficient with academic language and conceptual development, which may take five to ten years if support is provided. Cummins delineates further by commenting that "for second language learners entering high school, the implications of these figures may appear daunting; students will run out of time to attain graduation requirements in English and academic content unless their progress can be accelerated" (1996, p. 71). Cummins also observes that 'catching up' to English first language students is further compounded as ESL students must "catch up with a moving target" (1994, p. 43). Thus the northern educational system could potentially benefit from looking at the current language proficiency expectations, and perhaps changing their expectations by relating them to culturally relevant goals.

One of the means of attempting to marry the language proficiency expectations and culturally relevant goals could be through the use of technology, such as computers. Generally, the use of technology is regarded as motivating for youth. Seymour Papert in particular has commented that "across the world children have entered a passionate and enduring love affair with the computer" (1993, p. ix). Forms of technology offer the potential to provide youth in Iqaluit with experiences and opportunities to communicate on a more global level, while maintaining their cultural identity.

Introduction of CSILE/Knowledge Forum®

As assistant principal responsible for the junior high wing of Inuksuk High School, I was asked to provide feedback about the CSILE software program when BDBE Secondary Educational Consultant, Sandy McAuley, returned from educational leave in the early nineties. My initial reaction was one of fascination, my mind reeling with ideas of how this could potentially fit with the changes being implemented in the Inuksuk Junior High Division. A recent switch to homeroom, thematic based programming was an effort to better meet the needs of the teenagers and young adults in class each day. I saw potential in the use of CSILE that possibly would enable the development of culturally relevant topics through a shared database, allowing students to interact on a regular basis with other grades seven to nine classrooms in the junior high wing through the use of networked computers. Such practices could potentially enhance the integration of the Board's program of studies and NWT curricula. Thus initial Board support for the CSILE/Knowledge Forum® project was sought and received. Iqaluit was designated by the Board and the CSILE/Knowledge Forum® team at OISE as one of the eight pilot sites in North America.

The principles behind CSILE/Knowledge Forum® appeared consistent with Board philosophies:

1. Make knowledge construction overt . . . .
2. Maintain attention to cognitive go . . . .
3. Treat knowledge lacks in a positive way . . . .
4. Provide process-relevant feedback. . . .

5. Encourage learning strategies other than rehearsal . . .

6. Encourage multiple passes through information. . . .

7. Support varied ways for students to organize their knowledge . . . .

8. Encourage maximum use and examination of existing knowledge . .

9. Provide opportunities for reflectivity and individual learning styles. . . .

10. Facilitate transfer of knowledge across contexts. . . .

11. Give students more responsibility for contributing to each other's learning. . . (Scardamalia et al., 1987, pp. 4-9).

CSILE/Knowledge Forum® is a program that allowed each site to start with an empty database on their server. Students, educators and external resource people contribute to the database on client computers to construct knowledge as a community. For example, as the database is public, all participants with logins can view everyone else's notes, whether text, graphic or a combination of the two. This allows for continual modification, building on each other's ideas, constructing knowledge whether individually or in groups. In northern settings, where many students are learning in their second language, with very limited written resources in their first language of Inuktitut, this has enabled many to benefit from information that is culturally relevant and locally developed, as a springboard to expanding their ideas on a more global level.

As an example of how this would look in a typical classroom for a visitor just learning about the project (See Appendix B), there are three to five computers, sometimes grouped together due to limits placed by electrical outlets. A group of students would be working on CSILE/Knowledge Forum®. The other students

would be working in small groups, or individually, on some aspect of their research. The groups rotate on a regular basis with the aim of having each student work on the database for twenty to thirty minutes each day.

Umbrella topics are dictated by the curricula and regional directives for each grade level. In CSILE/Knowledge Forum® classes, themes are developed initially by students brainstorming what they know about the curricular topic, and, more importantly, what they want to know about the topic. From such initial discussions, students, either individually or in small groups, determine what aspect of the topic they would like to explore. As an example, one unit used with Grade 6 students was the History, Government and Resources of the NWT. Topics were brainstormed in both Inuktitut and English so students could express themselves comfortably. From the list, or from further questions generated by the discussion, students individually, in pairs or small groups, would then choose an area to explore. One student wished to discover how transportation has changed in the Arctic; another group wanted to know what the regional government does for northerners; another looked at how people in Iqaluit get power; and one student with special needs wanted to know where crayons come from. Each of these groups were able to take ownership for their learning by choosing their own area to focus on. They then followed a scientific method format whereby they posed more specific questions, expressed their hypotheses, came up with a plan, researched and recorded what they had learned through use of written texts, Internet, interviews with elders, arrangement of visits by appropriate personnel or site visits, all contributed as part of the database. From their research, they expressed their new learning in both text and graphic format on

the communal database. Thus, over the course of the unit, students were sharing their experiences as works in progress.

One component of CSILE/Knowledge Forum® is the provision of tools, such as build-ons, for students to comment and discuss their thoughts and ideas on the database throughout the project, and beyond. Thus a student may offer praise for something that another student has written or illustrated right on the computer so that student can see that comment the next time they are logged on. Students can ask for clarification, share ideas or add information about other groups' research. Another feature of the project is being able to have local experts, such as elders, Science Institute members, parents, archaeologists, and others participate in the database with the students, sharing information, encouraging participants or asking for clarification. When this project was expanded to grade four to six students, in two languages, the possibilities for collaboration become unlimited.

Continued exposure to pilot work with OISE has provided opportunities to reflect on past and present teaching methods. CSILE/Knowledge Forum® is a unique tool that can be adapted to any situation, even teaching in Baffin where the vast majority of students have Inuktitut as a first language. Many times, as the classroom teacher, I have chosen an area of interest and proceeded through the steps as students have. For instance, when Grade 6 ESL students studied Indigenous People of the World, all students selected the areas they wanted to focus on; I chose to learn more about the Haida, sparked by a trip to British Columbia. While modeling the process, students also observed that learning is indeed a lifelong process, even for the teacher. A very needy student, who happened to be from an alternate program,

was placed in class about the same time. This student was fascinated with the Haida totem poles so we became a team, much like other groups in the class. How the Haida compared with the Inuit became the focus of our team. This young man's self-esteem appeared to increase as he became the group expert on comparisons with the Inuit and graphics. He also spent a great deal of time reading all about the Haida in his spare time, proud to be able to contribute his new knowledge to our classroom database. It was quite a step for a student who basically lives on the streets.

A decision to keep a classroom research journal a few years ago, to record observations of participants using CSILE/Knowledge Forum®, as well as frustrations and joys as an educator using technology, has resulted in many personal questions being raised about educational practices and theories. Some of these questions have formed the foundation for this research, thereby enabling action research to become a way of life. Personal contributions are shared with a broader audience through the communal database, leading other educators to comment that such observations, technical and pedagogical questions are helpful in reducing the sense of isolation in the often tumultuous journey to implement technology in classrooms in meaningful ways. Integral to such endeavours has been the support and involvement of CSILE/Knowledge Forum® telementor, Sandy McAuley, as well as continual discourse with the expanding community of participants, whether students, classroom support assistants, parents, teachers, local experts, researchers, university students or programmers.

As the base of participants has broadened, the opportunities to reflect on the bigger picture of educational issues and practices in the north have increased. This

has resulted in the desire to explore what has been done in Iqaluit in regards to the integration of knowledge-building technology in schools and examine potential relationships between software such as CSILE/Knowledge Forum® and literacy development.

As noted earlier in this chapter, the foundation for any study in the north must reflect understanding of the contextual framework, past and present. In using the inuksuk as representative of this research journey, that contextual framework would be represented by the foundation and base rocks of the inuksuk.

Thus Chapter Two will explore the theoretical underpinnings forming the foundation for the construction of this inuksuk. By identifying some of the foundational theories on which educational practices, past and present, are based, the construction of current practices for literacy learning and use of computers in education begin to make sense.

With an inuksuk, the rocks are often interchangeable, but need to be put in a sequence that will enable them to fit together to withstand the elements over time. At the base of this research inuksuk should be the cultures of the people of the north, given that over time the cultures have become embedded, much like the bottom rock of the inuksuk might in the tundra. Cultural practices have implications for educational practices so a brief literature review of culture is explored in Chapter Three to enhance understanding of the cultural framework mentioned in this chapter.

Chapter Three also reviews the literature on changing perceptions of literacy, particularly as they potentially impact on perceptions of literacy development in education. With the advance of the use of computers in schools, literacy practices in

the north have begun to include the use of technology. This third chapter also explores literature on technology in general, as well as previewing what has been written about more specific knowledge-building technology of CSILE/Knowledge Forum®. Literacy and communication seem to have evolved to be interchangeable terms for some people in the north, so communication, both traditional and modern, in its various forms, is the next rock placed in the construction of this inuksuk.

Due to the rapid rate of societal change in the north, resulting in increased interaction between culture and communication of northerners and a global society, change is an entity that should not be ignored. Chapter Four specifically looks at the methodology behind this particular research journey. The choice of qualitative framework for this research journey in itself reflects a changing trend in educational research. Change is also represented in the focus on educators' perspectives of literacy development and knowledge-building technology as little has been researched about what educators experience in the north. How those perspectives change for the participating educators forms the basis for this study. Synopses of the nature of participants are introduced in Chapter Four as well. As the effect of change on educational theories, practices and participants is woven throughout all the chapters, change therefore becomes the next rock placed on this research inuksuk.

From there, the rocks might vary, as the elements and/or others take their toll. For the purposes of this analogy, the next two rocks guiding the directions some will travel in northern education are literacy and technology, which are placed on the same level as they are the two main themes this particular research journey began

with. The role they play in the perspectives of educational theory and practice for participants in the north will be explored in greater detail in the analysis of the data in Chapter Five.

Chapter Six will be a summary of the findings pertinent to the themes analyzed in Chapter Five. As well, recommendations for the future will be explored. Thus the last stone on this particular inuksuk is the future, because we can not know what direction literacy and technology it will take us, as so much depends on the other elements in the inuksuk, as well as external factors. The direction taken from this research inuksuk (Figure 1), is open to individual and collective interpretations.

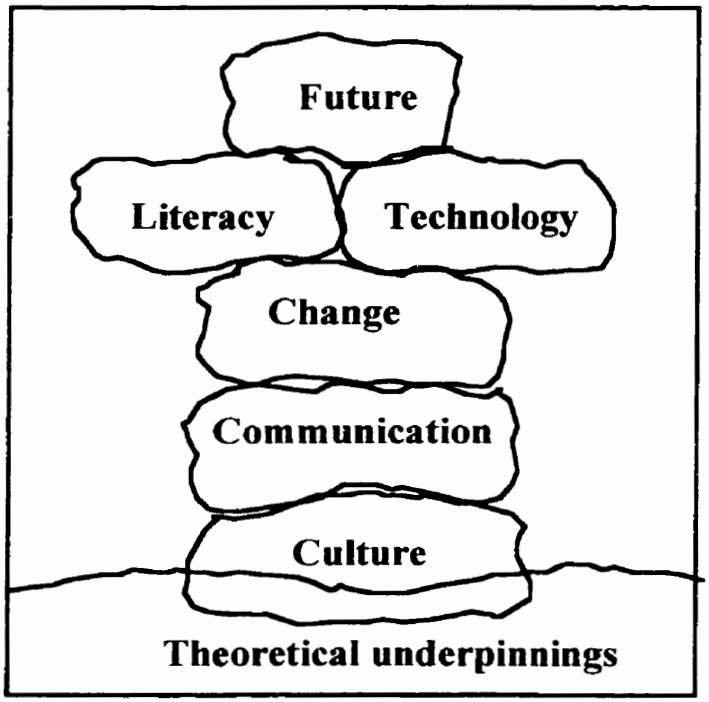

Figure 1: Inuksuk as guide for research journey

Chapter 2: Theoretical Underpinnings

The Tundra

What the child can do in cooperation today he can do alone tomorrow. Therefore the only good kind of instruction is that which marches ahead of development and leads it: it must be aimed not so much at the ripe as the ripening functions (Vygotsky, 1962, p. 104).

In an attempt to comprehend educators' perspectives about literacy development and use of computers in their current educational practices, this chapter will probe into the theories which form the foundation for the construction of the research inuksuk.

In the field of education, in the last several decades, there has been a shift in the direction of approaches guiding educational practices. After decades of emphases on more traditional educational practices, smattered with pockets of more progressive educational practices, there has emerged increased foci on various -isms to guide educational research and practice. The constructivist approach has emerged as the dominant paradigm. Personally, the term 'constructivism' has only been part of my vocabulary for the last couple of years, although my teaching style and

research have followed what many might term as constructivist approach for a very long time.

Initial exposure to constructivism per se came when attending the International Invitational Best Practices in Education Using Technology (K-12) Conference in Bloomington, Indiana (June 1997). While presenting northern work with CSILE, a Dutch member of the audience commented that the project demonstrated a constructivist approach. Not sure what he had meant, I had further discussions with him following our session. He very kindly offered web-based information for myself, and others (including Russian delegates), about constructivism, and the Russian theorist, Lev Vygotsky.

An initial review of constructivism seemed to demonstrate it was the most relevant theoretical foundation for the approach taken recently in education in the north. Exploring educational theories such as constructivism in greater detail has been important for this research journey, as it helps identify the theoretical principles supporting current trends in literacy learning and computer usage in classrooms. Thus this chapter will investigate past practices, particularly in regards to perceptions of knowledge and learning, before briefly exploring educational theories that are relative to this project, beginning with child-centred learning, folk psychology and situated learning. Next attention will be given to clarification of what constructivism means, variations currently proposed, commonalities and how constructivism differs from other '-isms', such as constructionism and connectionism.

In the process of researching the theoretical underpinnings for this journey,

several terms that use the root word of 'construct' have surfaced, with even more delineations of what 'construct-' approaches look like. In addition there are other -isms that are utilized when discussing educational theories today.

According to the Oxford Dictionary (Allen, 1984), the distinctions among the terms **construct**, **construction**, **constructive,** and **connect** are as follows:

construct	1. *v.t.* make by fitting parts together, build, form (*lit. or fig.*); . . . 2. *n.* thing constructed, esp. by the mind
construction	*n.* constructing or thing constructed; syntactical connection of words in sentence; interpretation or explanation of statement or action
constructive	*a.* tending to form basis for ideas, positive, helpful (*constructive arguments)*; derived by inference
connect	*v.* join (two things, or one to or with another); be joined (with); associate mentally or practically(with)

Thus the roots of construct- and connect- are similar in their reference to putting things together, whether from the beginning steps to things that are already built and are to be joined. Variations in terminology initially seem to be based on the part of speech involved, perhaps relating to whether individuals are oriented towards a focus on process or product. Obviously, such delineations are not that simplistic when referring to the corresponding educational theories. One commonality that all of the aforementioned educational theories share has been their origins in the desire for reform, with the aim to improve potential deficiencies in the educational system.

Past Practices

The education pendulum swings, inevitably although not always regularly, between conventional, didactic instruction and child-centred education.(Bereiter and Scardamalia, 1993, p. 199).

In the last century, two main polarities have dominated educational theory and practice - traditional and progressive educational theories, many of which have tended to focus on theories of teaching rather than theories of learning. For much of this past century, the behaviourists' approaches have dominated. Behaviourists believe that facts and skills are accumulated, with no structural distinction between learning and development. The mind is viewed as a container to be filled, or as a blank slate "on which experiences alone inscribes knowledge" (von Glasersfeld, 1995 b, p. 32). Many behaviourists believed that knowledge can be transmitted. Centuries ago Plato proposed that sensory experience led to opinion and reason to certain knowledge, resulting in teaching that reflected this belief. As noted by well-known educational theorist, John Dewey, "the very word pupil has almost come to mean one who is engaged not in having fruitful experiences but in absorbing knowledge directly" (1916, p. 164).

Not all people concerned with knowledge and education have felt this way. Many centuries ago, Socrates felt that education was achievable by leading students through series of questions in order to promote critical thinking. Others have traced the roots of more recent educational reform back to the Greek Skeptics, from the fifth century, who "have formulated logically irrefutable arguments showing that if true knowledge is to represent a real world, it could not be attained" (von

Glasersfeld, 1996, p. 3). Regardless of the origins, the cognitive revolution of the last century truly has tried to replace, rather than reform, behaviourist approach. Theorists' aims were to formally describe the meanings that human beings created out of their encounters with the world, proposing hypotheses about what meaning-making processes were involved. They focused on the "symbolic activities that human beings employed in constructing and in making sense, not only of the world, but of themselves " (Bruner, 1990, p. 2).

Many educational theories proliferated, some of which seem to overlap, making it difficult to make comparisons. Part of the confusion stems from which approach to educational theories they are reflecting on. Forman and Kuschner (1983) observe,

> We need theory to guide our practice and practice to improve our theory . . . . We are speaking of four interrelated theories: a theory of knowledge, a theory of development, a theory of learning, and a theory of teaching. If theory and practice are to influence each other, these four theories must be interrelated . . . . Ideally, a theory of knowledge leads to a theory of development, which in turn leads to a theory of learning . . . in turn leads to a theory of teaching (p. 3).

From numerous readings, it appears that the bases of many reforms over the centuries have been centred around the nature of knowledge and how children learn and develop. It appears to be whether one thinks knowledge is something given to the individual, something the individual has as a goal, or a combination of the two.

Knowledge

It appears to have been a common occurrence in education to treat knowledge as the noun and learning as the verb, thereby focusing on how to teach rather than how to learn. Until Seymour Papert's queries about why there is not a word for the art of learning, when the term 'pedagogy' is commonly used to denote the art of teaching, I had not given any thought to what is meant by knowledge, learning, and teaching, terminology that is used so frequently in educational communities. Papert introduced the term 'mathetic', of Greek origin, to describe the art of learning (Kafai & Resnick, 1996, p. 9). In order to discover mathetic, one needs to have some sense of what knowledge is, and how one learns. Is knowledge a mental state or an object in itself? Papert (1980) discusses knowing what (propositional knowledge) versus knowing how (procedural knowledge). Is knowledge something that exists, and is discovered by the mind, or is knowledge something that is created by the mind? Is the way we know different depending on previous experiences?

According to some theorists, knowledge is out there waiting to be discovered, existing independently of individual knowers (Bereiter & Scardamalia, 1996). This contradicts those that think that knowledge exists purely in the head, who, in turn, are disputed by theorists such as Lave (1988) who suggests that "the relationship between human thought, human action, and the environment is so tightly interwoven that the mind cannot be studied independently of the culturally organized settings within which people function" (Hewitt & Scardamalia, 1998, p. 75). Upon reflection of my experiences living and teaching in the north, Lave's theory about the interwoven nature of thoughts, actions and environment helps in comprehending the

lived world of northern students.

Some theorize that knowledge is socially constructed by the learner while others note that knowledge is attained by individuals through their own activity - individually or socially. The interwoven nature of culture and knowledge has also been explored. Whether knowledge is socially constructed, culturally evolved or the construction of individuals, or a combination, has implications for how learning is conceptualized. What does knowledge include - facts, principles, theories, ability to utilize information, thoughts, feelings and/or interpretations? Is knowledge stable or dynamic? Does it result from "disequilibrium, emerg[ing] from prior knowledge and grow[ing] through exposure and feedback" (Zahorik, 1997, p. 30)? Does knowledge come from our culture or our biological inheritance? Perhaps Freire (1998) has a solution when he notes that the process of knowledge production is social, open-ended, and unfolding (p. 47). His belief about the dynamic nature of knowledge is evident when he converses with Myles Horton, stating "if the act of knowing has historicity, then today's knowledge about something is not necessarily the same tomorrow. Knowledge is changed to the extent that reality also moves and changes" (Bell, Gaventa & Peters, 1990, p. 101).

There are variations in the nature of knowledge, and how it is formed in each of the educational theories reviewed. It is somewhat confusing initially, but exploring such theories and their impact on classroom practices is vital. Regardless of the origin of the theories of knowledge, I concur with Dewey that "the only place in which a comprehensive theory of knowledge can receive an active test is in the process of education" (Kliebard, 1987, p. 82).

Learning

Just as there are theories of knowledge that guide educational research, there are theories of learning that have implications as well. Before exploring recent theories in greater detail, it is important to have a sense of the past in regards to such theories of learning. Trends over time have included the notion that ideas are acquired transmissionally as the learner's mind is a blank slate or 'tabula rasa' (Locke, 1690). Another theory looks at transactional learning - as ideas change so learners are essentially misinformed, having ideas that need correction. Current educational theories focus on the view that knowledge can be constructed, with learners as active participants in their learning. Even within these transformational concepts of learning theories there are variations, given the different views on how people learn, whether through external stimuli or internal mental commands. The role of the social environment in learning has been given increasing support among researchers and practitioners.

> It is noteworthy that some cognitive researchers originally involved in cognitive strategy instruction have since moved to a more broadly social orientation, in which the emphasis is on building a classroom culture of active knowledge construction rather than relying on strategy instruction aimed at the individual (Scardamalia, Bereiter & Lamon, 1994, p. 203).

There is heightened recognition of the increasing magnitude of learning. Whatever the origins of learning, Seymour Papert's observation that "learning explodes when you stay with it" (1996, p. 23) is noteworthy, regardless of roles in educational communities. As Freire (1998) observes, "there is no teaching without

learning. . . . Teachers find themselves continually ready to rethink what has been thought and revise their positions. Their learning lies in their seeking to become involved in their students' curiosity and in the paths and streams it takes them through" (p. 17). The research explored in this study is a case in point.

Child-centered Education

> *According to the child-centred advocates, schools thwarted children's basic need for activity by treating them as passive receptacles and by using repressive methods of instruction (Shannon, 1990, p. 9).*

Child-centred education, as the name suggests, refers to education that is centred on the child and the child's interests. The dilemma comes when one attempts to determine if child-centred education means educating in the child's best interests or according to the interests of the child. "Child-centered educators sought to develop school environments and practices that would enable each individual to realize his or her uniquely creative essence" (Shannon, 1990, p. 83).

Over the course of the last century, the work of John Dewey has been credited as the origin of child-centred education, as well as often becoming synonymous with the Progressive Education Movement. "John Dewey is the most important single force in the progressive education movement" (Ratner, 1969, p. vii). Unfortunately, many of his thoughts have been misrepresented by child-centred education advocates. Dewey emphasized "putting children in command of the intellectual resources of their culture to break down the barriers that life in a technological society had erected between knowledge and human affairs" (Kliebard,

1987, p. 84). Some have interpreted these ideas on what constitutes child-centred as meaning the child has total control over their own learning. Dewey argued that "although education starts and ends with the child, this does not mean that the child should be left alone to figure out the complexities of modern life without guidance" (Shannon, 1990, p. 92). Traditional Inuit practices of focusing on children, guiding them by example from elders seems to parallel Dewey's thoughts. Thus, in order to clarify the foundations of child-centred education which seems particularly important in a northern context, and how it relates to other theories of education, a review of Dewey's own works is required.

Dewey's Pedagogic Creed (1916) is perhaps is the best indicator of his educational philosophy.

> I believe. . .
>
> - the only true education comes through the stimulation of the child's powers by the demands of the social situations in which he finds himself. . ..
> - knowledge of social conditions, of the present state of civilization, is necessary in order properly to interpret the child's powers . . . .
> - education is the primary method of social progress and reform (Archambault, 1964, pp.427-439).

According to Dewey, education is the result of empowerment of the learner in a social situation, a position endorsed by Paulo Freire (1971). Communication, with words as "counters for ideas" (Dewey, 1916, p. 168), and democracy, both play critical roles in such social empowerment of the learner. Reflective thinking is also integral to the full participation of individuals, albeit recognizing the risk inherent in

thinking. "Thinking is the accurate and deliberate instituting of connections between what is done and its consequences. . . . While all thinking results in knowledge, ultimately the value of knowledge is subordinate to its use in thinking" (1916, pp. 177-178).

As for his theory of learning, Dewey felt "learning . . .signifies an accumulated and transmitted body of knowledge, and . . .the acts of apprehending, understanding and retaining in and for subsequent use" (Kennedy, 1970, pp. 12-13). Dewey considered there is a crucial difference between the knower and the known, with learning experiences including both active and passive components. He also felt situations cannot be either subjective or objective as there is no fixed boundary between an organism and the environment.

Dewey's work is not without its critics. "John Dewey, . . . may have been out of step . . . with dominant American values, and while personally . . . much revered in his own lifetime, his educational reforms remained confined largely to the world of ideas rather than the world of practice" (Kliebard, 1987, p. 88). This seems contrary to personally articulated beliefs as "for Dewey, education is the most important testing ground for philosophic theory" (Axtelle & Burnett, 1970, p. 257). Dewey has also been criticized for seeming to neglect the emotional development of children (Shannon, 1990).

> The notion of child-centred education has become decidedly passe in recent years . . . . In at least one area we have not learned enough from the exponents of child-centred education. Our consciousness of the permissive implications of much of their rhetoric has obscured the importance of what they were saying . . .

> about the educational significance of children's interests . . . The moral relevance of the child's interests is absolutely essential to the process of curriculum development and severely limits the justified application of other considerations (Callan, 1980, p. 77).

In spite of the critics, and seemingly waning interest in child-centred education, Dewey has continued to be a prominent figure in educational philosophy in northern contexts, with many of his ideas used as springboards to further educational theories.

Folk Psychology

Another area which has had bearings on educational theories in recent years has been folk psychology. Perhaps the most known proponent of folk psychology has been Jerome Bruner. According to Bruner, folk psychology is the "system by which people organize their experience in, knowledge about, and transactions with the social world" (1990, p.35). As a system of organizing, learning is an active social process whereby learners construct new ideas/concepts based upon their current/past knowledge. The learner selects and transforms information, constructs hypotheses, and makes decisions, relying on a cognitive structure to do so. "Our culturally adapted way of life depends on shared meanings and shared concepts and depends as well upon shared modes of discourse for negotiating differences in meaning and interpretation" (p. 13). Folk psychology allows for the transmission of knowledge as well as more constructivist views of knowledge acquisition.

Bruner proposed a prescriptive and normative theory of instruction that is

distinctive from other educational theories as it makes reference to "how to arrange environments to optimize learning according to various criteria" (1966, p. 37). Bruner felt that a theory of instruction needs to consider that a curriculum should reflect "not only the nature of knowledge itself but also the nature of the knower and of the knowledge getting process" (1966, p. 72). He recognized that the power of learning is cumulative. Bruner elaborated that a theory of instruction should address: students' predisposition towards learning; ways in which a body of knowledge can be structured so it is most readily grasped by learners; the most effective sequences to present material; the natural pacing of rewards and punishments; intentionality; mental models; and the relationship between knowledge and culture, self and others.

Situated learning is often associated with folk psychology. In situated learning, learning is tied to specific situations in which learning takes place, with knowledge embedded in cultural practices. Traditional Inuit learning has been very tied to the situations Inuit found themselves in as they struggled to survive in the harsh Arctic environment. "Knowledge and learning beyond the individual level can be treated as metaphorical extensions of 'real' learning - as occupying a larger container" (Bereiter & Scardamalia, 1996, p. 491).

Constructivism

> *The latest catchword in educational circles is 'constructivism' applied both to learning theory and to epistemology - both to how people learn and to the nature of knowledge (Hein, 1991, p. 1).*

The increasing emphases on the importance of the social and cultural environment, along with the foundations of the work of John Dewey, Jerome Bruner, Jean Piaget, Lev Vygotsky and others, have evolved into currently favoured constructivist theories for educational research and practice. "Constructivism is all about inquiry, exploration, autonomy and personal expressions of knowledge and creativity . . . . According to research in education and psychology, constructivism mirrors the way humans learn. We learn by doing, by interacting with others and through authentic (real world) tools and experiences" (Burns, Heath & Dimrock, 1998, p. 2). Constructivism describes what knowing is and how one comes to know, and is based on a synthesis of philosophy, psychology, anthropology and education. Constructivism "assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and subject create understandings), and a naturalistic (in the natural world) set of methodological procedures" (Denzin & Lincoln, 1994, pp.13-14).

With more expansive outlooks and applications in education and beyond, there has arisen a great deal of confusion as to what a constructivist approach really is. As a current catchword in education, constructivism has been used in such a wide variety of ways that there is much confusion regarding its meaning and domain of interest. It has been referred to as a philosophical position, an epistemology, a form of research, learning theory, and even a model of learning. The term itself contains an important root metaphor, which is at the heart of constructivist viewpoint: Knowledge is constructed. It is constructed by individuals and groups. The constructivist paradigm departs from traditional approaches such as behaviorists in

its view of such ideas as the nature of reality and knowledge, the purpose of knowing, the role of the learner and of learning, the role of the teacher and of teaching, and the organization of the classroom and of the curriculum and its evaluation. Because it does so, it also is a way of challenging the nature of knowledge to be acquired by learners and the ways in which it is best acquired. (Shapiro, 1994, p. 11)

Ernst von Glasersfeld has traced the foundations of constructivism back over the centuries. In addition to the previously mentioned theorists who have played a role in the formation of a constructivist approach, von Glasersfeld (1995 b) has noted that insights in knowledge construction have been provided by Locke, Berkeley, Hume, and Vico.

> Locke spoke of reflection upon mental operations as a source of ideas; Berkeley noted that time, successions, number and other indispensable concepts are mental constructs; Hume explained the active generation of relational concepts by acts of association . . . [and] Vico produced the first explicit formulation of a constructive approach - human reason can only know what humans themselves have made (p. 49).

Further development this past century of the theory that knowledge is constructed came from Jean Piaget. Dubbed "one of the most influential proponents of constructivism" (Brooks & Brooks, 1993, p. 25), Piaget was a Swiss scientist who was interested in how the child constructs knowledge.

> The most impressive figure in the field of cognitive development today is Jean Piaget . . . [who] is often interpreted in the wrong way by those who think his

> principal mission is psychological. It is not. It is epistemological. He is deeply concerned with the nature of knowledge per se, knowledge as it exists at different points in the development of the child (Bruner, 1966, p. 7).

Piaget theorized that cognitive growth is an extension of biological growth. He also thought that learning is the compilation of complex knowledge structures, particularly three categories of knowledge: physical (from the physical environment), social (from other people), and logico-mathematical (from the way things move), with interactions among all three.

Piaget focused more on the individual's construction of knowledge, as the learner makes connections between prior knowledge and new ideas. This construction of knowledge occurs primarily through the child's interaction with physical objects. Piaget was very conservative in considering the impact of social interactions on the construction of knowledge. Piaget did, however, recognize the impact both biological and cultural heritage have on knowledge growth. His work on cognitive development essentially identified the specific stages children evolve through: sensorimotor, preoperational, concrete operational and formal operational. "Piaget has shown that children hold false theories as a necessary part of the process of learning to think" (Papert, 1980, p. 132). Piaget theorized that intellectual development controls emotional, social and moral development. Thus inner speech preexists, and is followed by social speech. Piaget has been criticized as he did not always take cultural and political issues such as race, class, gender and previous experiences into consideration when exploring intellectual development.

Another name that has come to be almost synonymous with constructivism is

Lev Vygotsky, the Russian psychologist. Dixon-Krauss observes "Vygotsky's primary objective was to create a unified psychological science by restoring the concept of consciousness to a field dominated by strict behaviourism" (1996, p. 8). Although his primary works evolved over a decade in the 1920-30's, his work was soon banned from further publication in Russia under Stalin. Thus, although initially his ideas were a powerful force in educational practice in his home country, Westerners did not became familiar with his work until the 1960's, when the translations of Vygotsky's works by his student collaborator, Alexander Luria, were published.

Vygotsky based some of his initial theories on the work of Hegel (objectification of the mind) and Marx (theory of society). He also used some of Piaget's theories as a starting point, but differed as Piaget felt development is an external process that is independent of learning and therefore precedes learning while Vygotsky thought the two are intricately related. Vygotsky's four major ideas were that knowledge is constructed, learning can lead development, development cannot be separated from its social context and language plays a central role in mental development. As his theories were based in practice through authentic social interactions, he was able to develop distinct concepts that guide constructivist theories to this day, including semiotic mediation (use of mental tools to transpose to higher mental functions), internalization (social transformation of behaviour through use of signs prior to internalization), inner speech and zone of proximal development (assisting learners to use strategies to further intellectual capacities).

Like Piaget, Vygotsky thought development did occur in stages, although he

did not believe the stages were maturational, placing greater emphasis on the social context. Vygotsky's stages of concept development were heaps (random categories), complexes (concrete factual relationships), potential concepts (transition to abstract) and genuine concepts (abstract knowledge within cultural context). Vygotsky did feel that the "source of thought is in the biological development of the child while the source of language is in the social environment" (Boudourides, 1998, p. 9).

Vygotsky searched for a way to separate knowledge in humans from animals, finding distinction in the use of language as a psychological tool. Vygotsky distinguished between lower, natural mental behaviour and higher, cultural mental behaviour. Lower mental functions are shared with other animals and include perception, memory and attention while higher functions were logical memory, selective attention, decision making, and comprehension of language. "Speech plays an essential role in the organization of higher psychological functions" (Vygotsky, 1978, p. 23). Contrary to Piaget, Vygotsky felt social speech development was a prerequisite to inner speech. He stressed the role of communication and social life in meaning formation and cognition. "The most significant moment in the course of intellectual development, which gives birth to the purely human forms of practical and abstract intelligence, occurs when speech and practical activity, two previously independent lines of development, converge" (1978, p. 24).

Vygotsky viewed culture as the product of social life and human social activity. Thus language and literacy were seen as cultural tools which transform behaviour as they become internalized."In stressing the social origins of language and thinking, Vygotsky was following the lead of influential French sociologists, but to

our knowledge he was the first modern psychologist to suggest the mechanisms by which culture becomes a part of each's person's nature" (Cole & Scribner, 1978, p. 6). Language is a transmitter and a cultural tool - a mechanism for thinking. "It is through language that all cultures have passed on the higher mental functions that enable us to sense our world . . . Language is the medium that carries experience to the mind" (P540, 1996, p. 3). Vygotsky believed that the learning community affects each individual's knowledge construction, placing particular importance on learning from the child' perspective. As the impact of the learning community on the learning process is so vital, it follows that "cooperation and collaboration, to a large extent, make up the backbone of Vygotsky's theory" (Jennings & Di, 1996, p. 77).

Of all Vygotsky's work, his research on the impact of rapid cultural change, language and tools is most relevant to this research journey.

> Vygotsky and his colleagues witnessed the rapid social changes in the Soviet Union that occurred when non-technical cultures. . .suddenly were expected to participate in the quite technically advanced western culture of the new empire. Not only was their knowledge base different but even their way of thinking about experience was different. . . .Like anthropologists, who studied other preliterate cultures, Vygotsky discovered that Western logic is not universal. Other cultures have ways of classifying and describing experience that differ from ours but they are appropriate to their environment. While the content and processes that we use in thinking are culturally determined, Vygotsky did believe that there is a similar structure of the mind in all humans . . . Responding to different environmental forces, different cultures have evolved different tools (P540, 1996,

p. 2).

In comparison, the North's rapid rate of change is a result of Inuit moving in the last century from a nomadic hunting/gathering lifestyle, with oral and non-verbal communication taking precedence, into government initiated, and often controlled, communities that over the years have placed more emphasis on written language, particularly English, with increased foci on being part of a more technologically advanced, global society. Thus Vygotsky's theories of constructivism offer an important perspective on analyzing northern education at this point. However, there are several other educational theories, outlined in the next section, that may have bearing as well.

Variations of Constructivism

The terrain of constructivist approaches is marked by multiple uses of the term (Schwandt, 1994, p. 126).

Although Vygotsky, Piaget, Bruner and others have laid the foundations for current constructivist research and practice, there are many other names visible in the literature about constructivism. There seems to be as many conceptions of constructivism as there are views of what constitutes knowledge in the first place. "Agreement on a constructivist theory of learning is not widespread due largely to what Derry (1996) terms as 'ethnocentrism within various constructivisms'" (Murphy, 1997 a, p. 1). Some of the delineations stem from the individual versus social dichotomy. Unfortunately there is a danger that constructivism's "lack of clarity in representing [itself] . . . may allow its appropriation by the most

authoritarian of pedagogies" (Lewin, in Ernest, 1995, p. 459). The following are some of the theorists credited with having constructivist frameworks supporting their theories.

One of the earlier constructivist approaches is known as naive constructivism, which equates activity with learning. "Naive constructivism boils down to a kind of faith on the part of teachers in the ability of students to structure their own learning" (Prawat, 1992, p. 369). Dewey contested this theory, as all activities do not necessarily lead to learning.

Nelson Goodman is another theorist known for his constructivist philosophy. "The philosopher most responsible for defining the contours of reality and cognition is Nelson Goodman (1984) . . .Goodman's constructivist philosophy is pluralistic and pragmatic" (Schwandt, 1994, p. 126). Goodman theorized that through verbal and nonverbal symbol systems, people create different versions of the world, in order to make things 'right' (greater reach than truth). "Worldmaking as we know it always starts from worlds already on hand; the making is a remaking" (Goodman, 1978, in Schwandt, 1994, p. 126).

A focus on the constructivist paradigm by Egon Guba and Yvonna Lincoln evolved from their 'Naturalistic inquiry' (1985). "What is real is a construction in the minds of individuals . . .there are multiple, often conflicting constructions, and all (at least potentially) are meaningful" (Lincoln & Guba, in Schwandt, 1994, p. 128). In terms of educational research with a constructivist approach, "the aim of inquiry is understanding and reconstruction of the constructions that people initially hold, aiming towards consensus but still open to new interpretations as information

and sophistication improve" (Lincoln & Guba, 1985, p. 113). When dealing with educators' perspectives in this research, the constructivist paradigm appears to be most apt, as, in ontological terms, multiple realities are locally and specifically constructed, while, epistemologically, findings are interactively created. Methodologically, Lincoln and Guba theorize that with a constructivist paradigm individuals construct knowledge through interactions within the world. The inquirer's voice is that of the "passionate participant" (Lincoln, 1991), actively engaged in "facilitating the multivoice reconstruction of his or her own construction as well as those of other participants" (Lincoln & Guba, 1985, p. 115). Thus the constructivist approach mirrors the work currently undertaken in Nunavut as many have noted 'passionate involvement' in the personal work experiences, which necessarily involves local and specific realities that are created through the interactions of educators, students and the multifaceted Inuit culture.

Another well known name in the constructivist field is Ernst von Glasersfeld, the psychologist who is concerned with the nature of knowledge and what it means to know. "We cannot know such a thing as an independent, objective world that stands apart from our experience of it" (Schwandt, 1994, p. 127). Von Glasersfeld has coined the term radical constructivism for his own work, while recognizing that there are different forms of radical constructivism. Radical constructivism is a theory of knowing, "an unconventional approach to the problems of knowledge and knowing. It starts from the assumption that knowledge, no matter how it is defined, is in the heads of persons, and that the thinking subject has no alternative but to construct what he or she knows on the basis of his or her own experience" (von

Glasersfeld, 1995 b, p. 1).

For von Glasersfeld, knowledge is a process that is personally, actively constructed by individuals, as "to know is to possess ways and means of acting and thinking that allow one to attain the goals one happens to have chosen" (Schwandt, 1994, p. 127). Knowledge is not just transferred as words, rather cognition is adaptive, based on and constantly modified by the learner's experience. "Knowledge does not reflect the world but only differences within one's own experiential world in what one can do" (Shotter, 1995, p. 49). The focus is on the individual, with the assumption that "the individual makes sense of experience in order to satisfy an essential need to gain predictability and control" (Confrey, 1995, p. 194). Thus von Glasersfeld recognized that the past cannot be reconstructed exactly as it was, because it is a challenge to avoid framing and understanding recollections in terms of the concepts currently possessed by the individual. "Radical constructivism is inhibitedly instrumentalist. It replaces the notion of 'truth' . . . with the notion of 'viability' within the subjects' experiential world" (von Glasersfeld, 1995 b, p. 22).

Merging radical constructivism with the social dimensions of Vygotsky's work results in another breed of constructivism known as social constructivism (Confrey, 1995). According to Hirtle (1996), the term social constructivism finds its origin in John Dewey's Pedagogic Creed (1963) where Dewey asserts that the "psychological and social sides of education are organically related and that education cannot be regarded as a compromise between the two, or a superimposition of one upon the other" (p. 91).

Within social constructivism frameworks, people are viewed as in conversation

in a socially constructed world thereby demonstrating both social and individual interconnectivity, particularly through language. "Social constructivism spotlights the role of language as a tool to spur forward intellectual growth" (Wiburg & Butler-Pascoe, 1999, p. 2). A slight variation of this is cognitive constructivism which "explores how language is processed at different stages of natural human development" (p. 2).

Elliot Eisner looks at constructivist thinking as an aesthetic approach to educational inquiry. With constructivist thinking, there is recognition that multiple realities exist, as do multiple rationale for constructing these realities. "Perception is framework or theory dependent and . . . knowledge is a constructed (versus discovered) form of experience" (Schwandt, 1994, p. 129). The knower and the known are interactive and inseparable within a natural setting.

A slight variation is found in George Kelly's personal construct psychology, which also emphasizes the importance of individual's interpretations of world events. He, like von Glasersfeld, believes that change results from individual's interpretations of events rather than as a reaction to an outside force. "We might best understand how an individual views his or her experience by seeing the person not as a set of drives or responses acting upon the universe, but as a person who views the world in his or her unique manner and whose view has individual integrity" (Shapiro, 1994, p. xv). In terms of how this theory would translate into educational practice, Kelly (1955) stressed that "recognition and high priority should be given to students' ideas, beliefs, and expectations, as these personal meanings are the bases upon which students create meaning during instruction"

(Shapiro, 1994, p. xv).

Although constructivism seems to defy a strict definition, there are commonalities among its variations. The 1) nature of knowledge, the foci on 2 a) the learner, 2 b) authentic learning experiences, and 2 c) student thinking or sense-making as well the 3) emphasis on language as the mediator between the learner and the world, are all points highlighted in most variations of constructivism.

Commonalities

1) The Nature of Knowledge

> *Constructivism describes knowledge as temporary, developmental, nonobjective, internally constructed and socially and culturally mediated.(Fosnot, 1996, p. ix).*

Knowledge, its nature and how we come to know, is an essential consideration for constructivists.

> The constructivist paradigm posits that a) learners do not receive bits of knowledge and store them in their heads, but rather they take in information from the world and then construct their own view of that knowledge domain, and b) that all knowledge is stored and accessed by an individual via experiences associated with knowledge in a particular domain (Carr, Jonassen, Litzinger & Marra, 1998, p. 8).

With constructivism, knowledge is viewed as a constant, naturally occurring process whereby students view new information in terms of their prior knowledge.

Constructivism claims that "knowledge is 'right' or 'wrong' in light of the perspective we have chosen to assume . . . The best we can hope for is that we be aware of our own perspective and those of others when we make our claims of 'rightness' and 'wrongness' " (Bruner, 1990, p. 25).

Emphasis is placed on personal and social construction of knowledge rather than understanding the true nature of things, thereby challenging the nature of knowledge to be acquired by learners. "Knowledge is the understanding of the process by which objects and events change . . . knowledge is more than doing; knowledge is also reflecting on how the doing was done" (Forman & Kuschner, 1983, p. vii). Thus, for constructivists, there are multiple truths, perspectives and realities.

2 (a) Focus on the Learner

With the constructivist belief that learners bring prior knowledge, experiences and beliefs to learning situations, there are increased opportunities for greater learner control. Recognition that there is no knowledge independent of the meaning attributed to experience constructed by the learner or community of learners, enables more active and reflective learners. Learning occurs as the individual participates in the construction of learning, and not as the passive recipients of knowledge transmitted directly from the environment. A constructivist approach, for research or in educational practice, is therefore a more interactive approach.

2 (b) Focus on Authentic Learning Experiences

Learners mediate knowledge through a social contextwhich can lead to the development of more complex relationships as knowledge is co-constructed involving more than one human at a time. As the learning community affects each individual's knowledge, the role of the community's cultures are important to the construction of knowledge.

> Constructivism . . . demands that we be conscious of how we come to our knowledge and as conscious as we can about the values that lead us to our perspectives. It asks that we be accountable for how and what we know. But it does not insist that there is only one way of constructing meaning, or the right way (Bruner, 1990, p. 30).

Thus, working within this framework, educators aim to ensure the learning opportunities are authentic and meaningful for all participants, not just those of the dominant culture, as has been past practice in the North. "In honouring a multiplicity of cultures and ways of knowing, . . . [we] have the opportunity to help . . . cross boundaries of culture, gender, politics and ways of knowing in . . . construct[ing] knowledge which helps [us] participate in the social consciousness of humanity" (Hirtle, 1996, p. 92).

2 (c) Focus on Learner's Thinking or Sense-Making

Teachers informed by the new constructivist theories seek to support learning, not control it. They further inquiry, not orthodoxy. They continuously evaluate themselves, their students, and the system in which they teach (Gould, 1996, p. 101).

A constructivist framework challenges educators to create environments in which all participants are encouraged to think and explore. This opens boundaries of knowledge through inquiry by providing participants with "the opportunity for concrete, contextually meaningful experience through which they can search for patterns, raise their own questions, and construct their own models, concepts and strategies" (Fosnot, 1996, p. ix). Some of the recognized strategies for accomplishing this include scaffolding, modeling, and building connections by connecting experiences and prior knowledge with new materials; schema building through the development of clusters of meaning; contextualizing; re-representation by taking text in one form and re-representing in another; and metacognitive activities such as planning, monitoring and evaluating one's thinking and learning. In essence, focusing on the participants' thinking is indicative of being open-minded about the construction of knowledge. "I take open mindedness to be a willingness to construct knowledge and values from multiple perspectives without loss of commitment to one's own values" (Bruner, 1990, p. 30).

3) Language as Mediator

> *Like tool systems, sign systems (language, writing, number systems) are created by societies over the course of human history and change with the form of society and the level of its cultural development (Cole & Scribner, 1978, p. 7).*

Vygotsky, and other constructivists, have emphasized the role of language and thought in development and learning. Language is powerful, and can be used as a

mediator between learners and their worlds. "It is with the social invention of language, with which we talk about the world, that we extend the natural world. . . into the cultural and historical worlds" (Freire, 1998, p. 69). Freire considers language as having dual potentials of being liberating and humanising or repressive (Davis, 1981), as there is the danger that "language can be used to create social, psychological, or political distances between people" (Freire, 1982, in Shapiro, p. 34). Thus it is vital that communication through language be encouraged, to enable all members of society to construct knowledge in meaningful ways through interpersonal and intrapersonal dialogue.

> Constructivists . . . believe that thinking takes place in communication, and that when learners' home cultures are honoured and validated, a dialogue will open up fixed boundaries so that students can freely examine different types of knowledge in a democratic classroom where they can freely examine their perspectives and moral commitments (Banks, in Hirtle, 1996, p. 92).

In spite of the commonalities, some of which have been delineated, constructivism is not without its critics. "While constructivism is clearly gaining popularity as a new paradigm for learning, many question how the philosophy can be operationalized. They argue it does not provide a method, approach or particular pedagogy" (Murphy, 1997 b, p. 1). Yet there is a "connection between constructivism as an epistemological and philosophical image and constructivism as an educational framework" (Brooks & Brooks, 1993, p. 23). Thus the challenge becomes how to ensure that constructivist theory translates into educational research and practice and vice versa.

As constructivism is often in stark contrast to traditional practices in education and educational research, moving toward a constructivist approach means that participants "will need to attend to their own conceptual change at least as much as they attend to this process in others" (Prawat, 1992, p. 389). Thus, as an educational researcher and practitioner, I am continually rethinking teaching and learning. Ritchie, in Shapiro (1994), notes

> A constructivist view of learning should be used not as an endpoint from which to make generalizations, but as a beginning from which to achieve a deeper understanding of the individual's actions in a social reality. Constructivism and constructivist theory examines the thoughts behind the actions of the individuals (p. 182-3).

A change in educational practices as a result of identifying with a more constructivist approach is really just a beginning in a personal educational journey as a lifelong learner. With the exploration of the theoretical underpinnings for this research project, other theories similar to constructivism were reviewed to explore potential relationships with current practices in northern education.

Constructionism

Constructionism is the theoretical foundation initially explored by Seymour Papert and colleagues at Massachusetts Institute for Technology (1991). Constructionism deals with the work being undertaken on how children think and learn, particularly with the development of technological tools. It is more multifaceted that merely learning by making. "Constructionism. . .shares

constructivism's connotation of learning as 'building knowledge structures' irrespective of the circumstances of the learning. It adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity" (Papert, 1991, p. 1).

Constructionism is dynamic as researchers are continually reconstructing and elaborating on what is meant by the term. Early constructionists focused on the individual, particularly given that early use of technology was by individuals. As new educational activities and tools are being developed, constructionism is being redefined with an increased emphasis on community. "Constructionism thinking adds to the constructivist viewpoint. Where constructivism casts the subject as an active builder of knowledge, constructionism places a critical emphasis on particular constructions of the subject that are external and shared" (Shaw, 1996, p. 177).

Papert previously discussed the conundrum of providing a definition for constructionism within a constructionist framework, given perceptions that it would be "oxymoric to convey the idea of constructionism through a definition since. . . [it] boils down to demanding that everything be understood by being constructed . . . for the more we share, the less probable it is that our self-constructed constructions would merge" (1991, p.2). More recently Papert, in Hooper (1996), contends that

> Constructionism . . . has as its main feature the fact that it looks more closely than other educational -isms at the idea of mental construction. . . attach[ing] special importance to the role of constructions in the world as a support for those in the head, thereby becoming less of a purely mentalist doctrine. . .tak[ing] the

idea of constructing in the head more seriously by recognizing more than one kind of construction and by asking questions about the materials used (p. 241).

Many learning theories view knowledge solely in cognitive terms, while constructionism tends to focus more on the affective domains, particularly when learners are engaged in personally meaningful activities. "In constructionist learning, forming new relationships with knowledge is as important as forming new representations of knowledge" (Kafai & Resnick, 1996, p. 2). Constructionism emphasizes diversity by recognizing that learners can make connections with knowledge in many different ways. It "offers an important bridge for the sociocultural and constructivist viewpoints by arguing that individual developmental cycles are enhanced" (Shaw, 1996, p. 179). There are strong connections between design and learning in constructionism, resulting in foci on both process and product.

As mentioned previously, one of the leading theorists for constructionism is Seymour Papert, who worked initially with Jean Piaget. Papert used what Piaget learned about children as a basis for rethinking education, differing from Piaget, not in that children are builders, but in the role that surrounding cultures play in that construction. "The educator must be an anthropologist. The educator as an anthropologist must work to understand which cultural materials are relevant to intellectual development" (1980, p. 32).

Papert suggests looking for connections, cognitively and culturally, is mathetic advice that leads to a closer look at the connectivity of knowledge. He encourages taking what is new and relating it to what is known, then personalizing it if there are conflicts between the new and old knowledge. Thus Papert sees the importance of

false theory learning for children in their development of knowledge, as they change constructions through the use of strategies such as abandoning, reconciling or combining.

> A deliberate part of learning consists of making connections between mental entities that already exist; new mental entities seem to come into existence in more subtle ways that escape conscious control . . . thinking about the inter-connectivity of knowledge suggests a theory of why some knowledge is so easily acquired without deliberate teaching (Papert, 1996, p. 24).

Papert's work has spawned further theories on constructionism. Kenneth and Mary Gergen explored social constructionism through an interest in the rules by which social realities are constructed and negotiated. Gergen and Gergen claim that the "influences determining the character of our psychological make-up . . are out there in the 'social realities' constructed between us" (Shotter, 1995, p. 44). They focus on the collective generation of meaning shaped by language and other social processes. "Social constructionism resembles social constructivism, but prioritize the social above the individual. . .Evidence of the mental is to be found in ˜social performance and public display" (Ernest, 1995, p. 481). With social constructionism, continually evolving social settings are intricately involved with the process and outcome of developmental activities, as noted by Gergen and Gergen. "The terms by which the world is understood are social artifacts, products of historically situated interchanges among people" (Schwandt, 1994, p. 127).

Another form of constructionism is radical constructionism, proposed by Melvin Feffer. Although constructionism does not distinguish between the objective

and subjective properties of experienced reality, Feffer theorizes that "we know our world by actively organizing our experience - by literally forming our object of knowledge" (1988, p. 35).

Building on previous research on constructionism, Mitchel Resnick prefers the terminology of 'distributed constructionism', which focuses on situations in which more than one person is involved in the design and construction activities. Resnick theorizes that cognition and intelligence are not individual properties, rather properties arising from social interactions within the environment. Distributed constructionism looks at these social interactions in the discussing, sharing and collaborating of constructions, with some focus on who controls the information. This vision puts construction (not information) at the center of the analysis. It views computer networks not as a channel for information distribution, but primarily as a new medium for construction, providing new ways for students to learn through construction activities by embedding activities within a community (Resnick, 1996, p. 2).

Connectionism

Like constructionism, connectionism is an educational theory that isbased on work completed initially at Massachusetts Institute of Technology in the mid 1980's. Connectionists believe that the mind adapts to patterns experienced both physically and socially, with knowledge found in the connections. "Connectionism's importance . . . is in providing a scientifically plausible picture of the vast sea of mental life that lies beneath the wharf of facts and rules that we have constructed

over it" (Bereiter & Scardamalia, 1993, p. 51). This has caused many to rethink previous assumptions about the mind, particularly if the mind is viewed as a pattern recognizer.

> It is not that the mind stores up patterns and matches new experiences to them . . . [rather] that the mind acquires abilities and dispositions to recognize and respond in various ways to various patterns. . . . The patterns are not in the mind . . . The patterns are in the environment . . . [as] a way for us as observers to describe relations between the mind and the environment" (Bereiter & Scardamalia, 1996, pp. 489-490).

Connectionists thus view the mind as being without mental content. "If we could open up the mind and probe its depths we would not find anything we could make sense of. The sense is in the disposition and abilities, of which we of course always have only partial information" (Bereiter & Scardamalia, p. 499).

Conclusion

Whether educators and researchers adhere to constructivist, connectionist, constructionist, child-centred or other educational theories does not appear to be as significant as possessing an awareness of the key components of these related theoretical foundations. As noted by von Glasersfeld, recent educational theories such as constructivism "do not claim to have made earth-shattering inventions in the area of education; . . . merely . . . to provide a solid conceptual basis for some of the things that, until now, inspired teachers had to do without theoretical foundation (1995 a, p. 15). Thus there is the desire to ensure theory and practice are intricately

intertwined, as too often in the past, reforms in practice have not been grounded in theory and thus took on a 'cookbook' faddism. "We . . . run the risk of short-lived reform unless educators understand the theory behind the practice, the connections across the disciplines of the reforms, and the major restructuring that is needed" (Fosnot, 1996, p. x).

Comprehension of such theories may only occur when there is joint sharing of understandings through social mediation, especially when considering the multiple natures of how people think and learn. The task is even more daunting when such sharing of understandings is to take place within communities where there are several cultures represented, such as in the north. Some feel that no single approach can handle all the ways in which knowledge needs to be considered by modern educators. "If educators are going to play more than subservient roles in knowledge-based society, they are going to have to be able to negotiate flexibly and without confusion between several different ways of conceptualizing knowledge, appropriate to its different roles" (Bereiter & Scardamalia, 1996, p. 492). This is particularly the case in the north, given the contextual framework, past and present. Thus the challenge becomes how to refine the ideas continually, while ensuring they are shared with all stakeholders in education, whether theorists, researchers, educators, students, parents or community members.

When theories about specific aspects of education that impact on northern educational practices, such as literacy development, multiculturalism, technology and knowledge-building, are added to such continual refining of ideas, educators may find it mind boggling initially. Chapter Three will probe past and current trends in

these specific theories and practices as they relate to education in the north and to the major theoretical underpinnings that form this research's foundation.

Constructed on the theoretical foundation of the tundra developed in this chapter, the roles of communication and culture, explored more in depth in the next chapter, form the base rocks for the developing inuksuk that acts as a guide for this research journey. The constantly evolving landscape for such construction reflect the true nature of the northern tundra. As the elements change and take their toll, the people adapt in order to survive. Thus educators can develop discourse around setting broad goals that serve as guides. The underlying theories may also change and evolve, but the guidepost of inuksuk continues, albeit in potentially varying forms.

Perhaps instead of aligning to specific theories, educators should, as Freire (1998) suggests, focus on

> providing all learners with a humanizing education [which] is the path through which men and women can become conscious about their presence in the world. [This focus is on] the way they act and think when they develop all of their capacities, taking into consideration their needs, but also the needs and aspirations of others (p.xiii).

Chapter 3: Literature Review

Inuksuit

What is known is the funded products of previous inquiries, everything that is at hand, as it were, in the way of information and skills that may be used in the solution of the immediate problem. What is to be known is eventual: inquiry is directed to what is indeterminate in significance within the problematic situation. (Kennedy, 1970, p. 65)

As Kennedy notes, an awareness of previous inquiries is of significance when attempting to understand the contextual framework for newer inquiries. Thus exploration of previous research on specific areas of literacy, culture, technology and knowledge-building, key concepts underlying this research question, will form part of the foundation, much like comprehension of underpinnings of educational theories has in the last chapter. The roles of these more specific concepts appear to be an integral part of any northern study, so comprehension of past research discussions will act as guides on this current research journey, much like inuksuit (plural of inuksuk) have been beacons for past and present journeys across the tundra.

Literacy or Multiliteracies?

Literacy is a two-edged sword. It can be repressive or liberating (Hoyles, 1977, p.29).

Based on personal experiences over the years, my initial view of literacy as an indication of reading and writing skills was a commonly shared one. In the past, the focus seemed to be more on the negative connotation of illiteracy, meaning the lack of literacy skills. Calamai (1987) considered illiteracy to be the "hidden problem" (foreword) in our society. As such, illiteracy levels were researched using the Southam Canadian Survey (1987) which describes*functional* literacy as "the ability to use printed and written information to function in society". Kale and Luke (1991) counter this narrow definition of literacy by noting that definitions of the term as the "series of mechanical skills learned through classroom drill and repetition . . . are limited and narrow" (p. 3). They explore the social nature and cultural implications of the "multiple and varying routes to literacy" (p. 3).

In 1997, the International Adult Literacy Survey began to utilize the term 'literacy' in a broader context to denote "the ability to understand and employ printed information in daily activities at home, at work and in the community - to achieve one's goals, and to develop one's knowledge and potential" (Organization for Economic Co-operation and Development, 1997, p. 14). As a result of surveys and revisions to definitions of literacy, there is growing recognition that literacy levels are "arbitrary and fluctuating" (McDonagh, 1993, p. 219). The information needs of a society dictate current definitions for literacy (Niederhauser, 1996, p. 1).

Societal information needs are delineated by Ross and Bailey as four distinct

historical literacy eras, "pictographic, oral, bibliographic and electrographic" (Niederhauser, 1996, p. 1). Although the time frameworks are different from those in many parts of the world, for Inuit these eras are still pertinent. The 'pictographic' era, with the focus on pictures and monuments, could be exemplified by the initial use of inuksuit, as signals of directions to travel, as well as through use of artwork, such as carvings, for the purposes of sharing events and stories.

For Inuit, the pictographic literacy era seems to coincide with the era of 'oral' literacy. The Inuit are well known for their oral traditions, with storytelling and throat singing being utilized as means of "giving children the knowledge, skills, beliefs and values necessary for social, economic and political survival in society" (Maina, 1997, p. 296). In an oral culture, a person and their words would not be separated. Oral traditions, as a means of transmitting the beliefs and values of people, are more common in the world than most perceive, as "of 2,796 languages in the world, all have an oral form, but only about 153 have a written form" (Diamond & Moore, 1995, p. 221). Thus traditional definitions of literacy in western Societies need to be less dismissive of oral traditions and more inclusive in regards to the value placed on written and oral expectations.

For Inuit, the 'bibliographic' era of literacy began with the coming of the Qallunaat (non-Inuit), whether they were missionaries, whalers, government personnel or traders. Indeed the missionaries are credited with adopting the syllabics of the Cree to form the written symbols of Inuktitut, the language of the Inuit. Unfortunately, up until the last decade or so, the language of Qallunaat, English, has dominated the educational system in the Eastern Arctic.

> The ascendancy of spoken English and English literacy in Native communities in Canada has threatened not only the oral tradition but also the survival of Native languages themselves - people's ways of thinking, communicating, and establishing identity . . . The intruding language has undermined oral tradition by imposing a new reliance on writing for the authentication of knowledge and ideas . . . It is possible to embrace literacy as a creative, rather than destructive, adjunct to the oral tradition . . . by acknowledging the value of both components. . . . Native languages hold the promise of providing a bridge between the oral tradition and English literacy (Leavitt, 1995, p. 128).

With the permeation of technology, Ross and Bailey's 'electrographic' literacy era (Niederhauser, 1996) is well underway in the North, perhaps to the detriment of oral traditions and traditional Aboriginal cultures, given technology's dependency on written communication in the dominant language of English. This need not be the case, if oral traditions and Aboriginal languages form a foundation for what is communicated electronically.

The more literature reviewed, the greater the realization, like Ross and Bailey (Niederhauser, 1996), that literacy is indeed a complex entity, with many political, cultural and societal implications. In the past, journal articles have expounded on increasingly more specialized theories of literacy, as evidenced by descriptions of *media* literacy (Rother & Baron, 1992), *scientific / technology* literacy (Aikenhead, 1990), *science* literacy (McDonagh, 1993) and *visual* literacy (Roblyer, 1998), to name but a few. Literacy, for many years an indication of one's ability to perform a specific task, as exemplified by Krasnicki's (1993) view that "teaching literacy

means teaching the syntactical and semantic rules for the symbolization of ideas through our alphabetic code" (p. 254), has expanded to cover content, process and context. As explained in The Culture and Politics of Literacy, "reading and writing are not so much skills as they are reflections of values and life-styles" (Winterowd, 1989, p. xiii). These values and lifestyles are integral parts of a community's culture. Hirsch (1983) argued that "you cannot have *linguistic* literacy without *cultural* literacy" (p. 145), thus recognizing the broader societal implications for literacy levels. His work is extended by Saravia-Shor's and Arvizu's (1992) notion of *cross-cultural* literacy that "encompasses knowledge and understanding of other cultures' patterns of interaction, values, institutions, metaphors and symbols as well as cross-cultural communication skills" (p. xi).

Heath and Mangiola (1991) further the theory of literacy as a mix of content, process and context by differentiating between 'literacy skills' and 'literate behaviours'. Literacy *skills* they define as "mechanistic abilities that focus on separating out and manipulating discrete elements of text" (p. 40), while literate *behaviours* refer to being able to "communicate. . . analy[se] and interpret . . . through extended text. . . . [They are] ways of going about learning that treat language as both the medium and the object" (p. 40). Their cross-grade tutoring projects serve as a model for "improving learning for all children, especially those who are now least well served by our nation's schools" (p. 7). This has potential transferability to Nunavut schools.

The critical component of literacy has been explored by many, including Hunsberger, Bailey and Hayden (1998), who note that although educated people

assume literacy is desirable and necessary, there are many issues that the term 'literacy' raises that may not always be so desirable. De Castell concurs when he indicates "with the advent of literacy came the possibility of speaking with forked tongue, like the devil" (1990, p. 27). Hunsberger, Bailey and Hayden explore the work of Scribner, who, through his metaphors of literacy as adaptation, power and state of grace, notes that "literacy is socially defined. The enterprise of defining literacy is one of assessing what counts as literacy in a given social context" (p. 125). Determining 'what counts' has political, social and economic implications that may not be desirable to all. Hunsberger et al. therefore look at the broader based *information* literacy, which "entails finding, evaluating, using and subsequently communicating knowledge" (p. 122) as a means of empowering learners.

Perhaps one of the more broader concepts of literacy encountered was put forth by Ira Shor (1992), whose definition of *critical* literacy encompasses habits of thought, reading, writing and speaking which go beneath surface meaning, first impressions, dominant myths, official pronouncements, traditional cliches, received wisdom, and mere opinions, to understand the deep meaning, root causes, social context, ideology, and personal consequences of any action, event, object, process, organization, experience, text, subject matter, policy, mass media, or discourse (Cummins, 1996, p. 157). Such an in-depth approach to literacy in the north would enable Inuit to become more empowered in their learning to "read the world" (Freire, in Hirsch, 1993, p. 110).

The whole issue of literacy as a means of empowerment has been explored most extensively by Paulo Freire, with his literacy programs for oppressed people

in Brazil. In Pedagogy of the Oppressed (1971), his experience of being personally jailed, for believing that once political consciousness was raised, Brazilian villagers would be motivated to become more literate, speaks volumes about Freire's philosophical convictions. The promotion of education through consciousness as a process rather than transferring existing knowledge as content, Freire believed, was the means of empowering the people. The parallels that can be drawn for multicultural education around the world include the need to advance from the 'banking' concept of literacy education whereby people are containers to be filled with facts to more libertarian notions of literacy based dialogue. Freire was convinced that people need reassurances of their own worth, "to show them that no matter how denuded of dignity they considered themselves to be, they were in fact makers of culture, of history, and subjects in life, not merely objects of manipulation" (Bee, p. 41). Freire "maintains that the educative process is never neutral and that persons are either educated for domestication or for liberation" (1971, p. 42). For Inuit students, with the future offered with the creation of Nunavut, there is more hope for liberation, even with their history of Eurocentric domination. Thus the work of Freire has particular relevance. Freire's work is representative of *critical multicultural* literacy as "in a pluralistic society education should affirm and encourage the quest for self-examination through social transformation by creating relevant problem-solving activities that allow students to confront the challenges offered by the diversity of the reality of everyday life" (Weil, 1993, p. 68). Delpit (1988) continues this theme of empowerment through literacy as she discusses the 'culture of power' through literacy within an

educational framework.

Literacy "puts some distance between spoken words and the reader or writer, mak[ing] possible, indeed encourag[ing] the extensive analysis and reworking, sorting and classifying of ideas" (Leavitt, 1995, p. 127). The empowerment through literate activities was evident a few years ago in the grade six ESL class, as noted in my classroom research journal.

> *This year one of the most powerful notes was a discussion note on suicide, established when the suicide of a grade 8 student personally impacted on several students in our class. Classroom discussions on the topic left feelings of unarticulated thoughts/feelings. By expressing themselves on the database, even though students were very aware that the database was public, students were able to communicate their personal experiences in a non-threatening manner. One student in particular was struggling in class. The psychologist who visits our community semiannually felt that her 'problem' was that it was her first year being taught in English. Past experiences had led me to believe that there was something else there, holding her back. Through this discussion note, she was able to share her experiences in finding her brother who had committed suicide a few months prior. After discovering that she wasn't the only one affected by suicide, and sharing that information with others, she became a changed child in class. It was amazing!* (Tumblin, 1997).

This experience adds support to Langer's broader view of literacy, as "learners assume ownership for their literacy activities . . . they are . . . learning to master themselves - they gain control of their own abilities as literate thinkers and doers,

using language to serve their own needs" (Moll, 1994, p. 180).

With the expansion of the framework of literacy comes a realization that its multifaceted nature could increase student success rate as "past literacy practices in school have systematically worked against those children whose previous language and literacy socialization has taught them 'other' rules and procedures for speech and literacy events" (Kale & Luke, 1991, p. 12). Indeed these authors feel that literacy difficulties for ESL students are due in part to differences in speech and literacy events between home and school, the lack of recognition of the competencies students bring to school with them, resulting in failure of the school system to meet their needs through appropriate programs. This is being countered by increasing efforts to ensure cultural relevance of programs in the North. Hopefully Mitiche's view that "cultural identity mediates the acquisition and development of literacy which, in turn, affects the alteration of the learner's cultural identity" (1993, p. 135) will become a reality for youth in the Eastern Arctic.

Literacy can be "examined through many lenses (educational, aesthetic, sociological, political , philosophical, cultural, economical, critical)" (Hunsberger et al, 1998, p. 129). In fact, the terminology 'literacy' is a misnomer itself as it implies there is only one type of literacy. The terminology of "multiliteracies" or "multicultural literacies" become more appropriate as they reflect the complexity and plural nature of this concept. Indeed, the shift from a focus on "scribal literacy, [which] makes the acquisition of literacy particularly difficult especially for children from less literate homes" (Olson, 1990, p. 20), to multicultural literacies is particularly relevant in the North. According to Diamond and Moore, multicultural

literacy is best defined as the process of linking the cultural experiences, histories, and languages that all children bring to school with language learning and academi learning that take place in the school. Multicultural literacy further activates silent voices, opens closed minds, promotes academic achievement, and enables students to think and act critically in a pluralistic, democratic society (1995, p. 7).

Multiliteracies "overcomes the limitations of traditional approaches by emphasizing how negotiating the multiple linguistic and cultural differences in our society is central to the pragmatics of the working, civic, and private lives of students" (New London Group, 1996, p. 60). Such massive changes in outlooks on literacy have resulted in more inclusive definitions, thereby necessitating greater demands for individuals and cultures (Brown, 1993; Graff, 1991). "The idea of multiple literacies suggests that other voices need to be heard and not disenfranchized by a single view of correct language as schooled literacy. A new understanding of literacy has emerged recently, one which recognizes that literacy is a hegemonic and counter-hegemonic instrument, one creating and maintaining power as well as enabling resistance" (Cook-Gumperz & Keller-Cohen, 1993, p. 283). One of the bonuses of the revised terminology of multiliteracies is a fresh look at the acquisition of language and the construction of knowledge within a cultural framework, thereby potentially enhancing the liberation or empowerment of Inuit students.

Perhaps Bloom's perception of literacy, as "the ideological rallying point to reduce culture to a warehouse of selected works of Western civilization and to deride those expressions of popular culture and cultural differences that question the

economies of privilege that separate the center and the margins of power and culture in this society" (Giroux, 1992, p. 233), will provide the impetus for societal change. Giroux's perception of the need for literacy to recognize the "importance of acknowledging that meaning is not fixed and that to be literate is to undertake a dialogue with others who speak from different histories, locations, and experiences" (p. 244) sums up the currently more acceptable concept of multiliteracies.

Or perhaps it is a simple as Seymour Papert notes, when he states "Paulo Freire enjoins us not to dissociate "reading the word" from "reading the world." Becoming literate means thinking differently than one did previously, seeing the world differently" (1998). A northern setting enhances the development of different ways of viewing the word and the world.

Culture or Multiculturalism?

We learn from, and our lives are enriched by, our contacts with other peoples and cultures (Meyers, 1993, p. 110).

What is culture? Like literacy, it has been open to multiple interpretations over the years. It has been presented in many guises, as evidenced by the following descriptors for education that addresses the diversities in our societies: 'cultural', 'ethnic', 'ethnocultural', 'multicultural', 'multiethnic', 'multiculturation' (Cortes, 1994), 'anti-racist', 'intercultural', 'cross-cultural', 'bilingual', 'bicultural', 'minority', 'multipluralism', 'critical multiculturalism' (Webster, 1996), 'culturally compatible' (Jordan, Tharp & Baird-Vogt, 1992) as well as 'education for a global perspective' (Meyers, 1993). Differences between cultural and ethnic identity have

been explored by Dorais (1995), where the former refers to "the basic consciousness of one's own group's specificity amongst other peoples" while the latter "only seems to occur within complex societies. . . .generally operat[ing] as a way to gain access to, or be alienated from, some economic, political or cultural resources" (pp.294-295). Winterowd (1987) takes one step further, differentiating between '*kultur*' and "culture". The former is "stable, immutable, and of unquestioned value. It is what institutions pass on from generation to generation, in the form of canons, collections and societal norms." This differs from culture as "always becoming, being made" (p. 870). The distinction seems to be whether one perceives culture as being a product or a process. Two types of culture put forth by Williams have similarities to Winterowd's interpretations: "backward - looking conception of culture that promotes the preservation of that which has gone before . . .and a forward - looking conception . . . the cultivation in each new generation of that culture which is to come" (de Castell, 1990, p. 23).

In Canada, "the educational system has for the most part reflected a fundamental commitment to the product of monoculturalism. Historically, education was inseparable from the amalgamation of cultures in the mainstream. . . .Special curricula or references to other languages or cultures were rejected as inconsistent with the educational needs of Canadian society-building" (Fleras & Elliott, 1996, p. 373). The former practices of sending Aboriginal children to residential schools is reflective of this ideology. Inuit students' experiences were denied as valid, and they were punished if they spoke in their first language of Inuktitut. "It is easy to assert power over others if they are made to feel like they have no identity, they have no

past, or at least no past that matters" (Chartrand, in Fleras & Elliott, 1996, p. 376). Past indoctrination through residential schools affirmed the dominance of Eurocentric education. "When school personnel reject students' identities,. . . they force students to make an unnecessary and potentially traumatic choice between their two cultures, and the resulting conflict may actually interfere with language learning" (Cummins, 1994, p. 46).

As we become more critical of traditionally held views of education in our modernistic society, this lack of a single universally acceptable definition or terminology to describe what is becoming more commonly referred to as multiculturalism, is to be expected. Winterowd (1987) concurs with Freire and Hirsch that "we [are] at a paradox: students must both inherit and make culture" (p. 872). This dilemma is a common thread within our current northern educational system. In many cases, who determines the power, and what that power is, seem to be the most common themes, as illustrated by Fleras' and Elliott's (1996) enrichment and empowerment styles of multicultural education. They tackle the issue by stating that multiculturalism is "a process for accommodating diversity.. .. [It] is not about promoting minorities or ethnocultural differences, [rather] . . . creating a political climate in which diversity is incorporated as a legitimate and equal component of society, without sacrificing the interconnectedness of. . . society" (p. 324-325). They interpret multiculturalism as having distinct levels, as a fact, an ideology, a policy or as a process.

In Canada, Fleras and Elliott note that multiculturalism as a policy has undergone changes since it was first initiated in 1971, defined by decades as

'folkloric' (celebrating differences), 'institutional' (managing diversity) and 'civic' (society-building) (p. 335). The latter ties in with Cortes' view that "education for a future of societal multiethnicity and global interdependence demands civic commitment" (1994, p. 33). Thus there appears to be growing belief that culture is indeed dynamic and evolving. As an example, Inuit culture in schools today reflects the past, in the present, while adapting to and evolving as time goes on. By considering culture as a process, there seems to be a reduction in the use of Qallunaat ways as the standards for other cultures to be measured against in the north. Dewey cautioned against the use of such standards in his essay "The Interpretation of the Savage Mind" (1902), which perhaps should have been made available to early northern education policy makers. In that essay, Dewey found the work of anthropologist, Herbert Spencer, was disturbing as "his interpretations of so-called primitive peoples, seemed to take his own civilization as the standard for which to measure others, as if the savage mind could be gauged on some kind of 'fixed scale' (Kliebard, 1987, p. 70).

The broader acceptance of a move from monocultural education to multicultural, multiliterate education over time does not automatically assume there is unified understanding of the term 'multiculturalism'. According to Fleras and Elliott (1996), it "encompasses a variety of policies, programs, and practices for managing diversity within the school setting. It can encompass the study of many cultures or an understanding of the world from diverse perspectives or convey how power and politics are inextricably connected with unequal group relations" (p. 375). Grant, on the other hand, takes a more theoretical slant as he sees multiculturalism as

a "philosophical and educational process . . . built upon the philosophical ideas of freedom, equality, equity and human dignity. . . . It recognizes . . . that equality and equity are not the same thing; equal access does not guarantee fairness" (Webster, 1996, p. 24). For Jean Belkir, a more personal interpretation of multiculturalism is broader based as "the academic arm of the long war fought against racism, sexism, and classism in multicultural America and the World" (Webster, 1996, p. 26).

With a more educational focus, Banks perceives that multiculturalism is "the chance for students to analyze the culture, gender, and racial biases that are consistently present in many schools' curriculum and thus transform school to be more a reflection of their own personal experiences" (Nixon-Ponder, 1998, pp. 63-64). In an effort to continue viewing education as the change agent in our society, the range of interpretations for literacy/multiliteracies and culture/multiculturalism necessitates an examination of how they can impact on education in the North.

Educational Implications

> *When students uncover ways to express their ideas and thoughts, they legitimize their cultural experiences, ideas, and histories. They . . . begin to understand themselves and the world around them more clearly; solutions to problems surface (Diamond & Moore, 1995, p. 142).*

In the north, as mentioned previously, with the history of Eurocentric domination in education, politics and society for the last half a century, attempting to invoke megachange takes an extended period of time. Past dilemmas "face[d] in trying to regain both knowledge and understanding of our language and culture within

a European model of education" (Leavitt, 1995, p. 125), have meant that students in the Eastern Arctic have received mixed messages about their language and culture. The move to a more culturally relevant curriculum, in the elementary school at least, has been a big step in validating the Inuit values and beliefs, thus acting as a link between experiences and learning in homes and schools. In reflecting on past and current educational practices in the Eastern Arctic, Webster's words are brought to mind: "Justifications for multiculturalism involve the postmodernist conceptualization of knowledge that asks: Who produced this knowledge and whose interest does it serve? Who defines what is knowledge, and decides which knowledge becomes institutionalized?" (1996, p. 28).

The former trend of residential schools, where Inuit youth were shipped off to for the majority of the year, away from their families, and punished for speaking in Inuktitut, leads one to wonder whose interests were being served? What knowledge was being portrayed as paramount? Current practices of having students attend school in their first language go a long way in recognizing that "Native language instruction in schools can be an important factor in ethnic communities shedding their minority status by sharing power with the dominant group" (Ruiz, 1991, p. 217). Indeed, Cummins' studies of North American and European student success have demonstrated that in situations where a child is of a minority culture and that culture is not the dominant culture, students achieve better in school when they are taught in their first language for at least the first three years of their school career. Inuit students would be considered to be in a minority position vis-a-vis the dominant Canadian society, even though they make up the majority of students in

Nunavut (Tompkins, 1998, p. 35).

This has been a practice in the North for the last decade. Thus the recent, more gradual tendency for Inuit professional parents to choose for their children to enter English First Language (EFL) classes as soon as they enter school due to a perception that this will better equip them for high school programs, are disturbing, and bring to the forefront multicultural literacy issues within the northern school system. Whose interests are being served if the Inuit culture and language only truly appear to valued in the elementary school?

As noted by Hamme, "educators of First Nations children in Canada face the challenging task of recovering the cultural heritages of First Nations while providing preparation for successful participation in a culturally diverse, modern technological society" (Maina, 1997, p. 294). Informal discussions over the years with high school students who have come through the early Inuktitut education model, have awakened a realization that students feel they are being short-changed, given their inability to compete at the high school level, based on their second language proficiency. Have educators met the challenge? The question of what can be done as educators to ensure that future students do not feel as short-changed in terms of multicultural multiliteracies is always forefront in my mind.

There are many who would claim that such statements by the youth are 'proof' that multicultural, multiliterate environments just do not work in the North, contrary to beliefs that "empowerment and multicultural education are interwoven, and together suggest powerful and far-reaching school reform" (Sleeter, 1991, p. 2). Others would question whether the source of the difficulties lies in the current

practices at the junior/senior high levels or with the lack of resources (human and material) for Inuktitut language programs. Both these often opposing viewpoints are typical of educational discourse where high school teachers blame elementary practices and vice versa. Neither viewpoint recognizes the "power of education to create new perceptions and a new culture, and the responsibility teachers assume for shaping students' identities" (Leavitt, 1995, p. 126). Indeed Cummins notes that "language and content will be acquired most successfully when students are challenged cognitively but provided with the contextual and linguistic supports required for successful tasks completion" (1996, p. 60). Thus if the supports in a multicultural, multiliterate environment are not provided for students, and indeed staff, in elementary, junior and senior high, any deficiencies would tend to become quite political in nature.

Giroux puts forth the notion that current definitions for literacy or multiliteracies and culture or multicultures are just as political in nature, reflections of the stances people take.

> The right-wing educational and cultural agenda, with its emphasis on heritage rather than liberating memory, literacy rather than literacies, censorship rather than artistic expression, moral regulation rather than self and social empowerment, and testing rather than learning, is mobilized by a vision of the arts, culture and schooling that presupposes and legitimates particular forms of history, community and authority (1992, p. 231).

Given the cultural and linguistic failure of past practices in the North, perhaps looking towards participation in a more global society through educational change,

with more emphases on multiliterate, multicultural education at all levels of schooling in the north should become a priority, which could potentially be enabled through the use of knowledge-building technology.

Knowledge-building Technology

Thinking about the computer's role in education does not mean thinking about computers; it means thinking about education (Ellis, 1974, p.42).

In the latter part of this century, there have been great discussions about alternate forms of education that incorporate multicultural, multiliterate ideas, reflect more transformational outcomes, such as the constructivist/connectionist's/ constructionist's theories explored in Chapter 2, and expand the use of technology in education. As Seymour Papert notes, "We are at a point in the history of education when radical change is possible, and the possibility for that change is directly tied to the impact of the computer . . . the computer presence is in the process of creating an environment for change" (1980, p. 37). The more literature reviewed, the greater sense that in order for computers to be truly an integral part of the multicultural, multiliterate classroom, those classrooms would have to change from transmissional modes to reflecting more transformative beliefs about education. Howard Mehlinger (1996), from the Centre for Excellence in Education at Indiana University, illustrates:

> Information Age technology is like [a] volcano. It is changing the landscape of American culture in ways we either take for granted or scarcely notice . . . .The use of the new technologies will have a profound effect on schools. The very

> relationship between students and teachers will be challenged because the technologies enable learners to gain control of their own learning. . . The new technologies provide students access to information that was once under the control of teachers (p. 402).

No longer will educators be the ones who determine where the inuksuit containing knowledge will be placed, with the students only responsible for absorbing the knowledge provided in the rocks when the location of the variety of inuksuit is pointed out to them. Recent technologies are beginning to change the landscape of the tundra, and beyond.

One of the most well known names in education using such technologies is Seymour Papert, perhaps best known for his work with LOGO through the Massachusetts Institute of Technology. He explores the dilemma presented by initial use of computers in school as he laments "how strange it is . . . that computers in education should so often reduce to using the bright new gadgets to teach the same old stuff in thinly disguised versions of the same old way" (Ellis, 1974, p. 47). Over time, Papert demonstrates that computer usage is, and indeed should be, transforming education in ways few people have anticipated. He notes "Nothing could be more absurd than . . .[when] computers are placed in a classroom where nothing else has changed .. . . Computers serve best when they allow *everything* to change" (1993, p. 149). Since beginning to use computers, just about everything has changed in my personal approach to education, and indeed, life in general.

What specific role computers should take as a catalyst for learning has been

debated frequently in recent years. The use of computers as such a catalyst for change comes with some cautions. Falbel (1991) notes the potential dangers inherent in how we use computers when he perceives the spectrum that could be created by their use. "Computers can be used to enslave people, to program them, to dehumanize them; or they can be used in a liberatory manner, to extend our creative and expressive reach, to foster conviviality" (p. 36). The aim is for the latter to become evident in endeavours, as a more liberatory approach to computer usage will assist in to ensuring computers are an integral part of multiliterate, multicultural classrooms in the North.

Perhaps the perspective of Papert exemplifies northern goals as he contends that computers are potentially the "carriers of powerful ideas . . . seeds of cultural change. . .[which] can help people form new relationships with knowledge that cut across the traditional lines separating humanities from sciences and knowledge of the self from both of these" (1980, p.4). He goes on to assert that "the computer is the Proteus of machines. Its essence is its universality, its power to simulate. Because it can take on a thousand forms and can serve a thousand functions, it can appeal to a thousand tastes" (1980, p. viii). Recognizing that poor-achieving schools historically favour a more basics-oriented approach, the willingness to change to a more constructivist, knowledge-building approach, learning through integration with technology may well be the means of appealing to the multitude of tastes in northern communities. In schools, constructivism can be exemplified with the learner actively constructing knowledge through problem-oriented learning, using highly visual formats, in rich learning environments, through collaboration, cooperation,

exploration, and authentic activities. Many of these features are professed to be integral components of numerous computer software programs. With "constructivist frameworks challeng[ing] teachers to create innovative environments in which they and their students are encouraged to think and explore" (Gould, p. 93), the computer as a potential instrument of change in the north may appeal to all manners of cultural and linguistic endeavors/goals.

Thus a move towards a more constructivist approach to learning in the north, with the use of technology as a support, may be validated through the examination of similar projects elsewhere in the world, even while recognizing the role the unique culture of Inuit will play in any integration. One of the most significant longitudinal studies of the relationship between technology and education has been the Apple Classrooms of Tomorrow (ACOT) project in over one hundred elementary and secondary classrooms in the United States, of which CSILE was a component. In the decade following its inception in 1985, the ACOT project discovered that

> teachers and researchers found that having an array of tools for acquiring information, thinking, and communicating allows more children more ways to become successful learners. . . . Technology itself appears to be a catalyst for change, encouraging fundamentally different forms of interactions among students and between students and teachers, engaging students in higher-order cognitive tasks, and prompting teachers to question old assumptions about instruction and learning (Fisher, Dwyer & Yocam, p. 7).

David Dwyer, one of the editors of the book that chronicles the findings of the ACOT project, elaborates on the computer as a catalyst for classroom change in

both theory and practice. He differentiates between knowledge instruction and knowledge construction, where the former is the traditional practice of transferring information from the expert to the learner, often through direct instruction. In contrast, knowledge construction is viewed as "a personal, reflective, and transformative process, in which teacher work is construed as facilitating students' abilities to integrate ideas, experiences, and points of view into something new" (Fisher et al., p. 17). Scardamalia and Bereiter (1993) share this view as they articulate that "the goal of computer-based knowledge-building environments in education is to fundamentally alter educational discourse so that knowledge reproduction processes give way to knowledge-building processes" (p. 45). In such computer based, knowledge-building classrooms, both students and teachers are learners, with expertise shared and valued, whether from within the school community or beyond. Collaboration, inquiry and conversation become the norm. The use of technology broadens as it enables "access to information, communication with experts, more possibilities for collaboration, and a creative medium for thought and expression" (Dwyer, in Fisher et al., 1996, p. 19).

Another research study explored computer support for collaborative learning at two high schools in Austin, Texas. The researchers found that "infusion of technologies that support knowledge-building, intentional learning, and collaboration . . . enhance the establishment of collaborative knowledge-building communities in high school classrooms and . . . influence students' engagement in knowledge-building, . . . intentional learning and students' perceptions of the classroom environment" (Shell, Turner, Husman, Droesch-Cliffel, Nath & Sweany, 1996, p.

10). The research currently underway in schools in Iqaluit could potentially demonstrate parallel results for elementary students within an Inuit cultural community.

Vygotsky's thoughts on the ever present existence of expertise in the culture of a community, which is best accessed through participation in activities with those who have that expertise (Bereiter & Scardamalia, 1993), have formed part of the foundation of the development of specific knowledge-building technology. In 1992, Bereiter and Scardamalia coined the term 'knowledge-building communities' to represent their model for learning that was distinguished from other approaches by its very nature. "What is defining about a Knowledge-Building Community is. . . a commitment among its members to invest their resources in the collective upgrading of knowledge" (Hewitt & Scardamalia, 1998, p. 82). Characteristics of such knowledge-building communities include sustained, in-depth study of topics; focus on problem solving rather than acquisition of facts; student driven inquiries; student production of theories and critiques; collective understanding of topics; small group cooperation; discourse based; and the teacher as learner along with the students, much like the functions of a research community (Bereiter & Scardamalia, 1993, pp. 210-211; Scardamalia & Bereiter, 1992, p. 43). Bereiter and Scardamalia note that "the focus of activity is on acquiring new knowledge, synthesizing it with existing information, detecting gaps in understanding, constructing explanations, and so on. Developing understanding becomes an objective of the student, and knowledge becomes an object of inquiry" (Hewitt, Webb & Rowley, 1994, p. 1). Scardamalia and Bereiter (1993) differentiate between traditional knowledge-reproduction

activities, or "first order knowledge processing" (p. 2) and knowledge-building as the "second-order system of activities that has understanding as its primary purpose" (p. 2). Such a shift in educational focus requires a reconceptualization of the purposes of education for youth today.

One of the tools that potentially can assist in such a change in focus, according to these authors, is the computer. With that belief, Scardamalia, Bereiter and others have developed a computer software program originally released in 1987 as CSILE, more recently as Knowledge Forum® (1996). The software has been an integral part of a collaborative research project known as CSILE/Knowledge Forum® that has been based out of Ontario Institute for Studies in Education (OISE) at the University of Toronto. Part of that research has been the exploration of how the software has become a change agent in several classrooms, including northern classrooms. It was not until recently that I read excerpts from Jim Hewitt's doctoral thesis (1996) and reflected on the role such knowledge-building technology can play in many classrooms, including my own. Hewitt speculates that any substantial change in the culture of schooling will require a multi-faceted approach.

> The difficulty of moving from traditional classroom models to a knowledge-centred paradigm suggests that much more is needed than teacher awareness of constructivist theory (Lamon,1993). Nor are software packages, like CSILE, sufficient to instigate change. CSILE's cognitive supports and facilities for collaboration provide affordances for restructuring, but do not produce change by themselves. Studies by the CSILE group suggest that the teachers that have most closely approximated the Knowledge-Building Community model are those that

> have worked to invent new classroom procedures that put constructivist philosophy into practice (Brett & Woodruff, 1993). That generally involves making substantial changes to teacher-student roles, evaluation methods, and classroom discourse as well as fundamental attitudes towards knowledge and learning (1996, p. 2).

Salomon also theorizes that effective computer-based learning environments transform learning settings, which in turn impact positively on problem-solving. "Computer tools that embody certain qualities enable students to enter into intellectual partnerships . . . When sufficient mental effort is expended by. . . .users, . . . [they] leave a generalizable cognitive residue in the form of improved self-monitoring which facilitates performance later " (Salomon, 1992, p. 257). Indeed an integral part of Knowledge Forum® is the scaffolds that support metacognitive learning for all participants. As Papert mentions "thinking about thinking turns the child into an epistemologist, an experience not even shared by most adults" (1980, p. 19).

In order for such effective learning environments utilizing computers to materialize, there needs to be an understanding of the impact culture and context have on the construction of knowledge. "Context and the culture. . . .affect the kinds of learning that is engaged and fostered in it. Knowledge and the processes engaged in constructing or acquiring it are both affected by the situation in which that knowledge construction or acquisition occurs" (Carr, Jonassen, Litzinger & Marra, 1998, pp. 5-6). The impact of culture within the context of ESL classrooms in Iqaluit is quite evident. The use of culturally relevant curricula enables educators in

the Eastern Arctic to begin with where the students are, and build accordingly. "We cannot educate if we don't start . . . from the levels in which people perceive themselves, their relationships with others and with reality, because this is precisely what makes their knowledge" (Bell, Gaventa & Peters, 1990, p. 66).

The construction of knowledge, or knowledge-building, potentially can become empowering for such students as "when students are given the opportunity to co-create their own knowledge base, they will be more likely to accept responsibility for claiming, and actively participating in, their own educational experience" (Carı et al., p. 12). Such changes in approach within the educational system, particularly through knowledge-building technology, will necessitate dynamic reviews of the aims and values in education."As society is altered by the presence of the computer, education . . . must reexamine and refashion its educational goals" (Ellis, 1974, p. 57).

Knowledge in the northern classroom environment is thereby enhanced through the students' cultural context, assisting in the development of knowledge-building communities. This " suggests continuity with other knowledge-building communities that exist beyond the school and . . . that the classroom community works to produce knowledge[as a] a collective product" (Scardamalia & Bereiter, 1996, p. 254). This collective nature of education in some northern classrooms has been augmented by "introducing curriculum that related to their cultures and employing instructional strategies that were more congruent with their learning styles, . . . [resulting in] students blossom[ing]" (Nixon-Ponder, 1998, p. 61). Similar trends have been noticed informally in Iqaluit schools, when "self-

knowledge" and "self-discovery" (Diamond & Moore, 1995, p. 142) become group goals.

> The more people participate in the process of their own education, the more people participate in the process of defining what kind of production to produce, and for what and why, the more people participate in the development of themselves. The more people become themselves, the better the democracy (Bell et al.,1990, p. 145).

In the North, this has been shown to be possible through "active participation, student-initiated exploration of selected materials, . . . planned student-teacher collaboration . . . and hear[ing]. . . first-hand experiences . . . from guest speakers" (Leavitt, 1995, p. 124), exemplifying that the move towards multicultural, multiliterate, technologically supported views of education is valid and worthwhile route to take for all grade levels. Such involvement isn't necessarily the easiest path to follow, as Peter Rowley cautions

> For a student, knowledge-building is cognitively more stimulating, but more difficult, than sitting while a teacher lectures. For a teacher accustomed to a model of teaching based on content delivery, it is cognitively harder to be a coach to a group of learners (each with their own differences in learning style) than to be responsible for a given body of content. Consequently while the rewards of a knowledge-building classroom are many and highly motivating, it can be hard to get started. We have found that three elements are required to establish and maintain a knowledge-building classroom:

- a classroom culture which values collaboration and hard questions

- sufficient access to information resources
- an information-sharing infrastructure tailored to support knowledge-building (1994, p. 154)

Seymour Harris' thoughts on the use of computers as a change agent also comes with a word of caution. "Never forget, . . .school is primarily a social system [thus] the need for social rather than . . .mechanical inventions must. . .be stressed. . . . It would be disastrous to have the machines dominate the development of the social system of learning" (Ellis, 1974, p. 56). Hewitt and Scardamalia have recognized this and therefore recommend a "careful interweaving of computer supports and new educational practices" (1998, p. 94) in order to foster a classroom based knowledge-building community.

Knowledge-building technology as the catalyst for learning may be the impetus for change in educators' reflection on what is known, or thought to be known, about children, learning, knowledge and role of the teacher in the educative process. Marlene Scardamalia (1997) perhaps sums it up the most concisely when she states of greatest educational significance has been the extent to which this initiative has led to a radical shift in classroom processes, moving them from a focus on task performance to public knowledge jointly constructed by students. It has also made clear that the problems to be faced are not about schooling, but rather rethinking society's knowledge resources and the ways in which students engage these resources, as students are able to engage in considerably more self-intentioned and high-level group processes than suggested by current literature (p. 19).

Thus foci on multiliteracies, multiculturalism and knowledge-building

technologies in our schools in the North could potentially lead to reconstruction of inuksuit on the horizon of the tundra, pointing educators in different directions as the components rocks are changed to enhance future survival.

As the research inuksuk begins to take shape, with the blocks representing the contextual framework of culture, communication and change placed on the foundation of theoretical underpinnings, the directions literacy and technology, the two blocks explored in this third chapter, will take the traveler in this research journey remain to be seen. Chapter Four will therefore outline the methodology used to conduct research through the voices of educators, so those traveling across the tundra of northern education can have a guide in the exploration of perspectives on the impact literacy and knowledge-building technology may have on the terrain.

Chapter 4: Methodology

The Journey

Individual constructions can be elicited and refined only through interaction between and among investigator and respondents (Guba & Lincoln, 1994, p. 111).

In an effort to understand the perspectives of educational staff, on literacy, knowledge-building and technology, a methodology that reflects qualitative research framework was adopted, particularly as the northern setting plays such an integral role in development in Iqaluit.

W. Lawrence Neuman (1997), in his textSocial Research Methods: Qualitative and Quantitative Approaches, looks at the history of research in the field, beginning with the curious travelers who went far afield to gather, and send back home, information about those intriguing distant lands. For centuries, field research consisted of observations by strangers, often with little insight into the accuracy of their 'findings'. Indeed, such approaches are still common today. Northerners know about the impact of 'fly-in experts' who are in the North for a few hours/days prior to writing articles about life in the North for international media, often inaccurately portraying the culture of the Inuit to the global society.

It was not until the late 1800's that a researcher, British social anthropologist, Bronislaw Malinoski, actually became part of an unfamiliar community for an extended period of time to collect data. Malinoski felt that "social researchers should directly interact with and live among the native people and learn their customs, beliefs and social processes" (Neuman, 1997, p. 345). In the case of this research journey, as a resident of the North for over a decade, being part of communities that include all of the participants in this particular research project has enabled extensive interaction. Rationale for going to the North initially in 1980 did not include the purpose of research. Rather my husband and I went north with a sense of adventure after acquiring a teaching position in an isolated community, at time when such positions were rare in the Maritimes. The communities were isolated only in the sense that you had to fly in to get to the community. In terms of the people, there was no sense of isolation. Over time, decisions as a family to stay in the north became based on a love for its unique blend of cultures and distinct way of life. Indeed many say the North gets in your blood - you either love it or hate it. There's no gray area. Thus, being a participant narrator in the north has evolved over time. As Bruner so aptly states, "The cultural setting of one's own actions forces one to be a narrator" (1990, p. 81).

Even after extended periods of time living in the Arctic, personal claims of expertise aren't forthcoming. A sense of being fortunate to be an extended traveler in the North has developed, as well as an increased willingness to share personal experiences with others. Kvale's use of the metaphor of the researcher as a traveler is therefore most apt, given the metaphor of inuksuit used throughout this thesis. As a

traveler, people rely on the inuksuit to guide them, to point them in directions to take, whether paths traveled before or new ones they are embarking on as the tundra changes. Kvale notes that the metaphor of the traveler is a merited one for qualitative research, as the traveler "wanders through the landscape and enters into conversations with the people encountered . . . . The journey may not only lead to new knowledge; the traveler might change as well" (Kvale, 1996, p. 4). My current research journey over the landscape of the north, and the readings about the theories that underlie such research, have, upon reflection, led to new knowledge and indeed have resulted in personal changes. Thus the choice of qualitative research is a natural one, as "doing qualitative research is by nature a reflective and recursive process" (Ely, 1997, p. 179). As well, given my social nature, interest in exploring what people think within a given setting leads one to believe that qualitative research is indeed the most appropriate means of research, as it "involves learning more about, understanding or describing a group of interacting people" (Neuman, 1997, p. 344).

The choice of a qualitative framework for this study is also partially due to the emphases such framework places on the social context. Lincoln and Guba note that such inquiries should "always be carried out . . . in a natural setting, since context is so heavily implicated in meaning" (1985, p. 187). The social context is an important component in understanding how knowledge-building technology programs, such as Knowledge Forum®, could potentially impact on educators' perspectives of Iqaluit elementary students' literacy development, given the multicultural nature of the community and indeed the education system. Thus the fact that qualitative research is "rich in description of people, places and conversations" (Bogdan & Biklen, 1992,

p. 2) means that the context will form an integral part of this research.

> Qualitative researchers emphasize the importance of social context for understanding the social world . . . . Attention to social context means that a qualitative researcher notes what comes before or what surrounds the focus of the study. It also implies that the same events or behaviours can have different meanings in different cultures or historical eras. (Neuman, 1997, p. 331).

Given the unique nature of the Eastern Arctic, with the strong Inuit culture, originally based on oral traditions but increasingly emphasizing both oral and written communication, this methodology seemed to be the most appropriate one, once the decision was made, based on personal experiences and inquisitiveness in the north, to embark on this research journey formally in 1998. The combination of oral and written data collection in the 'field' reflects the realities of past and present life in the Eastern Arctic, although the whole notion of 'field' is a foreign one for people who do not believe in owning patches of land individually. All land is owned by all Inuit. Others just lease it, rather fitting in the sense that this particular research in the 'field' is a snapshot in time that has been 'borrowed' from the northern experiences of the participants.

The decision to focus on the educators' perspectives as a first step in analyzing the implementation of Knowledge Forum® program and its relationship to literacy development, arises from the assumption that educators and learners have a right to a voice about issues that affect educative processes, and from a belief that, as educators, our voices are not solicited on a regular basis, so have little impact on educational processes that govern educators in the day to day life of our chosen

profession. As Bolster (1983) observes, "a qualitative approach that emphasizes the perspectives of teachers and the understanding of particular settings . . . [has] far more potential for informing educational practitioners" (Maxwell, 1996, p. 21). Indeed northern research by respected fellow educator, Joanne Tompkins, mentions that "research that allows teachers and principals to treat the most important work they do each day as worthy of reflection and study helps give energy, drive, and enthusiasm to doing the job itself" (1998, p. 129).

Certain key principles seem to be prevalent in many descriptions of qualitative research. Bogdan and Biklen's five criteria of qualitative research were personally among the most helpful:

- the natural setting as the direct source of data and the researcher as the key instrument . . .
- information is descriptive . . .
- research is concerned with process rather than simply outcomes or products . . .
- analyze data inductively . . . [as] the abstractions are built as the particulars that have been gathered are grouped together. . .
- meaning is of essential concern to the qualitative approach (1992, pp. 29-32)

The value given to the natural setting has been discussed. Just being in a natural setting, however, is not enough. The benefits of doing research in a location that has been a personal residence for over a decade, whose complexity is attractive, are multifaceted. Smith (1995) noted that "without firsthand information about the research setting, it is difficult for qualitative researchers to develop adequate conceptual framework for their studies" (Neuman, 1997, p. 334). Developing

conceptual framework has not been an issue when one has been immersed in the setting for extended periods of time.

Upon reflection, the notion that the researcher is 'the key instrument' is also applicable as I certainly have been an integral part of the process, as the coordinator of the Iqaluit Knowledge Forum® Team, working with staff on a regular bases as a computer trainer, technician, mentor and fellow classroom teacher using Knowledge Forum® in Transition 'Year' classrooms. Therefore I concur with Harry Wolcott (1994) that "treating oneself, one's experiences, and one's questions about research as data are effective ways to extend our research dialogue." True to constructivist paradigm, as facilitator of multi-voice reconstructions, my voice is indeed one of "passionate participant" (Guba & Lincoln, 1994, p. 112), as several fellow educators have noted. Therefore a qualitative research focus on a "socially constructed nature of reality, . . .intimate relationship between the researcher and what is studied, and . . . situational constraints that shape inquiry . . . [where] the qualitative researcher does more than observe history; he or she plays a part in it (Denzin & Lincoln, 1994, p. 4 -7) seems appropriate, given the circumstances.

Schwandt's exploration of the constructivist paradigm within qualitative research demonstrates a "commitment to the study of the world from the point of view of the interacting individual" (Denzin & Lincoln, 1994, p. 100). With the type of research undertaken, rich descriptions of the context, the social interactions and themes are critical to understanding its uniqueness. Given the interconnected and flexible structure that Knowledge Forum® enables, an interactive approach of qualitative research enables potentially richer descriptions. "In this model, the

components form an integrated and interacting whole, with each component closely tied to several others, rather than being linked in a linear or cyclic sequence" (Maxwell, 1996, p. 5).

Process appears to play as important a role as product in qualitative research. If this research site is any indication, the prominence of process is upheld, particularly after observing the struggles and growth of team members over the course of several years, some of whom are participants in this research project. Through use of the Knowledge Forum® as a tool for learning and a means of validating experiences and cultures, the Iqaluit Knowledge Forum® team members have, in essence, been involved in participatory action research, defined by Bogdan and Biklen as "systemic collection of information that is designed to bring about social change" (1992, p. 223). Such research involvement potentially could support change in interactions of students and staff when technology is integrated in Inuktitut and English classrooms.

With the possible goal of implementing social change in education as a result of such participatory action research, an understanding of the critical-alternative research paradigm is needed. "The goal of [critical-alternative] research is to empower" (Neuman, 1997, p. 74). After reading many of the works of Paulo Freire, and the implications of relationships between literacy development and empowerment, a changing belief that it is the students and the educators in the North who potentially could be empowered by participating in any such research ventures has emerged.

In essence, if one needs to specifically label methodology, this particular

research follows a qualitative approach, from primarily a constructivist paradigm, using elements of interpretive and critical-alternative paradigms, such as participatory action research. The complexity of a constructivist paradigm is such that the epistemology of it and critical-alternative paradigms are both transactional. Therefore, the "investigator and the object of investigation are assumed to be interactively linked so that the findings are literally created as the investigation proceeds" (Guba & Lincoln, 1994, p. 110-111). This supports Bogdan and Biklen's criteria that data is analyzed "inductively . . .[as] the abstractions are built as the particulars that have been gathered are grouped together" (Bogdan & Biklen, pp. 29-32). There are no preconceived outcomes/destinations for this research journey, in a manner similar to the nomadic Inuit who, for centuries, have followed the caribou and other animals across the tundra, the process of survival, collective and personal growth and development more important than their specific location at the end of the day.

Constructivist and critical-alternative paradigms differ in ontology as critical theorists claim reality is historical in nature while constructivists feel realities are locally and specifically constructed. In a northern setting where history has played such an important role, willingly or not, in shaping the local and specific realities, this can be confusing. However, underlying this research project is a belief that it involves a relativist ontology where "realities are. . . in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature . . . and dependent . . . on individual persons or groups holding the constructions" (Guba & Lincoln, 1994 , p. 110-111).

Thus some personal confusion about specific paradigms behind the methodology utilized in this research project is understandable. As Denzin and Lincoln have noted, "the open-ended nature of. . . cultural studies projects leads to a perpetual resistance against attempts to impose a single paradigm over the entire project" (1994, p. 103). As an educator I do not believe in labeling students just for the sake of labeling, only accepting labels if they come with specific suggestions for helping the child learn and develop academically, socially, emotionally and physically. Likewise the specific labeling of this research journey's methodology is not a high priority, unless it assists in traveling across the research landscape. The previously mentioned points have done just that, providing an appreciation for the complexity of paradigms that guide research endeavors.

Scope of Study

> *Qualitative research us[es] . . . rich description, colourful detail, and unusual characters instead of a formal neutral tone with statistics. They give the reader a feel for particular people and events in concrete social settings (Neuman, 1997, p. 328).*

Knowledge Forum® has been introduced in ten countries around the world, and in several communities in the North over the last decade. Aside from articles on the team teaching that have been made possible through use of Knowledge Forum® in the north, such as 'Virtual Teaching on the Tundra' (McAuley, 1998), and interviews with a variety of journalists for publications around North America, relatively little has been written about Iqaluit's use of Knowledge Forum® from a northern perspective. McAuley's research focuses specifically on telementoring

relationships, which arose from involvement in the CSILE/Knowledge Forum® project at the Iqaluit site. His efforts resulted in the creation "of electronic spaces where we can consider and reflect upon our roles as educators as our students acquire the skills they need to reflect on and understand issues in their lives" (1998, p. 11). McAuley's research is based on specific long distance technological partnerships among educators in Iqaluit, Nunavut, Hay River, Northwest Territories and Prince Edward Island. Although some of the participants are the same, and the inspiring project provided the foundation for this research, it does not delve into the specific perspectives of Iqaluit educators, particularly with foci on literacy development and the use of the knowledge-building technology of Knowledge Forum®. Thus the scope of this research will cover the perspectives of a team of Iqaluit educators concerning the potential relationship between literacy development and technology.

This research will focus on the work in two elementary schools, Joamie and Nakasuk, in Iqaluit, Nunavut. The benefit of doing research at two schools where I have taught and where they are using Knowledge Forum® in their elementary grades, is that "immersion gives the researcher an intimate familiarity with people's lives and culture. He or she looks for patterns in the lives, actions , and words of people in the context of the complete case as a whole" (Neuman, 1997, p. 331).

In an effort to maintain a team approach, all members of the Iqaluit Knowledge Forum® Team were asked if they are interested in participating in this research. In September 1998, seven participants volunteered, forming a cross-section of educators according to years of experience with the project, cultural background and

position as educator. Thus first-, second-, and multiple-year users of Knowledge Forum®, Inuit and non-Inuit, classroom support assistant, teachers, administrator, and consultant were the initial participants, known in random order by their chosen pseudonyms of Mary, Brian O'Malley, Cecilia, George, Dale, Lance Headgame, and Ingkhar. As I have been part of this research project for the past eight years, and this team for the last several years, my voice became an integral part of the process, although in this research, my personal perspectives are woven throughout using my name, rather than being identified by a pseudonym. Direct quotes from my research journals are in italics.

A letter was sent to the Chairperson of the Iqaluit District Education Authority, asking permission to proceed with this research (see Appendix C). By mid-October 1999, verbal approval had been received from the IDEA, through the school principal and confirmed in a personal phone call with a member of the IDEA. In the north, with the history of oral tradition, verbal approval is traditionally valued and accepted. This is in contrast with southern academic requirements so written permission was ultimately sought and received as well.

Volunteer participants then were sent a letter early in November 1998 which outlined the research project, proposed timeline and initial baseline questions (see Appendix D). Those initial volunteers were then asked to give formal consent through a detailed consent form that was faxed to the schools (see Appendix E). Over the course of the next three months, during which there were frequent fax machine failures, as well as school closures due to storms and local fire that burned the phone wires, cutting off phone/fax/computer connections to that area of town

for an extended period of time, four of the seven managed to fax back their signed consent forms, while three others gave verbal consent after viewing the consent form. After living in the north for an extended period of time, both these forms of consent are initially acceptable, particularly when realizing that the consent form, as with many written communications, was written in English, the second language of most of the inhabitants of Iqaluit. Thus verbal explanations and oral acceptance are frequently the preferred mode of communication in the North. Awareness of southern written requirements, explained in person to participants, resulted in ultimately ensuring that all participants had provided both oral and written consent.

As students and staff build the knowledge together using the Knowledge Forum® database, it was important to have all families aware of what the project entailed, and have parents/guardians sign permission slips for their child's participation in the project. Thus, in conjunction with the administration of both schools, and the Iqaluit Knowledge Forum® Team, a letter and permission slip were drafted, translated, and distributed, and returned to the respective schools (for Joamie Elementary School's English sample see Appendix F). This was important as although students aren't mentioned by name in this particular research project, their work and behaviours are integral to the observations and perspectives developed by the educators involved.

As this research has taken over a period of several years, some of the participants changed when some of the initial members either changed occupations, transferred to another school where they weren't using Knowledge Forum®, or moved out of the territory altogether. As a high turnover rate in the north is normal,

as evidenced by "the average turnover rate of principals in the Northwest Territories in 1990 was 2.3 years" (Tompkins, 1998, p. 4), such changes in personnel are taken in stride. Thus although Dale, Lance, Brian O'Malley, Ingkhar and Mary were no longer main participants in this research project, their voice is still considered valid and the data from their initial interviews and database contributions still form part of the landscape.

With the loss of five participants midstream, upon returning to teaching in Iqaluit for the 1999 - 2000 school year, members of the staff as a whole were invited to be part of the Knowledge Forum® Team. Expecting perhaps three volunteers, I was astonished by the commitment to this project from seven educators at Joamie. The sole Nakasuk member was also new as she had taken over from the previous Knowledge Forum® teacher who went on leave. The same invitation as the previous year was then issued to Iqaluit Knowledge Forum® Team members in September 1999 to participate in this specific research project. An additional three team members volunteered to be part of this project - Vic, Ullariaq and Elisapee. As an aside, the whole issue of pseudonyms, required by the university, is an interesting one as northern participants had mixed feelings about being anonymous, not being able to show the world they are standing by what they say. The rationale behind how they actually chose their personal pseudonyms was interesting in itself.

Upon returning to the North, discussion about the research project occurred with the new principal. Then, an Iqaluit Knowledge Forum® Team decision resulted in a presentation on the project for the IDEA as there were many new members on the IDEA. The initial request was oral, an accepted mode in the north, through the

principal, as our school's voice on the IDEA. In addition, a written request was submitted to supplement the verbal approval received the previous school year, as written forms of communication are more acceptable in the south and are a requirement for university research. A request came for substantiation that this research met the ethical guidelines of the affiliated university. Once that arrived (see Appendix G), team members provided a bilingual presentation for IDEA on the fourth of October, 1999. As part of the presentation, a proposed brochure and consent form for participants in the 1999-2000 school year was submitted, receiving IDEA support (see Appendix H) in principle. Follow-up work with administrators, consultants, chairperson of the IDEA and translators resulted in a mutually acceptable bilingual brochure (see Appendix I) and consent form (see Appendix J) which were then distributed through the schools. The politics involved in conducting research was an eye opener, but if one is truly committed to what one is doing, i.e. Lincoln's and Guba's previously mentioned "passionate participant" (1994 , p. 112), then perseverance is the key.

Once team members agreed to become part of this research, they were provided with a revised draft of the project, its 1999-2000 outline and expanded initial interview baseline questions (see Appendix K) early in October. With the necessary approval of the local IDEA in place, the new participants and the two original participants, Cecilia and George MacCallum, were asked to complete the revised consent form (see Appendix L). The main difference between the original consent form and the revised one of October 1999 was that instead of conducting interviews by phone, E-mail or fax, due to presence back in the community of

Iqaluit, interviews would be conducted in person.

With five main participants in place, and five supplementary participants, research resumed during the 1999-2000 school year. Believing that sampling is generally completed with a purpose in mind, the original aim was for a cross-section of educators, with representatives from classroom assistant, classroom teachers, administrators and consultants who had either English or Inuktitut as a first language and varying years of experience in teaching and with using technology, such as Knowledge Forum®. Thus one of Michael Quinn Patton (1990)'s seven purposes for sampling is most appropriate as in essence the aim was to sample "critical cases to permit maximum application of information to other cases because, if the information is valid for critical cases, it is also likely to be true of all other cases" (Lincoln & Guba, 1985, p. 200). Although the research conducted in the last year does reflect critical cases, given that two of the participants were Inuktitut first language educators, and all had at least two years experience teaching in the north, the original plan of having administrators and classroom assistants as participants throughout did not happen for a variety of reasons. Although this was disappointing, yet not unexpected with the high turnover of employees in our schools, that is not to say that classroom assistants and administrators voices were not heard. The data from interviews with two administrators and one classroom assistant form part of the landscape, as previously mentioned, and three classroom assistants were part of the database the second year, although none of them were participants in the specific research project outlined in this thesis. Their voice comes through other participant educators' perspectives. Thus although both initial and

secondary interviews were conducted with four classroom teachers and one consultant, representing both English and Inuktitut language streams in the schools, the participation of many other educators in the database is valued.

Core Travelers

The backgrounds of participants, fellow travelers in this journey, are varied. Beginning with the five major contributors to this research, followed by the other original five participants, here are brief synopses of participants, using their chosen pseudonyms.

Cecilia

Cecilia is a bilingual Inuk Grade 1 teacher whose students are taught totally in Inuktitut. She has been involved with the Knowledge Forum® project for three years, beginning when she was teaching Grade 4 Inuktitut. Her integration of Knowledge Forum® and computers has grown over the course of those three years. Original encounters began in my first year in Iqaluit schools, in 1991, as she was my classroom assistant. She left the school after Christmas that first year to go to Nunavut Arctic College to train to become a classroom teacher. In 1997-1998, Cecilia taught my Grade 5/6 students Inuktitut three times a week while I taught her students English. In the 1999 - 2000 school year, our students (Grade 1's and Grade 4/5's) were partnered several times a week as reading and computer buddies.

To get a sense of the experiences that have affected Cecilia's realities, her initial schooling was totally in English in a community of about seven hundred

people just north of Iqaluit, with no translator available for the Inuit students in school. Teachers were unilingual English speakers from the south. Her home was a haven where only Inuktitut was spoken. In school she was called by a Qallunaat name that was given to her by the teachers, instead of by her Inuk name that she had been known by since she was born. She was punished by school staff for speaking Inuktitut so she learned at a very tender age that survival often meant withdrawing from attempts at conversation. Her memories of her initial schooling include learning about cows and horses, animals that she had never encountered. Cecilia was one of the original research participants so her initial interview was conducted by phone from Wolfville, Nova Scotia to Iqaluit, NWT on February 16, 1999. Her second interview date was in person, conducted at Joamie School in Iqaluit, Nunavut on June 20, 2000.

George MacCallum

The other original research participant is George MacCallum. George has been part of the CSILE/ Knowledge Forum® project in Iqaluit since its inception as he was responsible for bringing the software to Baffin in 1992 after a sabbatical at OISE. George is a former secondary school consultant with the Baffin Divisional Board of Education as well as former Information Technology consultant with the Department of Education in Yellowknife. He is a Qallunaat with background as an English teacher who spent almost twenty years as an educator in the North. George's role in the last decade has been one of telementor to various northern Knowledge Forum® teams, which has included technical, pedagogical and reflective

support. He has provided numerous workshops and poster presentations about Knowledge Forum® locally, nationally and internationally. George is currently completing his doctorate. George's first interview was by phone connection between Wolfville, Nova Scotia and Prince Edward Island. His final interview was conducted in person, at his home in July 2000.

Vic

Vic joined the team and this research project as the sole representative from another elementary school in town. She is a veteran northern teacher, having taught in several communities in northern Labrador, and in Inuvik, NWT before moving with her family to Iqaluit in 1989. The majority of her teaching in Iqaluit has been at the junior high level, where she experienced some use of CSILE in her classroom as part of a team of Grade 7 teachers using the program. Technical issues around computers in general within the school led to her dropping out of the original project. When she moved to the elementary school of Nakasuk, in her second year she acquired the classroom, grade level and CSILE computers from Mary who left on sabbatical. Thus she volunteered to join the Iqaluit Knowledge Forum® team and ultimately this research project in the fall of 1999. Both her initial and final interviews were conducted in person in her classroom, on October 25, 1999 and June 19, 2000 respectively.

Ullariaq

Another bilingual team member is Ullariaq, an Inuk Grade 3/4 teacher who

spent the majority of her day teaching the students to read, write and learn concepts in Inuktitut. Ullariaq was originally taught in Inuktitut for Kindergarten/Grade I in her home community farther up Baffin Island, with the rest of her schooling being in English. Unlike Cecilia, she had the benefit of a bilingual classroom assistant in her earlier grades. She was first introduced to computers when she was a student in grade 6. She has been teaching for less than ten years. Ullariaq became part of the research project in the fall of 1999, having used computers in her classroom for awhile. She had heard about Knowledge Forum® from fellow educators the previous year, but had not used it personally until the school year 1999-2000. A group of her students were taught the basics of Knowledge Forum® by a group of Grade 4/5 students. Her 'expert group' of students then went on to teach other students in her class and in a younger class. Both of Ullariaq's interviews were conducted in person in school, in December 1999 and June, 2000.

Elisapee

The newest member of the research group is Elisapee who is a grade four English First Language teacher. Prior to coming to the Iqaluit school, she taught ESL for two years in a community farther up Baffin Island. She also came from a southern Canadian island prior to her move north. When she began with this project, she was the least experienced team member in terms of years of teaching, years in the North and the use of computers. I taught her class Social Studies using Knowledge Forum® while she taught my students Physical Education during the 1999 - 2000 school year. Grade 4/5 students were often her coaches as she learned

how to use the technology of Knowledge Forum®. Elisapee's interviews were also both conducted in person, initially on December 6, 1999 and more recently in June of 2000.

Guest Travelers

Part of the landscape for this research journey includes the voices and experiences of guests or secondary travelers on this journey. As guests, who chose to accept the invitation to participate, although they were only able to stay for part of the journey, their voices have impact on the journey. Thus they are important components of the terrain covered. Thus brief synopses of Mary, Brian, Dale, Lance and Ingkhar are following.

Dale

Dale was the very first person interviewed for this project. Dale was the elementary principal at that time so witnessed and supported the implementation of Knowledge Forum® at the school level. Dale is originally from the Maritimes, moving to the Eastern Arctic in the late 1980's. Dale has made her home in the North, marrying a talented local artist. Most of Dale's classroom experience was with upper elementary ESL students. Dale's original interview was in November 1998. Dale transferred to the new middle school for the beginning of the last school year, so withdrew from the project.

Brian O'Malley

Brian O'Malley was the principal of another elementary school in Iqaluit at the start of this research. He was principal at that school when I was using CSILE in a Grade 6 classroom. Brian continued to support the use of technology in the school, especially the Knowledge Forum® project in Mary's/Vic's classroom. Brian has since moved to a southern province in the west of Canada. His initial interview was conducted by phone from Nova Scotia to Iqaluit on January 14, 1999.

Mary

Mary is an experienced northern educator originally from an Atlantic province. Her years in the north have been in two main Baffin Region communities - one to the west of Hudson Bay and in Iqaluit. She has worked extensively with ESL students in both elementary and junior high classrooms and as program support teacher, particularly with Inuit staff/programs. She was involved with CSILE for a year prior to becoming involved with this research project. Her initial interview was also by phone form Wolfville to Iqaluit in December 1998. She left the North on sabbatical for the past school year, choosing to drop out of the project.

Ingkhar

Ingkhar became involved in the Knowledge Forum® project as a classroom assistant in a Grade 5/6 Transition class part way through the 1997-1998 school year, where he became a valuable member of the team. As classroom assistant in a heterogeneous Grade 6 classroom during the 1998-1999 school year, he volunteered to become a participant in this research. Ingkhar was interviewed by phone from

Wolfville to his home in December 1998. Ingkhar's role within the school switched from being a classroom assistant to being in charge of cultural projects in the Sanavik portable beside the school in January 1999. Thus he was no longer involved with computers. He ultimately left the staff of the school so dropped out of the project in 1999.

Lance Headgame

The final original participant was Lance Headgame. Lance was a grade 6 English First Language teacher who was responsible for establishing the network, troubleshooting the computers and training staff in the use of computer basics and software such as ClarisWorks. Once transferred back to the school in 1997, we worked extensively as a team to write proposals for funding for computers, participate jointly in a course on troubleshooting Macs and assist staff with the use of computers in the classroom, both as full time teachers.

Initially the partnership between Apple and OISE was known as MacCSILE. When that relationship broke down, Iqaluit continued with both offspring - I used CSILE (OISE) and Lance used Co-learning (Apple). When Apple discontinued their version, Lance put his energies into other computer hardware and software. Lance agreed to be part of this research, requesting participation through fax to enable greater personal reflection. Thus his responses to the baseline questions were received by fax early in January 1999. By the spring of 1999, Lance had been asked to move as part of a team to the new middle school so his energies went into establishing a lab for that school. He dropped out of the research, but has recently

become involved in the Iqaluit Knowledge Forum® project as part of his role as technology consultant with the Department of Education for the Government of Nunavut. Aside from Lance's fax and a few contributions to the database, there is little in the form of written contribution to this project from Lance, although his musings over the years have been cause for great personal reflection on this journey. Thus his voice is valued.

The Map

If you want to know about how people understand their world and their life, why not talk to them? (Kvale, 1996, p. 1).

Selecting a site for the starting point in this journey was the easiest part of this qualitative research project, due to involvement in Iqaluit as a research site for Knowledge Forum® for six years prior to this personal research journey. Building rapport with the travelers on site was also not an issue, having been a teacher in the north for over a decade, and in Iqaluit since 1991, so familiarity with the context and the participants was already established. What did change was my personal role as participant researcher for that journey, through continual development as more of a mentor to staff when it came to the use of technology in general. With the added mantle of researcher, the participants did not seem to view my changing role as problematic, as the roles of mentor and researcher seemed to blend with that of fellow classroom teacher. The whole notion of a community of learners, where everyone has their own areas of expertise assisted in laying the foundation for this project. Thus the development of a local community of learners meant the

perception of the researcher being an outsider, or a 'higher up' wasn't substantiated, as this researcher was one of the team who had to function often in similar, very challenging positions within classrooms, within the school and community as a whole.

Conversations, both informally and formally, became the key to continued positive relationships with participants along the way. The only challenge to such conversations came from attempting to maintain relations with participants from a distance when staff are working full time and the researcher is in a different time zone attending university, relying on temperamental technology as the main source of communication. Once back on location, conversations proceeded more frequently and fluently.

Given the unique setting for this research project, and the preferred oral culture of the school community, it was most natural to utilize such conversation as the most prominent means of data collection. As an educator, emphasis is increasingly placed on the accommodation of the multiple intelligences of people one interacts with, whether students, staff or members of the community at large. After all, "to do justice to complexity, qualitative researchers immerse themselves in the settings or loves of others, and they use multiple means to gather data" (Glesne & Peshkin, 1992, p. 7). Thus 'conversations' for the purpose of this research took many forms, from transcripts from interviews by phone, fax, Email or in person, notes posted as text and graphic contributions to the Iqaluit Knowledge Forum® databases, to personal observations in classroom research journals and the oral reflections of participants. The very nature of the participants, their familiarity and their genuine

openness, whether in sharing successes or concerns, made the gathering of data relatively easy. Indeed familiarity with participants may have been an advantage as, "often an interviewer does no harm and indeed does some good by entering judiciously to let the interviewee know that you 'have been there' and can sympathize. A growing trust is the basis for richer interviews" (Ely, 1997, p. 61). The only hindrance to data collection came in the first year when relying on technical connections that were often problematic when thousands of kilometers away in Nova Scotia.

The course of action, once appropriate permissions were obtained, involved conducting initial interviews with the representative cross-section of educators involved in using Knowledge Forum® in Iqaluit, Nunavut to identify their individual beginning thoughts/experiences. As Vygotsky comments, "Every word that people use in telling their stories is a microcosm of their consciousness" (cited in Seidman, 1991, p. 1). Thus my interest was in understanding the experiences of the members of the Iqaluit Knowledge Forum® team, in the sense of how they interpret and apply meaning. I concur with Seidman that "at the heart of interviewing research is an interest in other individuals' stories because they are of worth" (p. 3). That sense of valuing, not evaluating, participants was a very important aspect of the whole data collection process.

In spite of "conversation [being] . . . the basic mode of human interaction" (Kvale, 1996, p. 5), the choice of interviewing as a primary means of data collection was not made lightly. The main reason for doing interviews is "to learn to see the world from the eyes of the person being interviewed" (Ely, 1997, p. 58). As noted

previously, the voice of educators at the school level is not solicited nearly enough, therefore the opportunity to hear their voices through research that "attempts to understand the world from the subjects' point of view, to unfold the meaning of people's personal experiences, to uncover their lived world" (Kvale, 1996, p. 1-2), seems to be most authentic when personal, individual interviews are conducted with the participants so their words, ideas, thoughts, and experiences take precedence. Following the pattern of most qualitative research, the type of interviews conducted were semi-structured as there was foci on themes such as literacy development, knowledge-building and technology, with several suggested questions for each theme, but the actual questions asked often changed during the course of each interview. Conducting semi-structured interviews with each of the participants "allows depth to be achieved by providing the opportunity to probe and expand the interviewee's response" (Hitchcock & Hughes, 1989, p. 83). From years of teaching in second language situations, as basically a unilingual English speaker, there is recognition of the importance during interviews to "adjust to the members' norms and language usage" (Neuman, 1997, p. 371). For the Inuit staff members, their original constructions deserve equal consideration with other participant's who come from more traditionally dominant cultures. This does not mean 'watering down' the meaning, rather expressing thoughts and questions in plain English, taking the time to elaborate when necessary. Personal interviews have an advantage over phone interviews as often body language can provide the interviewer with clues as to when such occasions arise.

For the initial participants who were interviewed in November 1998 (Dale),

and December 1998 (Ingkhar), the following were the baseline questions:

1. a) What are your experiences to date using technology in the classroom?

b) What do you think is the role of technology in the northern elementary classroom?

2. a) What does 'knowledge-building' mean to you?

b) What are your experiences to date with CSILE / Knowledge Forum®?

c) What are the particular advantages/disadvantages you've observed to date using technology such as Knowledge Forum® in the northern classroom setting?

3. a) What is your perception of 'literacy'?

b) What are your observations about literacy skills when Knowledge Forum® is utilized?

Based on a thought by Ingkhar as to how literacy would have been perceived in traditional Inuit culture, that baseline question was added to all future interviews, an indication of the value of having guests' voices as integral parts of the journey. In addition, the sequencing of questions changed to adapt to the progression from technology in general to specifics about the computer software program of Knowledge Forum®. The role of literacy development and technology began to be explored in more detail as well (see Appendix J). That is one of the advantages of qualitative research, the interviews are adaptable to enable richer descriptions.

These interviews were transcribed for the most part by myself. Once self-imposed writing deadlines loomed, a neighbour/relative/secretary was enlisted to assist with the lengthy transcription process. The transcriptions were to be read for the purpose of recording memos, so as to "develop tentative ideas about categories

and relationships" (Maxwell, 1996, p. 78). Copies of the transcriptions were sent to the people interviewed for their perusal, to verify that they are an accurate reflection of the interview process.

Analysis began with contextualizing strategies as the data needs to be understood in this unique context. "Analysis involves working with data, organizing them, breaking them into manageable units, synthesizing them, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others." (Bogdan & Biklen, 1992, p. 153) Analysis involves coding the participant's words, followed by the search for themes. "Inductive data analysis . . . [is] defined . . . as a process for making sense of field data" (Lincoln & Guba, 1985, p. 202), which, in this case, involves multiple data sources that reflect the existence of multiple realities, given the multicultural nature of the community. Data analysis is comprised of coding and finding themes in the transcripts and other data sources. An earlier research journal states that "given my relative inexperience in data analysis, the bulk of it will be completed once the data has been collected". Analysis after data collection is an integral part of qualitative research. Qualitative research begins with a research question and theories develop during data collection and analysis. Holsti (1969) uses the terms 'unitized' and 'categorized' instead of coding and analyzing for the next steps in the study, with the former referring to the taking "raw data . . . [and] systematically transform[ing] and aggregat[ing] into units which permit precise description of relevant content characteristics" (Lincoln & Guba, 1985, p. 203). Categorizing therefore becomes "a process whereby previously unitized data are organized into categories that provide descriptive or inferential

information about the context or setting from which the units were derived" (p. 203).

As a qualitative researcher, theories will be developed through comparisons among the categories. Thus the categories are not preexisting, as they are in conventional inquiry. Naturally the main themes that guide interview questions, surrounding literacy development and technology, form the framework for the categories that develop. Such inquiry that has the theory following from data is sometimes referred to as grounded theory, recognizing that "transferability is dependent on local contextual factors" (Lincoln & Guba, 1985, p. 205).

In addition to the interviews, over the course of the year, these volunteer Knowledge Forum® educators were asked to continue to participate regularly in biweekly after-school sessions as part of the Iqaluit Knowledge Forum® Team, as well as continuing contributions to the Classroom Research Journal View on the Iqaluit Knowledge Forum® databases, in the form of knowledge-building notes around concepts such as the impact of Knowledge Forum®, observations, questions and comments. I anticipated being part of these databases initially through Apple Remote Access from Wolfville, Nova Scotia until they became available via Internet connections. Due to technical issues, particularly as the government switched from the Government of Northwest Territories to the Government of Nunavut, the Apple Remote Access connection was not always reliable in that first year, and the Internet connection for the school became part of a larger Internet provider political issue. Thus it was a technical relief to actually become part of the school network upon returning to Iqaluit. I did become the first line of contact for staff when it came to

troubleshooting computers as Lance moved to another school, a role I was not always comfortable with. This necessitated acceptance of responsibility for ensuring the continuance of the pilot which, in turn, could affect the outcome of this research. If computers do not work, the educators cannot provide perspectives and observations on how they feel particular software is working.

The educators involved were ultimately interviewed later in the spring and summer of the second school year (2000) to see if their perceptions had changed from their initial interviews. Once again those tapes were transcribed for further coding and analysis.

Ethical Issues

With any journey, there are ethical issues throughout, particularly concerns about impact on the surrounding environment. When one is participant researcher, sometimes it seems the ethical concerns should be magnified. Consciousness of separating roles as researcher from those as computer troubleshooter, staff trainer, coordinator of the team and most importantly, team member was always at the forefront. How successfully this was achieved remains to be seen. Acceptance of personal bias in such research is vital, particularly given the multiplicity of roles in a small, northern community where the participants know each other and often had worked together for years.

> One must accept that multiple interpretations exist . . . and that to be completely unbiased . . . is impossible. So we work through for ourselves and negotiate with . . . [our participants] the functional understanding that complete objectivity is

> unattainable, that we strive to become less blinded by our own subjectivities, more self-aware (Ely, 1997, p. 120).

The priority became demonstrating regularly that everyone has a voice, collectively representing reflections of multiple realities, and attempting to ensure that no one's voice would have dominance over any others.

Throughout this research journey, conscious of past bad tastes in the mouths of northerners about the damage done by 'fly-in experts', ensuring that participation was through informed consent was another priority. Thus participants have been aware, from the very beginning, of the purposes and main features of this research design and have been told they can withdraw at any time. In fact that happened with several of the initial participants, not due to unwillingness to participate but rather because their situations changed so they weren't able to continue for one reason or other. Whatever contributions they were able to make have been valued and included as part of the landscape.

Another ethical issue revolves around the issue of confidentiality, particularly as participants were volunteers. Confidentiality perhaps is the greatest ethical challenge in a northern community in the sense that it is very difficult to maintain anonymity when one participant is the sole participant from her school, while another may be the only Inuk or Qallunaat teacher for that grade in another school. Yet those descriptions of cultural background and school experiences are important in understanding the forces that shape who they are and how they respond. For example, if people are asked what they see as literacy in traditional Inuit culture, whether they are an Inuk or Inuit and raised in the north or Qallunaat recently

arrived from the south, affects how they understand, their lived world, and how they respond. Thus the descriptions provided previously in this chapter were included to provide a profile of the participants for readers from outside our community, so they have a better understanding of the social context this research took place in and the background of the various participants, not to place more value on one participants' voice than another. Within the project community, anonymity is almost impossible as all participants were part of a larger team that was active throughout the school and in the community. As much as possible, for outsiders, the identity of individuals should not be an issue as educators within northern schools have a high turnover rate.

In an effort to ensure that facts and interpretations are subjected to scrutiny by respondents, copies of transcripts have been returned to participants for inspection. Copies of the analysis and conclusions have also been sent to the community. Copies of the final thesis will also be given. If there are areas that come in conflict with the multiple realities of the participants, every effort will be made to include any such negotiated outcomes, with the understanding that not all negotiations can end in agreement, and one cannot expect an inquiry to produce findings that everyone could or would accept. But everyone does have the right to provide input on the subject of what the outcomes are, and the inquirer has an obligation to attend to those inputs, honouring them so far as possible (Lincoln & Guba, 1985, p. 211).

As a researcher, the notion of consequences resulting from participation in a project is one that is difficult to ignore. Upon reflection, by providing opportunities

for increased awareness of the project to IDEA, staff, parents, students, and the community as a whole, by being clear right from the onset the implications of involvement in Knowledge Forum® through a public database and the fact that Iqaluit is one of the North American research pilot sites, the possibility of harm has been significantly reduced. As for benefits for the participants, those will unfold in greater detail as the analysis of the data continues. Suffice to say that participants' comments at the end of the year as part of the broader team were very positive, both upon reflection of the whole research project and the changes noticed personally. After all, "an interview inquiry is a moral enterprise: The personal interaction in the interview affects the interviewee, and the knowledge produced by the interview affects our understanding of the human situation" (Kvale, 1996, p. 109).

Thus the rationale behind participating in qualitative research, following a constructivist paradigm, is that as the inquirer, my role has been one of coordinator and facilitator (Guba & Lincoln, 1994 , p. 114) so that all participants, myself included, come to a greater understanding of our work as educators in the north, how technology and literacy development are potentially interconnected, through the creation of mutual understandings based on various forms of conversations. Kvale's metaphor of researchers being similar to travelers remains prominent as traveling is more about the journey than the destination, particularly when the destination is not known. Those best suited to assist in this journey are the guides, or inuksuit that dot the landscape of our travels. The voices of the participants, as educators, are perhaps the most appropriate models for present and future inuksuit.

Chapter Five will therefore expand on those voices as they are woven

throughout the analysis of the data, exploring what impact winds of change have on the educators' journeys.

Chapter 5: Analysis

The Winds of Change

The aim of inquiry is the understanding and reconstruction of the constructions the people (including the inquirer) initially hold . . . . The criterion for progress is that over time, everyone formulates more informed and sophisticated constructions and becomes more aware of the content and meaning of competing constructions (Guba & Lincoln , 1994 , p. 113).

The words of Lincoln and Guba imply the analytical component of research should be relatively easy. One might think that, for a researcher immersed in the research and lives of the participants for an extended period of time, understanding the reconstructions of their constructions should be a breeze. Actual experience in analyzing data has demonstrated that, like the weather when traveling across the tundra, one minute it could be a blizzard, the next all is calm. Neuman's description of coding qualitative data as "wearisome and tedious" (1997, p. 422) on some days seems applicable, resembling traveling day after day among the indistinguishable white hills. Plath compared coding and analysis with "the dramatic tension of watching paint dry" (Neuman, p. 422). After months of sometimes defeating feelings

of working with the data, comparing data analysis to watching the ice in the bay freeze in anticipation of continuing a journey may be more appropriate as some days a strong wind comes along, blowing the ice (and analyses) out to sea, necessitating a fresh start. There is reassurance, however, in the inevitability that both the freezing of the bay for travel and analysis of data collected will eventually take place.

With the wealth of resources collected, feelings of frustration and being overwhelmed have led to a sense of being lost in the blowing whiteout on the landscape of this thesis journey. The sudden sense of directionality arising out of signs from the clearing landscape could be compared to a light being switched on, most apt as the symbol for Knowledge Forum® software is a light bulb. The uniqueness is lessened when reading that "contrasted with weeks and weeks in which she will be engaged in mechanical processing, the truly analytic moments will occur during bursts of insight or pattern recognition" (Wolcott, cited in Neuman, 1997, p. 422). This lack of singularity of experience does not detract from the motivating feeling of euphoria when data begins to make sense, so the journey can continue.

The voyage through the land of data analysis began by perusing the various sources, assigning each response a different combination of letters and numbers utilizing open coding. Beginning topics for each response were noted in the margins. A secondary pass through the data determined themes within themes, resulting in a variety of subtopics. From there, similar aspects of topics and subtopics were placed on index cards. This was more challenging than anticipated, because many excerpts and quotes had relevance in several topics and subtopics. Sometimes a

choice had to be made which one the excerpt related most to, while at other times there was an overlap, with parts going under several different categories. Through careful perusing, during both the mechanical data reduction and analytic categorization stages, the themes emerged. Initially, there was a temptation to divide data into the three main components arising from the initial research questions- 'literacy', 'knowledge-building technology' and 'cultural relevance'. Thus participants' references to the various types of literacy and current issues would fall under that theme, cultural practices, past and present could be categorized under 'cultural relevance' while theories, practices, roles and perceptions about technology could be classified under the theme of 'knowledge-building technology'. These general themes became problematic when pondering how technology could be a separate entity from literacy in today's world, given the multiliteracies discussed in Chapter Three. Thus the broader theme of 'communication' replaced 'literacy' after assessing the data in more detail, one which was more inclusive of technology. In the same manner, the data revealed so much more about culture that went beyond just cultural relevance. Cultural issues, practices, and relevance became topics of the overall theme of culture. As knowledge-building technology as a theme seemed to address only one component of the changes educators were articulating, societal change became the umbrella theme that encompassed changing influences (including technology), roles, access and perceptions. These categories seemed appropriate, as noted by similarities to the contextual framework in earlier chapters that formed the base of the research inuksuk guiding the way.

Accepting change as an integral component of analyses of literacy, technology

and culture, means acceptance that, like the rocks in an inuksuk, reconstruction of the participants' constructions may not be the sole way to examine data, rather a reflection of a place and time. The reconstructions themselves seemed to change as often as the box of file cards was dropped, necessitating new ways of looking at the data collected. Thus greater importance was placed on the process of building reconstructions, through increased awareness of the content and meaning of those constructions. For example, how could culture be treated as a separate entity any more than literacy or technology could? Another wind was blowing, changing directions of data analysis.

Over time, the whole impact of societal change on all components surfaced as a major theme. Thus the data was reanalyzed under themes of changing influences in education, changing educational perceptions, changing educational roles and practices, resulting in changing issues in education. These revised themes allowed for the integration of literacy, culture and technology. Thus the remainder of this chapter will focus on data analysis under the general themes of changing influences, perceptions, roles/practices, and issues, weaving original categories of literacy, culture and technology throughout.

Changing Influences in Education

> *Culture is the representation of lived experiences, material artifacts, and practices forged within the unequal and dialectical relations that different groups establish within a given society at a particular point in historical time (Freire, in Giroux, 1985, p. xxi).*

In this section, I will introduce many of the influences that impact northern

education that have emerged as major themes in the data. Specifically I will explore the changing influences of elders/ancestors, the church, Eurocentric schooling, mass media, technology and global society. Central to discussion of these influences are the cultures of northern society.

Influence of Elders/Ancestors

Past cultural practices and lived experiences of elders have played roles in the development of current literacy theories for some northern participants, emphasizing Hirsch's 'cultural literacy' (1983). For centuries, the main ways of learning in Inuit culture were through observation of elders and listening to ancestral voices before trying out new knowledge personally. Children had to learn at a very early age exactly what they had to do to survive, often through direct transfer of information, which is reminiscent of Dewey's discussion (1916) of 'pupil' in Chapter Two. With such transmissional formats of learning, the grandparents of both Ullariaq and Cecilia were able to dialogue with their world at that time. Both participants noted that for many generations of Inuit, traveling and surviving by reading the land was possible because knowledge was transmitted and shared among the members of the small groups that stayed together, reflective of situated learning theories. Their earlier educational experiences were similar to those in traditional classrooms in regards to the transmission of knowledge by adults to youth through groups that are together for extended periods of time.

Influence of the Church

For many decades in the last century, the church held the greatest influence over literacy development in the north, with missionaries responsible for depositing theologically based information on the 'tabula rasa' (Locke, 1690) of Inuit minds. The only access to written Inuktitut for many generations was the Bible. Indeed Bishop Peck became a role model for Inuit as he used the Bible to teach so many to read syllabics. There is a definite sense of pride in Cecilia's voice when she talks about this well-known northern missionary who taught her father to read Inuktitut. Cecilia herself remembers learning to read Inuktitut in Sunday School, rather ironic when you consider she was not allowed to even speak Inuktitut in the church-run schools she attended. Ullariaq recalls her grandparents learned to read and write from the Anglican minister who would have them read a Biblical verse, practice it and recite it back to him. In turn, her grandmother taught her syllabics and their sounds from the Bible when they were out on the land camping. For many Inuit today, those Bibles, prayer and hymn books remain the major sources of written Inuktitut in their homes, exemplifying Winterowd's descriptor of reading and writing as reflections of values (1989), although the church's role in formal education is greatly minimized with decreasing value placed on the church in general.

Influence of Eurocentric Schooling

Formal schooling for northerners has changed over the last fifty years, from reliance on ancestors and the church as primary influences in learning, to more Eurocentric focus on written tenets of knowledge, indicative of educating for

dominance rather than liberation (Freire, 1971). The impact of such early formal schooling experiences on literacy development varies according to participants' ages and locations. Cecilia, as noted previously, was taught totally in English in a community school, often by southern teachers who stressed cows, horses and southern values, changed her name and punished her for any cultural practices, thus demonstrating a rejection of her identity. This echoes what was discussed earlier by Kale and Luke (1991), as her earlier literacy practices worked against her deeply embedded culture. As a result, any definition of literacy for Cecilia reflects inclusion of cultural practices that were denied her in earlier formal schooling experiences.

Ullariaq was schooled in the north as a member of the next generation, being taught initially in Inuktitut. Her transition in Grade One to English was a challenge, she recalls, but felt her culture and language had earned a place in her schooling. Although Ullariaq was raised in a community setting and was the second generation in her family to attend formal school, she reflects that a great deal of her cultural literacy development was still the result of frequent camping on the land with her grandparents. She also stresses the benefits of cross-age modeling, a throwback to her ancestors, when recalling how her older best friend helped her with Inuktitut by circling words in the Inuktitut Bible for her to read and how older students (repeaters) in the class helped her learn English in school.

Both Vic and Elisapee received their education in southern Canada. As they are about the same age difference as Cecilia and Ullariaq, it was interesting to note that their educational experiences were similar while Cecilia's and Ullariaq's were so totally different from each other, exemplifying how seemingly little education in

Vic's and Elisapee's shared home province changed over time when compared to the revolution happening in northern education. Both Vic and Elisapee recalled a fair amount of memorizing and regurgitation of Western Society facts found in prescribed textbooks, with little application, which is consistent with the container model of education noted earlier by Freire (1971) and Bloom's definition of literacy that includes reference to a warehouse of the works of Western civilization (Giroux, 1992).

With the exception perhaps of Ullariaq, the accommodation of several cultures in education, a multicultural approach, was not a reality in schools for the participants. Each experienced an education that reflected the dominance of Eurocentric culture so initial views of literacy are often the ones most accepted in Western Society. Indeed the whole idea of multiculturalism, a policy in Canada since 1971 (Fleras and Elliott, 1996), as a component of education that potentially could enhance literacy development, was a foreign one in earlier schooling experiences for the majority of participants, even though they were in the school system after 1971. All of the participants are changing the influence of multicultures in education today, a departure from their own early schooling experiences. The impact of changing multicultural practices on literacy development remains to be seen, but the challenge, noted by Hamme (Maina, 1997) appears to be a positive step thus far for northern educators.

Influence of Mass Media

For today's youth, the advances in mass media overall have resulted in even

more far-reaching changes in northern literacy development, more extensive than the influence of the church, elders, and earlier schooling experiences of educators. The following discussion of the impact on northerners of a variety of mass media brings to mind Mehlinger's metaphor (1996) of new technologies resulting in increased access to an erupting volcano of information, as well as Rother's and Baron's delineation of media literacy (1992).

For Cecilia's family, initially they relied on irregular postal service as the primary means of communicating with other family members not living nearby. The coming of telephone changed communication patterns in that it decreased the use of written Inuktitut, as "you can just dial and talk" (Second interview). Thus Inuit literacy development reverted to oral communication as a primary means.

For many years, the only other source of written Inuktitut was the newspaper. Today, for many Inuit adults, this remains the case, with the regional trilingual newspaper, Nunatsiaq News. This lack of written Inuktitut resources for unilingual Inuktitut speaking northerners has affected their literacy development by limiting their involvement in a broader society, noted by Cecilia when she shared some of the literacy experiences of her unilingual family members who could not make use of the newest mass media invading the north, the Internet, aside from online newspapers, because most of the information posted on the World Wide Web is not available in Inuktitut. Youth have an advantage as northern educators have produced and published several hundred children's storybooks, written in Inuktitut. This has only occurred in the last decade and a half, and distribution is primarily through school settings so the majority of Inuit students still enter school without

having been read Inuktitut books, aside from the Bible.

The coming of television through cable via satellite has perhaps been the most invasive mass media, often believed to be negatively affecting first language Inuktitut literacy development. Although Cecilia points to the benefits of television in increasing awareness of a global society as "they know what's going on in the world because they've seen it on TV" (Initial interview), George fears it is undermining the acquisition of Inuktitut. George recalls one of Jim Cummins' northern visits, when Cummins is attributed with commenting that "usually the first sign or the first crack in the armor of indigenous languages is television and mass media getting there in the dominant language" (Second interview).

Some fear that advent of the computer, with exposure to the world through the Internet, will eclipse all of these previously mentioned forms of mass media, thereby contributing to diminishing literacy development in many northerners' first language of Inuktitut. Such fears fuel the cautions of Harris (Ellis, 1974) who expresses concern about machines potentially dominating social education systems, potentially resulting in lack of universal desire for literacy, an issue raised by Hunsberger et al. (1998).

Influence of Technology

There is the belief that computers are responsible for changing perceptions of knowledge, teaching and learning in the north and indeed around the world, a view reinforced by Papert (1980) theory's that the computer is creating an environment for change, delineated in Chapter 3. Computers were nonexistent in earlier school

cultures for Vic, Cecilia, George and I. It is interesting that although Elisapee and Ullariaq are of similar ages, Ullariaq in the north was exposed to computers in Grade Six while Elisapee in southern Canada didn't have the opportunity to access computers until university. The influence of technology and the role it should take in literacy development in northern classrooms was therefore one of the questions raised with each of the participants. Elisapee, in her initial interview, views using computer databases in northern classrooms today as having similarities with traditional Inuit forms of communication.

> Years ago they didn't read, they didn't write so they had to [communicate] by word of mouth. Today kids can read, can write so they are using the computers to do it. Because we are spread out more, they are using Knowledge Forum® to do it. You can't very well shout down to Hay River [in NWT] or . . . [another school in town]. So they are just using the computer to do it . . . . It's basically what they were doing years ago but today we just use the computer to do it.

Lance, in his faxed responses to the initial questions, replied that information technology has a role in all classrooms, north and south, as much of a role as the technology of paper, pencils, and books. His perception that "computer technology, when applied creatively, can be a boon to students who respond to the playful, non-threatening environment a computer may convey, as well as those students who are highly motivated and want to work at their own rate" shows the potential spectrum of computer usage mentioned by Falbel (1991) and Papert's (1980) notation of the multiple appeal of computers.

Vic also feels computers in northern classrooms should not be treated as a

separate subject, rather as a learning tool, integrated with all other uses of language of their day as "it should be . . . just a part of what they do, not an extra or a frill but just a part of their everyday learning" (Second interview).

The consensus of participants is that the degree of influence the computer has on literacy development is tied to issues of comfort levels for those using them. All noted the generational differences in comfort levels, citing personal examples of the importance of starting from levels people individually perceive they have as starting points (Bell et al., 1990). Students are motivated by the computer itself so participants feel student comfort with computers for the most part is not an issue in their literacy development. Vic reports that her students are "just as comfortable using the computer as they are a pencil" (Second interview) while Cecilia has found that her students "are not scared of touching anything at all in the computer . . . unlike us (adults) who just learned" (Second interview). Elisapee comments "it was mindboggling. Kids know so much about computers and up until the last few years, I knew nothing about them really because I wasn't exposed to them" (Initial interview).

Thus, if these educators are indicators of the norm, the challenge in using technology to possibly enhance literacy development appears to be getting the staff comfortable with their use so they can integrate computers in their classrooms, as students are already motivated to learn using them. The biggest hurdle to overcome with staff, and some students, is the notion that one does not have to know everything there is to know about particular software or hardware right from the beginning. The learning pace is gradual, individual and sometimes collective

Elisapee talked about being timid to turn on the computer at the first of the year while Cecilia was afraid to even touch the computer. By the end of the year both were attempting to troubleshoot when something went wrong, as it invariably does when technology is utilized in the north. Vic fears she is holding back her students because of her slower pace in acquiring comfort with computers in the classroom. "Computers were the first . . . aspect of teaching that I don't feel I have a handle on," still an issue for her by her her second interview as she laments "My kids would be a lot further ahead if I was more on top of it . . . . They can go pretty far themselves but to bring new things into the picture, it has to come from . . . the teacher (although) I'm not the only one to teach them something." She also realizes that her comfort level with technology may be situational, which demonstrates the progress she has personally made.

> Sometimes I say to my husband . . . when I am trying to do a simple task on the computer [at home]. 'You must think I'm a real idiot. You should see me at school . . . Sometimes I think he can't image I can open a program, do something, print it . . . make changes . . . and close it up again (Second interview).

Over the course of this research project, the comfort level of all participants seemed to increase, particularly as they integrated computer use as part of their regular activities, perhaps increasing opportunities for literacy development for themselves and their students. Personal reflections support this, as does Papert's theory (1993) that computers are most effective when they allow everything to change:

> *As my comfort level with the program had gradually increased, my focus turned*

more to observing the students' interactions on and off the computers. Although an integral part of the classroom, in terms of research I believe I was becoming more objective as I was no longer hindered by learning the software. I also spent more time analyzing how I teach and learn (Tumblin, September 28, 1998).

Influence of Global Society

As a child, Cecilia recollects not knowing that a world existed outside her community, not even being aware of other communities in the north. Now she teaches her students, using technology, about a much larger world, one that goes beyond earth to the solar system.

> I think we shouldn't be just under our own little umbrella. I think we should spread, learn other cultures . . . or about other people . . . Now I think it is a lot easier for the students to learn about more things because they know it's there. When I was in school, it wasn't there (Initial interview).

As people of the North have become aware of their role as part of a global society, they are being exposed to uses of technology that are totally foreign to their previous lifestyles. Ullariaq recalls a southern lady at a local bank expressing amazement at how literate Inuit were when it came to learning how to use Interact machines, reflective of the International Adult Literacy Survey (1997) definition of 'literacy'. Perhaps the ability to adapt to changing conditions for centuries enhances their literacy development, enabling them to become integral parts of a global society.

Computer usage itself does seem to broaden the scope of a more global

society, thereby increasing opportunities through technology for literacy development in an expanded context, as noted by Ross and Bailey's descriptors of their electrographic literacy era (Niederhauser, 1996). In her initial interview, Vic noted that

> Computers. . . open up a world that is not there otherwise . . . . You can communicate with someone at the North Pole and in Japan . . . even between classrooms, . . . school to school, . . . opening up a world of knowledge . . . . It has to be very clearly directed and steered so that you're getting the most benefit of it but to me it's another way of helping them with language.

The perceptions of the influence computers potentially have on global literacy development vary, from its role as a motivational tool to opening up the world to bringing together the modern and traditional worlds. Cecilia feels that if Inuktitut literacy development is to advance, its use in technology must also occur beyond the schools, citing her sister who is unilingual (Inuktitut), has access to a computer at home, yet is isolated from a global society that could be available at her fingertips because she is not literate in the dominant language of English. Advancing technologically to keep up with the rest of the world, developing literacy along the way through changes offered society in the use of such mass media may have too high a price to pay if it means losing the Inuktitut language and ultimately Inuit identity. Which path literacy development takes, through changing exposure to the global society, often depends on whether issues of language and comfort with computers are addressed, stressing the need for critical multicultural literacy (Weil, 1993).

Changing Educational Perceptions

The focus on literacy development in initial questions to participating educators resulted in observations of gradually expanding perceptions of literacy. From initial reactions to reflective practices, various components of changing educational perceptions evolved, enabling insight into the transition from traditional perceptions of literacy to perceptions of traditional literacy for Inuit to perceptions of literacy for today's youth.

Traditional Perceptions of Literacy

How literacy is defined and valued traditionally is another of the baseline questions asked of participants. Without exception, their first spontaneous response pegged literacy as being able to read and write, a view shared by many in Western Society. What is interesting is how each of the participants expand their thoughts from this starting point. Dale in her initial interview views literacy as "the ability to read and write at a level used in the common world," comparable to Maina's literacy tools for societal survival (1997). Vic comments that "being literate . . . is being comfortable to read and write in a language" (Initial interview), whether it is your first or second language. By her second interview, Vic stresses functionability as literacy "means being able to function, read, and write in a language," similar to the Southam Canadian Survey (1987). Ingkhar adds communicating as an important part of literacy. Elisapee (Initial interview) includes understanding in her definition, "Today you have to have deeper understanding of what you are reading and writing." She views understanding and meaningful reading/writing as a change from

past generations who did routine writing and rote reading without reading/writing to find answers. Both communicating and understanding are also integral to literacy delineations by Saravia-Shor and Arvizu (1992). Ullariaq takes writing one step further to include composing and story writing as separate entities from just writing from other sources (First interview), comparable to the distinction made by Heath and Mangiola (1991) between literacy skills and literate behaviours. George discusses the empowerment inherent in being literate.

> Literacy is making meaning and taking control . . . . It's not enough for me to . . . pick up a text and read the words out to you. I have to be able to make sense of those words. They have to have meaning . . . resonate in my life and then I have to . . . apply them in my life (Second interview).

Thus from their initial concepts of literacy being just reading and writing, participants have expanded their definitions to include comfort with, understanding of, functioning and communicating through, creating and applying reading and writing in meaningful ways .

Perceptions of Traditional Literacy for Inuit

When asked to consider what literacy might have meant for Inuit traditionally, most of the Qallunaat participants initially thought of literacy in terms of the dominant language of English, reinforcing Scribner's socially defined literacy definitions (Hunsberger et al., 1998). Cecilia however thought immediately of Inuktitut writing and speaking as literacy during her first interview, interesting given her personal educational experiences. During her second interview Cecilia mentions

that she knows a lot of Inuit who can't read and write in Inuktitut because they weren't taught. This is in contrast with Ullariaq who comments that "I've never seen an illiterate Inuk yet, who couldn't read and write in Inuktitut or both" (Initial interview). The difference in perspectives may be due to generational experiences as Cecilia's generation were denied formal education in their first language while Ullariaq's generation have been more fortunate. Such varying generational experiences in Inuktitut literacy development, combined with observations of Inuit students over the years, have led Cecilia to conclude that literacy development in Inuktitut may indeed be situational as "it depends on the school" (Second interview), reminiscent of situated learning discussed previously.

Another interpretation of traditional Inuit literacy that was mentioned by several participants was inclusion of reading of the land. Christopherson's (1997) definition of visual literacy as the "critical ability . . . to use visual images accurately and behave appropriately" (Roblyer, 1998) would accommodate reading of the land as a component of literacy. Perhaps the most encompassing definition of literacy in general from participants, that would include reading of the land, was put forth by George in his initial interview. He feels that literacy is "being able to enter into a dialogue with the world." George expands on this definition as he feels the nature of that dialogue varies in different cultures. "For most of Western Society, dialoguing with the world involves understanding and relating to print, and communicating with print" while literacy in the traditional Inuit world "involved being able to read the weather, the land, animal tracks, and those kind of things." By his second interview, a year and a half later, George clarified both of these, noting that Western Society

would necessarily geographically include Inuit culture so Eurocentric culture is a better descriptor and the time frame of the last century is a better one as reliance on print has been more prominent during the last hundred years. "Twentieth century Eurocentric culture . . . involves being print literate so being able to read and write and make sense of the world through reading and writing is an essential part of literacy for us . . . [and] for anybody else who wants to partake of what society and culture has to offer." George implies there are choices involved in being literate, in contrast to Cecilia's situational nature of literacy development.

Perceptions of Literacy for Today's Youth

Literacy is a many-meaninged thing (Scribner, 1988)

With increased awareness of multicultural multiliteracies, greater acceptance of the variances of communication means within cultures is possible. Communicating through reading, writing, and speaking in a print-based society may be what most people think of initially when they hear the term 'literacy', but that is changing. For participants in this project, reflective thinking practices have lead them to a broader based outlook for today's youth on literacy, its development and how people communicate. Well (1996) continues with this frame of thought by noting that "the meanings we attach to literacy, the expectations we hold for it, and the value we give it are largely dependent on the context in which it takes place . . . . Social organization and cultural patterning not only influence literacy practices and development, but those literacy practices also affect social organization and the

culture of classrooms and schools" (p. 2). Well believes that literacy development is part and parcel of learning communities, a view shared by the participants in this research, and others in the broader educational community.

> It may be that thoughtful literacy cannot be fully mobilized without a strong sense of community - without widening circles of meaning, through which individuals can understand themselves and their condition and construct coherent, purposeful lives . . . to go beyond the mere technology of education, to build and sustain coherent, vital communities in and around their schools (Brown, 1993, p. 56).

For Inuit youth, whose sense of cultural community is strong in the Eastern Arctic, George's definition of literacy expands to include storytelling, reading the weather and knowing the seasons. Many Inuit and Qallunaat go out on the land for hunting and recreation so being able to read the signs remains vital to survival. Some assistance is possible through the newer technology of Global Positioning Systems (GPS), but many still rely on more traditional means of reading the weather signs and the land features.

> Hunters-gatherers read and write. They did not have the alphabetical or pictorial scripts that agricultural societies have developed in relatively recent times. They did not use letters to represent sounds. But all hunters read tracks; everyone who lives by hunting or gathering must notice, read, interpret and share the meaning of signs in the natural world, and where carvings establish family histories, people read images on totem poles and house posts. These are also forms of literacy (Brody, 2000, p.191).

That said, George still recognizes that cultures other than Inuit culture may vary in their approach to literacy within their communities. He is postulating that some cultures possess environmental literacy which enables them to dialogue with their surroundings, while other communities differ in what is required for literacy development. The societal demands for literacy development are noted as well by Peterson (1992) who found

> People learn language to participate more fully in the social life of family and community, not for the sake of learning language. Language and learning are both social. It is by using language to learn and to participate in the world that understanding of language and the world develops (p. 76).

This is compatible with Lance's use of "the United Nations definition for literacy which involve[s] all those skills needed to fully participate as a citizen in a society" (Initial interview). Which society you participate in depends on where you live. For the northern setting of Iqaluit, Nunavut, any definition of literacy should include the societal needs/expectations of both Inuit and Qallunaat cultures. Both cultures' societal needs are reflected in the data collected from participants, mirroring Ross and Bailey's literacy components of 'pictographic', 'oral', 'bibliographic' and 'electrographic' (Niederhauser, 1996, p.1). The primary difference between perceptions of literacy in Iqaluit and those of Ross and Bailey is that the latter view these as distinct historical literacy eras while participants see them all as components of literacy for today's northern society. In addition, northerners add another facet to their definition of literacy with the inclusion of 'nonverbal'. Recognizing that "responding to different environmental forces, different cultures

have evolved different tools" (P540, 1996, p. 2), the multiplicity of perceptions of literacy in the north will therefore be explored next, drawing on Ross and Bailey's framework, and the added component of nonverbal, to discuss data collected.

Nonverbal Communication

The role of nonverbal communication has traditionally been ignored when literacy development is discussed. For Inuit, raised eyebrows [to signify 'yes'] and scrunched up noses [for 'no'] can be vital communication tools that are often overlooked by southerners. Out on the land, when someone glances behind to check the progress of fellow travelers in a strong wind that decreases hearing abilities, nonverbal communication becomes even more vital. Such gestures also remain integral to communication within today's communities, as experienced in northern classrooms. Both Cecilia and George in their second interviews make reference to the importance of including nonverbal communication in any definition of literacy, past and present, as these gestures convey meaning, helping people communicate with their world.

Nonverbal communication isn't restricted to humans, or perhaps even living things. Elisapee considers inuksuit forms of communication and thus useful in literacy development as their very existence across the tundra is a symbol of "We've been here. This is the way home" (Second interview), as much as a direction sign in the middle of a city would be. Other signs of the land, from the way the snow has been shaped by the winds to landforms to the weather, have been read by many, as noted previously, so should be included as components of literacy, although there

are fears land literacy development is diminishing for today's youth. Cecilia laments the recent generational changes in such land literacy as "for me to go from here to behind the hills over there or a little bit further, I'd get lost. [The elders] read the sign of the land . . . travel[ing] all over just by looking at the land shape . . . . They were really, really smart to survive" (Second interview). Thus the abilities of Inuit and Qallunaat to read gestures and non-print based signs from the land could be recognized as a form of nonverbal literacy, or even Roblyer's 'visual literacy' (1998), vital for existence in the northern literate world.

Oral Communication

Given the statistics offered by Diamond and Moore (1995) about how few world languages have written components, it is no surprise that oral literacy remains an integral component of the literate environment for many Canadians, including all the participants. Both Elisapee and Ullariaq recall the power of oral traditions in their lives as a means of building information between generations, even though one was raised in the north and the other in the south. Cecilia recalls listening as a child in a qamaaq (sodhouse) out on the land to elders telling Inuit legends and Bible stories, an active learner, absorbing and processing the knowledge dispensed by the elders in story form. Ingkhar expands the concept of oral literacy traditions by including throat singing as another creative way elders handed on stories and information. The use of bone games, string games and juggling songs to tell stories are other traditional examples of oral literacy. Ullariaq commented on the respect they had for multiple versions of the same basic stories, theorizing that part of the

reason for differences was that often Inuit traveled by dogteam to other communities to replenish supplies at the trading posts, to find wives, and meet other family members, thereby creating opportunities for broader sharing and transformation of knowledge.

In Ullariaq's second interview, she notes the value of the integration of newer technologies and oral traditions for students as they record on tape recorders and computers the stories heard from others, thereby ensuring future generations have the benefit of the knowledge of the past so it is less likely to be forgotten or fragmented. "Since we know how to write down things we hear, they'll be imprinted forever." Ullariaq acknowledges that such recordings of oral stories removes some of the magic spun by different storytellers about the same incident (Leavitt, 1995), but enhances the possibilities that the essence of the stories are preserved for future generations. Ullariaq regrets not being able to put together the fragments of stories she remembers hearing as a child from her elders. Cecilia also feels by her second interview that such storytelling practices remain an important part of life for youth, only they are taking on a new twist. She feels oral traditions are continuing in the form of dialoguing on and in front of the computers by her young students. They discuss items found in the Knowledge Forum® database, such as the stories recorded by Ullariaq's students, comparing the written notes with their personal experiences, passing on their knowledge orally to others.

One oral tradition often overlooked in discussions of literacy for Inuit society, but remaining in place today, is the traditional practice of naming. Cecilia cites her personal example of being named after her deceased aunt, Ungaaq. Through

namesake practices, a lifelong commitment, Inuit share information about ancestors. Cecilia is called 'Grandmother' by Ungaaq's grandchildren. It becomes Cecilia's responsibility to carry on the traditions and share what she has learned about her ancestor, Ungaaq. In return she is treated by Ungaaq's family as Ungaaq would have been if she had lived. Thus naming practices as a means of literate communication and knowledge-building, Cecilia stresses, should be considered a component of literacy development in the north.

Pictographic Communication

The role graphics play in literacy development, previously referred to as visual literacy (Roblyer, 1998), is mentioned and reflected on by many participants over the course of time. The inclusion of art as a component of literacy was initially raised by Ingkhar. Elisapee embraces drama, communicating through actions and dance, as part of such artistic literacy. Cecilia mentioned the use of pictures by Aboriginal groups in parts of North America as a means of communication. Upon further reflection, she recalled examples from her own culture. Her ancestors used bowdrills, a practical tool made from antler or ivory for drilling holes and starting fires, that were often engraved with designs around the edges to tell stories of events in their lives, whether a whale hunt or the first time they met Qallunaat (Second interview). Further pictorial literacy came in the form of miniatures, carvings, and prints. Elisapee notes that "they communicated through the carvings, . . . like a narwhal tusk I've seen carved to tell an entire story." The same goes for soapstone carvings, mentioned by Vic. Carvers believe the story is in the stone and it is their

job to recognize and enable that story to come out, thereby mastering the language of the stone (Langer, in Moll, 1994). Being able to share stories through artwork is a means of communicating with others, building knowledge collectively and thus should be very much a part of northern literacy development. Carvers, printmakers, and painters have made old stories come alive through their artwork, much like writers have through print. The north is not alone in its use of graphic literacy. After receiving the transcript of his second interview, George responded that graphics were indeed a way of presenting knowledge. "I think, given things like the cave paintings in France, that graphics are something virtually any human could find useful."

Cecilia notes the role of pictures on 'wallpaper insulation' newspapers in her early literacy development. She was reminiscing that although there were no books to be read before bedtime, they often listened to their parents tell legends and Bible stories in Inuktitut. They also spent considerable amount of time reading, and playing games, such as 'I Spy', with the images on the papers pasted from English catalogues and newspapers as insulation on the wall of their qamaaq, a time Cecilia remembers with fondness. "Looking at pictures I see is literacy. You are learning your words by looking at the pictures" (Second interview). The negotiation of multiple linguistic and cultural experiences emphasizes the need for greater acceptance of multiliteracies in northern societies (New London Group, 1996).

This effective strategy is continued today when students and staff create graphics on the computer to share with others. Cecilia has found graphic communication through the Knowledge Forum® database a great starting point for

her younger students. Graphics on the database for her Inuktitut First Language[IFL] Grade One students have become conversation starters, starting points for text labels, expressions of experiences and prior knowledge, and motivators for further database searches. In older IFL, ESL and English First Language classes, graphics on Knowledge Forum® have become a focus of expression as well as initiator of dialogues and further communication. For some, graphics have become a way of communicating in a world that is confusing as they learn a second language. For others who are less proficient in either language, it is a way for their voice to be heard. Often for students with special needs, graphics are their signature on the database, whether a primitive caribou sketch, a drawing of a crayon or a rhebus from their teacher as something they could 'read' in the database. Still others use graphics as a means of sharing information in a multicultural, more global society. A picture of an Inuk mother and child in caribou clothing drawn by a student for inclusion in a webpage can convey more meaning than words ever could across the distances. For others, who may be proficiently bilingual, graphics have become a choice of expression, a way of utilizing multiple intelligences. A research journal contribution demonstrates this:

> *Teaching is a very humbling experience. Today was a case in point. I could hear a couple of students asking who did the graphic for the Land and Sea view, as they snickered behind their hands. A couple of really shy girls had seen me start it . . . . They came up and asked me if they could do the graphic for the opening view. . . . It demonstrates to the students and staff that it is okay for each of us to have different strengths/different things to share with others. It also shows the*

importance of being tolerant of others' attempts. These girls did not make any negative comments about my drawing, just offering to help - cooperation at its best! (Tumblin, Iqaluit Millennium database, Oct. 8, 1999).

By the second interview, all five core participants discussed at length how impressed they were in the use of graphics in literacy development for all ages, noting improved self-esteem for participants. As George so aptly notes,

> Graphics are another way of representing knowledge . . . like that old cliche of a picture being worth a thousand words, or for expressing relationships between things . . . in a different modality . . . . There's a little self-esteem tree built around a graphic . . . . With a graphic it is so much easier to have discourse around it (Second interview).

Bibliographic Communication

> *Literacy is not monolithic; rather it depends on the community for its definition. How students use reading and writing, what they use reading and writing for, how reading and writing are defined, how students interpret written texts, depend on the community and can differ across communities (Bloome, 1986, p. 72).*

As mentioned previously, the roles of reading and writing in literacy development, referred to as 'bibliographic' by Ross and Bailey (Niederhauser, 1996), are perhaps the most commonly included ones in any discussion of literacy in Western Society. For participants in this research, reading and writing appear to be a given in any discussion of literacy development and knowledge-building. Issues of accessibility of appropriate text-based resources for reading and writing activities

in both languages were raised by many participants. Ullariaq (Initial interview) also notes the increased support needed for students learning to read and write in a second language, the lack of which can negatively impact on students' literacy development.

Writing was discussed more often than reading in the data, perhaps due to the fact that many of these educators are working in second language situations so the availability of text at appropriate levels for learners to read frequently rests on work produced in the local learning community. Writing was discussed primarily in terms of integration with knowledge-building technology, but one discussion on the database between George and I focused on the use of writing for different purposes, regardless of whether on paper or using the computer. George differentiates between knowledge-telling and knowledge-transforming through writing, where the former is "useful for composition tasks which are well within our level of expertise; our understanding of the problem or issue we wish to discuss and the genre which it will be used to express are so well appropriated that they are almost instinctive" (Iqaluit Millennium database, October 4, 1999). On the other hand, George views writing for knowledge-transforming to be

> the kind of model we need when we're close to the limits of our expertise and/or we're starting to move out to ill-defined or ill-understood questions and problems. In other words, we're not sure what we want to say, nor of the genre in which we should say it. To me this is an approach to composition which helps us appropriate new and deeper understandings of content and genre (Iqaluit Millennium database, October 4, 1999).

This is compatible with Brian's view that literacy skills vary, situation by situation, citing the example of the literacy skills students require to write a story being vastly different from the skills required to read and write a thesis. The distinction may be similar to Heath's and Mangiola's (1991) differentiation between literacy skills and literate behaviour, mentioned in Chapter Three. Some participants find that learning to write for an audience, particularly in a second language about a topic you are interested in but have never encountered as a problem before, would be an example of knowledge transforming. Regardless of whether writing is for knowledge retelling or knowledge transforming, recognition of the different stages of reading and writing is important, as noted in my personal contribution on the development of students' writing, "*There needs to be realization that we are working towards excellence, not necessarily perfection in all areas. We also need to understand that it is a process that students travel in developing these skills*" (HC Teacher Discussion database, November 11, 2000).

Electrographic Communication

> *With . . . knowledge, the computer is like the piano. It enables you to play the knowledge; the book can only give it to you (Papert, 1997).*

Being able to interact with print, rather than just as passive recipients of words, has become vital to connectivity with the rest of the world, whether regionally or more globally. "Their notes, the links between them, other people's comments, are showing them that their use of the printed word has a role in helping them move towards a better understanding about issues in the world" (George, Initial

interview). Participants mentioned assistance with language development through electrographic tools such as word processing, especially ClarisWorks®, games such as Reader Rabbit® and Math Blaster®, and the Internet. All participants use electrographic literate environments such as word processing software for the creation of materials for use with learners, whether produced in Inuktitut or English. Vic finds word processing more of a "finishing touch" rather than "a glorified typewriter", as although such programs are literate environments, they have minimal knowledge-building capacity (Initial interview). Papert also muses about gadgets being used to teach using traditional strategies (Ellis, 1974).

By the second interviews, dialogue about computers focused more on Knowledge Forum® than other electrographic literate environments, perhaps because of immersion by participants in the use of this software in their classrooms. Cecilia notes the interconnectiveness of reading, writing and dialoguing in perpetuating many of the traditions of Inuit culture, feeling the use of computers has enhanced sense making in the northern multicultural world for her students. "Instead of going to ClarisWorks® now, they go to Knowledge Forum® which tells me . . . they want to see other kids' work . . . or work on their own thing" (Second interview). This exemplifies the collective understanding of topics that characterize knowledge-building communities (Bereiter & Scardamalia, 1993).

Vic, Ullariaq, Cecilia, Elisapee and I have also observed informally that the students have increased their willingness to read, write, edit, and share, whether in Inuktitut or English, by browsing through and contributing to the computer database, perhaps as a result of having an authentic audience to explore culturally

relevant topics with. The overall discussions on writing as a component of literacy led to a database contribution by George, noting that "the conceptual framework for KF [Knowledge Forum®] originated in research on the processes of expert writers. The difference between 'knowledge-telling' (novice writers) and 'knowledge transforming' (expert writers) is one gap KF is intended to bridge, by allowing such things as scaffolded discourse, revisable notes, commenting, and so on" (HC Teacher Discussion database, November 15, 2000).

Ullariaq commented that Knowledge Forum® has been responsible for exponential growth in her students' writing, even for those who traditionally lagged behind because of poor attendance. She notes that Knowledge Forum® "is building literacy. . . Kids are writing on them [Knowledge Forum® computers], reading on them, composing their own stories. . . . The kids like to look at what other kids are doing, especially the older kids" (Second interview). Mary notes that "kids tend to want to write their ideas on the computer easier than when you are sitting at a desk with paper" (First interview). Thus language as a mediator and a cultural tool, an common element in constructivist theories such as the work of Vygotsky (1962), becomes the norm for participants of all ages.

Part of the reason for growth in writing through computer use, Vic feels, is their ability to take control, create their own signature on the computer by changing fonts, sizes and styles of the text for their stories. Ironically, originally CSILE developers held off allowing multiple fonts, styles and sizes of text as they felt it would detract from the original intent of using the software for knowledge-building. It appears from informal classroom observations that once students experiment to

find a signature style, font and size for their notes, in a sense their unique voice, they tend to use those features for most of their notes (Vic). Empowering them in the development of their writing style appears to enhance their overall literacy development through collective knowledge-building. George notes by using the computer students and staff are learning "a different kind of literacy. They learn an understanding, a way of dialoguing that says the written language is a medium for learning . . . . The form of that dialogue is shaped by your culture and how you interact with the world" (Second interview).

During her second interview, Vic stresses the impact computers have also had on reading as a component of literacy development. When her students are using the shared Knowledge Forum® database, they "read, read, read tremendously the things that were entered and right away they began to respond to those kids. They found that to be pretty exciting." She elaborates on the impact computers are having on students' literacy development, noting "they just dive into it . . . . The more they are doing it, the better they are going to get . . . . More editing . . . more sharing . . . more reading . . . . It's . . . like bringing in another . . . set of books for the kids to use to be comfortable" (Second interview).

Part of the attraction of electrographic means of literacy development for participants has to do with the inclusiveness such use of computers offers. Vic notes during her second interview that the use of the Knowledge Forum® database has resulted in increased sharing by all students. "A quiet natured person who doesn't want to speak up . . . will share on the computer . . . . They can share all they want without having to shoot their hand up or speak out . . . [with] a bit of distance and

safety." The accounts by Vic are consistent with the delineation of multicultural literacy provided by Diamond and Moore (1995) in Chapter 3, as such a process "activates silent voices" (p. 7). A personal example of the activation of a silent voice was the contribution of a note to the Iqaluit Millennium database by a very quiet young man following a videoconference on space exploration. His query about what it feels like to touch a star prompted my contribution to the research journal view as follows:

> *As educators, we have often in the past been trained to be the experts, to be the keeper of the knowledge that is dispensed to students. In a traditional classroom, the answer might be: "Oh, it is much too hot to touch a star. You would burn up before you do." or "You wouldn't be able to reach a star due to lack of oxygen and other resources to take you that far." and so on. Actually in a traditional classroom, students wouldn't be encouraged to even ask questions! Anyway, . . . it is wonderful to see students comfortable asking the questions that are forefront in their minds. This particular question reminds me of a poster that tells you it is okay to reach for the stars and not make it, as you just might reach the moon. In other words, it is okay to have dreams, and not to have all the answers. The knowledge you build along the way with others is what is important*(Iqaluit Millennium database, November 25, 1999).

The use of electrographic literacy therefore also seems to enhance critical literacy for learners of all age, defined in Chapter Three by Shor in 1992 (in Cummins, 1996).

Changing Perceptions of Pedagogy and Mathetics

The change in classroom culture as a result of increased use of technology has encouraged many to rethink pedagogical theories that back educational practices and, in turn, explore how those changing pedagogies and mathetics (Papert, in Kafai & Resnick, 1996) affect literacy development for students and staff.

Brian notes that there is a need for change in how we think about education. "I honestly don't believe in school the way it has been . . . a group of kids in a box. . . . We've got to change a lot of the attitudes of the people that are working in schools now" (Initial interview). The biggest change for all participants since beginning to use computers in their classroom has been the deepening of their understanding of their pedagogical beliefs of how children learn, consistent with Ellis' (1974) quote in Chapter Three that thinking about computers is thinking about education. Instead of traditional beliefs that teachers teach and students learn, participants are finding that sometimes students teach and teachers learn, with everyone learning from each other.

As an example, Vic has noted personal changes in beliefs about teaching and learning since beginning to use computers in school, reflecting on the impact that is having in her classroom as a literate environment. In the past Vic has considered herself the class leader, very organized, always at least a few steps ahead of her students. The introduction of CSILE and Knowledge Forum®, in her classroom have changed that.

> I like to be planned . . . [as it is] my nature. I can't teach a day without having a plan, without having my pile of photocopied material right there . . . . There's no scrambling to nature. That's why I'm not one hundred percent comfortable or

happy with what I've done with Knowledge Forum®. I'm never on top of it. So yes it has changed me. It has opened things up (Second interview).

Vic has always advocated that as the teacher, she should model the behaviors and responses she expects from her students. With the introduction of computers in the classroom, she was initially fearful about her students knowing more than she did, but took some comfort in teaching ESL students as the majority do not have access to computers outside school so they might not be that far ahead of her. But Vic admits gradually becoming more comfortable with students knowing more about the technology than she does, accepting that there are multiple experts in her class and that she can indeed learn from the students. That does not mean the transition has been an easy one for her, particularly as computers did not come into Vic's life until she was an adult. In spite of this, Vic is persistent in her efforts to improve her personal computer literate behaviours. "It's changed me in that I'm trying to learn too. I've spent . . . every available time . . . whether release time or inservice or professional development time, I've put it all into Knowledge Forum®" (Second interview).

Ullariaq notes computers have changed teaching over time, from her experience as a Grade 6 student using computers with a transmission style of teaching, where "it was all from the teacher's mouth all the time" (Initial interview) to acceptance that students can be the teachers, a more transformational approach. "I believe that kids learn best from other kids - more effectively than [from an adult] . . . . Actually I think that they explain better than us" (Second interview). She notes that computers in her class have gone from being dust collectors to having almost daily

use by both her students and herself, from use as a word processor to print a final product to being utilized for regular contributors in a communal database, features of which the students are teaching to younger students as well as their teacher. Ullariaq's personal use of computers now includes professional development and sharing of ideas/resources with other educators. The changing perceptions of how computers can be utilized in classrooms has changed her classroom practices, which in turn affects literacy development for all learners.

Elisapee also has observed a change in how computers are utilized, from her experiences in university to her present classroom, a time frame of five years. Her university computer course focused on programming languages, straight from a book, with no hands-on experience, quite a difference from present classroom daily use. Within one year, Elisapee's classroom use of computers has also changed her teaching style as initially she chose the aspects of curricular topics her students were to learn about. She asked the questions and they answered, whether in class or on the computers. She told them what sites to look at on the Internet and posted the questions she wanted answered on Knowledge Forum® (Initial interview). Gradually she began to turn over more control to her student learners, by having them brainstorm questions they had on the curricular topics. At one point she grappled with what makes a question good or trivial. Her dilemma became how to deal with this issue with her students so their interests were respected, yet they went deeper in their exploration of topics. This is representative of critical literacy development by an educator through increased use of knowledge-building technology. She even tried using the "same format as if we were to do Knowledge

Forum® . . . but I did the paper project because I thought it would be easier and less time consuming than using the computer, but I'm not sure" (Second interview). Elisapee explains that she found with the traditional paper version, she was the one commenting, asking further questions, probing to have deeper understanding of the students' topics, whereas on Knowledge Forum® she found her students took over those roles. Elisapee has therefore discovered that with the use of technology such as Knowledge Forum®, her students' roles have changed as well. "It's a time now where . . . they can take their learning . . . and go beyond that. It's a time when they can share what they've learned. They can do so much more . . . I'm learning just as much from them" (Second interview). Scardamalia (1997) notes a similar change in processes in other classrooms using CSILE/Knowledge Forum®.

Cecilia remarks that her beliefs about teaching and learning using technology changed as she watched her son, from a very young age, benefit from having access to the computer at home. He now is in high school and recently asked to assist others learn to use the computer. Therefore she was frustrated when she was told a couple of years ago that she couldn't have a computer in her Kindergarten classroom because her students were too young for it. She now reinforces students as teachers and teachers as learners whenever she can, citing the development of the Iqaluit Knowledge Forum® Team as another of the examples of the benefits of learning from peers at any age. "We've been doing very well together, learning from each other, having little meetings . . . ongoing since we started . . . it's a buddy system." Cecilia has also changed her outlook on students as teachers, citing the positive impact it has on their self-esteem, whether teaching younger students as "it makes

the older students feel needed" or teaching staff. She reflects that "the older kids . . . knew quite a bit . . . . I think it would really help the kids if they could help teachers . . . [It would] really help their self-esteem" (Second interview). Cecilia goes on to note a growing independence as a result of her Grade One students using the computers to read and write Inuktitut. "By me not even being there (beside them on the computer) they'll still learn with their writing and reading." Thus, with growing self-esteem, she finds students and staff more willing to contribute to literate environments on the computer. Rowley's recommendation of a collaborative classroom culture (1994) in order to enhance knowledge-building coincides with multigenerational benefits noted by Cecilia.

Ullariaq has also noted the benefit to students and staff self-esteem when everybody is a learner and expert at something,

> In my classroom . . . as teacher, I've built confidence along with the students. I think we are just blooming together . . . . I thought I wouldn't, just looking at all the workload or . . . the meetings . . . that we would have ourselves - that it would stress me out but as it comes . . . I've enjoyed it! . . . Without even realizing it, within my class, we've accomplished quite a bit on the Knowledge Forum®" (Second interview).

The influences of changing pedagogies through the use of computers and implications on literacy development was something discussed at length with George during his second interview, as he has had greater opportunities to see the progression of technology use in schools, from his vantage point as mentor in Iqaluit databases over the years. George perceives that many educational software packages

on the market today lack pedagogical background, providing entertainment with little regard to classroom practices. His observations of Knowledge Forum® use in the north is that unlike many others, it has a pedagogical framework, based on constructivist theory. Thus he feels

> This program and this use of computers carries a certain set of values which . . . has shaped the culture of teaching and learning at your school. If you don't think particularly about how kids learn or particularly deeply about that or you think that's beyond the capability of most teachers or . . . most teachers don't . . . or can't teach like that and you're not willing to go through the throes of educational change, you're going to reject it (Second interview).

George acknowledges there are many factors influencing change in pedagogy in schools, not the least of which has been computers. He has observed that changes in pedagogy through the use of Knowledge Forum® in the north have enhanced students' literacy development, commenting "if students are using Knowledge Forum® appropriately, their literacy skills are bound to grow" (Initial interview). What exactly George views as appropriate use cannot be prescribed, but George feels the creation of a climate of personal advocacy for both students and staff, of learners having control of what they do and an active role in what they learn, plays a big part in the change in approaches to teaching and learning in the north. All of the strategies George mentions have parallels in the original guiding principles of CSILE (Scardamalia et al., 1987). When people bring and access their prior knowledge, experiences and beliefs to any learning situations, they have greater control. "The change or shift [in theories and practices]. . . from being part of this [Knowledge

Forum® project], . . . comes from your enthusiasm and . . . involvement and part . . . comes from a technological environment which is shaped to channel energies in a certain direction" (Second interview). The 'certain direction' referred to by George is one based on a constructivist framework, explained in more detail in Chapter Two.

Changing Educational Roles and Practices

The common components of constructivism outlined in Chapter Two will form the framework for the discussion of the analysis of changing roles and practices in education, and the exploration of what impact such changes potentially could have on literacy development through knowledge-building technology in the north. Common components of constructivist theories include the nature of knowledge, foci on the learner, authentic learning experiences, and student thinking or sense making, as well as emphasis on language as the mediator. Educators' perceptions of how those threads are changing in northern education will be explored in the next section in an attempt to understand possible relationships among roles and practices, literacy development, and knowledge-building technology.

Changing Roles and Practices of Knowledge

Changing theories about knowledge through participants' exploration of its multiplicity can be juxtaposed with theories about literacy, often resulting in changes to the roles and practices of learners. Mary reflects on the multiple natures of knowledge as she feels "the whole idea of knowledge and being knowledgeable . . . is different in everybody's culture" (Initial interview). Brian does not see knowledge as

based in particular cultures, rather as more situational, connecting to what one is doing at a particular place and time. He mentions that a lot of information delivery has been given to students in the past but feels that is changing as "it's how you go about the process of developing the knowledge that you need at that particular moment" (Initial interview). He feels such changes are necessary if students' literacy skills are to develop. Brian's outlook may be more in line with connectionists who believe knowledge is found in the connections. Lance, on the other hand, notes that knowledge "is not simply content passed on from one to another . . . . [rather] a dynamic process, a continuum, a process in which a dialogue exists" (Initial interview). His view is consistent with that of constructivists as knowledge is seen as a process, with people using prior knowledge to make sense of new information.

George concurs that knowledge and how it is viewed is changing. Knowledge for traditional Inuit culture varies from knowledge for today's Inuit youth. "In . . . traditional cultures I suspect knowledge evolved more slowly . . . . People were less willing to take risks because the consequences . . . were often immediate and disastrous whereas now we're sort of insulated so kids are encouraged to take risks and . . . experiment" (Second interview). He theorizes that the increased reliance on print to communicate in the north has escalated the rate of knowledge growth. Thus views on literacy development in the north have had to change and adapt to increased utilization of print.

Inuit for centuries believed knowledge could and should be transmitted. According to other Inuit Knowledge Forum® team members, in their childhood, asking questions of elders as they modeled the knowledge they were passing on was

not encouraged. That is changing for today's youth, as evidenced by the openness which students ask questions of elders in the school and the encouragement Inuit staff give students to ask questions to guide and revise their learning. Learners "recognize that although there might not be any final right answers, there are certainly answers that you are going to discard along the way as being inadequate and that's how in our society . . . knowledge grows scientifically" (George, Second interview). The ability to analyze, accept or reject knowledge through successive questioning is another example of critical literacy development, which in turn is consistent with one of the guiding principles of Knowledge Forum® as knowledge misconceptions are treated in a positive way (Scardamalia et al., 1987). George recalls a misconception about what dehydrated and dehydrated meant for a student studying food in space. The student's initial theory was that dehydrated was taking water out of food and rehydrated was the tray. Build-ons from other participants enabled that student to have a deeper understanding of those terms. Likewise peer and staff build-ons assisted another student who was confused about whether a whale is a mammal or a fish. Building knowledge, adjusting misconceptions in the process, also fits with Piaget's developmental learning theories and Papert's (1980) discussion of the role of false theories in the development of knowledge through abandoning, reconciling, or combining, explored in Chapter Two.

The changing roles of knowledge in current technological practices have been observed by participants who have become more discriminating, noting, for instance, that there are no CD ROM programs in Inuktitut or ones that provide culturally relevant knowledge (Ullariaq), computer games have predetermined knowledge and

so do not enable building of knowledge (Elisapee), word processors are basically individual sheets of paper on a screen (George) so do not encourage collaboration in the construction of knowledge, providing instead more of a venue for final products (Vic), and that the level of the language required to access the knowledge available on the Internet is a challenge for second language learners so it would be "like trying to set me down to read Japanese . . . I just can't do it" (Elisapee, Second interview). George notes that "you can find a program that can do just about anything you want. If you can't find it, there's someone who, for the right amount of money, will develop it and make it sound good. There's no pedagogy inherent in it" (Initial interview).

In contrast, the comments from participants about Knowledge Forum® stress a belief in knowledge being socially constructed (Bruner, 1990), culturally evolved and constructed by individuals and groups. As Scardamalia, Bereiter and Lamon (1994) explain, the focus is on the creation of a classroom culture of active knowledge construction. "With Knowledge Forum® there's nothing there except what's put there by someone [designated users in that database] . . . so kids . . . share their own knowledge, . . . put in graphics, . . . share experiences, . . . compare [and] learn from each other" (Vic, Second interview). Participants have noted that both students and staff are benefiting from the shared, overt construction of knowledge, another of the guiding principles of the software (Scardamalia et al., 1987) that is consistent with Vygotsky's theories of the construction of knowledge. "Knowledge Forum® is a highly literate environment . . . [which] allows you to create, recreate and repropose notes so you can actually build to something - a new

understanding" (George, Initial interview).

Changing Roles and Practices of Learners

Educators were asked in the course of their interviews what the terminology of 'knowledge-building' meant to them, in an effort to understand their perspectives on the background of the software utilized. In analysis of the data, it appears their responses have as much to do with changing roles and practices of learners as they do with the actual software. Some initially felt the term was self-explanatory (Ingkhar, Dale, Ullariaq), while Lance considered knowledge-building to be

> the practice of learning through experience in a collaborative fashion . . . [which] conveys the belief that in order for a learner to begin learning, or to be conscious of himself as a learner, he must start from what he already knows, and gather more information based on the questions he generates himself and with dialogue with others (Initial interview).

Mary also recognizes the role that learner control plays in knowledge-building as she feels it is "learning and kids having control of their learning, . . . building or their learning and their skills with each other and growing with each other and adding to each other's ideas" (Initial interview). Ingkhar, upon further reflection, perceives knowledge-building is "accumulating . . . information about a subject . . . between students and . . . putting our knowledge together . . . [through] doing lots of research and building on . . . getting input from other schools or students or teachers." Cecilia notes the need to be able to communicate collaboratively through reading, writing and dialoguing in order to build knowledge.

Vic views knowledge-building as a cooperative venture where, through sharing, contributing and even editing, knowledge is built by many instead of the traditional individual activities found in many classrooms. "It's not just you and a computer screen . . . It does and will and has to be part of what is going on at your desk" (Initial interview). The collaborative nature of knowledge-building, which places greater responsibility on the learners collectively, represents another of the guiding principles of Knowledge Forum®, outlined in Chapter Three (Scardamalia et al., 1987), also reflective of Resnick's distributed constructionism (1996). Thus George's interpretation of knowledge-building, after years of using the software, is understandable, noting it is

> a social construct . . . built up through engaging ourselves with the world and other people in an effort to understand something, so that one level of understanding leads to deeper questions, further investigation, further testing of that understanding, deeper levels of understanding and more sophisticated questions (George, First interview).

The collaborative nature of Knowledge Forum® was noted by all participants, lending credence to its role in knowledge-building and literacy development. As Ullariaq observed from her students' browsing and learning from other classes " I really like it because it's not just my word that the kids are building from, but from others." Elisapee explains in greater detail,

> Basically they go in with what they know. . . . If something is not clarified or doesn't make sense to another student, they can ask questions and then the student can respond and add more information. It kind of never stops . . . . A

> student may think his project is completed . . . but simply ask one question . . . and everything gets going again (Second interview)

George knows this from experience as a simple question from a distance, in a database near the end of a unit about the differences between the Dorset and Thule, both ancestors of Inuit, sparked a whole new round of exploration, research, reorganization, written/graphic contributions and knowledge-building as part of the theme, resulting in greater understanding and indeed ownership for that increased understanding by students and staff as co-learners in the process.

Through personal experiences, often developed over the course of this research, participating educators recognize the significance of learner focus, regardless of the age. As educators, they are often cast in the role of learners, with students acting as support to them, as I noted in my research journal

> *Initially I was learning the software along with my . . . students, which . . . provided a great model for the students who have too often thought that the teacher should know all. In some areas, such as graphics, students soon outraced my knowledge* (September 28, 1998).

Elisapee also comments on the gradual change in her feelings as a learner asking students for help since she began using computers in her classroom,

> At first it was really funny but now I have no qualms in saying, 'I don't know how to do that. How do you do this?'. . . I have no qualms with . . . the students showing me anything. But at first I felt kind of funny, especially at the beginning of the year. Being new . . . I felt . . . I should have known that, . . . as the teacher . . . . They've learned it, they use it and they're teaching me . . . . I'm not ashamed

to say (Second interview).

These changes in roles and practices in the unique northern multicultural setting are supported by Heath and Mangiola (1991) as

> the search for effective, sensitive ways to empower students from diverse linguistic and cultural backgrounds to engage in meaningful learning is guide by the following credo: Teachers, students, and researchers must be jointly active in the learning process. All must have chances to learn and to construct and revise theories about what and how they know. They must be free to use the language of give-and-take to negotiate ideas, to build knowledge, and to acquire new skills to prepare for lifelong learning (pp.12 -13).

Many current practices in the north often appear contrary to such a learner focus, as the older students get, the less it seems their interests and questions are taken into account, leading to queries about the detriment of such practices on their literacy development.

Changing Roles and Practices of Authentic Learning

We learn by doing, both by ourselves and through interaction with others in authentic activities. These are techniques which form part of the foundation of a constructivist approach. For Inuit children in the past, opportunities for experiential learning abounded, as noted by Ullariaq in her first interview, "You learn what you live and what you see." How much more authentic can you get than a girl learning how to sew by making seal skin qamiqs (footwear) and amoutiq (hooded woman's parka) for her doll, or a young boy learning to hunt seal through watching his father

sit for hours at a seal breathing hole? For northern youth today, it becomes a challenge to involve them in authentic literate activities reflective of multicultural northern communities, while at the same time ensuring them a position in a global society.

Computers have been changing the direction of learning for northern youth, but educators are finding that CD ROMs and the Internet provide few resources for any of the culturally relevant themes utilized. Computers should recognize and enable people to grow and celebrate their cultures, with the wealth of information they are supposed to provide access to. It is precisely because the resources are not there for culturally relevant themes that George has found the use of Knowledge Forum® in the north appealing as "you start with an empty database, so you can make of it what you want as a way of encouraging incorporation and exploration of Inuit culture . . . [which] means Inuktitut literacy as well as Qallunaat literacy" (Second interview).

Thus the northern educators, in spite of monocultural earlier schooling, are using the Knowledge Forum® database to demonstrate a relationship between literacy development and authentic learning opportunities, through multicultural building of connections among past experiences, prior knowledge and new learning. All mentioned starting with autobiographical activities, focusing on the learner. From there, in English First Language, Inuktitut First Language and ESL classrooms, themes from the curricula that reflect Inuit culture were explored, including Inuit Legends, Traditional Medicine, Hunting, Fishing, Arctic Animals, Dorset and Thule, Traditions of Nunavut and Arctic Tropical Forest [mummified trees on Axel Heiberg

Island]. These topics are a far cry from the apple trees that young Cecilia was forced to read and write about as she gazed out on the treeless tundra. Even more southern topics, such as Nutrition and Weather, can be explored on such a database through the eyes of multiple cultures, with the inclusion of country food in the former and traditional weather predictors in the latter. All participants feel the use of culturally relevant topics are motivating for their students and staff, thereby enhancing literacy development as they are reading, writing, dialoguing, drawing, creating and sharing more. This supports Maina's theory that "cultural relevance in curriculum development is central to identity formation . . . provides survival skills . . . encourages self-determination, . . . and is a means of achieving education equality" (1997, p. 299)

Ullariaq mentions the excitement generated by the 'real thing' for her students who participated in a videoconference with the Canadian Space Agency (St. Hubert, Quebec) and MD Robotics (Toronto, Ontario). This proved to be the springboard for a theme on space exploration that culminated with older students learning more about Inuit legends relating to the various constellations and northern lights when they linked with another school in the Western Arctic. They were collaborating across distances using technology as a tool (George). Students seemed to enhance their literate behaviours (Heath & Mangiola, 1991) through use of technology in meaningful ways. Educators are gradually learning in the process of authentic learning experiences that even traditionally southern topics like space can become authentic or relevant activities as they may have northern aspects that students can explore. When Inuit students begin with what they already know, ask questions

such as 'Can space stations be used for the homeless?', they are sharing information from their own perspectives in the process of accessing a more global world.

Such queries by learners recalls cautions about literacy development as perceived traditionally and the need for inclusion of critical literacy practices, delineated as the importance of being able to identify false and misleading advertising, propaganda, and bending or distortions of the truth. George considers the knowledge rate is increasing but acknowledges that does not automatically translate into changes to literacy rates so it becomes even more important to critique what is communicated to you. "At the rate that knowledge is growing, to be able to decide what's important, connect what you believe to things that are evolving" (Second interview), becomes vital in order to dialogue with the world. He refers to Cummins' and Sayers' book, Brave New Schools (1995), where they discuss critical literacy and how focusing on social issues of concern is essential to a kind of literacy that has a constructive role to play in the world as it grows in a Freirian sense

> Students must be encouraged to focus their developing literacy skills on the analysis and resolution of both local and global problems . . . . [Such] promotion of critical literacy may be a necessary condition for the development of functional literacy. Students will be more motivated to learn when they can appreciate the relevance of the content to their own lives (p. 116).

Ullariaq also commented on the value in having students being able to access themes and notes all year round as students can continually add their new learning and make connections with previous knowledge built. These form the basis for the idea of a database being a continuum so that students and staff realize they are part

of a community which "predates them and will extend beyond them as well" (George, Second interview), demonstrating a commitment to collective upgrading of knowledge through shared resources (Hewitt & Scardamalia, 1998) over extended periods of time, authentic learning practices in themselves.

The complexity and plural nature of literacy certainly has evolved over time for the participants. From their responses comes a greater sense of awareness that as they adapt to the communication needs of changing societies, they are recognizing a community's cultural roles in the construction of knowledge through authentic activities.

Changing Roles and Practices of Thinking/Sense Making

When examining changes in thinking and sense-making, Papert's previously mentioned caution about the dangers of using computers to teach in the same old way comes to mind. A review of data from educators in the north who are using Knowledge Forum® software demonstrates they are venturing into new territory, rather than using computers to do the 'same old stuff'. The creation of environments where learners includes students, teachers, and others in their communities is new territory in itself, different from original discussions about learners in Chapter Two. The guiding principles of knowledge-building software (Scardamalia et al., 1987) encourage learners to think and explore, which mirrors the work of Bruner (1990) where learning is optimized through thinking and sense making in social environments.

Collaborative thinking and knowledge-building through use of reading, writing

dialoguing, and graphics is made possible as all participants can see the contributions of others as they progress, resulting in an increase of cross-class and cross-school projects. Cecilia mentioned the computer buddy system established between her grade One Inuktitut speaking students and Grade Four/Five Transition class, where they worked together on autobiographical notes with text and graphics so the younger students can master some of the basic features. As a result, Cecilia found increased dialoguing and learning around topics other classes were doing when her students explored the database. She found that Knowledge Forum® became the activity of choice during her students' free time. Ullariaq talked about the special events, like the Argentina/Nunavut videoconference that some of her students were able to participate in and then share through contributions to the database with the rest of the class and beyond. George examined the impact of the first cross-school database collaboration called Frontier Space where students from two different schools, territories and cultures were able to build knowledge together on a shared database. Participants felt all of these, and other, cross-age collaborations enhanced literacy development because they were authentic activities, starting from learners' prior knowledge and experiences, using a shared environment to foster cooperation and sense making. In essence, the software removed previously felt physical boundaries (Brian, Initial interview). These observations mirror the advocacy of cross-age training suggested by Brown and Campione (1994). Students act as discussion leaders, and guest experts are involved in the process, which extends the community beyond walls of the classroom through distributed expertise.

One of the observations of the use of Knowledge Forum® that all participants

noted was increased cooperation and collaboration among users, resulting in greater sense-making through the use of language in meaningful ways. Ullariaq's comments were typical of many: "I see a lot more cooperation among kids when they are working together on the computer, especially Knowledge Forum®. They can do it at their own seats but I think using the computers, they are more interested" (Second interview). She also noted that students with stronger reading skills help those with weaker skills make sense of contributions, an observation that was echoed in both English and Inuktitut language classrooms. Vic felt her students exceeded her expectation in terms of peer assistance when on computers. Some of the collaboration noticed by staff was often incidental, such as idea generation. "When kids are confused, or trying to come up with ideas on what to write, they can get ideas from each other just by looking at [what] they're reading or . . . writing." (Ullariaq, First interview).

All participants commented on the increased learning opportunities for staff and students through awareness of what was happening in other classrooms, regardless of the language of instruction. This enabled increased cooperation among learners as they were able to share ideas and resources both on and off the computer that would not typically have happened. Students and staff found their contributions to the notes and views of others were well received. Vic commented that there was almost disappointment when one child's note did not get a build-on, a change from previous school experiences where a student in one class often had no idea what was being learned in another class, particularly if the language of instruction was different. Graphics often initiated build-ons in both languages. As

noted by a review of Vygotsky's theories, "insight about self-appraisal and self-management can be promoted by other people as well as through self-discovery" (Paris & Winograd, 1990, p. 8). The zone of proximal development is therefore enhanced by 'experts', both off and on the database, whether they are students in the same class, in other classes or educators and guests involved in the database.

One of the features of Knowledge Forum® that reflects the promotion and organization of thinking is the use of metacognitive scaffolds, enabling participants to classify their thinking as they make contributions to the public database. These would be considered examples of Vygotsky's semiotic mediation, which involve the use of mental tools to transpose to higher mental functions. In my research journal, I noted that the use of the scaffolds on the computer database seemed to generate more of such classification for northern participants than traditional means have.

> *I have tried the scaffolds [on] planning sheets in the absence of computers and Knowledge Forum® . . . but the motivation to categorize their thoughts, share what they are learning and to build on each other's knowledge just wasn't as readily available. By using the public database, where all participants can read/view what everyone else has written, at all stages of their work, students and educators seem to adapt more quickly to categorizing the stages of their thinking, sharing information directly and indirectly with all others* (March 22, 1999).

Indeed the availability of relevant feedback on the database seems to have increased opportunities for critical literacy development. Exploration by Cummins and Sayers (1995) of what constitutes acceptable literacy, whether functional, cultural, or critical has application to work in the database.

> The capacity for collaborative critical inquiry that we wish to encourage through participation in computer-mediated communities of learning is anathema to many of those who have been most vocal about the need for educational reform. . . . The literacy crisis . . . is a direct consequence of a power structure that has systematically denied educational or social advancement to marginalized groups . . . [where] critical literacy is . . . the analytic abilities involved in cutting through the surface veneer of persuasive arguments to the realities underneath and analyzing the methods and purposes of particular forms of persuasion (pp. 86-90).

Vic's former classes were able to take the local issue of dog by-laws and have it form the basis of an effective cross-cultural computer discussion in their database, an example of critical literacy that Cummins and Sayers make reference to.

Perhaps the description by Papert of a computer project he was actively involved in, could also sum up the change in thinking and sense-making by learners. Participants feel such changes ultimately impact northern literacy development when using knowledge-building software of Knowledge Forum® as both "allow time to think, to dream, to gaze, to get a new idea and try it and drop it or persist, time to talk, to see other people's work and their reaction to yours" (1991, p. 4).

Changing Roles and Practices of Language

Language is the medium that carries experience to the mind (P540, p.3).

Social constructivists feel that the role of language is to enhance intellectual growth. In the past, language has been used to repress northerners, as the dominant

language of Inuit was denied a place in education. Language as a mediator betweer cultures has changed, as learners can access knowledge-building through bilingual database contributions. One early observation I made in my research journal of ESL students in their beginning stages of using technology noted the role computers might play in mediating language usage.

> *I am amazed at the ease with which even my most reluctant/weakest readers are getting into CSILE and the notes they are to work on. The language is more complex than they have had to date - words like 'text', 'discussion', 'autobiography' and so on are far more complex than the basic words [in English] that they struggle with on a daily basis. I guess they don't perceive it as reading so they don't hesitate with utilizing the language. If I asked them to read the same words on a page, they would refuse!* (November 14, 1996).

Several educators commented informally and in interviews that students were using language as the mediator in their relationships with others in the database, by contributing valid, detailed comments to other students. Some are also going back and making revisions to their work based to comments attached to their notes. Students are asking for clarification on notes they can not understand. Thus they are learning that on databases, one us always writing to an audience. A more recent database entry I made on November 13, 2000 has further observations of students who are using the computer while learning English as a second language

> *Students who are learning English as a second language seem to be most concerned about initial perfection when they record their thoughts/ideas and new learning on a shared database like Knowledge Forum®. Over time however, they*

develop higher priority on building knowledge and sharing what they want to know and what they've learned and less emphasis seems to be placed on exact spelling/grammar rules. But, as they make the shift and increase their confidence, perhaps because they are using language in a meaningful manner, writing for an audience, viewing the work of others, their spelling and language usage seems to improve . . . . I've also noticed that over time, the ESL students gain the confidence and start to correct the spelling of English First Language users, including typos of their teacher! (HC Teacher Discussion database).

The ability to contribute notes to the Knowledge Forum® database in both English and Inuktitut languages occurred mid way in this research project. This greatly increased contributions by students and staff as there was choice in what language to use as mediator, with both cultures of the opinion that their first language was valued. The result was increased opportunities for literacy development and knowledge-building. However, as with anything, whenever new variables are introduced, such as changing educational roles and practices, new issues arise. Thus the final section of this analysis will explore changing educational issues that could negatively impact literacy development and knowledge-building when using computers in the north, if they are not addressed.

Changing Educational Issues

With changing influences, perceptions, roles and practices in education over time, some old issues related to past practices are resolved, while new issues emerge, anticipated as part of the change process. Embedded in the data from northern

educators are references to issues that they feel are currently affecting literacy development and the implementation of knowledge-building technology in Iqaluit schools. The last section in this chapter will focus on the issues of language, access to resources, whether human, text-based or technological, power and support that are evident from data collected.

Language Issues

Language issues which go beyond the lack of resources can impede growth as they often act as an impediment to full literacy development. Vic finds the whole issue of streaming students according to their first language accentuates feelings of isolation amongst the students and staff, and reduces language-based interactions between the classes at the same grade level. She is concerned that there is little cross-stream collaboration in schools, aside from what has been done using Knowledge Forum® in recent years. Thus islands within the school are created, diminishing opportunities for meaningful literacy activities between classes.

Vic's students, even though it is their first full year in English, do not have the benefit of a bilingual support person in class, which is counter to the theories of Cummins that support for second language learners needs to continue for years after their initial transition. Such practices tend to lead to reductions in perceptions of the importance of their first language, a concern shared by Mary (First interview). Vic laments, "If I had someone team teaching with me or if I had a language specialist working with me in the classroom all the time, that would be perfect . . . because you would have both [languages] flowing all the time." Although she encourages bilingua

responses from her students during their transition year, her inability to respond acts as a deterrent as they lack an authentic audience and thus feedback for their efforts. Inuktitut literacy development slows down to a crawl as a result, a trend that continues in successive years.

Ruiz (1991) reinforces the significance of incorporating Aboriginal languages in school practices as a means of sharing power. Thus the ability to use Inuktitut on the networked computers has generated excitement among students and staff. Even with the introduction of Inuktitut to the Knowledge Forum® Iqaluit database, thereby providing increased opportunities for the use of Inuktitut for students in classrooms such as Vic's without first language support, Inuktitut use through the computer has not been without controversy. In order to log in to the school database, students need to use English versions of their name, some of which are quite complicated for young students to master. In addition, relatively expensive Inuktitut syllabics key caps have to be purchased for keyboards as the language is not based on Roman Orthography. Once these are in place, contributing in both languages is generally easier, provided the Roman Orthography on the keyboard hasn't been whited out.

The software allows students to use Nunacom or Naamajut fonts for Inuktitut, but until a change was made midyear, such use was cumbersome for Ullariaq's students as the font kept reverting back to an alphabeic font. Once their default font was changed to an Inuktitut one, their frustration level was reduced, although it continues to be an issue for bilingual classes who use both syllabics and Roman Orthography fonts in the same notes and views. Students became quite adept in

changing fonts, but found it time consuming. First language issues such as these have therefore acted as deterrents to first language literacy development for many users.

Another language issue that negatively affects metacognitive literacy practices is the inability to use the scaffolds in Inuktitut, whether scaffolds provided with the software or those inserted by educators for specific topics in the Knowledge Forum® database. The software currently does not allow for scaffolds or menu items to be in the syllabics of Inuktitut, although French and Portuguese versions of the software are available. Thus Inuktitut first language teachers have to either translate these components orally or on paper for students each time or, in the case of the scaffolds, not use them at all. This diminishes the whole premise of knowledge-building through metacognitive means. Although the list of strings (words that are used to program the software) was sent to the community to be translated into Inuktitut for a future Inuktitut version of Knowledge Forum®, locating a translator in a community where they are in short demand after the creation of the new territory, and accessing funding to pay for the translation becomes a political issue. Thus politics of language can act as an impediment to literacy development as well.

Inuktitut language development remains a concern in general in northern schools. Vic mentions staff room discussions with Inuit staff, echoed in other staff rooms, about how fewer students are entering school proficient in oral Inuktitut, and the impact it is having on their learning throughout their schooling. She expresses great sadness upon hearing Inuit staff say that perhaps Inuktitut should be dropped as they are putting so much effort into teaching rather than maintaining Inuktitut.

Inuktitut as a second language is becoming a reality for many students entering school today, even though their parents have Inuktitut as a first language. Perhaps an indication of this is found in the 1996 census as although eighty-four percent of the population are Inuit, only seventy-four percent of Nunavummiut claim to have Inuktitut as their first language, while only sixty-four percent still speak it at home ("Nunavut by the numbers", 2001). As a result, down the line when Inuktitut First Language students do begin learning to read, write and dialogue in their second language, they are finding it even more of an uphill battle. As an ESL teacher, Vic is finding that

> the system that we work in . . . and . . . are buying into is telling us in theory they should be strong in their first language, because of how we are doing it. So therefore you are helping them become literate in their second language but you are not given the full deck you were promised (Second interview).

Vic and others are finding that the reality is, many other factors are interfering with the students' literacy development in their first language, thereby compounding their struggles in their second language development, even with the computer as a motivator. Such thoughts as reflected in one of my earlier research journal entries, although small gains are encouraging

> *Ah, the difference between English First Language students and ESL students becomes clearer each time I log on. The ability to pose questions and find specific answers comes with confidence in language . . . . Just doing research (for ESL students) is a whole new concept . . . as there are not any research materials in Inuktitut at their level. Basic learning for this first major project included how to*

spell their last name [in English], how to use an index, encyclopedias and how to get the material you want from a book. Then trying to put what they are learning in their own words [in a second language] is a major challenge . . . . The few independent readers . . . are struggling with comparisons as this is something new to them. Long process but starting to see results(February 11, 1998).

Thus the ability to use either language in the database has helped in literacy development through collaborative knowledge-building as other participants can contribute, clarify and respond in both languages, but the path is not necessarily a smooth one.

Human Resource Issues

Over the course of the last few years students have used interviews with elders and conversations with family members to contribute bilingual notes to the Knowledge Forum® database about cultural practices, past and present. Not only do these practices encourage the use of human resources, much like the past, but the exploration and integration of Inuit culture with other cultures through the database demonstrates an equality among cultures that has not always been available in the school system (Cecilia, George). As Cecilia knows first hand, too often in the past her culture has been devalued and even shunned from being part of the school system. Unfortunately, for today's youth in most of our country, such opportunities for multi-age, literacy-based experiences are rarer. In the North, according to the 1996 census, fifty percent of the population are under the age of twenty while only 0.001 percent of the population are over the age of 85 ("Nunavut

by the numbers," 2001). Thus such opportunities for cross-generational communication are rarer, and perhaps even more important given past cultural practices and the relative lack of text-based resources for northern youth when they explore culturally relevant topics. Hamme reinforces the potential danger that Inuit culture will continue to be marginalized if youth lose a sense of their past (Maina, 1997). Declining human resources is a contributing factor, as youth lose out on access to ancestral voices.

Text-Based Resource Issues

Inuktitut books currently available in elementary classroom are not sufficient by themselves for expanding literacy development. Ullariaq and Cecilia observe that as educators become more constructivist in their approach, starting from what the child wants to learn about a specific curricular topic, this becomes problematic as nonfiction print material in Inuktitut is extremely rare. Classrooms do not have access to published Inuktitut dictionaries or encyclopedias, either in print or online. Ullariaq mentions her struggles to find appropriate resources for her Inuktitut First Language students on the theme topic of fish. A focus on the student as learner necessarily becomes restricted as the topics they ultimately choose are limited to the Inuktitut, often teacher-generated, resources available. Thus it is a challenge to implement a truly constructivist approach to learning in Inuktitut first language classes.

For students who are moving in to English as a Second language classrooms, it is no any easier to find resources (Vic). Ullariaq commented on her personal early

frustration because she "didn't know how to voice [herself] in English". When you compound this with the fact that information about the north, so vital for culturally relevant themes, is often written by non-northern 'experts', whether scientists such as archeologists, or explorers, with intended audiences of other scientists and university students elsewhere, literacy development can be affected negatively by the lack of appropriate text-based resources. There is therefore danger that the knowledge contained in the multitude of text-based tenets of Western Society and in the increasingly dominant language of English, may take precedence over Inuktitut print material, just because of the availability in such large quantities. Thus the absence of cultural information in text form for Inuit students may lead to being disadvantaged from the beginning in their literacy development (Cummins, 1996).

Technological Issues

Issues surrounding technology have been sprinkled throughout this analysis, such as lack of Inuktitut sites on the Internet, dearth of culturally relevant CD ROMs and computer software programs, challenges in ensuring keyboards have access to syllabics and so on. One of the major technological issues remains equality of access to computers outside classrooms, and the impact it has on literacy development. One difference I have observed between language streams is that *"many of the EFL students have access to computers outside of school. I think I have only one out of twenty-eight who has access to a computer at home* (Research journal, February 11, 1998). That pattern has continued in successive years. Thus if technology is indeed the "catalyst for change" (Fisher et al., 1985), the inequity of

access to computers outside the school system could result in students being less equipped to deal with the changes in their classrooms, potentially affecting how their literacy develops and how significant an impact knowledge-building technology has on their education.

Support Issues

There were several strategies utilized as part of this research project that increased the participants' time on, and ultimately comfort level with, using computers in the classroom. One of the most effective, from the views of the participants, was the scheduling of biweekly team meetings, demonstrating the significance of learners being active participants in their own education (Bell et al., 1990). Ullariaq reflects in her second interview that "the meetings that we have on Tuesday after school have helped. I didn't know that I had applied the skills I was learning from the meetings. I guess now I have to think . . . I did learn from the teachers and the students both. It goes both ways." From my perspective as coordinator, the biggest change was that at the first of the year, the teachers sat in a group away from the computers until they were given specific instructions of a task to do on the computer. By the end of the year the team members almost had to be pried away from the computers to discuss some topics face to face.

> *What I was most excited about, aside from the energy in the room, was that the adults were acting as we want to see the students - cooperating, collaborating, questioning, learning from each other as they build knowledge. A very diverse group in terms of interests, experiences, abilities and language. I spent time*

> *incidentally listening to conversations as they worked away, both on and off the computer. Commented several times . . . about how great it was to see them exhibiting the very same behaviors we want from the students*(Research journal, February 24, 1998).

Such support takes commitment on behalf of a team member to coordinate regular gatherings to build knowledge in much the same way as student learners do. Participants mentioned the benefit of support for the supporters that is possible through use of telementoring. Brian, George and Lance all talked about the importance of having locally based leadership to encourage the ongoing participation of the team in addition to telementoring support. Brian laments "It's a bit of a pity that you really need a driver to keep that sort of stuff going" (First interview). Recognizing that leadership is a factor in establishing and maintaining change in education is not an issue unique to northern settings. With the changeover in staff that occurs on a regular basis in the north, assuming that a leader will arrive to provide informal and formal support to perpetuating a team approach could be problematic so continuity remains an issue for northern communities.

Other forms of support included support for time to learn and develop as a user of knowledge-building technology. The team participated in the writing of several proposals early in the year, enhancing literacy development for staff in the process. As a result, funding was accessed to enable release time [one period every two weeks] for staff team members to work with the Knowledge Forum® database, whether in the staff room, in their classroom while their students worked with a sub or in another teacher's classroom. The latter provided more opportunities for

students to teach staff, particularly with graphics and other features of the software. All participants acknowledged the time it takes to learn to use computers themselves, some thinking computers would increase the time they needed to do things in the school. Ullariaq was pleasantly surprised that this was not necessarily so.

> I thought I'd be doing more. But it's actually released things for me to do . . . . I have more things to do with other students when other students are on the computer working independently. It's actually taken time off my hands where I thought it would be the thing I'd put my time to . . . . It's actually given me more time (Second interview).

The timing of release time at the beginning stages of use of Knowledge Forum was helpful for staff. Unfortunately, such funding is difficult to access, so the same opportunities for support through release time just has not been available for newer staff, detrimental to literacy development using computers for both students and educators.

The strategies mentioned have assisted in the development of staff computer literate behaviours (Heath & Mangiola, 1991), but they do not replace the need for on-site support. "These support group meetings are essential but there are going to be times when I am going to want to fly one of you into the room and not wait until next Tuesday" (Vic, First interview). Lance concurs with the need for support. "Be aware . . . that the creative application of any technology is completely teacher dependent, and subject to breakdown if administrative, technical and educational support isn't given" (First interview). With so many of the participants at one

school, maintaining the network for computers in general, and Knowledge Forum® in particular was easier. For Vic, the lone participant from a neighbouring school, her involvement in the database was dependent on her school's network and Internet access functioning. Often the issue was bigger than her classroom. She had past negative experiences in fluctuating changes in school technical support when she had worked with CSILE at the high school so really felt isolated. She strongly feels that nothing can replace the casual conversation in the hallway where strategies, troubleshooting ideas and observations can be shared incidentally throughout the course of the day. "If I was among a group, surrounded by others doing it [using Knowledge Forum®], I'd be a lot further ahead. When you are not comfortable with something to start with, but you are willing to try . . . it doesn't make it any easier" (Second interview). Lance's cautions have proven appropriate as the lack of school- and Board-based technical support have been major issues in the time periods since second interviews were conducted.

Other support issues that seemed to influence staff's, and ultimately students', use of technology for literacy development include lack of bilingual support as well as ongoing administrative, and Board level support. The latter has been problematic with a high rate of turnover of administrators, some of whom have never touched a computer before coming north.

Thus for project participants, there was a definite relationship among support issues such as time on computers, support for users, access to computers, and its impact on literacy development. As these support issues decreased in the north, staff, and ultimately student, literacy development appeared to increase.

Issues of Power

As mentioned in Chapter Three, Paulo Freire's literacy work in Brazil (1971) raises the issue of the role of empowerment in literacy development. George reasons that "how knowledge is accepted as true is as much dependent on issues of power as it is on issues of right or wrong." Cecilia's early schooling is indicative of a bleak time in northern education, when the knowledge and power to express herself through cultural means was denied. She recalls being made to feel stupid and punished because she did not answer her teachers' questions. Her teacher was referring to her by a name they had imposed on her so she did not know they were talking to her. She reflected, "someone told me to write a story about where did Ungaaq go, for people like me who kind of lost their identity." Reflective thinking is indeed a key in empowerment, as is communication and democracy. Although she grew up in an English-only school environment, and today is comfortable teaching in an Inuktitut-only classroom, Cecilia has not fully realized she has the power within herself to share her reflections in either language. Today's youth are better off than she was, as Cecilia shows respect for cultural practices by making a point of asking her students' parents what name they want their child to be called in school. Interestingly, when Qallunaat teachers ask the same question of students, the students ask to be called by their 'Qallunaat name', for example 'Rebecca' instead of 'Oleepeeka'. Thus language and culture remain interconnected with perceptions of power.

The fine line between power and oppression, explored extensively in other contexts by Freire (1971), Cummins (1996) and Maina (1997), is sometimes still an

issue today in the north. With the rate of rotation of predominantly non-Inuit southern educators, students are likely to encounter teachers who may not have an understanding of their culture, and who may not allow traditional means of communication in their classroom such as nonverbal gestures for 'yes' and 'no'. George discusses the issue of power in his second interview, noting that anyone who does not believe "that all kids can . . . should . . . have a right . . . . and responsibility to achieve" will not do well in developing students' literacy as they are disempowering students before they start.

Education, and approaches to schooling have, over the years, impacted both positively and negatively on the development of literacy in the north. Language issues previously mentioned have taken their toll on the acquisition of Inuktitut and English literacy skills. Likewise issues related to power and control, also covered in this chapter, have impacted the rate of literacy development. Other influences on education and thus literacy development, according to the participants, have included exposure to computers, increased Inuktitut in schools, changes in how learning is viewed, as a product, a process or a "mix of content, process and context" (Heath and Mangiola, p. 19). Time constraints, broader expectations, movement of staff and the use of untrained substitute teachers to cover classes when staff are participating in curricular development or professional development activities also have been identified as areas that affect change in schools, and society as a whole. Increase in the power of local education authority, whose members may have the best interests of students at heart, but are not culturally representative, can also influence education.

Control issues within the classroom are also a factor, as increasing personal advocacy and turning a sense of control over to students can influence education for today's society. At the heart of many of these changes in education are changing perceptions of knowledge, pedagogy (art of teaching) and mathetic (art of learning).

In George's experience, the use of technology is resulting in fewer people controlling the power. Students and staff are empowered as they gain control of the computer. He theorizes that perhaps that is why the use of graphics as a form of literacy in the database has been so empowering for participants, as by drawing, the universal language, even those who are a bit timid of the computer can control it by producing something they know and feel they do well. Perhaps the most powerful example of empowerment through graphic literacy in the Knowledge Forum® database was the contribution by a shy Grade Three unilingual (Inuktitut) young man. He drew a magnificent char using only the mouse, labeled the parts and contributed his note to the database for all to view. Word of his contribution spread quickly among students and staff, becoming a teaching and learning tool for many others. In the process this shy young man became empowered. It also has demonstrated the power of supporting multiple intelligences through the use of technology, while recognizing the power inherent in having students model for students and staff, particularly when staff are often more reluctant initially to use computers than their students.

Summation

Deborah Meier (1995), when discussing four effective schools in New York,

notes that each of them

> offers a rich and interesting curriculum full of powerful ideas and experiences aimed at inspiring its students with the desire to know more, a curriculum that sustains students' natural drive to make sense of the world and trusts in their capacity to have an impact upon it. . . . Schools . . . where teachers with the passion of the amateur and competence of the professional thrive (p.16).

Given the winds of educational change currently blowing through the community of Iqaluit, the same could be said of the elementary schools, thanks in part to the open mindedness of educators in embracing newer technologies. According to their reconstructions, all the questioning, theorizing, researching, dialoguing, contributing new learning in text and graphic forms, editing and so on are examples of how the knowledge-building technology of Knowledge Forum® enhances literacy development as participants, young and old, are using language in meaningful ways, both on and off the computer, through an integrated, culturally relevant approach to teaching and learning. The theory that changing influences, perceptions, roles, practices, and issues makes a difference in relationships between literacy development and knowledge-building technology will be explored further in the final chapter. This final chapter will also include a summary of the analysis and examine how the reconstructions are related to the initial questions that guided this research journey. As well, implications from this research will be proposed, and questions will be raised to possibly guide future research endeavours.

Chapter Six: Conclusion

Inuksuit of the Future

With modern information technology, they can learn so much more by doing, . . . by exploring for themselves . . . .The teacher's role is . . . to act as a guide, . . . to be a counselor . . . .We need a vision. . . . .We can do that by . . . creating situations in schools where children pursue with their own passion from their hearts . . . so the teacher get[s] used to . . . respecting the children as learners . . . [who] can create their own knowledge . . . . It's about . . . how we would like children to learn and technology makes [it] possible [for] . . . these dreams . . . [to] come true, (Papert, 1998)

The use of technology, especially computers, has advanced rapidly and pervasively, permeating life in the north. The computer, and its integration, has had a profound effect on northern education, challenging educators' thinking about teaching, learning, and knowledge. While continually motivating both the students and educators to strive for access to, and success in, the global society, it has provided opportunities for students and staff that they might not otherwise have had . As exposure to the use of technology has grown, my personal fascination with the potentiality of how technology could make a difference in the lives of students,

staff, and education has increased. For a northern locale, the roles potentially played by culture and literacy development in the use of computers in northern school has lead to further introspection. After all,

> In the world of the twenty-first century, decision making and problem-solving, virtually all spheres. . . will depend on electronic networks that span diverse national and cultural boundaries. Students whose education has provided them with a broad range of experience in using such networks for intercultural collaboration and critical thinking will be better prepared to thrive in this radically different communications and employment environment than those who have not been provided with access to cross-cultural awareness and problem-solving skills (Cummins & Sayers, 1995, p. 12).

Consciously choosing qualitative research for this research journey in the north arose from its emphases on social context and rich descriptions of people, places and voices. Recognizing research as a process or "a snapshot in time of a set of emergent ideas" (Lincoln & Guba, in Ely, 1997, p. 193) has led to both personal and professional development. "As qualitative researchers, we become aware of ourselves as contingent, interactive, open to change as a way of life . . . . The process of qualitative research also become processes of professional growth" (Ely, 1997, p. 180).

The journey began with reflection on northern life and the impact theoretical frameworks for education have had on that life for students and staff. Acknowledgement that "talk lies at the heart of both our everyday lives and our intellectual development" (Meier, 1995, p. 153) has led to the use of the voices of

educators as the primary sources of information, in a multitude of formats. "Teachers commented that as they talked to us . . . they had begun to examine their beliefs by listening to themselves talk" (Ely, 1997, p. 200). The process has been fascinating, professionally and personally, resulting in reexamination of technology, literacy and culture in northern settings by educators involved.

Involvement in computer and literacy ventures, both within and outside the school system, has lead to reflection and dialogue about the specific software of Knowledge Forum® that has been piloted in Iqaluit, Nunavut for a number of years. In order to comprehend educators' perspectives on potential relationships between knowledge-building technology of Knowledge Forum® and literacy development for Inuit students in Iqaluit, as a researcher I had to understand what the terminology of 'literacy' and 'knowledge-building' meant for the participants, individually, and collectively. Those understandings became the beaconsof the cultural framework for this journey, representative of their lived experiences in the landscape of the north and beyond.

This concluding chapter will begin with summaries of participants' beliefs about literacy, knowledge-building, and cultural relevance, particularly as related to the computer based software of Knowledge Forum®. From there, conclusions reached from the data and implications for further research will be explored.

Literacy

Literacy is a relative term. Its meaning depends on individuals' needs and values and the norms and expectations of the social group of which the individual is a part (Winterowd, 1989, p. xii).

How is literacy defined in traditional Inuit culture and for today's youth? According to northern educators, literacy is a relative term and indeed, a multifaceted one. Traditional definitions of literacy as being reading and writing, particularly in the dominant language of English, is a typical first response for many participants raised in Eurocentric educational systems. Further dialoguing and reflection by participants gives credence to a much broader, more inclusive view of literacy, one that encompasses oral, pictographic, bibliographic, electrographic (Ross & Bailey, in Niederhauser, 1996) as well as nonverbal components.

Being literate in 'land' or 'environmental' literacy sustained Inuit for centuries as they were required to read the signs of the land in order to survive in the often harsh environment, whether natural signs, such as snow formation, weather indicators and hill composition across the treeless tundra, or signs produced by humans, like inuksuit and nonverbal gestures. As satellite technology is not always reliable due to sun transit in the fall/spring and occasional breakdowns of the actual satellites, land literacy is still valid for today's northern travelers out on the land, even with newer technology such as Global Positioning Systems [GPS].

Another major facet of literacy for northerners is the cultural component (Hirsch, 1983), one that recognizes the contributions from multiple cultures. Traditional Inuit cultural contributions, often neglected in definitions of literacy, but integral to northern literacy, include oral communication, as exemplified by sharing information through throat singing, juggling songs, bone and string games, naming practices and storytelling. Many of the stories passed orally for generations are forming the basis of newer literate technologies as youth gather information from the

dwindling number of elders and transfer them to cassettes, videos, and computer databases. Drama, through song and dance, also plays a role in northern literate behaviours for multiple cultures. Other forms of artistic expression have garnered a place in cultural literacy for northerners over the years, as the significance of information expressed through, and gleaned from, interactions with carvings, prints, photography and computer graphics have been recognized. Two unique examples of Inuit cultural literacy provided by participants as representations of knowledge communicated are the carving of traditional tools like bowdrills and the dual use of newspapers and catalogues from Qallunaat culture as insulation and bedtime reading material.

The roles of reading and writing, in both syllabics of Inuktitut and Roman Orthography of English, remain a prominent component of literacy in the north, although issues related to the use of both languages are widely recognized. "The language and literacy knowledge-learners construct is influenced by the home and community and varying degrees of contact with the larger society . . . . Language develops through authentic language use, not language exercises" (Altwerger & Ivener, 1994, p. 68-70). Thus how languages are treated through reading and writing in schools impacts on literacy development for northerners.

For northerners of today, major contributors to cultural literacy are newer technologies, whether mass media such as the telephone, newspapers, and televisions or the increasingly dominant computer, all of which have the potential to enhance multicultural literacy or destroy less dominant cultures, such as the language and culture of Inuit. Educators acknowledge the changing influences in education

offered by newer technologies yet are aware of potential harm in such changes.

> We don't create all the conditions that affect our students lives; we can't stop the world our students live in while we do our work, a world that places crushing burdens on far too many of our young people. We have no guarantees to offer our kids, their families, or the wider public beyond trying our best (Meier, 1995, p. 49).

Intertwined with all the previously mentioned composites of northern literacy are critical components. Critical literacy (Ira Shor (1992) in Cummins, 1996) for those in the north over the last half a century involves being able to examine practices by multiple cultures in the past, in the present and indeed for the future. The work of Paulo Freire in Brazil has been a personal inuksuk guiding recognition of the need for critical literacy behaviours in the north. For less dominant cultures, according to Freirian theories, "the chief object of the literacy process was not one of mere technical mastery of the written word, but a quality of consciousness, a changed awareness which the people could express through language and action" (Bee, 1981, p. 40). Perhaps the suggestions of George would represent such changing consciousness, as

> Reading and writing . . . equals literacy in a very constrained set of circumstances. That set of circumstances equates very nearly with those lived in by large numbers of power-brokers, . . . in the world they define reading and writing as a key to success. Today's youth need that, but I think they need more. They need the critical capacity, not only to deal with print, but to dissect and, if necessary, disembowel the visual imagery that hits them constantly from MTV, advertising

> and so on. Literacy . . . means being able to stand up and tell someone that what they are trying to stuff down your throat is garbage, in their language (Joamie database, March 8, 1999).

Both critical and cultural components of literacy emerged from other participants as being vital to a comprehension of northern literacy. Lance contributed a note to the database that provides a more inclusive outlook on literacy that perhaps typifies participants' views.

> True literacy is more than simply reading text, but living and interpreting the word - whether it be oral or written, but the relationship between the word and the reader is not one of master-slave but of a fully conscious human being aware of his own history, and hence 'authorship' (Joamie, March 8, 1999).

Ullariaq's analysis that "right now we are so advanced in literacy because there's literacy all around us" (Second interview) and Cecilia's comments that "Literacy came a long way from the time it arrived here up to now" (Second interview) are thought-provoking. If the combined perspectives of northern educators' more encompassing view of literacy is to be the inuksuk guiding educational practices, then a belief that literate practices and behaviours (Heath & Mangiola, 1991) have been in existence for centuries needs to be affirmed, that is, literacy is not a 'product' brought to the north by Qallunaat, rather a process that is inclusive of multicultural practices over extended periods of time.

Knowledge-building

> *What is important is not what a particular program is called, but the extent to which*

genuine change occurs in the role definitions of educators and the structures that frame the interactions between educators and students (Cummins, 1996, p. 173).

How does Knowledge Forum® support knowledge-building for Inuit students? For participants, understanding the phrase 'knowledge-building' in relation to Knowledge Forum® began initially with a discussion of knowledge in general. Some participants believe knowledge is information based in a variety of cultures while others see knowledge as more situation specific, connected to events in a particular place and time that may or may not follow cultural boundaries. Some view knowledge as a product while others see it as a process. Whether a product or a process, all believe that the nature of knowledge is changing, in light of the changing influences of elders, church, education, mass media, technology and global society. There is general acceptance amongst participants that knowledge can be culturally evolved, knowledge is socially constructed by individuals and groups, and misconceptions are part of the process of knowledge transformation. These features are components of a constructivist approach, playing roles in knowledge-building through Knowledge Forum® databases.

Learner empowerment is an important feature of knowledge-building for many of the participating educators, as learners start from what they know, generate questions individually and collectively, building knowledge together on Knowledge Forum® databases, using their interests and queries about curricular topics as framework for extended exploration of topics. Learning empowerment is expanded as learners' voices, whether traditionally shy or not, are included in the database by

dialoguing through bilingual text and graphic notes, thereby recognizing multiple intelligences. For students who could understand English, the use of metacognitive scaffolds in the Knowledge Forum® software enables them to think about their thinking, classifying their contributions for others to share, a feature that could be extended to all students once Inuktitut menu items are available. One of the down sides of attempting to empower learners to build knowledge continues to be the relative lack of appropriate text and computer based resources in Inuktitut or about culturally relevant topics, not surprising given the nonverbal, oral and pictographic literacy traditions in the north.

Another component of Knowledge Forum® software that educators felt contributed to literacy development and knowledge-building is the 'public' nature of the database, in that all those provided with logins can read and potentially respond to the text and graphic notes of all other database participants. Thus, authentic audiences are provided for participants, another component of a constructivist framework. Through the process of asking questions, proposing theories, contributing new learning, revising previous theories, editing and making connections with other people's ideas and learning, learners probe deeper questions which often lead to further investigations. Dialoguing through verbal, nonverbal, and written means, both on and off the database, becomes part of the process, demonstrating that what happens electrographically is integrated with literacy development activities in the rest of the classroom. Thus nonverbal, oral, pictographic, and bibliographic contributions are integral parts of the knowledge-building process inherent the Knowledge Forum® database.

One of the most frequently discussed components of knowledge-building by participants is the changing roles and practices of learners, from teacher as the 'sage on the stage' to the development of a community of learners, where students and staff are learners and guides for other learners of all ages. The changing roles and practices of learners assists in knowledge-building, as all participants learn through experience as collaborators, sharing their own areas of expertise. George observed, based on years of using the software, north and south, that

> Knowledge Forum® also works because teachers are using, for their own purposes, the same environment they are trying to use with kids. Teachers are the expert learners. They're learning to use the same technology to support their own learning, and they understand their own learning a little bit better. They understand the software a little bit better. I think that means they can apply it better to help kids in how they are learning (Initial interview).

A sense of team in the construction of knowledge has developed for educators and students through these changing roles and practices of knowledge-building, as the database reflects the contributions to, awareness of and value inherent in multicultural, multi-age learning in numerous classrooms and schools, a model which is in contrast with traditional isolating classrooms as boxes within a school (Brian).

Upon reflection, the data from northern educators about changing roles and practices in the construction of knowledge mirrors the distinguishing features of knowledge-building communities delineated by Bereiter and Scardamalia (1993), as

> there is sustained in-depth study of topics, a focus on problems where inquiry is driven by learner's questions, challenges are inherent in the explaining as

> personal theories are developed and adapted with input from others, there is collective understanding as the goal through group efforts, from which discourse is integral, demonstrating that teachers are not the only source of information as they become the facilitators rather than sages (pp. 210-211).

The terminology of 'knowledge-building community' used in conjunction with Knowledge Forum® implies collective effort using technology, resulting in utilization of literacy behaviours in the decentralized establishment of a community of learners.

Cultural relevance

> *We never educate directly, but indirectly by means of the environment. Whether we permit chance environments to do the work, or whether we design environments for the purpose makes a great difference (John Dewey, 1916, p. 19).*

In what manner does Knowledge Forum® support culturally relevant learning in both literacy development and knowledge construction? The design of the Knowledge Forum® environment is such that many of the facets of knowledge-building discussed in the previous section have application in terms of culturally relevant learning. Learners bring prior knowledge, experiences, and beliefs of their multiple cultures to their classrooms and ultimately to the Knowledge Forum® database, resulting in greater collective empowerment through the creation of a "climate of personal advocacy" (George).

Past Inuit cultural practices of cross-age feedback through authentic activities are reflected in the current practices of all ages of learners contributing in Inuktitut

and/or English to the Knowledge Forum® database, where the audience is authentic, often comprised of peers, students in other classrooms, staff, parents, local, regional, and national 'experts'. Thus multicultural connections are made using literate behaviours between past experiences, prior knowledge and new learning, whether building knowledge about traditional northern topics or relating exploration of more global themes to northern experiences.

The ongoing nature of learning through a networked database encourages multi-staged contributions throughout the school year, as different classes explore a variety of themes, making connections with other views in the process, much like traditional interconnectiveness of learning outside schools. A topic is not covered in isolation and disposed of when the chapter is finished, as has been the case traditionally in schools. Authentic activities, both on and off the Knowledge Forum® database, enable the tailoring of current such culturally relevant activities to meet individual and collective needs by creating positive climates for self-esteem development that enable ongoing access to previous contributions and theories contributed to the database. As safe spaces are created to share thoughts and ideas as works in progress for all learners, educators have noticed increasing confidence for participants, as the software is used to overcome previous language gaps. Thus learner sense-making is changing as critical thinking becomes a base for learner initiated inquiries which highlight unique cultural perspectives and experiences

Consistent with beliefs that have sustained Inuit in their collaborative quest for survival out on the land, Knowledge Forum "incorporates so many of the objectives we want in education. It avoids the competitive aspect of many activities done in

school classrooms and builds on the cooperative and problem-solving aspects of learning" (HC Teacher Discussion Database, November 11, 2000). So much of Inuit culture for centuries involved cooperative, two way interactions yet so much of technology use today is one way. Knowledge Forum® seems to be an exception, showing respect for traditional values of two-way communication, recognizing that the greatest support is frequently from each other. By promoting Inuit traditions such as two-way communication and collaboration, the use of the software of Knowledge Forum® becomes culturally relevant in more than just the themes explored for database contributions. "Our experiences with the CSILE learning environment have convinced us of its power to contribute to the creation of immensely rich cross-cultural classrooms in which teachers are lifelong learners" (McAuley, 1998, p.14).

The capacity to accommodate multiple cultures, languages, ages, perspectives, and experiences within the framework of Knowledge Forum® databases has parallels in Freire's theories behind literacy development efforts in Brazil.

> One of the most important pedagogical tenets for Freire is the need for teachers to respect the consciousness and culture of their students and to create the pedagogical situation in which students can articulate their understanding of the world. At the same time, teachers must be self-reflective and seek to understand their own presuppositions and assumptions, the ideological prism through which external reality is sorted and understood . . . recognition that both students and teachers are subjects, creators of meaning and members of cultural worlds, and both are engaged in the task of understanding their own consciousness and the

world (Weiler, 1988, p.18).

The capacity to explore such multiple facets of learning through Knowledge Forum® databases translates into enhanced literacy development opportunities through knowledge-building activities, and the creation of culturally relevant resources leading to further exploration and learning by all learners. This research demonstrates that, in the process, learners of all ages have become empowered, and, according to educators, seem to be more motivated to continue as lifelong learners

Integration

What are educators' perspectives about literacy development through knowledge-building technology for students in Iqaluit, Nunavut? Given the recognition of the broader definition of literacy for northern communities, the relationship appears to be a positive one, Even when the narrower traditional definition of literacy as being reading and writing is used, the relationship for northern educators between literacy and Knowledge Forum® would still be viewed as a positive one. Acceptance of broader, more inclusive definitions of literacy that include land, cultural, and critical literacy components in addition to reading and writing, acknowledges the intensive environment for literacy development provided by the software. There is consensus amongst participants that Knowledge Forum® provides the framework, through the initially empty database, for the development of a knowledge-building community, both on and off the computers, that is culturally relevant and recognizes multiple literacy formats. Learners are required to use texts and graphics, in a choice of languages, about a multitude of topics in order

to contribute to the developing database. Part of the attraction for educators is the adaptability to numerous classroom experiences, whether young Inuktitut First Language learners, transitioning bilingual learners, English First Language learners or educators, resulting in participants observing increased willingness to read, write, dialogue and use graphics as mediator for language. "Language is the means by which children develop personal power in their lives" (Anthony, Johnson, Mickelson & Preece, 1991, p. 2).

This research therefore refutes the proposal by Hewitt in his doctoral thesis, who initially compares Brown's and Campione's 'Community of Learners' model (1994) with Scardamalia's and Bereiter's 'knowledge-building Community' model. Hewitt theorizes that

> students with lower literacy skills, and short attention spans, might benefit more from Community of Learners, which is more highly structured, and has better established supports for reading. Students who have already developed some proficiency in reading and writing might benefit more from the Knowledge-Building Community model, with its greater emphasis on reflection and progressive knowledge advancement (1996, p. 17).

As discussed in Chapter One, Dufficy and Gummer (1991) encourage the recognition that second language ability is not a reflection of cognitive ability or learning potential. Thus Inuit learners appear to be just as capable of reflecting and advancing knowledge as other students, as evidenced by multicultural database contributions. By providing a safe environment for exploration of culturally relevant topics, which accepts students at their starting points in either language, valuing

multicultural experiences, and perspectives, there is increased collaboration as connections are made by participants. A gradual approach is supported by Scardamalia and Bereiter (1991) who recommend that "knowledge-building community is not a model that all classrooms should adopt overnight, but is rather a goal to work toward. That is, high-level skills should be progressively turned over to the students as their competency and ability develops" (Hewitt, 1996, p. 9). Educators have noticed such gradual changes in both themselves and the students as connections are made in the database.

McAuley (1998) noted that "learning supported by CSILE [Knowledge Forum®] . . . becomes a matter of weaving connections between individual notes and topics and exploring relationships" (p. 14). As the roles of audience and learner purpose become intricately related through literacy development and collective knowledge-building, those connections are being made by northern learners, regardless of their starting levels in their first and second languages. George comments, "I think Knowledge Forum® . . . make[s] the processes visible so they can be discussed, diagnosed, and emulated(Iqaluit Millennium database, October 14, 1999).

As a visible, collaborative environment, Knowledge Forum® values cross-cultural and multiage contributions, developing critical thinking skills in the process. Rowley (1994) mentions the mixed blessing of such knowledge-building community approaches as although they are more cognitively stimulating, they require greater effort on behalf of all learners. Maintenance of such knowledge-building, literate environments requires valuing collaboration and questioning while ensuring access to

resources. The latter may be an issue in sustainability of knowledge-building literate environments in the north, due to fluctuations in availability of support, whether human, text-based or technological.

According to participants, the role of the computer as motivator in the development of literacy through knowledge-building communities is an important one. This has been particularly reinforced through observations of younger learners, as the multiplicity of uses for computers is recognized (Papert, 1980). Beginning at an early age, children are naturally curious. If literacy is only considered to involve the use of the printed word, there is risk of squashing that interest. Papert refers to the computer as the "Knowledge Machine", recognizing the potential intrinsic in it for becoming literate at a tender age through stimulation of a child's natural curiosity. Papert is convinced that "all successful learners find ways to take charge of their early lives sufficiently to develop a sense of intellectual identity" (pp.24-25). For northern educators, particularly those just beginning to use computers, it is never too late to adapt, something Inuit have demonstrated over and over again. Northern educators involved in Knowledge Forum® have begun to take charge of their learning through a collaborative approach, exploring the interrelatedness of literacy, knowledge-building and cultural relevance. Through computer usage of Knowledge Forum®, the general belief of participants is that the interwoven nature of these topics is directly related to the experiences, comfort level, educational learning background, and support provided for educators involved. Their views are similar to others who are integrating technology in their classrooms.

As . . . teachers became more comfortable with the technology, they reported

> enjoying their work more and feeling more successful with their students. They also reported that they interacted differently with their students, more as guides or mentors and less as lecturers. In some cases, their personal efforts to make technology an integral part of their classrooms caused them to rethink basic beliefs about education and opened them to the possibility of redefining how they went about providing opportunities for students to learn (Fisher et al., p. 8).

Scardamalia (1997) has researched other North American sites using the technology of CSILE/Knowledge Forum®, noting similar rethinking of knowledge, resources and practices by participants.

From this research journey, it appears another factor that enhances the potential integration of literacy, knowledge-building, and culture is open-mindedness, as educators embrace change in their classrooms and schools.

> The more people participate in the process of their own education, the more people participate in the process of defining what kind of production to produce, and for what and why, the more people participate in the development of themselves. The more people become themselves, the better the democracy (Bell et al., 1990, p. 145).

Change has indeed become the defining component of integration of knowledge-building technology and literacy development for participating northern educators.

Change

The winds of change are a constant force in the north in the last century, and therefore are a major part of the landscape of this research journey. The role of

change in educational relationships between literacy and knowledge-building technology in the north is therefore an important one to consider. From over a decade of work with staff and students using computers, I have found it fundamental for participants to be willing and open to new ideas.

> For the kinds of change necessary to transform . . . education, the work force of teachers must do three tough things more or less at once: change how they view learning itself, develop new habits of mind to go with their new cognitive understanding, and simultaneously develop new habits of work - habits that are collegial and public in nature, not solo and private that has been the custom in teaching . . . . Schools must create a passion for learning not only among children but also among their teachers (Meier, 1995, p. 140).

That openness to new ideas, and personal passion for learning, combined with George's suggestions of a need for leadership and technological environment, have led to the change in the perceptions of teaching and learning for participants, personally and for their students. As an example, after completing a Knowledge Forum® workshop, Mary found she "thought about myself and my approach to teaching and learning and how that would fit into what I want to do. . . . We all need to teach our kids independence and some control in . . . their learning and what they learn." Perhaps northern educators willing to change and adapt how they view the arts of teaching and learning, using technology to enhance literacy development is linked to being in a northern culture that has undergone such rapid change in a relatively short period of time.

The rapid adaptation to generational changes by Cecilia in particular is

inspiring. Cecilia and I are about the same age. Her early literacy experiences included storytelling of generational legends in Inuktitut, as well as reading pictures and English text from old catalogues and newspapers pasted on the walls of her family's qamaaq out on the land, while I was growing up in a different culture, surrounded by books and other media in houses over a century old. Her primary means of communication was oral, while mine was print based. Yet we ended up in the same space in time - both using the latest technologies in northern schools and our neighbouring homes. From relying on inuksuit to guide her family across the tundra to using an inuksuk on the computer database to guide participants through the knowledge built together - how powerful change has been in our lives. Literacy development for both of us has been advanced through the use of technology, both have experienced great change in our lives, but one almost wonders if Cecilia's life has included a time warp, given the speed of change in her life

How such rapid change is possible has been in the background throughout this research journey. Papert (1997) notes

> Often the richest countries are the most conservative about making big changes . . . . When you go into a developing country, the people are much more open to new ideas. In the developed country they think they know everything. So they are not ready for change. In countries that are developing the very fact that you say I am a developing country means you recognize you need to change and you try to do something new. The ones who do not take up the challenge of reworking their educational system to fit the world of the future will lag behind [online interview].

In terms of the creation of a new territory in 1999 and the changes that have been wrought over the years, some of which have not been favourable to northern cultures, the north could be compared to a developing region within Canada. There is always fear that the promotion of newer technologies such as knowledge-building technology in the name of literacy advancement may be viewed by future generations as contributors to the demise of a culture, something none of the participants would support.

Personal and professional change, such as Cecilia's, has indeed been a factor in this research. Perhaps the very nature of the participants, their willingness to explore newer educational theories and practices, led them to volunteer to be part of this research, so scalability of results might be a challenge in schools where educators are not as open to new ideas and change. Even within the group of volunteer educators, it is important to recognize that there are variations in where they are in a change process. All are aware of, and understand the use of, technology in education. Over time they have accepted the integration of technology in education, as evidenced by their experimentation with such change, integrating the old and new.

> Teachers need to feel free to move back and forth, at their own pace, between the new habits they are trying out and the old ones they are theoretically abandoning. There will come a moment when the tension between the old and the new becomes a hindrance and the leap forward must be made, the paradigm shift completed (Meier, 1995, p. 149).

Moving beyond experimentation to integration has occurred for longer term users of technology, such as Ullariaq, Lance, George and I. All have shown that, although the

use of such innovations is sometimes cumbersome, exhausting and frustrating, particularly with technical issues in isolated schools, there is belief that technology in classrooms will enable learners to be more effective in local and global societies. "People's habits change only when they have strong reasons to want to change, and a conducive environment" (Meier, 1995, p.149).

For Vic, who is reflective in her experimentation in the use of technology in her classroom, change has been more of an uphill climb even though her initial fears about computer usage were far less than those of Cecilia and Elisapee. Vic has practiced many of the constructivist strategies in her classroom for years, such as using small, flexible groupings, starting from where the students are, using students' questions as foundations for activities. She is reflective about her fears and the impact they may have on her progress with technology. She vocalizes that past support issues play a role, as does the fact that schools and classrooms can indeed be islands. Even though she is an integral part of the team, she does not feel physically part of the team as she is in another school. Vic also surmises that perhaps her slower rate of progress is really a control issue. The fact that she is still progressing and reflecting, regardless of her starting point, is an important example for the integration of technology in education. Thus although Vic is at a different place in the change process, her growing belief in the capacity of technology to enhance literacy development translates into her voice being an integral part of this research. Involvement in this research project therefore seems to be comparable to when teachers became involved in the Apple Classrooms of Tomorrow (ACOT) project, as participants have discovered that "whether they knew it or not, when

teachers joined the project, they embarked on an intense and practically continuous program of development that in one way or another touched every aspect of their lives as teachers" (Fisher, p.119). Where to go next becomes just as significant as where the participants have been.

Future inuksuit

> *In education, the highest mark of success is not having imitators but in inspiring others to do something else (Papert, 1993, p.78).*

This research journey did not have a set direction or destination when it began. It is not an end product, rather a continually evolving and adapting inuksuk to guide future dialoguing, reflection and continuing changes, personally and for a group of northern educators. As exposure to related research expands, there is personal support for Papert's observation that "getting to know a domain of knowledge . . . is much like coming into a new community of people. Sometimes one is initially overwhelmed by a bewildering array of undifferentiated faces. Only gradually do the individuals begin to stand out" (1980, p. 137). Such has been the case for this research, resulting in a desire to get to know more about other aspects of education that have arisen as questions, when participants use technology such as Knowledge Forum® to explore topics such as literacy development. The passion to continue is reinforced by dreams of the future. Ingkhar, in referring to the use of Inuktitut in the database, notes comparable excitement as "What we were dreaming about last year is becoming a reality!" (Initial interview). Setting goals, realizing dreams, and setting future goals are integral parts of northern education.

Analysis of the various data collected in seeking the voices of educators, especially pertaining to literacy, culture and technology, has raised several questions which may prove worthy of future research. It would be interesting to look at students' perspectives on potential relationships between literacy development and knowledge-building technology, and compare those results with the educators' perspectives reflected in this research. A longitudinal research project into educators' perspectives over time would also potentially be worthy of further research. The whole multigenerational approach to change in education could be explored for scalability in other contexts. As well, I wondered if the changes noted in this research using knowledge-building technology necessarily occurs in other contexts where ESL students are learning in English First Language cultures, such as larger cities, where often the only source of learners' first language is their home environment.

Gender issues in use of technology has always been of interest to me personally, particularly when informal observations seem to show that female students have greater success initially with Knowledge Forum, differing from other articles about technology and gender. Therefore the relationship is between Knowledge Forum® and gender bears further exploration.

Conclusion

By engaging teachers, small schools stand a chance to engage their students. As we become capable of being strong, powerful, lifelong learners and citizens in our schools, so too will our students stand a better chance of being lifelong learners and citizens in a free society (Meier, 1995, p. 118).

There are very few pieces of research on Nunavut so one of my goals has been to enable northern educators' voices to be heard and valued. The participating educators' exploration of literacy development and knowledge-building technology has enriched our personal experiences and collective constructions of educational theories and practices. Such research has been tempered through acknowledgement that I am not an Inuk, and therefore do not possess the multi-generational experiences of learning to live off the land and survive in northern multilingual, rapidly changing environments. Even so, I strongly feel that validating multicultural and multiliterate educational theories and practices in northern societies is a step towards critical consciousness by members of northern cultures. As Paulo Freire (Bell et al, 1990) has delineated, there are distinct differences between literacy development for domination and literacy development for liberation. Past practices in the north are indicative of domination attempts, where Inuit were expected to fit a Qallunaat mould. Humans need reflection and action in order to be liberated and, in turn become more literate. Open dialogue in an effort to build knowledge about educational theories and practices by stakeholders may indeed be a first step in such a process towards liberation. Whatever direction taken, schools could be more encouraging of reflection and dialogue amongst educators.

As multi-age learners, educators and researchers, there is a need for increased dialogue about the vital roles played by culturally relevant, multiliterate, technology-based educational theories and practices. Such acknowledgement will go a long way in enhancing the relationships between language, culture and identity, resulting in greater empowerment for Inuit of all ages.

> Teachers, students and researchers must be jointly active in the learning process. All must have chances to learn and to construct and revise theories about what and how they know. They must be free to use the language of give-and-take to negotiate ideas, to build knowledge, and to acquire new skills to prepare for lifelong learning (Heath & Mangiola, 1991, p. 13).

What has emerged through the dialogues in this research is increased acceptance of multiple components of literacy for northerners, that are enhanced by participation in knowledge-building communities supported through the use of software such as Knowledge Forum®. One of the changes recommended as part of this research is based on a belief that a multicultural approach to literacy in society needs to be a reality for northerners today. Therefore I suggest a new type of literacy: **adaptational literacy.** Adaptational literacy may be the most inclusive terminology for the reality of literacy practices and literate behaviours experienced by northerners, in the past, in the present and for the future. Such a phrase includes components of land or environmental, cultural and critical literacy, as northerners communicate, read, dialogue, question, revise and reflect, adapting to meet the challenges faced in a continually changing society and environment, from inuksuit to computers to whatever the future brings.

Recognizing adaptation as a component for future survival, whether in regards to literacy definitions or infiltration of technologies in everyday life, does not mean discarding all the features of one culture or environment for another. Nunavut, as a territory, is built on combining components of old and new practices, recognizing that no one method is best for all participants. The same could be said of research

journeys, as we learn and grow from each other. One component of traditional Inuit culture that could assist in northern educational research is travel practices. When Inuit travel across the tundra, they go one behind the other so the lead person is the one breaking the trail. They take turns being the leader so that not everyone expends all their energy at the same time, thereby sharing responsibilities. There is a lesson to be learned by other cultures, who tend to walk abreast, all putting forth the same energy as the same time, tiring more easily in the process. Perhaps as researchers and technology users, we can move ahead using more Inuit styles of travel. The torch can therefore be passed to other northern educators to become the leaders for the next segment of an ongoing journey across the tundra of the northern educational landscape. The components of inuksuit guiding such future educational research may change, but the most important feature is the process of the ongoing journey. As Cecilia stressed in her second interview, "I really want to keep going as it is now for years. . . . I do not want it to stop, . . . not just for us [Knowledge Forum® Team] but for the kids. It should be an ongoing thing, as long as there is Knowledge Forum® or technology here at school." Ullariaq concurs in her second interview, observing "We are blooming together. We are learning together and I hope we keep it up." The torch has therefore been passed to other northern educators like Cecilia, Ullariaq, Elisapee and Vic.

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Appendix A

Glossary of Northern Terms

amoutiq	*(a -mau -tik)* Eastern Arctic woman's parka or coat with big hood in back to carry a baby
Dorset	ancestors of modern Inuit who lived in the Eastern Arctic from about 2700 years ago until the They'll people moved in around 1000 years ago; also known as Tuniit
igloo	*(ig glu)* traditional Inuit shelter made of blocks of snow that is generally only used nowadays for emergency shelter on the land and for tourists
inuksuk	*(in - uk - suk)* Inuktitut for rock cairns placed across tundra, meaning 'in likeness of man'
inuksuit	*(in - uk - su-eet)* plural form of inuksuk
Inuktitut	*(in - uk-ti-toot)* language of Inuit, with about seven dialects in Nunavut
Inuit	*(in-u-eet)* Aboriginal people in Canada's north, from Inuktitut word meaning 'the people'
Inuk	*(in - uk)* Aboriginal person in Canada's north, from Inuktitut Inuktitut word for one person
Inuuk	*(in - uuk)* two Aboriginal people in Canada's north, from Inuktitut word for two people

Iqaluit *(ik-kow-loo-it)* capital of the Canadian territory of Nunavut, from Inuktitut word meaning 'place of fish'; formerly known prior to 1985 as Frobisher Bay, on Baffin Island

Naamajut *(na-ma-yoot)* Inuktitut font for computers

nakurmiq *(na-kau-meek)* Inuktitut word for 'thank you' (South Baffin dialect)

Nunacom *(nu-na-com)* most recent Inuktitut font for computers

Nunavut *(nu-na-vuut)* Canada's newest territory as of April 1, 1999, from Inuktitut word meaning 'our land'

Nunavummiut *(nu-na-vu-me-yut)* people living in Nunavut

Qallunaat *(kau-lu-nat)* non-Inuit, from Inuktitut phrase for early European whalers known as 'men with bushy eyebrows and big stomachs'

qamaaq *(ka-muk)* earlier sod shelter for Inuit families out on the land, rarely used today

qamiq *(ka-mik)* traditional hand-made Inuit footwear, generally from seal skin or caribou fur, still worn by many northerners today

Thule *(too-le)* ancestors of Inuit who migrated from Alaska to the Eastern Arctic about one thousand years ago, known for their whale hunting ability

ulu *(oo-loo)* northern women's cutting tool, with handle and rounded cutting edge

Appendix B

Thick Description

Walking into the Grade 6 classroom at Nakasuk School is like coming upon an oasis in the desert, where the wealth of colour that is before your eyes is in stark contrast to the white Arctic desert outside the community of Iqaluit, visible through the lonely porthole window of this '70's modular two storey school. You start to wonder if this is a mirage, but the constant hum of activity, with its intermittent crescendos, soon lets you know that you are indeed in a world that is very real for participants and observers.

As these participants are used to an open-door policy, whereby visitors from around the world drop in to see what they are doing, the intrusion of a video camera on this occasion offers only minimal diversion. Indeed, these young learners, with their natural curiosity, quickly commandeer the camera to interview and videotape some of their peers. Their attempt at video - journalism is like a roller coaster ride in an amusement park, a sharp climb up to the white, hole infested ceiling tiles, rapidly down to the worn, beige flecked industrial indoor/outdoor carpet, around the bends of the eight-sided classroom, with flashes of fluorescent bilingual (Inuktitut/English) word cards, motivational posters in primary colours and a variety of centres and resources blurring by. In this dizzying glimpse of their daytime world dart images of the Inuit children who choose to occupy this time and space. The range of responses to the visiting camera on its tripod includes images of welcoming waves of 'Hello!

Please notice me!', tongues darting out and in, broad, friendly smiles, mischievous hands covering the lens, shy heads cowering under arms and even some indifference. In time, once some of the more outgoing members of the class experiment with the newest mode of technology in their world, things in this oasis return to business as usual.

For these students, their daily business is anything but usual, particularly when compared to other classes in the school. These active ten to twelve year olds are part of an international research project called CSILE (pronounced see-sill) that uses the technology of networked computers to build knowledge collaboratively though a shared database. To these students, whose lives are anything but ordinary, given the exposure to suicide, abuse, alcohol and drugs in this booming, rapidly changing community, the use of computers seems as natural as using a pencil or a piece of paper or the traditional ulu for scraping and cutting.

Their day in school begins with the sometimes harmonious singing of 'O Canada' in three languages, followed by broadcast announcements of congratulations to those students in this school of three hundred and fifty who have reached milestones - in terms of their age and as participants in a community Literacy Committee sponsored Reading Club. As the students trickle into their home room class on the second floor, they take their assigned seats that change monthly, in pods of four desks, with communal supplies positioned in bright red plastic trays in the centers of their respective groups. Some, who have told their teacher that they spent a good portion of the previous twenty-two hours daylight outside playing, slouch over their desks, reposing their heads on their arms. Others are rested, primed and

raring to go.

Initial glance at the teacher, in her burgundy vest with its caribou antler caribou pin, responsible for motivating this group leaves you with an image of a tired Qallunaat lady, with bags under her eyes, reflections of the demands associated with being a caring teacher of students learning in a second language, who sports a typical northern hairstyle that cries out - "It's been eight months since you had a haircut by a professional hairstylist in the south!" Don't let the image fool you. This woman wears the traditional Inuit footwear - scraped bleached seal skin qamiqs with the colourful tassels and embroidered duffel socks for a reason - so she can move quickly and effortlessly around this crowded classroom. She has been described in a recent article as a conductor of an orchestra. Watching through the lens of the video camera, one begins to understand why. Once the standard morning routines have been dispensed with, she gathers the attention of the whole class by raising her hand, saying, "Give me five!" Once she has the attention of all students, she proceeds to explain in general terms the goals of the morning. If the students have no questions, they scatter to the corners of their classroom to begin their individual and group activities.

Half of the twenty-five students gather their folders covered with syllabics and head to the far reaches of the shared classroom for their regular hour daily session with their Inuktitut instructor. Echoes of their Inuktitut conversations reverberate when there is a lull in dialogue in the rest of the classroom. The remaining students demonstrate their involvement in their learning as they make choices about directions to take on this particular morning. Students saunter in dribs and drabs over to the

paper-boxes-cum-research-folder-holders on the side table, collecting their bright blue legal folders, some bulging with books and papers, others thin skeletons who find their meat in the books stored haphazardly in the desks of the less organized students. Other students fumble in their desks, searching for organized theme duotangs that contain maps, reference sheets and previous work on their current theme of Indigenous People.

Students chatter as they get organized in their groups. The teacher models organizational skills as she circulates, initially completing a 'status of the class' sheet on her clipboard by checking in with each student to find out what they have chosen to work on this morning. Some students are crowded around a large, colourful wall map complete with pictures of Indigenous people in traditional garb, as they work on a mapping activity in their theme duotangs that has them searching for the names of Indigenous groups in North America, beginning with their own. Others choose to complete the same activity using a smaller reference sheet previously provided. One student has difficulty accessing this sheet as it was jammed in his duotang, given the eleven by seventeen size of the paper. As the teacher circulates near this student, he draws her attention to his dilemma. She shows him a trick to folding large papers using forty-five degree angle folds and moves on.

The majority of students have elected to work on various stages of their research project. In a lull in the activity, the camera lens zooms in on the teacher as she explains to the unknown future audience the specifics of this activity. It becomes evident as she proceeds, with her hands elaborating on what she says, that she has observed that having choices in their learning translates into increased

student motivation. Although all are working on the same overall theme, individuals and partners chose to research a range of Indigenous People around the world, from the Blackfoot to the Beothuck, the Maori to the Saami to the Bushmen. Panning the camera eye around the room, this range becomes evident as you notice one troubled young man with an irregularly shaved head, and loud, attention seeking voice reading a book on the Northwest Coast Indians with a classroom assistant over in the library area to find out about their shelters, while another young man with hearing difficulties sits obliviously scanning material on the Iroquois and their means of getting around. Models of cardboard Blackfoot tipis, clay Iroquois longhouse, Bushmen hut and Inuit kayaks adorn one table. The eye of the camera and the teacher converge across the busy room on another animated student, sitting with his legs bent, feet propped in his desk in front of him and his chair leaned back as he peruses information written about the Inuit in a text, comparing what he knows of his culture with what outsiders have published, discussing his observations with another student in his group.

During the status of the class check-in, several students express their preparedness to add information to the communal database. As a result, five students are assigned time slots on the four grey Macintosh 580 computers arranged on orange and blue trapezoidal tables on both sides of the intersection of two of the classroom walls, and the server across the classroom near the mound of the teacher's desk. These students log on skillfully by inserting their name and password. Over the course of the next half hour, the dialogue overheard by the ear of the camera resounds with snippets of discussions about how to make group notes, spelling

collaborations, importance of descriptive titles, confirmation of ideas ("See, I told you so!"), giggles, blends of Inuktitut and English, and coaching on writing for an audience who are more likely to understand 'the maple syrup' than "TMS'. The teacher weaves in and out of the picture and audio range as she offers encouragement, support and reminders to stay focused on task. There is periodic whistling and spit bubble blowing directly in front of the camera that the teacher initially seems to ignore, but a closer look reveals that certain hand signals, traditional scrunched nose signifying 'no' for Inuit and closer proximity to the offenders soon eliminate these distracting behaviours.

One student with a bobbed haircut exchanges places at the computer with another, to work on previously started graphics of a cradleboard and moccasins. Another quiet young man ponders aloud which thinking type to choose for his note, assisted by the student nearby. Another very attractive, confident looking young lady, who looks older than her years, uses her planning sheet to type in information she researched and recorded in her own words about the Algonquin. In the corner, one keen young man adeptly manoeuvres the mouse, scrolling down the screen as he browses the database for notes to read. Next to him is a young beginning reader intently focusing on spelling a word for his note, guided in the process by the teacher who encourages him to try on his own, to use rhyming strategies to assist him when he stumbles.

The camera once again focuses on the teacher, obviously as comfortable with the type of activity as the students, who has stopped moving her feet and started gesturing with her hands again. She is positioned by a quiet, but obviously capable

young lady who, as the teacher's story unfolds, has chosen to research the Maori, based on her connections with a family friend from New Zealand, and her interest in one member of the Polar Free expedition, a native of New Zealand, who recently visited the class. As a result, this shy student exchanged information about the Inuit and Maori culture via Email from the classroom. In addition, she went to the local library to find books about these Indigenous People when the school and classroom library yielded little information. At one point today, the camera captured this student discussing with the teacher how to use the index, and what it offered in terms of transportation information, past and present.

The teacher, with a gleam in her eye as she shares her observations about the students' use of CSILE, mentions that in addition to stipulated requirements of text and graphic notes, students are encouraged to comment on other's notes, asking questions for clarification, and contributing information they might come across on topics chosen by other students. She continues, for the benefit of conference participants who will view the videotape at a later date, by noting that, unlike traditional projects, which were presented, handed in, marked and displayed, the CSILE database enables all students to be aware of, and respond to, all stages of what others are learning. In addition, their work is available for revision, additions and comparisons throughout the year. The teacher mentions with pride how one student contributed a note about how his mother had met a 'real live Mohawk', and her impressions, while another commented on a TV show she saw where a principal was appealing for shoes for his Cherokee students. Still another added a note with information she read in her novel about another North American group. She recalled

overhearing two boys discussing how the wigwam was shaped like the Bushmen hut and the igloo. The teacher went on to mention that students initiated, individually and in groups, discussion notes on the database that had relevance to the theme, specifically " What I Would Take If I Went Out on the Land" and "Comparisons of the Inuit and Other Indigenous Groups". At this point, another student called out her first name, seeking assistance on some matter, so the gyrations commenced once again, as she facilitated students' learning by moving around the classroom.

Although the eye and ear of the video camera presents a unique opportunity to enter into the reality of this classroom, it can only offer a shallow view. What is not evident from the perspective of the camera lens is the background of these students, what they have experienced, and overcome each day in order to function as well as they do as a group, and how their culture and language relate to their learning opportunities in school. Nor are the ups and downs of life in this classroom or any classroom evident to the viewer in such a brief, one morning snapshot of their life within the walls of a classroom. On the basis of this video imaging, however, this classroom and the members seemed to find their niche in their oasis, whether you define oasis as a fertile spot in the desert, or a place offering relief in difficulty, as their learning built on their own interests and experiences. The constant buzz of activity was definitely not a mirage.

Appendix C

Letter Requesting Research Permission

October 6, 1998

Mr. John Thomas
Chairperson,
Iqaluit District Education Authority
Iqaluit, NT
X0A 0H0

Dear Mr. John Thomas,

As you are aware, I have been involved for several years in the CSILE (Computer Supported Intentional Learning Environment)/Knowledge Forum (KF) project in Iqaluit schools. Iqaluit has been a research site for this project based out of OISE in Toronto for a number of years. This year, while on leave in Nova Scotia, I am exploring how the technology of Knowledge Forum enhances the literacy skills among English as a Second Language (ESL) students in Iqaluit. (With the exciting growth of KF using Inuktitut, perhaps this will be an area that can be focused on in the future!) More specifically, I am wondering if enhancing literacy skills is an integral part of the knowledge-building process that forms the foundations of Knowledge Forum. In order to study this, I will need the support of the IDEA, Knowledge Forum teachers and students.

The main areas I am focusing my research on are knowledge-building and literacy. Necessary subtopics include aboriginal education, computers in the

elementary school and ESL. I will be conducting a literature review of relevant materials while down here to provide background for this research.

Where I need the support of the IDEA is in granting me permission to work with the educators currently using Knowledge Forum, as well as the students who are contributing to the database at both Joamie and Nakasuk Schools. A formal permission slip for the parents of these students is being devised with other members of the project, a copy of which will be forwarded to you. I have personally witnessed the benefit of this program to our students in Iqaluit so am anxious to back up our observations with the appropriate research.

My course of action will involve doing initial interviews with a representational cross-section of educators currently using Knowledge Forum in the North to determine their beginning thoughts/experiences by asking the following questions via phone/E-mail:

1. What are your experiences to date using technology in the classroom?
2. What are the particular advantages/disadvantages using technology such as Knowledge Forum in the northern elementary classroom setting?
3. What impact on literacy skills have you observed with Knowledge Forum?

Over the course of the year, these volunteer Knowledge Forum educators will be asked to participate regularly in the classroom research journal on their Knowledge Forum database. I anticipate being part of these databases both as an observer and as a support for other members of the team, initially through Apple Remote Access until they are available via Internet connections. The educators involved will be interviewed in the spring to see if their perceptions have changed.

In addition to the educator component to this research, a representative sample of students will be followed through the database. Specifically I will be looking for evidence of knowledge-building and literacy growth in English. This will be supplemented by classroom observations/ interviews over the course of the project once I return to Iqaluit. Naturally, integral to this project is my personal involvement, past, present and future, in the project and the databases.

I am continuing , on a regular basis, discussions about this project with our principal, Darlene Nuqingaq, and our KF team . Thus I, or any member of the team, would be pleased to supply any further information the Iqaluit District Education Council requires about this exciting project.

Looking forward to hearing from you in the near future.

Yours sincerely,

Elizabeth J. Tumblin
57 Sherwood Drive
Site 1, B2, R.R. #1
Wolfville, NS ,B0P 1X0
(902) 542-3768
018284t@acadiau.ca

c.c. Paul Meggs, Joamie IT Team Coordinator
Darlene Nuqingaq, Principal, Joamie School
Peter Hough, Principal, Nakasuk School
Don Morrison, Supervisor, Joamie and Nakasuk Schools
Cathy McGregor, Director, CSILE/KF Coordinator, BDEC
Sandy McAuley, Information Networks, ECE

Appendix D

Letter Requesting Research Volunteers

November 5, 1998

Dear CSILE / Knowledge Forum Team members,

As you are aware, I am working on my Masters in Education thesis this year. The current title for this thesis is:

"Knowledge-building Technology: Educators' Perspectives of the Implications for Literacy in Inuktitut First language Elementary Students in Canada's Eastern Arctic"

Although the title may change, I am focusing on what educators view as the impacts on literacy and knowledge-building when Knowledge Forum is utilized in Iqaluit. I would welcome your participation in this research project as I feel each of you has an important voice as educators to share.

Knowing from experience just how busy life is as an educator in Iqaluit, I will outline the frames of reference for you to decide if you, **as an individual**, would like to participate in this project:

November /December: Participation in initial "interview", baseline questions following , either by phone (where interview will be taped, transcribed by me and verified by you), E-mail or fax.

January - May	Participation in Classroom Research Journal view on the Knowledge Forum database (recognizing that levels of participation will vary), where you can contribute your observations about students' usage of Knowledge Forum, knowledge-building, literacy and so on, highlights/examples, questions, frustrations, suggestions and so on.
May - June	Follow-up interview similar to initial interview format.

Please note that any representation of you or your thoughts in this thesis will be previewed by you to ensure accuracy, and aliases will be used if you so desire. Please indicate on the spreadsheet provided your decision on whether you are going to participate in this research project. (You can change your mind at any time- just let me know!) If you do decide to participate, please complete the information on the spreadsheet.

After doing an initial preview of the literature on knowledge-building, literacy, multicultural education, Aboriginal education, computers in the elementary classroom, ESL and so on, my preliminary thoughts are that we are definitely headed in the right direction, in some ways ahead of the game, with what we are doing in Iqaluit elementary schools with Knowledge Forum. I welcome your input, in whatever way you are comfortable sharing, and respect your thoughts/observations.

If you have any questions, at any time, please don't hesitate to contact me.

Thanks for your continued involvement as a member of the Baffin CSILE/Knowledge Forum Team.

Yours truly,

Elizabeth J. Tumblin
57 Sherwood Drive
Site 1, B2, R.R. # 1
Wolfville, Nova Scotia
B0P 1X0
(902) 542 - 3768
018284t@acadiau.ca

INITIAL INTERVIEW BASELINE QUESTIONS

(Please note, there are no right or wrong answers. I'm just trying to find out what your individual starting point is.)

1. a) What are your experiences to date using technology in the classroom?

   b) What do you think is the role of technology in the northern elementary classroom?

2. a) What does 'knowledge-building' mean to you?

   b) What are your experiences to date with CSILE / Knowledge Forum?

   c) What are the particular advantages / disadvantages you've observed to date using technology such as Knowledge Forum in the northern classroom setting?

3. a) What is your perception of 'literacy'?

   b) What are your observations about literacy skills when Knowledge Forum is utilized? (Where applicable, please elaborate with examples as much as possible.)

Thanks.

Appendix E

Consent Form

Inuksuit and Computers: Educators' Perspectives of Knowledge-building and Literacy Through Technology in Canada's Eastern Arctic

This study is being completed by Elizabeth J. Tumblin as partial fulfillment of the requirements for the Degree of Masters in Education (Curriculum Studies), Acadia University, Wolfville, Nova Scotia.

The purpose of the above study is to examine what educators view as the impacts on literacy and knowledge-building when the computer program of Knowledge Forum is utilized in Iqaluit, NT. Participation is strictly voluntary and participants may withdraw from the project at any time. Interviews by phone, fax or E-mail will be conducted in November/December 1998, with follow-up interviews in the spring of 1999. In addition, contributions to the Classroom Research Journal view of the Knowledge Forum database will be reviewed.

If you agree to be a participant in this study, it is requested that you review and agree to the following:

As a participant, I consent to:

1. the interviews being audio-recorded (unless arrangements are made to be interviewed by fax or E-mail), with the understanding that the tape(s) will be destroyed, or returned, after the final document has been approved.

2. a verbatim transcript of the interview(s) being made in order to assist in the writing of the final document. I understand that my name will be replaced with a pseudonym of my choosing.

3. the information disclosed in the interviews and the classroom research journal being used for the above study and any subsequent journal articles.

As a researcher, I agree to:

1. interview individual participants by phone, fax or E-mail, according to their wishes.

2. do everything within my power to ensure confidentiality of the interview process, while recognizing the difficulties protecting the anonymity of the participants, given the size of the community and the Knowledge Forum team.

3. provide each participant with an opportunity, where direct quotations from the interviews are used in the final report, to ensure a) that they have been quoted accurately, and b) that they have not been quoted out of context.

4. include as part of the final document any instances where participants interpretations differ from the researcher.

I have read and understood the conditions outlined above. I agree to participate in these interviews and the Classroom Research Journal view of the Knowledge Forum database, in accordance with the conditions outlined above.

_____ _____

Participant's signature Date

_____

Pseudonym

_____ _____

Elizabeth J. Tumblin (Researcher) Date

(902) 542 - 3768

018284t@acadiau.ca

Appendix F

Letter to Parents / Guardians

November 25, 1998

Dear Parent / Guardian:

In the 1998-99 school year the grade 4 - 6 classes at Joamie School have the opportunity to participate in a special computer-supported learning project called Knowledge Forum. Developed over the past 12 years at the Ontario Institute for Studies in Education at the University of Toronto (OISE/UT), Knowledge Forum has been designed to help students develop a deeper understanding of their school work as well as improving thinking, learning, collaboration, research, and literacy skills. The project has the support of the school, District Education Authority, Divisional Education Council, and the NWT Department of Education for the contribution it can make to improved teaching and learning.

Part of the reason for the strength of Knowledge Forum as a learning tool is the fact that it has been developed and refined through the ongoing input of the teachers and students who use it. We are very excited about our involvement in this process as we believe it contributes to the professional growth of our teachers, while providing classroom tools that are more responsive to student and staff needs, ultimately enhancing learning for students. The feedback we will be supplying to the research and development group will include access to the classroom databases

produced by students, photos and videotapes of classroom activities. These materials will be used to document student learning gains, identify improvements needed by the software, and demonstrate to others how Knowledge Forum is used in the classroom.

The attached form outlines in more detail the uses to which the material generated in Knowledge Forum classrooms may be used. It also requests your permission for the use of the materials generated by your child as a result of their participation in the project. Please review the form, discuss it with your child, fill in the required information, and return it to the school by December 11, 1998.

We believe that Knowledge Forum can make a substantial contribution to preparing students to live in a world which is making increasing use of computer networks in all aspects of life and work. We want your child to enjoy working on Knowledge Forum and are confident it will be an enriching and motivating experience. If you have any questions or suggestions about Knowledge Forum, the school's involvement in the research project, or the attached consent form, please contact us , or other members of the Knowledge Forum team.

Yours sincerely,

Darlene Nuqingaq and Paul Meggs
Coordinators
Joamie Information Technology Team

Permission Form

Joamie School 1998-99

Please indicate below your permission to have your child videotaped and to have their written work collected:

__ I give permission for my child to be videotaped and for his/her written work to be used for research purposes only.

__ I do NOT give permission for my child to be videotaped or for his/her written work to be used.

Student's Classroom: _____

Teacher's Name: _____

Student's Name: _____

Parent/Guardian's Name: _____

Parent/Guardian's Signature: _____

Relationship: _____

Student's Birth data: _____

Phone number(s): _____

Please have your child return this form to his/her teacher by December 11, 1998. Thank-you.

Appendix G

Letter from Director, School of Education

Director of the School of Education

Acadia University
Wolfville, Nova Scotia
Canada B0P 1X0

Telephone: (902) 585-1229
Facsimile: (902) 585-1071
http://ace.acadiau.ca/fps/educ/home.htm

September 15, 1999

To Whom It May Concern:

Re: Elizabeth J. Tumblin

I am writing at the request of Elizabeth J. Tumblin to confirm that I have accepted her graduate research proposal and that it meets the ethical guidelines of Acadia University.

Yours sincerely,

Bryant Griffith

Appendix H

Letter from IDEA

Iqaluit District Education Authority
P.O. Box 235, Iqaluit, NT
X0A 0H0
Phone: 979 – 0403 Fax: 979 – 5994
Email: idea98@bdec.nu.ca

Elizabeth Tumblin
Joamie School
Iqaluit, NT
X0A 0H0

October 6, 1999

Dear Elizabeth,

The members of the Iqaluit District Education Authority would like to thank you for attending our meeting on Monday, October 4, 1999. We reviewed your request to pass out the Knowledge Forum brochures so staff and students could use this learning tool in the near future. We understand you would also like to conduct some personal research regarding the Knowledge Forum.

We have approved both of your requests. The only stipulations we have are for the consent form to be revised as discussed at the meeting, and for you to conduct your research after school hours. We feel that the Knowledge Forum is a great benefit for our students and we would like to wish you all the best with both of your endeavors.

Sincerely,

Kathy Smith

Kathy Smith
Chairperson

Appendix I

Bilingual Knowledge Forum Brochure

This year students at Joamie and Nakasuk Schools will have the opportunity to join students, educators, and researchers from across Canada in the Knowledge Forum Research Project. Students and teachers at Joamie and Nakasuk are no strangers to Knowledge Forum. They have been using it and its predecessor, CSILE, on the computers in the school for the last several years. This year, however, they have the opportunity to extend what they've learned as part of a larger network.

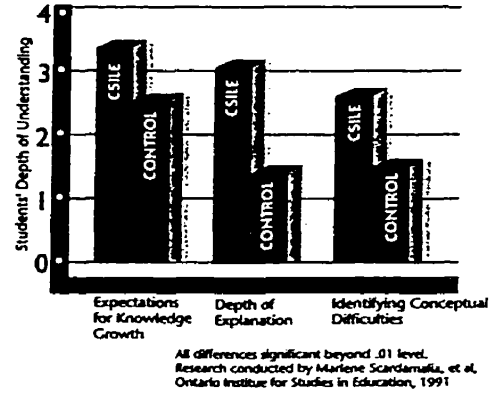
What is Knowledge Forum?

Knowledge Forum is a computer-based collaborative learning environment which allows students to work on joint projects over a local area network and the Internet. With the guidance of their teacher, students

- identify the important questions around a topic of study
- make plans to investigate these questions
- collect and share new information
- report on what they've learned
- pose new questions for further investigation

Knowledge Forum provides them with computer-based tools to help them enter, find, categorize, and make sense of what they find out. It emphasizes the importance of reading and writing skills for learning. Research has demonstrated that students using Knowledge Forum typically show stronger learning gains than those who do not:

BASED ON A DECADE OF CLASSROOM RESEARCH AND TESTING



Students using CSILE, the first generation of *Knowledge Forum*, outperformed the control groups on both standardized tests and knowledge tests.

Students also learn to use computers as tools to support their learning. All of these skills are becoming increasingly important in the growing knowledge economy.

What is the Knowledge Forum Research Project?

The Knowledge Forum Research Project is a partnership of educators, schools, and university researchers working as part of the TeleLearning National Centres of Excellence (TL-NCE). The TL-NCE is a multi-year, multi-million dollar, federally-funded research program designed to help Canadian students, educators and workers stay on the forefront of telelearning, the ability to use computers and computer networks to learn on demand. In a world which sees most people moving between several careers over their working life, telelearning becomes a powerful way to acquire new knowledge and skills.

The Knowledge Forum research project links schools using Knowledge Forum with each other and with university researchers to help determine how the benefits of Knowledge Forum can be best realized in more schools for greater numbers of students.

Why should I give permission for my child to participate in the research project?

Participation in the Knowledge Forum Research Project brings many benefits to the students and educators of Joamie and Nakasuk School.s. Besides the enhanced learning described above, they also include:

- ongoing access to and support for the Knowledge Forum environment in the school
- access to the latest tools to help identify, analyze and report student learning gains
- the opportunity to collaborate with other students and educators on joint projects using Knowledge Forum
- access to professional development activities to help teachers create better learning experiences for children using Knowledge Forum
- access to third-party funding opportunities to support ongoing work with Knowledge Forum at the school.

This sounds very positive. Is there anything else I should know?

Because much of this work is being funded by third parties, reports of progress are necessary to secure ongoing funding. Also, because this is a research project, it is important to report on what students and teachers learn from their experiences with Knowledge Forum. These may involve a number of things, including:

- classroom visits from researchers or visiting educators
- "virtual visits" to student Knowledge Forum databases via the Internet
- videotapes and/or photographs of students at work
- use of student work in reports and presentations.

The research work is led by the CSILE group at the University of Toronto. To ensure that participants' rights are protected, the project has undergone an ethical review by the University of Toronto. According to the terms of the ethical review, participants in the project must sign a permission form to indicate their willingness to take part.

Where can I find out more?

To find out more about:

- the Knowledge Forum Research Project, contact

Elizabeth Tumblin	(867)979-6206	etumblin@nunanet.com
Sandy McAuley (902)	(902) 672-3487	amcauley@isn.net

- Knowledge Forum software — http://www.learn.motion.com/
- the documented impact of Knowledge Forum on student achievement — http:www.learn.motion.com/Research.html
- the TeleLearning NCE — http://www.telelearn.ca

... or call Joamie or Nakasuk Schools to arrange a visit to see for yourself!

ᐊᕐᕿᒍᔪᒥ ᑕᒪᑐᒪᓂ ᔫᒥ ᐃᓕᓐᓂᐊᕕᐅᒥ ᓇᑯᓯᒥᑦ ᐃᓕᓐᓂᐊᕐᓂᑦ ᐱᖃᑕᐅᒍᓐᓇᓚᖓᓯᒪᑕ ᐃᓕᓐᓂᐊᕈᑎᓯᒧᑦ ᖃᕋᓴᐅᔭᒃᑯᑦ ᐋᕐᑭᑦᑕᐅᓯᒪᔪᒥᒃ ᑲᓇᑕᓕᒫᒧᖓᔪᒥᒃ.

ᐃᓕᓐᓂᐊᕐᓂᑦ ᔫᒥᒥ ᓇᑯᓯᒥᑦ ᐃᓕᓴᓇᔭᐅᖃᑕᐅᓯᒪᓕᕐᑯᑦ ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕈᑎᓯᓕᐊᓇᓯᒪᔪᒥ ᐱᖃᑕᐅᒍᓐᓇᕐᓗᑎᒃ ᐊᑐᖃᑦᑕᓕᕐᓯᒪᓕᕐᑐᑎᓪᓗ ᐸᐃᐸᓕᓇᒍᑎᑦᓯᐊᖑᔪᐃᑦ CSILE ᐊᑐᕐᑕᐅᖃᑦᑕᕐᓯᒪᓕᕐᒪᑕ ᐅᑭᐅᑲᓱᑦ ᑕᒪᑐᒪᓂᓕ ᐊᕐᕿᒍᔪᒥ ᐊᒥᓱᒃᑲᓐᓂᕐᓂᒃ ᐃᓕᑦᑎᓯᒪᓕᓇᕗᑦ.

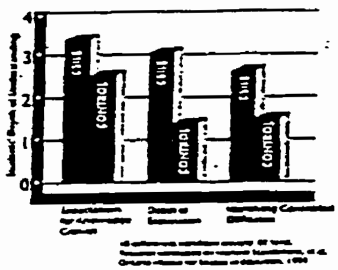
ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕈᑎᓴᕐ ᑭᓱᒪᑦ ?

ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕈᑎᓴᕐ ᐃᑲᔫᑎᖃᕐᓯᐊᕐᐳᕐ ᖃᓇᑕᐅᔪᑦ ᐱᑐᒃᓯᒪᕕᒃᑯᖓᓗᓂ ᐃᓕᓐᓂᐊᑎᑦᓯᖓᓗᑦ ᐊᔪᕿᕐᓲᔮᔮᖃᕐᓗᑎᒃ ᐃᓕᓐᓂᐊᕐᓂᑦ ᐃᒪᐃᓕᐅᓇᐊᖃᕐᖓᑕ:

- ᓇᓗᓇᐃᑦᓯᐊᕐᓯᐊᖃᑦᑕᕐᓗᒋᑦ ᐊᐱᕐᑯᑎᑦ ᐃᓕᓐᓂᐊᕐᑕᐅᒋᐊᓂᓕᓐᓂ
- ᐅᐸᓗᖓᐃᕐᓯᒪᓚᓯᐊᕐᓂᕐ ᐊᐱᕐᑯᑎᐅᔪᑦ ᖃᐅᔨᓴᕐᑕᐅᓂᖏᓐᓂᒃ
- ᐃᓕᓐᓂᐊᕈᑎᓴᐃ ᓅᑭᓴᓕᐅᕐᓗᖏᑦ ᐅᖃᐅᓯᕆᔭᓐᓇᕐᓯᐸᑕ ᖃᐅᔨᒋᐊᕈᑎᓴᓐᖑᕐᑎᐸᓪᓗᒋᑦ.
- ᐃᓕᑕᕕᓂᑦ ᐅᖃᐅᓯᒍᓐᓇᕐᐸᓪᓗᒋᑦ
- ᐊᐱᕐᑯᑎᒋᔭᐅᓯᒪᔪᑦ ᖃᐅᔨᓴᒃᑲᓂᖃᑦᑕᕐᓗᒋᑦ

ᖃᕋᓴᐅᔭᓄᑦ ᐃᓕᓐᓂᐊᕈᑎᓴᓕᐊᓇᓯᒪᔪᑦ ᐃᑲᔪᕐᑐᐃᒍᑎᐅᕗᕐ ᐃᓕᓐᓂᐊᕐᑕᒧᑦ ᓇᓂᓯᓯᓯᐅᕐᓂᕐᓂᒃ ᐊᒍᕐᓯᒪᓂᖏᓐᓂᓪᓗ ᖃᓄᐃᓕᖓᓂᖏᓐᓂᒃ ᖃᐅᔨᐸᓪᓕᐊᖃᑦᑕᕐᓗᑎᒃ. ᐅᖃᓖᒃᓂᕐᒥᒃ ᑎᑎᕋᓇᐅᕆᒪᓂᕐᒥᓪᓗ ᐱᖑᒪᓂᕐᓴᐅᓕᕆᑎᐅᒍᓐᓇᕐᒪᑦ ᐃᓕᓐᓂᐊᕆᓯᓇᓗᓂ. ᑕᒪᓐᓇ ᓴᕿᑎᑕᐅᓯᒪᔪᕐ ᓇᓗᓇᐃᕐᓯᓯᒪᓕᕐᒪᑦ ᐃᓕᓐᓂᐊᕐᓂᑦ ᑲᔪᖏᕐᐸᓪᓕᕐᓯᒪᓂᖏᓐᓂ ᐃᓕᓐᓂᐊᕆᓯᓇᓂᕐᒥᒃ ᑕᐃᒃᑯᓇᓐᖓᓕᓕ ᖃᕋᓴᐅᔭᓕᓇᐋᖏᑐᓂᑦ.

ᐅᑭᐅᑦ ᓯᒍᓕᑦ ᐃᓕᓐᓂᐊᕐᕕᐅᒥ ᐃᓪᓗᕆᓯᒥ ᑕᒪᓐᓇ
ᖃᐅᔨᓴᕈᑎᐅᓯᒪᓕᕐᑐᕐ ᐆᑦᑑᑎᐅᓯᒪᓪᓗᓂᓗ



Students using CSILE, the first generation of Knowledge Forum, outperformed the control groups on both standardized tests and knowledge tests.

ᐃᓕᓐᓂᐊᕐᓂᑦ ᖃᕋᓴᐅᔭᓕᓇᒋᐅᕐᓴᕆᑦᑐᑦ ᐃᓕᓐᓂᐊᕆᓯᓇᓂᖏᓐᓂᒃ ᐃᑲᔪᕐᓯᓕᓇᑦᓯᒪᓕᕐᑐᕐ. ᐱᓪᓚᕆᐅᓂᖓᓂᓪᓗ ᐃᓕᓐᓂᐊᕐᓂᕐ ᐱᕆᓕᐊᒍᑎᐅᓕᕐᑐᓂ.

ᐃᓕᓐᓂᐊᕈᑎᓴᓕᐅᕐᓂᕐ ᖃᕋᓴᐅᔭᑎᒍᑦ ᓴᕿᑎᑕᐅᓯᐊᕐᑐᕐ ᑭᓲᕙ ?

ᐃᓕᓐᓂᐊᕈᑎᓴᓕᐅᕐᓂᕐ ᖃᕋᓴᐅᔭᑎᒍᑦ ᓴᕿᑎᑕᐅᓯᐊᕐᑐᕐ ᑲᑐᔾᔨᖓᐅᓪᓗᓂ ᐃᓕᓴᐃᔨᓄᑦ ᐃᓕᓐᓂᐊᕕᓐᓂ ᐃᓕᓐᓂᐊᕕᔾᔪᐊᓂᓗ ᓴᕿᑎᓯᖓᓯᐊᕐᑎᓄᑦ (TL-NCE) ᑭᓇᐅᔭᕐᔪᐊᓕᒃᑯᑦ ᐃᑲᔪᕐᑐᐃᒪᑕ ᑕᒪᓐᓇ ᓴᕿᑎᑕᐅᓯᐊᕐᓂᖓᓄᑦ ᑲᓇᑕᒥ ᐃᓕᓐᓂᐊᕐᓂᑦ ᐃᓕᓴᐃᔩᓪᓗ ᐃᖃᓇᐃᔭᕐᑏᓪᓗ ᐃᓕᐸᓪᓕᐊᓂᖃᕐᓂᕐᒍᓪᓗᒋᑦ ᖃᕋᓴᐅᔭᓕᓇᓂᕐᒥᒃ. ᓯᓕᕐᔪᓕᒫᒥ ᖃᐅᔨᒪᔪᑎᐅᖃᑦᑕᓇᖓᒪᑦ ᐃᖃᓇᐃᔭᕐᓂᐅᔪᓂᒃ ᓇᒥᓂᓗ ᐃᓕᓐᓂᐊᕈᑎᐅᓯᓈᕿᓇᒥᒪᑦ ᑕᒪᓐᓇ.

ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕈᑎᓴᐅᐸ ᓴᕿᑎᑕᐅᓂᖓ ᐃᓕᓐᓂᐊᕕᓐᓄᑦ ᐱᑐᑦᓯᒪᕐᑲᑦᑕᐅᑎᒍᓇᓗᕗᕐ ᐃᑲᔪᕐᑐᐃᕐᑲᑦᑕᐅᑎᒍᑎᐅᒍᓇᕐᓗᓂᓗ ᐃᓕᓐᓂᐊᕐᑎᓄᑦ ᐊᒥᓱᓄᑦ ᐃᓕᓐᓂᐊᕆᓯᓇᒍᒪᓂᕐᓴᐅᓕᕆᑎᐅᒍᓇᓇᓪᓗᓂ.

ᑭᓱ ᐱᓪᓗᒍ ᐱᒡᔨᒍᑎᖃᖅᑎᑦᓯᒋᐊᖃᖅᑯᖓ ᕿᑐᕐᖓᕋ ᐱᖃᑕᐅᒋᓗᒍ ᐃᓕᓐᓂᐊᕐᑎᑦᓴᒨᓕᖓᔪᒥᒃ?

ᐱᖃᑕᐅᒍᑎᑦᓴᖅ ᖃᕋᓴᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕐᑎᑦᓴᒧᑦ ᓴᖅᑭᖅᑎᑕᐅᓯᒪᔪᖅ ᐊᑐᕐᓇᕐᓂᖃᓪᓚᖓᓪᓚᑦ ᐃᓕᓐᓂᐊᖅᑎᓄᑦ ᐃᓕᓴᐃᔨᓄᓪᓗ ᔫᒥ ᐃᓕᓐᓂᐊᕝᕕᒥ ᓇᑯᓯᒃ ᐃᓕᓐᓂᐊᕝᕕᒥᓗ. ᑖᒃᑯᐊ ᑎᑎᕋᖅᓯᒪᔪᐃᑦ ᓴᓂᐊᒍᑦ ᐱᖃᓯᐅᑎᓯᒪᕗᑦ ᒪᑯᐊ:

- ᑲᔪᓯᖃᕐᓗᓂ ᐃᓕᓐᓂᐊᕐᑎᑦᓴᒧᑦ ᐃᑲᔪᖅᑐᐃᓯᐊᕐᓗᓂ ᐃᓕᓐᓂᐊᕝᕕᒥ
- ᐃᓕᓐᓂᐊᕐᑎᑦ ᖃᕋᓴᐅᔭᒧᑦ ᐊᑐᖓᓱᐃᑦ ᐃᓕᓴᓇᔭᐅᔪᓐᓇᓕᕐᓗᑎᒃ ᐃᓕᓐᓂᐊᖅᑏᑦ ᐃᓕᑉᐸᓪᓕᐊᔪᖕᒥᑦ
- ᐅᖃᖃᑎᒌᒋᐊᕐᓇᕐᕕᒋᓗᒋ ᐱᓕᕆᖃᑎᒋᓗᒋᓪᓗ ᐃᓕᓐᓂᐊᖅᑏᑦ ᐃᓕᓴᐃᔩᓪᓗ ᖃᕋᓴᐅᔭᓕᕆᕝᕕᒥ
- ᐃᓕᓐᓂᐊᕐᑎᓕᐅᖅᐸᓪᓗᑎᒃ ᐃᑲᔫᑎᖃᒃᑲᓐᓂᕋᓲᓪᓗᒍ ᐃᓕᓴᐃᔩᑦ ᑐᑭᓯᒃᑲᓐᓂᕈᓐᓇᓲᓪᓗᒋᑦ ᐃᓕᑦᑎᔾᔪᑎᐅᒃᑲᓐᓂᕈᓐᓇᕐᓂᖓᓂᒃ ᖃᕋᓴᐅᔭᑎᒎᑦ ᓯᑭᓯᕐᓄᑦ.
- ᑮᓇᐅᔭᓄᑦ ᐃᑲᔪᖅᑐᖅᑕᐅᑦᑕᕐᓗᑎᒃ ᑕᖅᑳᓐᖓᑦ ᑲᑐᔾᔨᖃᑎᒌᓂᒃ ᖃᕋᓴᐅᔭᓕᕆᖕᕕᖃᐃᓐᓇᒍᓪᓗᒍ ᐃᓕᓐᓂᐊᕝᕕᒥ.

ᑖᓐᓇ ᑕᐃᒪᐃᓪᓕᓇᓐᓂᐊᕐᕆᓗᑦᑐᖅ. ᖃᐅᔨᒪᔭᖃᓇᐊᖅᑯᖓᖃᐃ ?

ᑮᓇᐅᔭᑎᒍᑦ ᐱᓕᕆᐊᖑᕐᔪᐊᖅᓯᒪᓪᓚᑦ ᑕᒪᓐᓇ ᐱᕙᓪᓕᐊᓂᖓ ᑕᒪᑐᒪ ᐅᖃᐅᓯᐅᓪᓚᕆᖃᑦᑕᕆᐊᖃᓪᓚᖓᓪᓚ ᑕᐃᒪᐃᓕᐅᑭᑕᐅᓂᖓᓄ ᑲᔪᓰᓐᓇᕆᐊᖃᖅᑐᓂ ᑖᓐᓇ ᖃᐅᔨᓴᐅᑎᐅᓚᐅᕐᓂᐊᖅᑎᓪᓗᒍ ᐅᖃᐅᓯᐅᖕᒋᓐᓇᖃᑦᑕᕆᐊᖃᓪᓚᖓᔪᐃᑦ ᑭᓱᓂᒃ ᐃᓕᑦᑎᓂᕐᒥᓐᓂᒃ ᖃᕋᓴᐅᔭᓕᕆᕝᕕᒥᒃ ᒪᑯᐊ ᐱᖃᓯᐅᑎᔭᐅᖃᑦᑕᕐᓂᐊᕐᐸᓪᓚᐃᓐᓇᑕ:

- ᐃᓕᓐᓂᐊᕝᕖᑦ ᐃᓗᐃᑦᑐᑭᓯᖕᒋᓐᓂ ᐸᓪᓚᖅᑕᐅᕙᓪᓗᑎᒃ ᖃᐅᔨᓇᓯᐊᖅᑎᓄᑦ
- ᐸᓪᓚᒍᔭᐅᓯᒪᔪᑦ ᖃᕋᓴᐅᔭᓕᕝᕕᒥ ᐸᓪᓚᒃᑕᕋᔭᖅᑐᑦ
- ᑕᑯᓇᓚᑦᓴᓂᒃ ᐊᔾᔨᓂᓪᓗᓐᓂᑦ ᐃᓕᓐᓂᐊᖅᑎᓄ ᐱᓕᕆᑎᓪᓗᒋᑦ ᐅᕝᕙᓘᓐᓃᑦ ᐱᓕᕆᐊᖃᖅᑎᓪᓗᒋᑦ
- ᐃᓕᓐᓂᐊᖅᑎᐅᑉ ᓴᓇᔭᕝᕕᓂᖕᒋᑦ ᐅᖃᐅᓯᓂᖕᒋᑦ ᕿᒥᕐᕈᔭᐅᓂᖕᒋᓪᓗ

ᑕᒪᓐᓇ ᖃᐅᔨᓴᖅᑕᐅᓯᒪᕗᖅ CSILE -ᒃᑯᓐᓄᑦ ᐃᓕᓐᓂᐊᕝᕕᔾᔪᐊᒥ ᑐᕌᓐᑐᒥ ᑕᐃᒃᑯᐊ ᐱᖃᑕᐅᔪᑦ ᑕᒪᑐᒥᖓ ᐱᔪᓐᓇᐅᑎᖕᒋᑦ ᓱᕋᔭᑕᐅᖃᑦᑕᓂᐊᖕᒋᓪᓚᑕ ᑕᐅᓇᓂ ᐱᔭᐅᓗᐊᕆᑎᒋᐋ ᐃᓕᓐᓂᐊᕝᕕᔾᔪᐊᒥ ᑐᕌᓐᑐᒥᑦᑐᒥ.

ᑕᒪᓐᓇ ᐋᖅᑭᔅᓯᒪᓂᖓ ᒪᓕᓪᓗᒍ ᑕᐃᒃᑯᐊ ᐱᖃᑕᓪᓚᖓᔪᐃᑦ ᐱᒡᔨᒍᑎᒥᒃ ᐊᑎᓕᐅᖅᓯᒪᓯᐊᖅᑲᓚᑕ ᐱᔪᒪᓂᖕᒋᑦ ᒪᓕᓪᓗᒋᑦ.

ᓇᑭᓪᓕ ᖃᐅᔨᒋᐊᒃᑲᓂᕋᓇᒍᖓ ?

ᑐᑭᓯᒋᐊᒃᑲᓂᕖᑦᓴᐅᕗᖅ ᑕᒪᑐᒥᖓ:

- ᖃᕋᓴᐅᔭᓕᕆᔨᐅᔪᖅ ᐃᓕᓐᓂᐊᕐᑎᑦᓴᓂᒃ ᖃᐅᔨᒋᐊᕝᕕᑦᓴᖅ
ᐃᓕᓴᐱᑎ ᑕᒻᐱᓕᓐ 979-6206 ᖃᕋᓴᐅᔭᑰᕐᑎᖓ etumblin@nunanet.com
ᐋᓐ ᒪᑳᓕ (902) 672-3487 ᖃᕋᓴᐅᔭᒃᑰᕐᑎᖓ amaculy@isn.net

-ᐃᓕᓐᓂᐊᕐᑎᑦᓴᖅ ᖃᕋᓴᐅᔭᒦᑦᑐᖅ http://www.learn.motion.com/

- the documented impact of Knowledge Forum on student achievement
http:www.learn.motion.com/Research.html

-the TeleLearning NCE http://www.telelearn.ca

ᔫᒥ ᐃᓕᓐᓂᐊᕝᕕᒻᒧᑦᑐᐊᓂᑦ ᐅᖃᓪᓚᑐᓯ ᓇᑯᓯᒻᒧᑦᑐᐊᓂᑦ ᑕᑯᓂᐊᕈᒪᑦᑕᕐᓂᕈᓯ ᓇᒻᒥᓂᖅ

Appendix J

Revised Consent Form

IQALUIT DISTRICT EDUCATION AUTHORIT.

email: idea@nunanet.com

ᖃᖅᑭᐅᔭᒃᑯᑦ ᐃᓕᓐᓂᐊᕈᑎᖏᑦ

ᐊᖓᔪᖄᓇᔭᐅᓪᓗᖓ / ᐱᓯᒪᑦᓯᔾᔨᐅᓪᓗᖓ ᐆᒧᖓ________________________________, ᐊᖏᖃᑎᒋᕙᖓ ᐊᔾᔨᙳᖅᑕᐅᒐᔭᕐᓂᖓ ᖃᕆᓴᐅᔭᑎᒍᑦ ᐃᓕᓐᓂᐊᖅᑎᑦᓴᓕᐊᕆᓯᒪᔪᑎᒎᖓᒐᒐᔭᕐᓂᖓ, ᐋᖅᑭᑦᑕᐅᓯᒪᔪᖅ ᑲᑐᑎᒐᐅᓪᓗᓂ ᐃᓕᓐᓂᐊᖅᑎᓄᑦ ᐃᓕᓴᐃᔨᓄᓪᓗ ᐊᑐᖅᑕᐅᒃᑲᓐᓂᕋᔭᖅᐸᑦ ᑕᐃᒪᐃᒻᒪᕆᐊᒃᑭᓂ ᐃᓕᓐᓂᐊᕈᑎᐅᒐᓱᐊᕐᓗᓂ ᐊᓯᑦᑎᓄᑦ ᖃᕆᓴᐅᔭᓕᕆᔨᓄᑦᑕᖅ ᐊᖓᔪᖄᓇᔭᓄᓪᓗᓐᓂᑦ ᐱᓯᒪᑦᓯᔾᔨᐅᔨᓄᓪᓗᓐᓂᑦ ᖃᖓᒎᓐᓇᕐᓗ ᕿᒥᕐᕈᕙᑦ ᐱᓕᕆᐊᕆᔭᐅᓂᖏᓐᓂᒃ ᕿᒥᕐᕈᕆᐊᖅᑐᕈᓐᓇᖅᑐᑦ.

ᐊᑐᖅᑕᐅᒐᔭᕈᓂ ᐃᓕᓐᓂᐊᕈᑎᖅ ᑕᒃᑯᐅᖕᒪᓪᓗᓂᑦ ᐅᓂᒃᑲᓇᔭᐅᒐᔭᕈᓂ ᐊᑐᖅᑕᐅᓗᓂ ᐊᖏᖅᑕᐅᔪᑎᓂᒃ ᑲᑎᒪᔨᒃᑯᓐᓂᒃ ᐃᓕᓐᓂᐊᖅᑐᓕᕆᓂᕐᒧᑦ ᑎᑎᖅᑲᖅᑖᕆᐊᖃᕐᓂᐊᖅᑐᑦ ᐊᖓᔪᖄᓇᔭᐅᔪᐃᓪᓗ ᐱᒃᑕᐅᓯᒪᔪᐃᑦ ᑖᓐᓇ ᐃᓕᓐᓂᐊᖅᑎᓕᐊᕆᓇᔭᐅᓯᒪᔪᖅ ᐃᓕᓐᓂᐊᖅᑎᓄᑦ ᐋᖅᑭᓱᖅᑕᐅᓯᒪᔪᖅ ᑕᑦᓇᔭᒪᓕᐊᕆᓯᒪᑉᐸᑕ ᐅᕙᓗ ᐊᔾᔨᒎᐃᓐᓇᐅᑉᐸᑕ ᐱᒋᔭᐅᖏᓐᓇᓂᐊᖅᐳᑦ ᐱᒃᑕᐅᓯᒪᔪᓄᑦ.

ᐊᖏᖃᑎᒋᕙᖓ ᕿᒥᕐᕈᒪ ᓴᓇᐅᒪᖓ ᐊᑐᖅᑕᐅᒐᖅᑲᑦ ᐃᓕᓐᓂᐊᕈᑎᐅᓗᓂ ᖁᖓᓂᑦᑐᐃᑦ ᑎᑎᕋᖅᓯᒪᔪᐃᑦ ᒪᓕᓪᓗᒋᑦ.

-- ________________________

ᐊᖓᔪᖄᖓᑕ / ᐱᓯᒪᑦᓯᔾᔨᐅᔪᓪᓗᓐᓂᑦ ᐊᑎᓕᐅᕐᓂᖓ ᐅᓪᓗᖓ

Knowledge Forum Project

As parent/guardian of ________________________________, I agree that data in the form of video and computer databases, collaboratively created by students and educators, may be shared, for educational purposes, with other Knowledge Forum participants and teams. Parents/guardians may review the material of their child at any time.

Any further use of this data, including any and all interest in publications of this data, will require further approvals from Iqaluit District Education Authority and the parents whose children are involved. The intellectual property that is the students' work, as well as their video and digital images, remains the property of the individual participants.

I agree to allow my child's work to be shared for this project as described above.

------------------------------ ________________________

Parent/Guardian Date

P.O. BOX 235 • IQALUIT, NT • X0A 0H0
PHONE: (867)979-0403 • FAX: (867)979-5994

Appendix K

Revised Letter Requesting Research Volunteers

October 1, 1999

Dear Knowledge Forum Team members,

As you are aware, I am continuing to work on my Masters in Education thesis(Acadia University, Wolfville, Nova Scotia) this year. The current title for this thesis is:

Literacy Development Through Knowledge Building Technology
in Canada's Eastern Arctic: Educators' Perspectives

Although the title may change, I am focusing on what educators view as the impacts on literacy and knowledge building when Knowledge Forum is utilized in Iqaluit. I would welcome your participation in this research project as I feel each of you has an important voice as educators to share.

Knowing from experience just how busy life is as an educator in Iqaluit, I will outline the tentative frames of reference for you to decide if you, as an individual, would like to participate in this project:

October:	Participation in initial personal 'interview', baseline questions following .
October - April	Participation in 'Our Research Contributions' view on the Knowledge Forum database (recognizing that levels of participation will vary), where you can contribute your observations about students' usage of Knowledge Forum, knowledge building, literacy etc. , highlights/examples, questions, frustrations, suggestions etc..
April / May	Follow-up interview similar to initial interview format.

Please note that any representation of you or your thoughts in this thesis will be previewed by you to ensure accuracy, and aliases will be used, as required by Acadia University. If you do decide to participate, please complete the attached consent form.

After doing an initial preview of the literature on knowledge building, literacy, multicultural education, Aboriginal education, computers in the elementary classroom, ESL etc., my preliminary thoughts are that we are definitely headed in the right direction, in some ways ahead of the game, with what we are doing in Iqaluit elementary schools with Knowledge Forum. I welcome your input, in whatever way you are comfortable sharing, and respect your thoughts/observations.

If you have any questions, at any time, please don't hesitate to contact me.
Thanks for your continued involvement as a member of the Baffin Knowledge Forum Team.

Yours truly,

Elizabeth J. Tumblin
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Iqaluit, Nunavut
X0A 0H0
(867) 979-1515 (Home)
(867) 979-0539 (Fax)
etumblin@nunanet.com
Acadia University # 100018284

INITIAL INTERVIEW BASELINE QUESTIONS

(Please note, there are no right or wrong answers! I'm just trying to find out what your individual intital thoughts are!)

1. a) What are your experiences to date using technology in the classroom?
   b) What do you think is the role of technology in the northern elementary classroom?

2. a) What are your experiences to date with CSILE / Knowledge Forum?
   b) How does Knowledge Forum allow for the 'building of knowledge'?
   c) Does Knowledge Forum allow for cultural diversity? Explain.
   d) What are the particular advantages / disadvantages you've observed to date using technology such as Knowledge Forum in the northern classroom setting?

3. a) What is literacy - in traditional Inuit culture?
   - for today's youth?

   b) How can we use technology to enhance literacy development for Inuit youth ?

   c) What is the relationship between Knowledge Forum and literacy development?

Thanks!

Appendix L

Revised Consent Form (Research Participants)

Literacy Development Through Knowledge Building Technology in Canada's Eastern Arctic: Educators' Perspectives

This study is being completed by Elizabeth J. Tumblin as partial fulfilment of the requirements for the Degree of Masters in Education (Curriculum Studies), Acadia University, Wolfville, Nova Scotia.

The purpose of the above study is to examine what educators view as the impacts on literacy and knowledge building when the computer program of Knowledge Forum is utilized in Iqaluit, NT. Participation is strictly voluntary and participants may withdraw from the project at any time. Personal interviews will be conducted in October 1999, with follow-up interviews in the spring of 2000. In addition, contributions to the Our Research Contributions view of the Knowledge Forum database will be reviewed.

If you agree to be a participant in this study, it is requested that you review and agree to the following:

As a participant, I consent to:

1. the interviews being audio-recorded, with the understanding that the tape(s) will be destroyed, or returned, after the final document has been approved.
2. a verbatim transcript of the interview(s) being made in order to assist in the writing of the final document. I understand that my name will be replaced with a pseudonym of my choosing.
3. the information disclosed in the interviews and the classroom research journal being used for the above study and any subsequent journal articles.

As a researcher, I agree to:

1. interview individual participants personally.
2. do everything within my power to ensure confidentiality of the interview process , while recognizing the difficulties protecting the anonymity of the participants, given the size of the community and the Knowledge Forum team.
3. provide each participant with an opportunity, where direct quotations from the interviews are used in the final report, to ensure a) that they have been quoted accurately, and b) that they have not been quoted out of context.
4. include as part of the final document any instances where participant's interpretations differ from the researcher.

I have read and understood the conditions outlined above. I agree to participate in these interviews and the Our Research Contributions view of the Knowledge Forum database, in accordance with the conditions outlined above.

_____ _____

Participant's signature Date

_____

Pseudonym

_____ _____

Elizabeth J. Tumblin (Researcher)
(867) 979 - 1515
etumblin@nunanet.com

Date