Aboriginal Education Annotated Bibliography – In Progress

Compiled August 2004 by Sophia Raby, Chris Jackson and Arin Fisher,
CURA Education Stream
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EDU CURA 51

Anon. Guidelines for Representing Aboriginal Knowledge in Cross-Cultural Science and Technology. Saskatchewan. **2004.**
Article provides 9 recommendations regarding how aboriginal knowledge may be effectively integrated in western science and technology disciplines.

EDU CURA 105

Anon. A Place Where Our Student's Spirits Soar. Winnipeg, Manitoba. **2003.**
Manitoba public high school in Winnipeg that is aboriginal in focus and offers graduation requirements. Teaches Cree and Ojibwe languages and follows teachings of elders and the Medicine Wheel philosophical view of life. Holistic education is stressed which addresses the physical, academic, social and spiritual well-being of students.

EDU CURA 112

Anon. Saskatchewan Indian Federated College Department of Indian Education First Nations and Metis Curriculum Units. Saskatchewan. **2004:** Obtains information on curriculum and curricular activities with a First Nations perspective.
This website demonstrates the attempt of the Saskatchewan Indian Federated College (SIFC) Department of Indian Education to integrate First Nations and Metis content in the classroom. The SIFC's mission is to enhance the quality of life, and to preserve, protect and interpret the history, language, culture and artistic heritage of First Nations. There are five curriculum teaching units that were created by the SIFC, each focusing on the historic and contemporary contributions and achievements of Canadian First Nations and Metis people and each to be implemented in the classroom. The website addresses these curriculum units and then goes into detail about each of them. Printed in this information package are the traditional plant use unit, the traditional dances of First Nations unit, Legends of First Nations unit, and the First Nations dwelling unit. This information package also provides an article by Wells (1999) which discuses a traditional knowledge camp and its main focus in the Qu'Appelle Valley near Regina. The website also obtains links to Saskatchwan's curricular outcomes for each grade level used as a framework for this project.

EDU CURA 114

Anon. Koeye Youth Science Camp. R. C. Society. **2004.**
This website addresses the Koeye Science Camp, located on the Heiltsuk traditional territory on the central coast of BC. This camp emphasizes traditional knowledge and western science to impart knowledge and rekindle a sense of pride, ownership and wonder for Heiltsuk territory and cultural heritage. The Heiltsuk oppose development on their territory and wish to provide knowledge to the next generations so that they may preserve the lands.

EDU CURA 115

Anon. Gwich'in Science Camps. G. i. S. a. C. Institute. **2004.**
This website introduces the Gwich'in Science camps, which have been in operation since 1995. These camps offer senior high school students the opportunity to learn Gwich'in traditional knowledge and western scientific knowledge while living off the land. School credits are granted if children attend this camp and a major role of the camp is to

encourage students to stay in school so they can take an active role in research and management of Gwich'in lands and resources.

EDU CURA 116

Anon. Customized Group Programs in Outdoor Experience. Vancouver. **2004**.

Information regarding the Hooksum Outdoor school (in Tofino) that emphasizes indigenous knowledge and cultural experience is provided within this website. Such courses have succeeded in expanding the base of understanding and knowledge of Hesquiaht natural and cultural history (similar idea as the Gwich'in and Heiltsuk camps). Attached is also an article by Susan Elliot which addresses the Squamish Cultural Immersion Program at School District 44 (North Vancouver) which is a program that works with the Squamish First Nations to provide information regarding attitudes and values of the Squamish people. One of the objectives of the Squamish Cultural Immersion Program is to enhance the students' understanding of, and respect for Native culture in general, and the pre-contact Bighouse culture of the Squamish people, in particular.

EDU CURA 117

Anon. Aboriginal Education. Aboriginal Education. B. M. o. Education. **2004**.

These series of websites come directly from the province's Ministry of Education web page. Such websites introduce Aboriginal programs that have been recently offered within BC school districts, the goals of these programs and the program components. The Langley School District, Campbell River School District and the Chase Primary School District are reflected upon in the information package. These programs are designed to address the academic needs of students.

EDU CURA 140

Anon. Forests for the Future: Local Ecological Knowledge. **2004**.

This website reflects the Forests and Oceans for the Future ecological knowledge research project. This research project aims to demonstrate, through extensive research into local ecological knowledge held by the Gitxaala people, how local systems of governance and resource management can be more effectively integrated with the models and approaches of Euro-Canadian science. Related to CURA's educational stream is the public education materials provided within this website. The resources material in this package include curriculum material designed for the use in the Province of BC's K-12 education system. Of interest may be Unit 1: Two Ways of Knowing, Traditional Ecological Knowledge Meets Western Science and Unit 2: Traditional Plant Knowledge of the Tsimshian.

EDU CURA 243

Anon. (1994). Integrated School Linked Services for Children and Youth At-Risk, Saskatchewan Education, Training and Employment: 1-90.

This Implementation Guide for integrated school-linked services has been developed as a companion to the policy framework called Working Together to Address Barriers to Learning. It is intended to help people develop responses to the needs of at risk children, drawing upon and coordinating the available resources in the community. It provides guidelines to develop the seed of an idea into an integrated services initiative in your community. The suggestions are included in this guide have come from the experience of groups working across the province and from literature on the topic (From Foreword of Report)

EDU CURA 101

Anon. (1998). Super Saturday: Investing in First Nations Youth. S. T. C. a. t. U. o. Saskatchewan. Saskatoon, Saskatchewan. **2004:** Website with information pamphlet.

This pamphlet provides general information regarding the Super Saturday Project offered

in Saskatchewan to aboriginal children. The aim of this project is to develop programing that will essentially enhance aboriginal learning, incorporate cultural perspectives and traditional knowledge with modern technology and teachings. Most importantly, the aim of this project is to create positive results amongst children and youth.

EDU CURA 89

Anon. (2000). Gathering Strength: Canada's Aboriginal Action Plan. M. o. I. A. a. N. Development. Ottawa, Minister of Public Works and Government Services Canada: 26.
This progress report looks at the standard of living of aboriginals across Canada and steps that have been taken as a means to address key dimensions of the relationship between the Crown and Aboriginal people. The purpose of Gathering Strength is: (1) to develop a new partnership among aboriginal people and other Canadians that reflects mutual interdependence and enables the ability to work together to build a better future; (2) Financially viable aboriginal governments are able to generate their own revenues and are able to operate with secure, predictable government transfers; (3) Aboriginal governments are reflective of and responsive to, predictable government transfers; (4) A quality of life for aboriginal people is similar to that of other Canadians. This progress report demonstrates the results that have elicited consequent of the government's initiative to increase the quality of life for aboriginal peoples in Canada.

EDU CURA 75

Anon. (2001). Removing Barriers To High School Completion-Final Report. A. L. S. I. a. R. Division. Edmonton, Alberta, Alberta Learning. **2004:** 1-38.
Executive Summary in article

EDU CURA 102

Anon. (2001). Northland School Division No. 61 Three Year Education Plan 2001-2004. N. S. D. N. Board. **2004:** Progress Report.
This progress report, reflecting the implementation of a Three Year Education Plan in Northern Alberta, incorporates schools highly composed of aboriginal students. Interestingly, this progress report compares what the provincial outcomes are and articulates what the division's outcomes are and how it proposes to reach these outcomes.

EDU CURA 137

Anon. (2001). Aboriginal Elders and Community Workers in Schools: A Guide for School Divisions and Their Partners. Saskatchewan Learning. C. E. S. Education, Saskatchewan Learning: 1-52.
This document provides an effective overview of an Aboriginal Elder/Outreach Program, a special component of the Indian and Metis Education Development (IMED) Program, which promotes incorporating aboriginal elders, community workers, cultural advisors and other Aboriginal resource people into the Saskatchewan, public school divisions. It is believed that this program will essentially build and enhance relationships between school divisions and the aboriginal community. The document commences by listing the benefits of involving aboriginal elders and other resources into the school. One of the main reasons for this incorporation includes enabling aboriginal students to see themselves and their cultural heritage reflected and respected within the school. Consequently, such will help students develop positive self-esteem, which in turn, helps them achieve their potential in school and in life. Other benefits include, but are not limited to: (1) Enhancing cultural perspectives; (2) Building relationships with the aboriginal community; (3) Promoting awareness of culture and traditions; (4) Addressing social and cultural issues; (5) Providing a mentor/role model; and (6) Promoting harmony.

The article suggests that these resources provide imperative links between the aboriginal community and the school. Not only does the presence of the elder help aboriginal parents

and other community members feel more comfortable in the school, elders also enhance relationships between Aboriginal governing bodies and community organizations and schools. Some of the elders' roles listed in this publication include promoting aboriginal language, providing guiding and counselling services to students, families and school staff and assisting teachers with the adaptive dimension in better include aboriginal perspectives and content. It is believed that the elder acts as an effective role model in the school system. The publication also reflects the role of the aboriginal community worker in a school as well as the role of other aboriginal resources in the school. These resources obtain similar roles to that of the elder. The article then makes some suggestions for planning and implementation. The appendices obtain examples of school division protocols and guidelines for aboriginal elders, examples of a job description for a cultural advisor, examples of programs and further resources.

EDU CURA 70

Anon. (2002). Innovative Programs are Changing the Face of Aboriginal Education in Alberta. ATA Magazine. A. T. s. Association. **2003**.
This article addresses innovative programming in Alberta that emphasize aboriginal education. Such programs stress the significance of aboriginal language development and enhancement; in addition such a program enables students to trace their ancestry and learn about their band. Providing an insight into how elementary and secondary education is funded, this article later reflects the significance of Indian and Northern Affairs Canada (INAC) and how it works with First Nations to review education programs, processes and results. Thus, First Nations are able to take a participatory approach in educating their children. The article concludes by stating that the INAC/Treaty First Nations Education Review have worked hard to come to an understanding of issues and potential solutions that will enable and support improved results for First Nations students.

EDU CURA 103

Anon. (2002). School Division Serves its People Well. ATA Magazine. A. T. Association. **2004**.
This article provides an overview of the Northland School Division No. 61, its history, governance structure, the schools, its initiatives, and its goals.

EDU CURA 164

Anon. (2002). How are we doing? Demographics and Performance Of Aboriginal Students in BC Public Schools. M. o. Education, Ministry of Education: 1-27.
Created by the Ministry of Education, this paper focuses on demographics and performance of Aboriginal students of varying ages in British Columbia public schools. The report consists mostly of graphs and tables, giving visual as opposed to verbal descriptions. The report is aimed at "increasing understanding of how Aboriginal students are performing in the school system, providing a context for examining continuous student achievement and addressing how we are doing, how have we improved and how can we improve?". The report makes some very worrisome statistics realistic, as it is easy to see the academic differences between Aboriginal and non-Aboriginal students. The report also offers suggestions on how to improve these statistics over time.

EDU CURA 240

Anon. (2002). Building Environmental Aboriginal Human Resources BEAHR. H. R. D. Canada, Canadian Council for Human Resources in the Environmental Industry (CCHREI) and the Aboriginal Human Resource Development Council of Canada (AHRDCC). **2004**.
Refer to Executive Summary

EDU CURA 242

Anon. (2003). Education Programs Report. I. a. N. A. Canada, Indian and Northern Affairs Canada: 1-15.

Indian and Northern Affairs Canada (INAC) is committed to working with First Nations and other stakeholders to ensure the provision of quality education for First Nations learners that assists them to achieve their educational needs and goals. This objective is supported through a variety of INAC programs described throughout this report including the Elementary/Secondary Education Program, Special Education Program, Post-Secondary Education Program, Gathering Strength Education Reform/New Paths Initiative, First Nations and Inuit Youth Employment Strategy and Cultural Education Centers.

INAC also plays a coordinating and advocacy role with respect to First Nations education, encouraging and facilitating cooperation between the federal government, First Nations, provincial governments and other stakeholders. The intended outcomes of these shared efforts are to ensure the provision of an educaiton that gives students the necessary knowledge, skills and confidence to be full participants in their own communities and in Canadian society (Abstract of report)

EDU CURA 244

Anon. (2004). Native Education Center 2004/2005 Program Calendar. U. N. I. E. Society. Vancouver, Urban Native Indian Education Society. **2004:** College Calender.

EDU CURA 186

Academy, A. (2003). Amiskwaciy Academy. Edmonton, Alta. **2004**.

This information package is in regards to Amiskwaciy Academy, a model school that obtains programming directly regarding the value and traditions of Aboriginal culture. This secondary school will be utilized as a model school for the native high school that is currently being created in Prince George. The school uses the Alberta Program of studies as a base, but enriches such curriculum by offering options courses that reflect Aboriginal tradition and values. The Academy also structures the school year into four terms that reflect four seasons in order to echo the aboriginal tradition that certain things are best learnt at certain times of the year.

What makes this school so successful is its commitment to helping students achieve their full academic potential and integrating an aboriginal focus into the curricula. Students also benefit from the teachings of Aboriginal elders through an elder-in-residence program. At the same time, the Work-based Learning Program builds partnerships with post-secondary institutes and business, encouraging internships, work experience, and job placement arrangements that let students explore a variety of career options.

The information package also briefly regards a Rites of Passage program offered at the school, which is aimed specifically towards at-risk students.

EDU CURA 4

Agbo, S. (2002). "Unstated Features of Cultural Deprivation or Discontinuity: Culture Standards for Administrators and Teachers of Aboriginal Students." EAF Journal **16**(2): n/a.

This article focuses specifically upon how the cultural roles of administrators and teachers of aboriginal teachers translate into strategies that will allow for students to learn more effectively. The article also reviews the Mohawk Education Curriculum Development Project, which was a collaboration between administrators, public school teachers and community people to construct a culturally relevant standards-based curriculum that would address problems of high drop out rates and underachievement of Mohawk students (Agbo, 2002). The author makes recommendations from the results of this case study. For example, the implementation of "cultural standards" for teachers and administrators are suggested in addition to standards for parent-teacher communication. The main focus of the article looks at how to enhance aboriginal students' achievement through culturally responsive pedagogues.

EDU CURA 54

Aikenhead, G. (1997). Stories from the Field: Experiences and Advice from the Rekindling Traditions Team. Saskatoon, SK. **2003**.

Aikenhead provides a guide for teachers that separates lessons into units. Each unit begins by establishing an Aboriginal framework about the unit's theme. The framework reflects local knowledge. This document is essentially organized into three parts: (a) summarizes the advantages of modifying a unit to suit the community's unique culture (b) to point out the challenges that arise upon doing such; and (c) to offer advice to science teachers who are thinking of implementing such units or who want to develop their own.

In this paper, aimed at science teachers, Aikenhead acts as a facilitator/coordinator for the College of Education at the University of Saskatchewan. The author's researchers for this paper were teachers and elders located throughout different parts of Saskatchewan. This allowed for first-hand research and experience in introducing new and unique science cultures to school curriculums.

This document will essentially aid in better understanding how Traditional Ecological Knowledge and Western science and technology can work together to sustain culture.

EDU CURA 55

Aikenhead, G. (1997). Toward a First Nations Cross-Cultural Science and Technology Curriculum for Economic Development, Environmental Responsibility and Cultural Survival. Science Education. Saskatoon, Saskatchewan. **81:** 217-238.

"This article explores First Nations science education from a cultural perspective. Science is recognized as a subculture of Western culture. Scientific and Aboriginal ideas about nature are contrasted. Learning science is viewed as culture acquisition that requires First Nations students to cross a cultural border from their everyday life world into the subculture of science. The pathway toward the cross cultural education explored in the article is: (a) founded on empirical studies in educational anthropology; (2) directed by the goals of First Nations people themselves; (3) illuminated by a reconceptualization of science teaching as cultural transmission; (4) guided by a cross-cultural STS science and technology curriculum; and (5) grounded in various types of content knowledge for the purpose of practical action such as economic development, environmental responsibility and cultural survival. Cross-cultural instruction requires teachers to identify cultural border crossings for students and to facilitate those border crossings by playing the role of tour guide, travel agent, or culture broker, while sustaining the validity of students' own culturally constructed ways of knowing" (Abstract in article).

Aikenhead is affiliated with the University of Saskatchewan under the Curriculum Studies department. This artcile focuses upon how Aboriginal students can learn Western science while keeping their own unique culture. The paper describes three practical ends to First Nations education: economic development, environmental responsibility, and cultural survival. To achieve these practical ends, the paper is divided into seven parts: (1) cultures and subcultures explains the numerous definitions of culture and subculture; (2) the subculture of science outlines how science is a system of norms, values, beliefs, expectations, and conventional actions, creating a threat to the sustainability of indigenous cultures; (3) First Nations knowledge of nature describes the similarities (TEK being one of them) and differences between Aboriginal verses scientific knowledge; (4) the subculture of school science and its threat of assimilation gives three possible processes: enculturation, assimilation, and Fatima's rules; (5) border crossing has inherent difficulties, especially with each culture being unique in its ways and mannerisms; (6) appropriate knowledge for First Nations students determines what might help to reach the ultimate goal of practical ends and the different knowledge systems involved; and (7) curriculum implications for First

Nations students involves First Nations students critiquing scientific ways to better determine which processes (enculturation, autonomous acculturation, and anthropological instruction) are working and which are not. Ultimately, this paper will be useful in understanding how science can be incorporated into a First Nations curriculum.

EDU CURA 40

Aikenhead, G. (1997). Teachers, Teaching Strategies and Culture. Globalization of Science Education: International Conference on Science Education. K. E. D. Institute. Seoul, Korea: 133-136.

Aikenhead introduces the notion of the "cultural broker," who obtains the potential for reformulating teaching strategies to harmonize with a teacher's practical knowledge and the classroom microculture. Aikenhead states that "a cultural perspective on teaching science recognizes: teaching as a cultural transmission, science as the culture to be transmitted, and students as having their own cultural identities that may or may not correspond to the culture of Western Science" (Aikenhead, 1997). Aikenhead further attests that the cultural identities of most students do not parallel the culture of science. Thus, learning science for these students is a cross-cultural experience. Teaching strategies must incorporate and address such.

EDU CURA 27

Aikenhead, G. (1998). "Many Students Cross Cultural Borders to Learn Science: Implications for Teaching." Australian Science Teachers Journal **44**(4): 9-13.

Aikenhead proclaims that learning western science may conflict with aboriginal culture as it requires native students to cross cultural borders from their everyday subcultures. Aikenhead discusses aboriginal knowledge of nature, the subculture of school science and cultural border crossing that occurs in the school curriculum. He also critically proclaims that formal education found in school science fails to translate to economic development and ecological responsibility and therefore may be why aboriginals reject conventional science-it contrasts to aboriginal culture and Indigenous traditional knowledge. Aikenhead concludes by suggesting that cross-cultural perspectives for the science curriculum are necessary so that science education contributes to aboriginal economic development, environmental responsibility and cultural survival.

EDU CURA 42

Aikenhead, G. (2000). Integrating Western and Aboriginal Science: Toward a Bi-Cultural Pedagogy. New Orleans.

This paper addresses the issue of social power and privilege in science classrooms experienced by aboriginal students. Aikenhead first presents a rationale for a cross-cultural science education dedicated to all students making personal meaning out of their science classrooms. He then illustrates a practical R&D project (Cross Cultural Science and Technology Units) that modestly illustrates this bi-cultural pedagogy for science classes in grades 6-11.

EDU CURA 64

Aikenhead, G. (2001). Cross-Cultural Science Teaching: Praxis. St. Louis.

This paper attempts to address three objectives: (1) to develop a prototype process for producing culturally sensitive instructional strategies and curriculum materials; (2) To produce some teaching strategies and materials; and (3) To inspire others to continue the practice of cross-cultural science teaching.

EDU CURA 43

Aikenhead, G. and B. Huntley (1997). Science and Culture Nexus.

Refer to Executive Summary (Prior to report)

EDU CURA 41

Aikenhead, G. and B. Huntley (1999). Barriers to Accommodating Culture in Science Classrooms, A Paper presented to the 9th Symposium of the International Organization for Science and Technology Education, South Africa.

"Because students' cultural identity is often different from the culture of Western Science, most students experience a type of cultural clash whenever they attempt to learn science meaningfully. To alleviate such clashes, science educators have suggested integrating students' indigenous knowledge of nature with science content. A culturally responsive curriculum would provide "science for all" aimed at sustainable development, environmental responsibility and cultural survival. As with all reforms in science education, the teacher is the key to success. Therefore, before embarking upon the development of a culturally responsive science curriculum, we need to understand teachers' thinking about such matters so we can better collaborate with them as partners in developing new curricula, instruction and assessment strategies."

Aikenhead and Huntley recognize that aboriginal people are extremely under-represented in careers relating to science and technology. In order to alleviate such participation in science disciplines, teachers must adapt their teaching strategies and incorporate aboriginal knowledge into their teaching lessons. These authors also recognized that "barriers to accommodating culture in science classrooms were: conceptual (not recognizing science as a subculture), ideological (blaming students), pedagogical(not providing culture brokering), cultural (schools promote memorization rather than deep understanding) and practical (insufficient resources and support for teachers and students). A number of recommendations are proposed.

(Abstract from Article)

EDU CURA 69

Aikenhead, G. and B. Huntley (1999). "Teachers' Views on Aboriginal Students Learning Western and Aboriginal Science." Canadian Journal of Native Education **23**(3): 159-175.

Aikenhead and Huntley conducted a research study into science teachers' conceptions of: (1) the connection between the culture of science and the culture of Aboriginal Students; (2) the possible assimilation of these students in their science classes and (3) the degree to which teachers saw themselves as "cultural brokers" who could smooth the cultural border crossings into school science for students. The research identified barriers to student participation in science- the vast difference between Aboriginal culture and the culture of science--differences that make science a foreign forbidding world to most students. There are various barriers to accommodating cultures of Western and aboriginal science that were identified: **Conceptual barriers** (not recognizing science as a culture); **Pedagogical** (not understanding that students' preconceptions can interfere with learning science and not providing cross-cultural instructions for students); **Ideological** (blaming students for not taking senior science classes); **Psychological** (Differing responses to cultural conflict in the classroom); **Cultural** (schools pmemorizationraization rather than deep understanding, some students feeling disconnected from their Indigenous cultures and some people not supporting Aboriginal knowledge in science classes); and **Practical** (insufficient resources and support for teachers and students).

EDU CURA 39

Aikenhead, G. and O. Jegede (1999). "Transcending Cultural Borders: Implications for Science Teaching." Research in Science and Technology Education **17**: 45-66.

"The current development towards 'science for all' in all parts of the globe necessities that consideration be given to how pupils move between their everyday life-world and the world of school science, how pupils deal with cognitive conflicts between those two worlds, and what this means for effective teaching of science. This paper reviews a new cognitive

explanation-collateral learning theory-for how pupils cope with disparate worldviews mediated by transcending cultural borders between their everyday culture and the culture of science. The assistance that most pupils receive when they attempt to negotiate these cultural borders will influence their success at science. A new pedagogy is proposed in which teachers assume a role of culture broker in the classroom to achieve culturally sensitive curriculum and assessment" (Jegede and Aikenhead, 1999, 45) (abstract of article)

EDU CURA 187

AISES American Indian Science and Engineering Society. Albuquerque, New Mexico. **2004**.
Both AISES and CASTS are non-profit organizations with the goal of increasing the number of aboriginals in the science and technology fields. Aboriginal people are underrepresented in science and technology (S&T) education programmes and occupations. To increase representation in these fields, it is vital that exposure to and support of S&T continues through elementary, secondary, post-secondary school and beyond. The goal of CASTS and AISES is to encourage Aboriginal people to strive for successful careers in S&T and to provide information and support along the way. The trained professionals then become technologically informed leaders within the Indian community.

EDU CURA 8

Anderson, D. (2002). "Preparing to Teach Our Children the Foundations for an Anishinaable Curriculum." McGill Journal of Education **37**(3): 293-308.
Similar to the aboriginals in northern BC, Anderson asserts that Eurocentric domination of the education system has neglected Anishinaable ways of thinking and have caused Anishinaable children to lose their distinct cultural identity. Consequently, the Anishinaable have taken over the education jurisdiction and have tried to develop their own school curriculum which stresses the Anishinaabe foundations, knowledge, language and ways of life. The curriculum reflects the teachings of four directions, defined as: the East (language), the South (ways of knowing and learning), the West (Spirit of teachings) and the North (wisdom and strength). Such honors the Anishinaabe traditions and reflects upon their culture.

EDU CURA 92

Anderson, L., C. Stehbens and J. Herbert (1999). Finding the Balance. Global Issues and Local Effects: The Challenge for Educational Research. Melbourne, Australia, AARE-NZARE Joint Conference: 1-8.
After generalizing particular reasons for aboriginal drop outs, the authors suggest that on the whole, schools do very little to acknowledge or respond to the cultural and community context from which aboriginal students come. They suggest that aboriginal community participation in education decision-making is crucial, however, nonexistent. Although schools have acknowledged that communities are not necessarily all encompassing they, ironically, fail to seek interacting with the communities. The authors also suggest that parents and caregivers feel powerless in their efforts to effectively participate in their children's education. The authors suggest that better parent-teacher interaction may alleviate this. The authors conclude by suggesting that schools need to reach out to aboriginal communities in ways which fosters priniciples of respect, reciprocity, responsibility and relevance (Kirkness and Barnhardt). In this way, aboriginal communities will become empowered and able to address the low achievement levels of aboriginal students.

EDU CURA 80

Antone, E. (2000). "Empowering Aboriginal Voice in Aboriginal Education." Canadian Journal of Native Education **24**(2): 92-101.

"This article is a summary pertaining to the importance of teaching our children our history and ways as they relate to our respective territories. It is based on data collected from the Onyota'a:ka of the Thames community. The findings of this study show that language and ceremony are important aspects of enhancing voice to nurture confidence and creativity of schoolchildren. The voices of aboriginal peoples need to be encouraged and need to be heard in the school systems that the Aboriginal students attend" (Abstract of article).

EDU CURA 2

Antone, E. (2003). "The Changing Face of Aboriginal Education in Rural and Northern Canada." Education Canada **43**(3): n/a.

This periodical focuses on current education programs and curriculum for aboriginal students, claiming that Euro-western school systems tend to contradict aboriginal ways of life. Eurocentric educational practices have neglected and ignored aboriginal world-views, languages, and values and have elicited widespread social and psychological upheaval in aboriginal communities. The author claims that by striving to obtain cultural wholeness, students can carry on celebrating traditional knowledge and values. The article also touches upon discriminative governmental policies that have disvalued aboriginal traditional knowledge, values and skills and demonstrates how aboriginal peoples have nevertheless tried to obtain control of education, throughout Canadian history, so that their knowledge and skills do not disappear entirely.

EDU CURA 91

Appleton, K. (1990). A Learning Model for Science Education: Deriving Teaching Strategies. Research in Science Education. P. Gardner. **20:** 364.

A learning model for science education was proposed by Appleton (1989) based on Osborne and Wittrock's generative learning theory (1983) and the Piagetian notions of disequilibrium, assimilation, and accommodation. The model incorporated many aspects of difficulties in learning science experienced by students, as revealed in the LISP projects and similar research. This paper examines how the model may be used to derive teaching strategies: components of the model are analyzed in terms of specific types of teacher interventions which could facilitate students' progress to accommodation. Some established teaching strategies are analyzed in terms of these interventions, divided as being either interactive or cognitive (Abstract of article).

EDU CURA 167

Archibald, J. (1995). Locally Developed Native Studies Curriculum: An Historical and Philosophical Rationale. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 288-312.

Archibald, by tracing the historical experiences of First Nations education in British Columbia, looks at the Sto:lo people of the Fraser Valley and the evolution of their educational curriculum. Historical phases of First Nations education are categorized in relation to the decision-making bodies that influenced major curriculum goals and objectives. These influential groups include traditional Sto:lo people, religious organizations, governments (federal and provincial), and contemporary First Nations people.

Archibald commences her article by addressing traditional Sto:lo education and the philosophy of their past educational systems. She writes, "First Nations people traditionally adopted a holistic approach to education. Principles of spiritual, physical, and emotional growth, as well as economic and physical survival skills, were developed in each individual to ensure eventual family and village survival. Certain learning specialties in these areas were emphasized, including independence, self-reliance, observation, discovery, empirical practicality and respect for nature" (1995:289). She then turns her attention to the on-

coming of the missionaries in the mid 1800s and how such arrival effected traditional education systems that were already in place. She also looks at the influence of both the provincial and federal governments on education and their attempts to assimilate the native child. It was not until the 1970s that there was an increase of interest in local Native studies curriculum development projects. Suddenly, First Nations involvement in curriculum development was crucial.

Provincial school districts began to work with local First Nations groups to establish new First Nations-orientated programs with more First Nations support staff. Some bands gained administrative control over education and established their own schools on reserves. In British Columbia, a First Nations education branch, a supportive provincial First Nations education policy, availability of funds, and revisions to the provincial social studies curriculum, all elicited. The influence of First Nations people on education curricula over the last two decades has contributed to the quality and quantity of locally-developed Native Studies curricula.

In 1968, Sto:lo elders began meeting formally to come up with cultural programs that would promote pride and self-identity for aboriginal youths. What arose was the public elementary school social studies curriculum: the Sto:lo Sitel. Archibald analyzes the Sto:lo units from Grades 1 to 7; each unit contains a comparison between traditional and contemporary worldviews. Of particular interest is the Sto:lo Unit in Grade 4, where particular attention is given to plant gathering.

Archibald also analyzes the Sto:lo Sitel curriculum process, in detail, according to the five following components: (1) situational analysis; (2) objectives; (3) active research; (4) Learning experiences; (5) evaluation. These curriculum components were also evaluated by First Nations educators, teachers and parents. Archibald concludes by looking at six factors that have contributed to the curriculum's longevity.

Locally-developed native curricula is perhaps more accepted on band-controlled schools than public schools, mainly because it is difficult to implement Native-orientated curricula in a western, provincially-controlled school setting. The curriculum that the Sto:lo have developed should provide a basic framework for learning Sto:lo history and culture. However, more teacher resources and cultural activities are required for maximum benefits.

Archibald believes that BC public schools are improving in their attempts to include aboriginal teachings within the provincial curricula. With the participation of aboriginals in curricula creation, cultural activities and teachings may be emphasized. The Sto:lo Sitel curriculum is a good example of how aboriginal participation in the curriculum development stage is both necessary and essential.

EDU CURA 235

Atwater, M. (1994). Research on Cultural Diversity in the Classroom. Handbook of Research on Science Teaching and Learning: A Project of the National Science Teachers Association. D. Gabel. Toronto, Maxwell Macmillan Canada: 558-576.

Important facets of learning and teaching for African American, Asian American, Hispanic, and Native American students are the foci of this chapter. The philosophy of the author is that all school stakeholders must collaborate to develop an environment in which all of these students can be successful in science classrooms. The problem is not the student. All students bring skills and knowledge that can help them be successful in science classrooms. We must build on that knowledge and those skills so that all students can understand the scientific principles, laws and theories; use science processes to help think critically and develop values that aid them in their decision making.

The chapter cites research in four main categories: (1) ethnic and cultural diversity in science classrooms; (2) cognitive and affective student factors related to ethnicity, culture and science learning; (3) Classroom environments conductive to science learning; and (4) teacher knowledge, affective characteristics, teaching methods and curriculum. The author reports on successful science programs for culturally diverse students (Abstract of article).

EDU CURA 159

Baker, D. (1995). "The Effect of Culture on the Learning of Science in Non-Western Countries: The Results of An Integrated Research Review." International Journal of Science Education **17**(6): 695-704.

Baker implies that traditional views, cultural explanations and language are simply expressions of that which society considers as normal to its eco-culture. Such norms are communicated through the epistemology inherent on the culture and the meanings embedded in particular metaphors which are passed on through time-honoured interpretations of reality. Such factors indicate that a student's cultural background is likely to affect their ability to fully comprehend and manipulate scientific concepts.

The author then turns his focus to the pedagogical model of conceptual change that accounts to students' prior knowledge. He claims that the fundamental goal of conceptual change is to help students change their conceptions. The conceptual change models are based, therefore, on "(1) a constructivist principle that instruction should commence with, and maintain, a focus on students' extant ideas and (2) a normative principle of initiating students into the culture of western science" (Baker, 1995, 699). Although the conceptual change model offers a promising pedagogy for school science, Baker asserts that it should not be imported directly into the science classrooms of non-western schools consequent of some potential problems. One of these problems is the fact that conceptual change pedagogy may serve to assimilate students into a dominant and monocultural western scientific worldview that requires them to relinquish their own culture. To solve this problem, Baker asserts that "one may have to adopt an epistemological framework that promotes the harmonization of worldviews" (Baker, 1995, 701). This means that teachers must teach a science that is relevant to the needs and culture of the learner.

Conversion into a western world-view should not be the goal of prerequisite of science education. Instead, one must assist people to meet modern challenges by sharing appropriate technologies and understanding. In other words, it is fully possible and legitimate for one to hold a scientific and a traditional view of the world, without one dominating over the other (hence, the harmonization of worldviews). The only way to allow this to fully happen in science, however, is to enable students to test prior cultural beliefs in the context of a scientific model.

EDU CURA 143

Ball, J. (2003). Incorporating Indigenous Knowledge in Post-Secondary Teaching. Teaching Large Classes: Usable Practices from Around the World. M. Cherian and R. Y. Mau. Singapore, McGraw-Hill Education. **Chapter 6:** 84-101.

The pilot projects mentioned in this chapter suggest that there is value of an indeterminate, generated approach to curriculum that invites multiple perspectives on a subject matter and especially emphasizes indigenous knowledge and experiences. Of the projects mentioned, the most relevant involves indigenous communities in Canada and demonstrates the benefits to students and communities of opening up the foundations of curriculum and teaching so that education is culturally sustaining and grounded in community development. The Generative curriculum model ensures that community members act as collaborators in co-constructing curricula and placing culturally embedded constructs at the core (not the periphery) of education. The pilot project suggest ways that post-secondary

professors can teach generatively. Ball asserts that, "using the generative curriculum model, what is taught and what is learned takes a different shape each time a curriculum is taught, reflecting the unique knowledge that resides in the local community and the experiences of students" (Ball, 2003, 93). Through the partnership programs, elder knowledge is both valued and invited; subsequently, curriculum is also generated by younger respected community members who have first hand experience with the culture, language, and social practices of students' communities. Consequently, community members experience a high degree of agency in determining what is learned and how they learn it. The pilot project involving First Nations demonstrates the successes in terms of student performance and contributions to social development goals. The project also encourages instructors to follow the guidelines imposed in order to make education more releant and meaningful to the First Nations community at large.

EDU CURA 225

Ball, J. and A. Pence (1999). Beyond Developmentally Appropriate Practice: Developing Community and Culturally Appropriate Practice. Young Children International**:** 46-50.
This article describes the evolution of the generative curriculum model, an early childhood education training program that takes seriously the challenge to include community and culture. Originating through a partnership between the University of Victoria, a mainstream Canadian university and the Meadow Lake Tribal Council, an Aboriginal tribal council in northern Canada, the generative curriculum model seeks to ensure that early childhood students receive "knowledge of the social and cultural contexts in which children live." Through the generative curriculum model, early childhood education trainees can learn to engage in practices that are developmentally appropriate and in dialogues and collaborative partnerships with communities to assess the appropriateness of such practices for the children and families served. Consequently, such approach ensures that the voices of the community are heard and the values and needs of the community are embodied in child care services that are community and culturally appropriate.

The childcare education program is an effective program on the reserve because it promotes students to tap into the cultural teachings and experimental wisdom of elders and other community-based resource people. Not only are such courses equivalent to mainstream university courses, students get to learn about the traditions and values of their culture and forge relationships with older members of the community. The community benefits from this program (as they are involved in curriculum design and the attainment of the services from the program and within their community), and the students benefit consequent of their direct communication with elders.

EDU CURA 224

Ball, J. and A. Pence (2001). Training in First Nations Communities: Five 'Secrets' of Success. Interaction**. 15:** 19-24.
The article addresses the importance of the integration of ECE programming/training on-reserves and the results of such. The author discusses lessons that emerged out of the First Nations Partnership Programs (FNPP). Providing a brief overview of what First Nations Partnership Programs consist of and why such programming are important within the aboriginal community, the author discusses five secrets of success that illustrate the FNPP approach--from an innovative idea to community-based ECE training to improve child care students.

EDU CURA 147

Ball, J. and A. Pence (2001). Constructing Knowledge and Training Curricula. C. I. o. S. Policy. Seattle, Caledon Institute of Social Policy**:** 1-33.
The effectiveness of an innovative "Generative Curriculum Model" was demonstrated in seven partnership programs involving rural Aboriginal communities and a team based at

the University of Victoria. A constructivist model of curriculum design and teaching by Elders ensured cultural relevance of the training curricula in child and youth care and subsequent transfer of training to development of community services by program graduates. Seventy-eight percent of the First Nations enrolled completed the two-year diploma program. Implications of the program evaluation findings for advancing the decolonization of post secondary education and the utility of education as a tool for aboriginal community development are discussed (Refer to *Overview* in article)

EDU CURA 81

Barnhardt, C. (1999). "Standing Their Ground: The Integration of Community and School in Quinhagak, Alaska." Canadian Journal of Native Education **23**(1): 100-16.
Case study describes the efforts of Kuinerrarmiut Elitnaurviat, the K-12 school in Quinhagak, Alaska, to implement school reform initiatives that support the merging of school and community values and priorities. Despite nearly a century of outside acculturation efforts, the Yupik people of Quinhagak are attempting to integrate their language, customs, and beliefs into the formal educational system.

EDU CURA 34

Barnhardt, R. (2000). Teaching/Learning Across Cultures: Strategies for Success. Voice of the Drum: Indigenous Education and Culture. N. Roger. Brandon, Manitoba, Kingfisher Publications.
Barnhardt attempts to provide teachers, who arrive in rural settings, with strategies that will elicit effective learning amongst aboriginal populations. His first recommendation is to make a good first impression once arriving in a new cultural community. Teachers must consider that differences in worldviews that exist, which have enormous implications for all aspects of how to approach tasks of everyday life. After listing the differences in cultural perspectives, Barnhardt provides suggestions that will influence what should be taught and how it should be taught in the aboriginal classroom. The purpose of these strategies is to make the classroom environment inviting places for students from different cultural backgrounds and to effectively educate students while simultaneously tap into their culture and use this as a framework for curriculum development.

EDU CURA 138

Barnhardt, R. and A. Kawagley (2004). Culture, Chaos and Complexity: Catalysts for Change in Indigenous Education. Cultural Survival Quarterly: 59-63.
The article commences with an introduction to the Alaska Rural Systemic Initiative (AKRSI) which was established with the purpose of implementing a set of initiatives that systematically document the indigenous knowledge systems of Alaska Native peoples and develop pedagogical practices that appropriately integrate indigenous knowledge and ways of knowing into all aspects of the education system. Both western and indigenous knowledge systems are utilized as the foundation for the school curriculum and integrated into the way educators think about learning and teaching.

The article then looks at the knowledge systems of the Alaskan Native people and recognizes that traditional ways of knowing have been overcome by western thinking. Consequently, the AKRSI education reform strategy must take into consideration the relationship between the indigenous system as a whole and the external systems with which it interacts, the most critical and pervasive being the Western formal education systems that now impact the life of every native in Alaska.

After reflecting upon the formal education system in rural Alaska and identifying the disparities that exist between the formal education system and indigenous traditional knowledge, the authors state that it is important that the AKRSI sees to serve to promote a relationship to join the two perspectives together.

The overall structure of the AKRSI is organized around five major initiatives, each of which is implemented in one of the five Alaska Native cultural regions each year on an annual rotational schedule over a five year cycle. In this way, these initiatives can be adapted to the cultural and geographic variability across each region. The initiative are as follows:

(1) Native ways of knowing/teaching
(2) Culturally Aligned Curriculum
(3) Indigenous Science Knowledge Base
(4) Elders and Cultural Camps
(5) Village Science Applications

The article concludes with a reflection of the success of the AKRSI program, stating that there has been an increase in student achievement scores, a decrease in drop outs, an increase in the number of native students attending college and an increase in native students pursuing studies in fields of math, science and engineering.

EDU CURA 148

Barton, A. (2000). "Crafting multicultural science education with preservice teachers through service-learning." Journal of Curriculum Studies **32**(6): 797-820.

Many science educators, in the US and elsewhere, suppport the idea that all students should have fair and equal opportunities to become scientifically literate through authentic, real problem-based science education. However, this challenge requires teachers to find ways to help all students feel comfortable with, and connected to, science. Despite the general consensus around the ideal of science for all, science teacher education programmes have had little or no impact on preservice teachers' philosophies of teaching and learning, especially as it relates to serving underserved populations in science. In this paper, I explore community service-learning as one way of addressing the multicultural dimension of preservice education with the following three questions: In what ways does involving pre-service science teachers in community service-learning influence their views on multicultural science education, in theory and practice? What qualities of community service-learning make multicultural science education a realistic objective? How might service-learning be used to push our collective understanding of what an inclusive and liberatory multicultural science teaching practice could be? I explore these questions and propose further areas of research by using a case study involving service-learning from my own teaching-research with preservice students (Abstract of Article)

EDU CURA 78

Battiste, M. (1998). "Enabling the Autumn Seed: Toward a Decolonized Approach to Aboriginal Knowledge, Language, and Education." Canadian Journal of Native Education **22**(1): 16-27.

Battiste argues that an aboriginal curricula, which emphasizes language, be incorporated into the provincial curricula in order to break the cycle of European centered views in education. She points out that aboriginal communities continue to suffer the effects of colonization and imperialistic policies which essentially erode the base of indigenous knowledge. Although the federal government has entered into agreements with First Nations that require them to adopt a provincial curricula as a minimum requirement to assume control of their education, these curricula are often developed away from aboriginal communities, without aboriginal input and written excursively in English. The article discusses the need for aboriginal knowledge to be retained through aboriginal languages supported in the curricula. It also challenges the Eurocentric assumptions that have pushed aboriginal knowledge and languages to the margins and raises current aboriginal educational concerns regarding a transformed curriculum that embraces the rich diversity of knowledge and provides the necessary consciousness to enable Aboriginal humanity to be respected and protected.

EDU CURA 24

Battiste, M., L. Bell and L. M. Findlay (2002). "Decolonizing Education in Canadian Universities: An Interdisciplinary, International, Indigenous Research Project." Canadian Journal of Native Education **26**(2): 82.

The authors identify that equity does not yet exist in the Canadian education system and attempts " to animate post secondary education that can generate methods of practice for a more thorough decolonization of research and policy development and the experience of Aboriginal teachers and students" (Battiste et al., 2002) The authors identify that the most significant challenge faced by aboriginal peoples has been trying to restore indigenous ecologies, consciousness and languages within the Eurocentric society that we reside. This paper's aim is to demonstrate the processes involved in decolonizing education, which "requires the institutional and system-wide centering of the indigenous renaissance and its empowering, intercultural diplomacy" (Battiste et al., 2002). The authors identify seven sites of animation in the assimilationist nation found in the Eurocentric education system.

EDU CURA 22

Bazylak, D. (2002). "Journeys to Success: Perceptions of Five Female Aboriginal High School Graduates." Canadian Journal of Native Education **26**(3): 134.

The article focuses upon the results of a qualitative research study of five at-risk aboriginal girls in grade 12. The researcher has identified factors that contribute to success of aboriginal students at a secondary level. These success factors serve as recommendations that should be implemented to every elementary and secondary school to elicit marginalized student success.

EDU CURA 46

Bell, D. (2004). Sharing Our Success, Society for the Advancement of Excellence in Education: 1-335.

This report focuses upon the success factors and successful experiences from the perspectives of those most intimately involved in aboriginal schooling: the students, their parents, community members, teachers, principles and school boards or education authorities. Ten schools, which have a high aboriginal enrolment rate, are examined and experiences of success from these particular schools are addressed. The researchers also include important textual information, descriptions of the school and its programs, as well as a careful analysis of what makes each site work and what pressing issues it faces.

Ten factors of school success are identified in this report: effective leadership, creating a welcoming school climate with high expectations, caring and dedicated school staff, adequate funding and strategic use of resources, engagement with community and forms of governance, quality programs, re-thinking governance structures, acquiring funding equity from the federal government, enhancing aboriginal language and literacy, retaining quality teachers, overcoming transition programs, and developing adequate learning measures. The report concludes with ten recommendations towards policy makers and eight towards practitioners. The report emphasis the importance of holding high expectations for achievement while recognizing the existence of student needs and providing layers of support, and using diverse measurement tools to monitor student progress and program effectiveness, including normed and provincial assessments. Employing school leaders and teachers with expertise and personal qualities is also an effective way to provide aboriginal learners with appropriate support. The importance of aboriginal language and culture through the development of specific programs and classes, the inclusion of aboriginal perspectives in regular curriculum and by special events and celebrations is also emphasized. Schools are urged to provide special emphasis on literacy and communication skills, mathematics and the sciences, which provide the core

competencies to enable their skills to open doors to future success.

EDU CURA 83

Berardi, G., D. Burns, P. Duran, R. Gonzalez-Plaza, S. Kinley, L. Robbins, T. Williams and W. Woods (2002). "Science and Culture in a Curriculum for Tribal Environmental Management: The TENRM Program at the Northwest Indian College." American Indian Culture and Research Journal **26**: 47-64.

This paper discusses an innovative, interdisciplinary two-year environmental studies program funded by the National Science Foundation (NSF). The authors describe the program--its origins, foundation principles, curriculum, assessment, and recruitment--discuss student participation and achievements and summarize the long-term prospects of the program. This article was prepared during the program's second NSF-funding cycle.

The program, titled Tribal Environmental and Natural Resource Management (TENRM), began in the fall of 1998 at the Northwest Indian College located on the Lummi Indian Reservation near Bellingham, Washington. Its second funding cycle ended in 2003. The grants for the program are awarded through the Advanced Technological Education Program of the National Science Foundation. The grants fund administrative and faculty salaries, field trips, faculty training in learning community, pedagogy, and attendance at conferences, guest lecturers, annual evaluations of the program and some teaching-aid equipment.

EDU CURA 133

Brown, W. (2003). Cultivating Learning Community Through Restitution: A Case Study. U. E. Program. Prince George, UNBC.

EDU CURA 49

Butler, K. (2000). "Overcoming Terra Nullius: Aboriginal Perspectives in Schools as a Site of Philosophical Struggle." Educational Philosophy and Theory **32**(1): 93-101.

Butler argues that the phenomenon of Terra Nullius continues to imbue the education system with problematic responses both to the needs of Aboriginal students and in the representation of Aboriginal issues to students as a whole. The pervasiveness of past mindsets continues to impede upon true equality and reconciliation in Australia, conferring an inferior status upon aboriginals. The Aboriginal Education Policy provides a range of directives, including the use of Aboriginal perspectives in attempting to overcome this legacy. There are manifold benefits to this aspect of policy if it leads to the rigorous scrutiny of past and present pedagogy. The integration of the aboriginal community and education system to negotiate Aboriginal perspectives has the potential to empower aboriginals. There must be acceptance and affirmation acknowledging diversity of the Aboriginal cultures and giving primacy to Aboriginal understandings of how these cultures are constituted, recognizing commonalities while celebrating differences. Butler begins with an analysis of the Terra Nullius mindset and later discusses how the aboriginal perspectives may be integrated and better represented within the school system. She concludes by trying to define the definitive aboriginal perspective, proclaiming that the recognition and expression of aboriginal forms of spirituality should be addressed in contemporary education systems.

EDU CURA 231

Cajete, G. (1988). Motivating American Indian Students in Science and Math. ERIC Digests. Las Cruces, NM, ERIC Digests. **2004**.

In this article, Cajete identifies the common trend amongst aboriginal students once they enter into junior high: they avoid science. He identifies the factors that may contribute to this avoidance: (1) Conflicts exist between home and school regarding the purpose and importance of school; (2) An abrupt movement away from lessons in context and interdisciplinary approaches to teaching science and math in earlier grades towards a

more structured and linear approach in junior high; (3) a social organization of lesson presentation which is less group orientated and more authoritarian and (4) American Indian students possess a cultural worldview that is significantly different than that of American society at large. Linguistic differences can add to this problem, especially when the student comes from a predominately native language speaking background. Under preparation of many teachers in elementary science and lack of culturally relevant coursework often condition students to expect "boring" science and math classes and to believe that Native American culture has nothing in common with science and math education.

EDU CURA 230

Cajete, G. (1994). Look to the Mountain: An Ecology of Indigenous Education. Skyland, Kivaki Press Inc.

There are three needs that Cajete identifies early on in his book:

(1) The need for a contemporary perspective of American Indian education that is principally derived from and informed by the thoughts, orientations, and cultural philosophies of Indian people themselves. The articulation and fulfillment of this need are identified as essential steps in Indian education self-determination.

(2) The need for exploring alternative approaches to education that directly and successfully address the requirements of Indian populations during this time of educational and ecological crisis. It is essential to open the field and entertain the possibilities of new approaches in a creative quest for viable and complete education processes.

(3) The need to integrate, synthesize, organize and focus on the accumulated materials from a wide range of disciplines about Indian cultures and Indian education toward the evolution of a contemporary philosophy for American Indian education that is **indigenously-inspired and ecologically based**.

Cajete identifies the challenges facing school in contemporary society and offers insights to educators regarding where improvements could be made. Cajete provides a lucid introduction to aboriginal education practices, including a thorough overview of the key cultural assumptions that underlay indigenous ways of teaching. He shares important legends and stories from various tribes, explaining their cultural, psychological and spiritual significance. Yet this book is more than a fascinating ethnographic study; it is a compelling call for North Americans to examine the cultural assumptions that underlie the mounting problems of our society found within our education systems. Modern culture, says Cajete, "must come to terms with the conditioning inherent in its educational systems that contribute to the loss of a shared integrative metaphor of Life. The loss, which may ultimately lead to a social/cultural/ecological catastrophe, should be a key concern of every American. This "loss is integrative life" refers to aboriginal ways of life and traditional and philosophical thinking.

The purpose of education in tribal cultures is to connect people to their heritage and to their distinct place on earth. Cajete describes how this is achieved through "mythopoetic" rather than reductionistic teaching methods, including storytelling, scared art, ritual, immersion in nature and simply through the daily involvement of young people in the life of the adult community. Education is not seen as a technical process to be managed by specialists but as a heroic journey, a challenging quest that each individual undertakes with the support and guidance of the community.

Cajete emphasizes the organic balance between cultivating individuality ("personal power") through diverse and flexible teaching methods, and leading the individual to understand

that people are essentially "social beings living in relations to one another. Our physical and biological survival is intimately interwoven with the communities that we create and that create us" (p. 166). Indigenous education is, above all, concerned with such relationships, based upon a profound respect for the rhythms and patterns of nature and the ways these are expressed archetypally both culturally and through the individual psyche. "Nothing in contemporary modern education experience, " observes Cajete, "comes close to affecting and engaging individuals as deeply and multi-dimensionally" (p 133). Clearly, there are powerful lessons here for educators struggling to come with the moral, and existential alienation of youths in the modern world.

EDU CURA 182

Cajete, G. (1999). Igniting the Sparkle: An Indigenous Science Education Model. Skyand, N.C., Kivaki Press.

It is virtually impossible to encompass the significance of this entire book in one short annotation. One must remember that the book is written for Native Americans, but can easily be applied to any country and prove to be beneficial. Cajete is a Native American educator; he is Tewa Indian and grew up in New Mexico in a very traditional way of life. This book gives insight into the development, transfer, and application of cultural knowledge. Alienation of Native Americans towards science is of great concern. This book expresses the importance of understanding that culture and learning are interrelated and must be incorporated into curricula. It discusses important aspects of Native American life, such as holistic learning, the importance of creativity, ethnoscience, indigenous science, the use of the mind and the heart as physical tools, border crossings, and the power of myths and story telling, just to name a few. The book includes graphs and tables, and it provides examples of stories with meaning and their implications. Most importantly, it gives educators samples of curricula and examples to make them work in unique classrooms. Ultimately, the book addresses the relationships between Native American culture and the Western science curriculum and is a model to facilitate teaching of indigenous students. Cajete has also written Look to the Mountain: An Ecology of Indigenous Education, which can also be found in the database.

EDU CURA 37

Cajete, G. (2000). Indigenous Knowledge: The Pueblo Metaphor of Indigenous Education. Reclaiming Indigenous Voice and Vision. M. Battiste. Vancouver, UBC Press.

Cajete presents Pueblo (New Mexico) metaphors of Indigenous education as a means to bring together some thoughts and ideas of various scholars about how to heal and transcend the effects of colonization. The metaphors essentially provide a means to reflect upon how we can use the tools of education in reinventing a contemporary philosophy of Indigenous education. Cajete proclaims that there are essentially five major foundations that underlie indigenous education: community, technical environmental knowledge or making a living in a place by understanding and interacting with it, visionary or dream tradition based on an understanding that one learns through dreams and visions, mythic traditions and spiritual ecology. He provides some interesting recommendations to help young aboriginal students understand their history. He concludes by stating that the curriculum is a creative process and therefore teachers have the responsibility of making learning experiences both creative and exciting and of helping students understand and appreciate their cultural heritage.

EDU CURA 237

Cameron, I. (1990). "Student Achievement Among Native Students in British Columbia." Canadian Journal of Native Education **17**(1): 36-43.

The achievement of Native Indian students is of concern to many educators in many parts of North America for a variety of reasons. In British Columbia, one of the reasons for concern is the revision of the Master Tuition Agreement, which governs relations with

regard to education among the federal government, the provincial government, and Native Indian bands in BC.

This paper reports the results of a preliminary investigation of Native Indian achievements in British Columbia, prompted by the revision of the agreement and therefore revision of the education of the province's status Indians. The revised agreement specifies that the province must evaluate the achievement of Native Indian students and report its findings to the Native Indian bands. A preliminary study indicates that Native Indian achievement is considerably low below that of non-Native students (Abstract of article)

EDU CURA 220

Carr-Stewart, S. (2003). "School Plus and Changing Demographics in Saskatchewan: Toward Diversity and Educational Communities." Canadian Journal of Native Education **27**(2): 223-234.

The article focuses on the demographic changes in Saskatchewan characterized by the increasing migration of First Nations people from the reserve to the city, population movement from the family farm to urban centers, and the Saskatchewan Department of Learning's policy decision to implement *School Plus: A Vision for Children and Youth. School Plus* is intended to foster "boundless diversity [while] trying to create a resilient community....to which diverse membership is possible" (Carr-Stewart, 2003, 228).

The School Plus program attempts to (a) Foster understanding between students; (b) Ensure educational equity for aboriginal people; (c) increase demand and requirement for schools to be reflective of both Aboriginal and non-Aboriginal contributions to Canada, differing world views, culture, and language and (d) focus on employment equity within the schools. In part, School Plus, is an educational administrative process to foster community at the school level between two peoples. The premise of School Plus is, therefore, centered on fostering community schools that are "forward looking" and address the need for learning experiences calculated to promote the growth of mind and spirit" (Carr-Stewart, 2003, 229).

The mandate of the School Plus program is focused on schools within the jurisdiction of the provincial government. This means that the implementation of School Plus is accompanied by additional funding for provincial schools. No funding is provided by the DIAND to First Nations schools to engage in the School Plus program. which means that Saskatchewan aboriginals are limited by the federal financial support in fostering schools that reflect their own community beliefs, practices and goals. The author states that First Nations supported by Federal funding must be equal participants in building connections with schools if School Plus is to become a reality.

School Plus focuses on the incidence of school dropouts or at-risk students. It fosters environments that are supportive of aboriginal peoples, aboriginal curricula, and community-building. The School Plus initiative also expands to bridge the divide between provincial and federally supported First Nations schools. School Plus is an opportunity to build relationships between two educational systems, ensuring educational equity for all students regardless of the system in which they attend. The province has embraced School Plus in its incentive to ensure that all students have the opportunity not only to gain the tools necessary to participate in a new society, but to live in a society that encourages community and diversity.

EDU CURA 136

Champagne, D. (2004). Education For Nation Building. Cultural Survival Quarterly**:** 35-38.

This article focuses upon the incentive of UCLA to promote learning of aboriginal perspectives and culture within the institution. Through a program called the Tribal

Learning Community and Educational Exchange (TLCEE), First Nations communities are introduced to course work on issues including law, policy, education, economic development and community building. TLCEE courses are offered at UCLA, and internships are provided on reserves and are instructed by community leaders and elders. These courses obtain a focus on community-building and culture resource management. Some courses that are offered at UCLA are also accessible online. UCLA understands the importance of native students to learn about their own histories and cultures from the perspectives of their own communities. Education for Native students needs to be made relevant to their history and lived experience. Only then will education be more valued by aboriginal students. Furthermore, education for native students needs to start in the community and needs to promote community involvement and buy-in. This is why the TLCEE program is such a success. Moreover, the article concludes that "education for nation-building is a means to help preserve Native cultures and communities as self-governing cultural and political groups with territory from time immemorial."

EDU CURA 208

Charters-Voght, O. (1999). "Indian Control of Indian Education: The Path of the Upper Nicola Band." Canadian Journal of Native Education **23**(1): 64-99.

This article examines how one band, the Upper Nicola Band, came to terms with Indian Control of Indian Education. An overview of the history of the education of these people and the Indian Control of Indian Education Policy provide some background as to why it is important for the Band to strive for local control of its education. The writer of this paper, who was to become the principal of the new band school, led a structured experiences workshop on May 15, 16, and 17, 1990 in which band members were encouraged to participate in thinking about where they had been, where they are now, and where they wanted to be. Through structured activities, band members developed their own educational philosophy, goals, and action plans. The workshop is described in detail in this article. Where appropriate, the data provided by the participants are analyzed in light of the Indian Control of Indian Education Policy. The outcomes of the workshop on education at the band school during the subsequent year are highlighted (Abstract of Article).

EDU CURA 99

Claeys, G. (2001). Indigenous Programs Progress Report (Royal Roads University). R. R. University, Royal Roads University: 1-69.

This progress report focuses upon the development of two indigenous programs offered at Royal Roads University. The Distributed Learning for Indigenous Communities undergraduate certificate programs help prepare First Nations students to develop and manage distributed learning environments for their own communities, from design and development of instructional environments to the technical considerations required to implement those environments. The certificate program in Indigenous Corporate Relations is offered with the objective of enhancing the capacity of aboriginal governments and organizations, individual companies, industry associations and other groups to create greater understanding and mutually beneficial relationships between the private sector and indigenous communities. These new programs at Royal Roads University will be filling an important niche, specifically, to address Indigenous Peoples' need to become independent.

EDU CURA 125

Cobern, W. (1996). "Worldview Theory and Conceptual Change in Science Education." Science Education **80**(5): 579-610.

Conceptual change is a simple idea. If students are given an opportunity to construct scientifically orthodox conceptions, if they then come to see that these conceptions are more intelligible, plausible and fruitful than other conceptions, the students will change

their conceptions for scientific ones. This rationalistic view is embedded in a narrowly conceived notion of the role knowledge plays in an individual's life and fails to recognize that students' everyday conceptions differ from science because they serve a different purpose. Conceptual change instruction is intended to foster a scientific view of the world. This goal is wrong-headed. Science needs to be joined with the other school disciplines in the common goal of developing student worldviews of which science is one articulated component. Conceptual change should become more plausible for students when they have been invited to a discourse on what are the important questions of life, what are the various answers, and what does science have to contribute to the common human quest for a meaningful life.

EDU CURA 63

Cobern, W. and C. Loving (2000). "Defining 'Science' in a Multicultural World: Implications for Science Education." Science Education **85**(1): 50-67.

"In today's school, there are often competing accounts of natural phenomena, especially when schools are located in a multicultural community. There are also competing claims about what counts as science. This article examines the definition of science put forward from multicultural perspectives in contrast to a Universalist perspective on science; that is, the Standard Account. The article argues that good science explanations will always be universal even if indigenous knowledge is incorporated as scientific knowledge. What works best is still of interest to most; although one may hate to use the word hegemony, Western science would co-opt and dominate indigenous knowledge if it were incorporated as science. Therefore, indigenous knowledge is better off as a different kind of knowledge that can be valued for its own merits, play a vital role in science education, and maintain a position of independence from which it can critique the practices of science and Standard Account" (Abstract of article).

This article, most likely meant for those developing textbooks and curriculum and those involved in teacher education, is meant to encourage thought and discussion on the meaning of "science" - more specifically, the meaning of science that has been derived from First Nations peoples. The root of the article is the question of whether or not to allow the knowledge that First Nations peoples have to become part of what is known as standard account science. Standard account science is science that involves data and testing, that is reliable, and that is objective compared to being subjective. Standard account science is the dominant science, and thus it is the one that has been overwhelmingly accepted by society. The article stresses the importance of the devaluing of TEK and the privileged position of Western modern science (WMS) today. They suggest TEK should be taught in the science classroom, but as separate from the knowledge and not included in science. The question the authors are emphasizing, then, is whether the knowledge of First Nations peoples should be incorporated into the science that is taught in the classrooms of our schools. Is this knowledge "science"? The article states that the "task for educators is to develop curricula that value knowledge in its many forms and from its many sources" - therefore educators must bring First Nations curricula into the classroom. In other words, teachers need to choose the knowledge that is valuable and relevant, and that may not always be knowledge based on standard account science.

EDU CURA 20

Cooke-Dallin, B., T. Rosborough and L. Underwood (2000). "The Role of Elders in Child and Youth Care Education." Canadian Journal of Native Education **24**(2): 82-92.

The article expresses the importance and influence of aboriginal elders in transmitting teachings of aboriginal culture to students. The practice of relying on elders for these purposes is consistent both with the tradition of oral history and with contemporary practices in First Nations communities that endorse special training rile of Elders. As the authors notes, "elders are the symbol as well as the repository of Indigenous culture, that

is, cumulatively they are the physical representation of the continuity of accumulated knowledge between generations as well as being individually the carriers and communicators of practical knowledge about what to do and how to do it" (Cooke-Dallin et al. 2000).

The authors introduce the Child and Youth Care First Nations program (CYC), which purpose is to integrate what was taught by Elder teachings with the content of their course work and practices. With elders involved, the program is essentially in the community which helps to keep this program in the awareness of the community while keeping the students aware of community issues.

The article expresses the advantages of incorporating elders into the school system, these including that elder teachings are culturally relevant and can become meaningful to the identities of First Nations students, practitioners and communities and that elder teachings provide students with the opportunity to learn skills and theory and develop as practitioners by placing their knowledge in the context of their own culture. Also, during elder teaching classes, students have the opportunity to know more about the traditional knowledge already acquired. In addition, the sharing of knowledge between participants in sessions is reciprocal in that the Elders become involved in discussions that arise from course content. Furthermore, the elder becomes an important personal support system for the student.

EDU CURA 82

Corbiere, A. (2000). Reconciling Epistemological Orientations: Toward a Wholistic Nishhabe (Ojibwe/Odawa/Potowatomi) Education. Canadian Journal of Native Education. Canada; Ontario.

The education of First Nations people has been used primarily for assimilation purposes. The last 30 years have witnessed the beginnings of First Nations' control of education with the primary impetus being self-determination. Achieving self-determination through education has been hindered by the social and cultural problems associated with colonization. To combat colonization and effect healing, the concept of wholistic education has been offered. Wholistic education describes the pedagogical approach that develops the whole First Nations child: intellectually, spiritually, emotionally, and physically. A wholistic education is compatible with traditional tenets of Native peoples' conceptualizations of well-being and the good life. The standardized Ontario provincial curriculum obstructs self-determination by interrupting the transmission from Elder to child of Indigenous knowledge and understanding of the earth, omitting Indigenous perspectives on history, presenting Indigenous world views as irrational and unscientific, and not using Indigenous languages. Wholistic education can effect cultural survival by providing an education that affirms Indigenous world views and traditions, restores the role of the land and Nature as teachers, teaches history from a Native perspective, restores the Elders to their rightful place as transmitters of Indigenous knowledge, reconnects the generations, and uses Native languages as the medium of instruction (Abstract of Article)

EDU CURA 35

Cordova, V. F. (1995). Doing Native American Philosophy. From Our Eyes: Learning from Indigenous Peoples. Toronto, Garamond Press.

Cordova argues that Native American philosophy does exist in the classroom. The author claims that, although Native American Philosophy courses are taught at a post-secondary level, little opportunity exists for students to understand deeper meanings of stories and legends in a philosophical manner. Additionally, Cordova argues that the psychological, economic and creative expression mode of Native American thought is often ignored when exploring stories and legends. Furthermore, Cordova attests that the philosophical exercise of questioning and analyzing data are different for Native Americans- they are

not concerned with "stories of creation," but rather ask questions "concerning how the people describe the world: what is it?; what are human beings?; how do they fit into this world?" (Cordova, 15). Cordova suggests that Native American philosophy should be approached as a complete alternative explanation for the world and for human nature. Many academics suggest that a Native American philosophy is nonexistent. Cordova attempts to argue this by stating that although aboriginal philosophy subsists, it is rendered absent consequent of the lack of queries by aboriginal scholars on philosophical issues underlying familiar stories and legends.

EDU CURA 181

Corsiglia, J. and G. Snively (1995). Global Lessons from the Traditional Science of Long-Resident Peoples. Thinking Globally About Mathematics and Science Education. G. Snively and A. Mackinnon. Vancouver, UBC: 25-52.

Corsiglia has lived and worked with traditional resident peoples for some time, while Snively is an associate professor at the University of Victoria within the Education Department. The two have created this article that focuses on First Nations traditional ways. First, a detailed description of traditional science is given. Then the article goes on to describe elders' ways of teaching and traditional ecological knowledge. It lists the different topics of traditional science, and it explains how metaphor and stories are used to keep traditions alive. Because the contributions that traditional science has made are immense and affect our everyday lives, balancing needs with environmental requirements is of great importance. The strengths and limitations of oral narrative traditions are also outlined. Through examples of the Nisga'a from northern British Columbia, Corsiglia and Snively have produced an article of importance in Native Environmental Education.

EDU CURA 87 (or CD 1)

Corsiglia, J. and G. Snively (2001). "Rejoinder: Infusing Indigenous Science into Western Modern Science for a Sustainable Future." Science Education **85**(1): 82-87.

This article focuses on infusing science into Western modern science for a sustainable future. Traditional ecological knowledge (TEK) strategies and wisdom approaches to attract interest among working scientists; Definition of TEK; Dilemma facing developing countries globally; Multicultural science in the classroom; Importance of TEK and wisdom on science education programs. This article also critques Loving and Cobern's view on TEK and Stanley and Brickhouse's conceptions of multicutluralism in science education.

EDU CURA 84

Costa, V. (1995). "When Science is "Another World": Relationships between Worlds of Family, Friends, School and Science." Science Education **79**(3): 313-333.

The purpose of this article is twofold: to describe a model for understanding how students' responses to science are related to the degree of congruency between their worlds of family, friends, school and science; and to explore the implications of this model for practice and policy in science education. The study focus upon the meaning-perspectives of students to understand how they differentially experience school science. On the basis of classroom observation, teacher recommendation, and students' willingness, 43 high school science students were interviewed to gain information on their perceptions of school and science, the importance of influence of friends on these perceptions and family conditions that were significant to their lives. Though the identification of five distinctive patterns regarding the relationship between personal experiences and success in school and science, this study draws attention to the necessity of curriculum and school practices that facilitate the integration of students; multiple worlds (Abstract of article).

EDU CURA 48

Council, F. N. E. (2001). Improving School Success for First Nations Students. First Nations Education Study: School District No. 73 (Kamloops/Thompson). F. N. E. Council. Kamloops/Thompson,

Ministry of Education. **2004**.
After discussing the barriers to success generally encountered by First Nations students, this report makes a series of recommendations that the School District should take into consideration as a means to improve low achievement rates of aboriginal students. Such recommendations may be implemented within School District 91 as well.

EDU CURA 67

Council, F. N. E. and S. D. 91 (2001). Report on Aboriginal Education in School District No.91 (Nechako Lakes). **2004**.
This report focuses upon aboriginal education in School District 91. This report reviews and assesses the success of aboriginal students and looks at programs and services in our schools and at the district level. Consequent of such an assessment, improvements can be made throughout the school district to increase the achievement levels of aboriginal students. The data enclosed stresses the importance of collaboration between school districts, parents, and First Nations, provides quantative data on enrollment, attendence, school completiion, and exams as well as addresses the Accountability Contract and the Enhancement Agreement for School District 91 (more information is enclosed regarding the Enhancement Agreement recently put into effect as of June 15, 2004). With regards to enrollment, enrollment, attendence, school completion, provincial exams, grade distributions, and special education, recommendations (qualitative) are made on how to make improvements on the results (quantitative).

This report concludes with the 2003 Aboriginal Grads yearbook.

EDU CURA 152

Cowley, P. and S. Easton (2004). Report Card on Aboriginal Education in BC. Studies in Education Policy. F. Institute. Vancouver, Fraser Institute: 1-49.
This report looks at aboriginal education in BC, proclaiming that British Columbia's education system is failing Aboriginal students. This report collects a variety of relevant, objective indicators of school performance into one document to assess the performance levels of aboriginal students. The *Report Card* also rates and ranks 38 BC elementary schools and 49 secondary schools with significant Aboriginal student populations whose students have participated in provincial assessment programs.

Although rating the schools elicits a qualitative approach, the authors make a good point. "The results of poorly performing schools generates concerns, as do those schools where performance is deteriorating. Schools that perform well or show consistent improvement are applauded. This inevitable attention provides an incentive for all those connected with a school to focus on student results" (Cowley and Easton, 2004, 4).

Similar to other Fraser Institute reports, the *Report Card* provides evidence about what can be accomplished. If one school can find ways to improve achievement levels of its students, then so too can other schools (Refer to executive summary).

EDU CURA 198

Crowshoe, R. (2001). Rebuilding Tradition to Create Workable Modern Systems and Practices for Indian Communities. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 141-148.
The article looks at how the Blackfoot Nation on the Peigan Reserve in Southern Alberta attempted to take control of some social services from the federal government and deal with private corporations. One significant challenge that these aboriginals faced was to find a way to take Western goals, perspectives and systems and match these with the issues and ways of the community so that partnership may be possible. In order to overcome this barrier, the tribal leadership joined with elders from the community to

devise approaches that would help young people become confident individuals and to build confident communities that would be able to succeed within the larger Canadian society. The elders suggested that parallels needed to be identified between specific systems and processes of Western society and aboriginal traditions. Only then would the community be able to move more effectively. By collecting oral histories, locating and using artifacts from the reserve, taping into traditional societies on the reserve, and traditional systems of running meetings, the Tribal leadership was able to start looking at parallels to Western systems and practices to figure out how to bring cultural content from the 1700s and 1800s into the 20th and 21st centuries. By developing modernized processes and tools rooted in culture, but matching Western concepts and goals, internal community health was promoted and true partnerships between community and mainstream Western society were made possible. No longer were these traditional holders excluded from making decisions and governance practices. Rather, these holders could be confident that traditional roles and processes were helping to meet the contemporary goals and objectives of an energized Blackfoot people.

In other words, the Blackfoot have been able to rebuild community services on the reserve along their traditional lines. For example, the Tribal leadership used the basic tepee floor plan to structure the health care system. They incorporated the roles that were equivalent to those of the different bundle keepers who were traditionally involved in the areas of traditional administration and decision making. They also added versions of the altar-and-smudge and pipe ceremonies to organize the process of health planning, decision making and service provision. Therefore, what this band essentially did was incorporate their traditions and culture and used these as a framework for carrying out modern services. In regards to education, incorporating traditional practices, roles and structures has helped young people better understand their traditions and themselves. By tapping into tradition, it is the hope that young people will have greater confidence in themselves and a form base on which to build.

EDU CURA 113

Cumming, B. (2003). Community Based Research and Education Curriculum Design (Clayoquot Sound). Teachers Resource Kit. Victoria, University of Victoria.
Following the research report initiated by Cummings, which addresses the importance of community involvement in curricula development is an article produced by Adrienne Mason who introduces a case study where students were encouraged to formulate ideas and feedback for the Clayoquot Biosphere Trust (CBT). There is also a short article included in this package that addresses the Clayoquot Alliance for Research, Education and Training as a means of including communities to elicit conservation and sustainable development in the Clayoquot Sound Biosphere reserve. These articles are all useful as each addresses the importance of community inclusion when deciding the future of this ancient rainforest.

EDU CURA 97

Day, M. (2000). Developing Benchmarks for Prior Learning Assessment. C. A. f. P. L. Assessment. Ottawa.
Refer to executive summary:

EDU CURA 60

Dillon, J. (2002). "Editorial-perspectives on Environmental Education-Related Research in Science Education." International Journal of Science Education **24**(11): 1111-1117.
This article critically examines the following:

(a) The relationship between science and environmental education in terms of ontology, epistemology, pedagogy, and policy

(b) The role of teachers of science might have in teaching environmental education with respect to the issues raised in (1)

(c) Current models of science and science education and their relationship with teaching and learning in EE in practical contexts.

The author asks three key questions regarding the future of environmental education:

(1) What might learning look like?
(2) What might teaching look like?
(3) What might the curriculum look like?

EDU CURA 14

Doige, L. (2003). "A Missing Link: Between Traditional Aboriginal Education and the Western System of Education." Canadian Journal of Native Education **27**(2): 144-160.
Refer to article

EDU CURA 58

Donaldson, D. and A. Docherty (2004). Community Development in the Upper Skeena: Death Feasts and Transformative Change. Community Stories. C. l. o. S. Policy, Caledon Institute of Social Policy. **2004**.
Human Resources Development Canada (HRDC) created the Office of Learning Technologies (OLT) in 1996, in order to encourage innovative, technology-based learning. HRDC staff and representatives from the (then) British Columbia Ministry of Community Development, Cooperatives and Volunteers, in cooperation with community leaders, tailored an OECD model to incorporate lifelong learning concepts and lessons from the learning cities work carried out in the UK. This Caledon series of community stories profiles several communities in BC that secured OLT funds in order to strengthen and extend their community capacities to deal with socioeconomic challenges.

EDU CURA 178

Dukepoo, F. (2001). The Native American Honor Society: Challenging Indian Students to Achieve. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 36-42.
The author addresses a National Native American Honor Society, which is an organization that is open to students from Grade 4 to graduate school. The purpose of this organization is to promote student success. By granting students a certificate and gold pin for each additional straight-A semester, the organization motivates early members, not only at their present level, but also into college and beyond. The National Native American Honor Society offers a considerable program (referred to in the text as a "four-prong program"). The organization obtains high expectations and the belief that any student can succeed in school. There is also an "Eagle Force Training" program that is a leadership skill program. Students are taught how to be leaders, including how to think and communicate effectively. Through high expectations, leadership training, and other means, students gain self-confidence. Additionally, spiritual and community forces are integrated into the Honor Society. In this way, students are taught how to become "smart" Indians, while, simultaneously, how to become active and involved community members.

Related to the goals of the CURA Education stream, the National Native American Honor Society emphasizes success in science. Dukepoo notes that success in science is crucial for native individuals and communities. In some cases, aboriginal students believe that they are unable to learn science because they are "right brained." This is an educational myth. An additional myth is that aboriginal students obtain a specific learning style that differs from non-aboriginal students. The author criticizes such theories, claiming that aboriginal students are just as capable of learning as their non-aboriginal counterparts.

The author mentions the Honor Society at the White Mountain Apache Reservation and how it

contributed to the rising achievement levels of the students. "The number of Apache students entering the Honor Society went from 8 in 1992 to 160 the following year" (2001:40). The author, fails however, to indicate how this rising success was brought about. It would be interesting to look further into this.

EDU CURA 196

Dyck, L. (2001). A Personal Journey into Science, Feminist Science and Aboriginal Science. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 22-35.

One interesting point that Dyck makes, in this chapter, is that traditional western scientists tend to see science as an end in itself, without thinking about how science may serve the community. Aboriginal science, on the other hand, involves how to improve the community. She identifies two approaches to aboriginal science: (1) Aboriginal knowledge and its relation to mainstream science. For example, traditional Indian societies and their knowledge about astronomy, cartography, agriculture and medicine and; (2) Understanding and developing Native ways of thinking about life, the world and the universe. Aboriginal science, as Crowshoe states, involves traditional ways of knowing about things and integrating this knowledge into a bigger picture. Dyck proclaims that such a view is missing in most universities, which promote a hierarchical, rational and linear way of thought. Any alternative approach to this tends to be seen as unscientific and less valuable. Integrating spirituality with science, in academic settings, is perceived as heretical. The standard view is that there is no room for spirit in science. Similarity, the emotional part of science is generally ignored by the mainstream; yet there is a very large emotional component involved. For example, to be a successful scientist, you have to be very competitive. You have to be confident to stand up before other scientists and defend your work (2001:27). Therefore, what is Dyck is essentially saying is that, despite that fact that mainstream science attempts to be objective and denounce feminist science and aboriginal science consequent of its subjective elements, it is, in itself, quite subjective. Therefore, shouldn't this component of mainstream science make it just as subjective and valid as aboriginal science or feminist science?

Dyck concludes by stating that it is necessary to bring aboriginals into science, not just for economic or equity reasons, but, rather, to better serve communities and to broaden the way that science is done. What she is essentially saying is that Indian students and communities need a broader and more intergated perspective than is seen in mainstream science. A perspective that allows them emotion and thought. Moreover, such will promote Indian student achievement as well as the advancement of both Indian communities and science.

EDU CURA 65

E-Bus Introducing the Nechako Electronic Busing Program. Vanderhoof. **2004:** Various websites with e-bus information attached.

This series of websites provides information about the Nechako Electronic Busing Program, an initiative that allows students to learn from home, while continuing to simultaneously connect with their teachers. This paper provides Details regarding the type of services and resources E-Bus provides, in addition to information regarding assessment and computer options. General information is also given about the E-Bus program as well as what courses are available for high school students.

EDU CURA 228

Education, B. M. o. (2000). BC First Nations Studies 12: Integrated Resource Package. B. M. o. Education. **2004**.

BC First Nations Studies 12 addresses the richness and diversity of First Nations languages and cultures by exploring them within their own unique contexts. It is intended to provide a conceptual foundation for all learners to develop an appreciation and respect for the

similarities among and differences between diverse cultures of the world. As such, the aim of this course is to promote an understanding of First Nations people among all students. A curriculum that concentrates on aboriginal content can lead to enlightened discussion of Aboriginal issues and contribute to Aboriginal students' sense of place and belonging in the public school system.

The Integrated Resource Package sets out the general themes to be addressed, the suggested assessment strategies, suggested instructional strategies, learning outcomes and learning resources for those secondary institutions that may implement the course at a later time.

EDU CURA 171

Educators, A. o. A. N. (1998). Alaska Standards for Culturally Responsive Schools. Alaska Native Knowledge Network. Anchorage, Alaska, Alaska Native Knowledge Network. **2004**. Alaska native educators have developed the following document for consideration of educators serving Native students around the state. Although the emphasis is on rural schools serving native communities, many of the standards provided are applicable to all students and communities because they focus curricular attention on in-depth study of the surrounding physical and cultural environment in which the school is situated while recognizing the unique contribution that indigenous people can make to such study as long-term inhabitants. Standards have been drawn up in five areas, including those for students, educators, curriculum, schools and communities. These "cultural standards" provide guidelines or touchstones against which schools and communities can examine what they are doing to attend to the cultural well-being of the young people they are responsible for nurturing to adulthood. The cultural standards provide guidance on how to reach state standards. The emphasis is fostering a strong connection between what students experience in school and their lives out of school by providing opportunities for students to engage in in-depth experimental learning in real-world contexts. These standards can essentially be synonymous to recommendations, especially for British Columbia educators. For example, the cultural standards section for educators proclaim that educators should use the local environment and community resources on a regular basis to link what they are teaching to the everyday lives of the student (1998: 5). These five sections are of particular value for the CURA project and are applicable to program development in Tache. The article states that the cultural standards should be adapted to fit local needs. "Each school, community and related organization must consider which of these standards are appropriate and which are not, and when necessary, develop additional cultural standards to accommodate local circumstances" (1998:3).

EDU CURA 173

Educators, A. o. A. N. (2000). Guidelines for Respecting Cultural Knowledge. Alaska Native Knowledge Network. Anchorage, Alaska, Alaska Native Knowledge Network. **2004**. Similar to the Alaska Standards for Culturally Responsive Schools document and the Cross-Cultural Orientation Programs published by the Alaska Native Knowledge Network (refer to Endnote database), this electronic source focuses upon the creation of guidelines aimed to respect cultural knowledge within the public school system. These guidelines were collaboratively established with the help of elders and native educators and are aimed to help expand the base of knowledge and expertise that culturally-responsive teachers can draw upon to enliven their work as educators. Similar to the Alaska Standards for Culturally Responsive Schools document, a set of recommendations are provided, which are aimed at stipulating the kind of steps that need to be taken to achieve the goals for which the guidelines are intended. The document states that if states and federal agencies, universities, school districts, textbook publishers and Native communities utilize these guidelines, in addition to the recommendations provided, students throughout Alaska will experience an enriched education. Such guidelines include, but are not limited to, the participation of native elders within the school system (as elders are a prime source for the

transmission of traditional cultural knowledge), the revision of materials by authors and illustrators that ensure that cultural content is accurate, appropriate and explicitly acknowledged, the inclusion of traditional knowledge by curriculum developers and administrators, and the encouragement of local language utilization by language specialists.

Significant to this study is the recognition that education does not adequately respect cultural knowledge. Through the active participation of elders in local and regional Elder's councils and in the schools themselves, traditional ways of knowing, teaching, listening and learning are passed on. An additional useful guideline is the encouragement that authors and illustrators represent cultural content that is accurate. This means that these individuals must refer to knowledgeable local people to consent to the content that is being represented.

EDU CURA 174

Educators, A. o. A. N. (2001). Guidelines for Strengthening Indigenous Languages. Alaska Native Knowledge Network. Anchorage, Alaska, Alaska Native Knowledge Network. **2004**.
The purpose of the guidelines established is to provide assistance to the local language advisory committees created under Senate Bill 103 that are responsible for making recommendations regarding the future of the heritage language in their community. It is crucial that traditional language is utilized on a daily basis within both the home and the community environments. "It is essential that we speak our own languages in our daily lives to help instill pride, knowledge and respect in our children" (2001:2).

Elders are recognized as the primary source of language expertise and cultural knowledge. Hence, all of the guidelines established by the Alaska Native Knowledge Network (ANKN) vigorously include elder participation within both the development and implementation stages. Along with the guidelines, a set of recommendations are also provided and are aimed at stipulating the kind of steps that need to be taken to achieve the goals outlined (similar to all the ANKN documents found in the Endnote database). Guidelines are imposed for native elders, parents, aspiring language learners, native communities and organizations, educators, schools, education agencies, linguistics, and media producers.

Although such guidelines are aimed towards rural communities of Alaska, such can equally be implemented at a local level. For example, the guidelines for Native communities and organizations may be implemented in Tache, where active participation of community members in promoting language may be encouraged. Additionally, residents of Tache may be involved in traditional storytelling gatherings that help people experience the heritage language and gain a deeper understanding of a story's meaning, along with dances, games and ceremonies. Also, the guidelines for educators may be implemented in the northern reserve, where educators are encouraged to make effective use of local expertise (through elder knowledge) wherever local language and cultural knowledge is addressed in the curriculum. Finally, educators should make an effort to utilize locally-relevant curriculum materials with which students can readily identify.

EDU CURA 172

Educators, A. o. A. N. (2003). Cross-Cultural Orientation Programs. Alaska Native Knowledge Network. Anchorage, Alaska, Alaska Native Knowledge Network. **2004**.
This website provides guidelines that address the need for cross-cultural orientation programs to better prepare teachers who are able to cross cultural borders and provide a culturally-responsive and supportive educational environment for all the students in their care. This education package especially emphasizes the integration of traditional values and ways of knowing in schools throughout Alaska, recognizing that they are value and identity-created institutions. The guidelines also stress the importance of reflecting the communities, by incorporating and building upon the rich cultural traditions and knowledge

of the people indigenous to the area.

The guidelines incorporate the views of native educators as well as knowledge of elders. Along with the guidelines are a set a recommendations that are aimed at stipulating the kind of initiatives that are needed to achieve the goals for which the guidelines are intended. Such guidelines and recommendations should be viewed in collaboration. Although such is aimed for schools in Alaska, they can be utilized anywhere (Taken from Preface).

EDU CURA 15

Elliott, J. (2003). "The Authentic Integration of Aboriginal Content and Perspectives." The Medium **43**(2): 18.

The main focus of this journal is to portray the importance of Aboriginal teachings not only to Aboriginal peoples but also to non-Aboriginal students. The value of teaching an Aboriginal content is to ensure that the historical record is truthful, so that other cultures see their heritage, with a realistic depiction of how the diversity of the Aboriginal peoples varies from traditional stereotypes. This aspect, incorporated into the curriculum, is a tool for preventing racism. Aboriginal students should be taught through true reflection, ensuring a true picture of their heritage. Teaching Aboriginal issues will meet the needs of today's diverse student body, which should include Canadian policies but also cultural traditions. First Nations societies look at education somewhat differently, since their views on children acknowledge a child's physical, spiritual, emotional, and intellectual development. This must be recognized as one of the differences between Aboriginal and Western views. School libraries must be provided with an accurate account of Aboriginal history to ensure the recourses are free of bias. Aboriginal issues must be taught for all students, creating a learning opportunity for the entire student body. Integration of Aboriginal issues is a key to increasing awareness about indigenous inhabitants of Canada and should be used as an educational tool to establish Aboriginal content in the curriculum.

EDU CURA 134

Enkiwe-Abayao (2004). Ifugao Knowledge and Formal Education. Cultural Survival Quarterly**:** 26-29.

This article looks at Ifguo knowledge and formal education systems, claiming that Ifugao culture and language emphasis in education has been lost consequent of the dominance of Western knowledge systems. Similar to the marginalization problem in Canada, the Ifugao find their culture unrecognized and devaluated consequent of an American curriculum.

EDU CURA 169

Ermine, W. (1995). Aboriginal Epistemology. First Nations Education in Canada:. M. Battiste and J. Barman. Vancouver, UBC Press**:** 124-138.

The article begins with a comparison of western and aboriginal ideology. The author claims that where western science seeks to understand the outer space objectively, aboriginal science attempts to find meaning in the inner space. "The inner space is that universe of being within each person that is synonymous with the soul, the spirit, the self, or the being. The priceless core within each of us and the process of touching that essence" (1995; 103). The way that aboriginal people attain knowledge differs significantly from western people and this is evident in Aboriginal language and culture. Ermine claims that the value of the ancient cultures and of the education system through time is borne out by the persistence of the promise of introspection in constructing meaning for contemporary aboriginals. He proclaims that the way that aboriginals think is highly influenced by the way they self-reflect and look inwards. Knowledge that comes from the inner world of the individual gives rise to a subjective worldview out onto the external world. Therefore, the way of obtaining knowledge from the physical plane is the task of aboriginal education.

Aboriginal epistemology is grounded in the self, the spirit, the unknown. Understanding of the universe must be grounded in the spirit. Knowledge must be sought though the stream of the inner space in unison with all instruments of knowing and conditions that make individuals receptive to knowing (1995:108). Ermine proclaims that such introversion has led aboriginals to come to grips with life mysteries.

The author states that the way that contemporary First Nations people obtain metaphysical knowledge has evolved from their ancestors. Mythology, vision quests, ritual, ceremonies, the medicine wheel, nature and language all reveal vestiges of grand discoveries and communion with the universe within. The culture of the Aboriginal recognized and reaffirmed the spiritual through practical application of inner-space discoveries.

Ermine concludes that stating that aboriginal education has the responsibility to uphold a worldview based on recognizing and affirming wholeness and to disseminate the benefits to all humanity (1995:110). The way that the western world thinks, looking at outer space instead of inner, is detrimental to aboriginal epistemology. Ermine criticizes western education systems, claiming that it fails to promote holism. Through analysis of the article, it is evident that Ermine opposes western systems because it fails to promote aboriginal ways of thinking and learning.

EDU CURA 146

Eshkibok-Trudeau, M. (2000). Circular Vision- Through Native Eyes. Voice of the Drum. R. Neil. Brandon, Man, Kingfisher Publications.

The author addresses circular vision from a Native perspective using a culture-based homeschooling curriculum that was used for homeschooling on the Wikwemikong Unceded First Nation during the early years of 1990. Homeschooling is preferred consequent of the lack of vision quest teachings, fasting teachings, Native language scroll teachings and sweat lodge teachings in the provincial school system on the reservation. Although the First Nation had been given control of their own education system, the opposition from the Catholic Church and some people in leadership positions on the reserve was, and still is, an obstruction. The author looks at the education of Elizabeth, who is the daughter of Marie and Wilfred A. Trudeau of the dodem Fish Clan and how native culture is taught to her while homeschooling.

EDU CURA 26

Evans, M., J. McDonald and D. Nyce (1999). "Acting Across Boundaries in Aboriginal Curriculum Development: Examples from Northern British Columbia." Canadian Journal of Native Education **23**(2): 190-205.

This article addresses the collaboration between the University of Northern British Columbia and aboriginal communities in their attempt to create a curriculum that will allow post-secondary students to participate in wider economic and political arenas but simultaneously meet the criteria of the aboriginal community (community-based programming). The UNBC model attempts to recognize all of the parties involved in the curriculum development process (First Nations Studies curriculum).

EDU CURA 38

Ezeife, A. (2001). "Integrating the Learner's Schema, Culture, and Environment into the Science Classroom: Some Cases Involving Traditional and Aboriginal Societies." Canadian and International Education **30**(1): 17-44.

Ezeife focuses upon science education in the aboriginal classroom and specifically attempts to devise effective teaching strategies that aboriginal learners would find suitable in their study of science. Ezeife identifies that the integration of a student's schema, culture and environment into the science classroom is a necessity. It is argued that

this approach would make science more meaningful and relevant to the students because of the background and prior experiences that students bring into the classroom. Ezeife also argues that the school continues along the path of learning that the youngster is already treading, building on what the child has acquired from the home and the environment. Therefore, by recognizing these three concepts as significant factors in science teaching and integrating them into science teaching/learning efforts, learning is facilitated for students, especially those students from indigenous backgrounds.

Ezeife makes several recommendations that, he believes, will elicit effective learning. He states that the similarity between learning experiences and familiar day-to-day activities definitely encourages the transfer of learning. Therefore, he suggests that a good way to teach aboriginal science is to promote "environmentally-based education," as this allows students to "tread on familiar turf and therefore stand a good chance of imbibing and utilizing what they are taught" (Ezeife, 2001, 22). After reviewing suggested science content areas, topics and principles that may be effectively taught through incorporating aboriginal culture and worldviews, the author looks at the benefits, limitations problems and solutions of teaching science using an integrated approach and concludes with an outline of an adequate curriculum that would utilize the integrated approach to teaching. He states that, no matter how adequate a curriculum may be, the success of teaching it depends entirely upon the ability of the teacher

EDU CURA 9

Ezeife, A. (2003). "The Pervading Influence of Cultural Border Crossing and Collateral Learning on the Learner of Science and Mathematics." Canadian Journal of Native Education **27**(2): 179-192.

Ezeife asserts that a correlation exists regarding low First Nations enrollment levels in Science and Mathematics consequent of a cultural border crossing they must endure when participating within these disciplines. Ezeife examines how students from non-Western backgrounds move between their everyday life-world culture and the culture of school science and how they deal with cognitive conflicts between the two worlds. He also makes suggestions on how science and mathematics may become more attractive to these students via alterations in classroom teaching strategies and methods. To make cross-cultural instruction clear, Ezeife gives an example of a lesson plan produced by Aikenhead and Jegede.

EDU CURA 158

Ezeife, A. (2003). "Using the Environment in Mathematics and Science Teaching: An African and Aboriginal Perspective." International Review of Education **49**(3/4): 319-342.

A strong case is made in this paper for the effective utilization of the learner's environment for science and mathematics teaching in Africa, rural and aboriginal societies. Dwelling on the rich cultural heritage of indigenous, traditional and rural settings, the paper attempts to explain why, and show how this heritage can be advantageously tapped and transferred to modern day mathematics and science classrooms and laboratories. The need for the integration of school science and mathematics with the lived experiences of learners in indigenous cultures where factors such as folklore, myths, legends and taboos play powerful roles is also discussed. Integrating the environment into school teaching/learning, the paper argues, would contribute to an effective mathematics-science-environment society interaction. Additionally, the approach could boost enrollment and performance in mathematics and science for students from indigenous cultural backgrounds, many of who shy away from these areas of study in present-day school (abstract from article).

Ezeife proclaims that the low enrollment and poor performance in science and mathematics may be attributed to the nature of the curricula in these subject areas, current methods of

teaching, issues related to border crossing/collateral learning, indigenous learning styles and matters relating to relevance, application and transfer of knowledge (Ezeife, 2003, 324). After addressing reasons or explanations for low aboriginal achievement and attendance in science and mathematics, Ezeife turns his attention to describe ways that may remedy the problem. Such include enriching the curriculum, modifying teaching methods so that they move towards being more integrative (holistic), utilizing familiar everyday objects and illustrations, and making science and mathematics relevant to indigenous culture. Such suggestions attempt to boost enrollment and performance in mathematics and science for students of aboriginal descent.

EDU CURA 111

Fisher, D. and B. Waldrip (1999). "Cultural Factors of Science Classroom Learning Environments, Teacher-Student Interactions and Student Outcomes." Research in Science and Technology Education **17**(1): 83-96.

The purpose of this article was to develop an instrument to assess culturally sensitive learning environments, to provide initial validation information in the instrument and to examine associations between teacher-student interactions, students' perceptions of their culturally sensitive learning environment, and their attitudes towards science and enquiry skills.

EDU CURA 30

Fleer, M. (1997). "Science, Technology and Culture: Supporting Multiple World Views in Curriculum Design." Australian Science Teachers Journal **43**(3): 13-19.

This paper specifically looks at the ways in which the curricula for science and technology have been created and how they are mindful to differing cultural viewpoints. Fleer asserts that moving between worldviews creates high-level thinkers; therefore, it is crucial that various worldviews are introduced within early childhood years. Fleer also argues that by knowing more about the various types of knowledge construction in science and in technology we will begin to understand the range of views expressed by children--as situated in the context of their culture.

Although this article focuses on the Australian curricula, its message is quite relevant to the aboriginal situation in Canada. Fleer points out that as individuals, we are enculturated into our designed environment. However, as Fleer argues, we should be encouraged to question the cultural design of our educational curriculum. Once we begin to question and deconstruct it, it will be evident that a Eurocentric worldview dominates.

EDU CURA *7*

Fleer, M. (1999). "Children's Alternative Views: Alternative to What?" International Journal of Science Education **21**(2): 119-135.

Fleer asserts that science education in the Australian education system fails to acknowledge and include Australian aboriginal worldviews and that although the curricula has recently been developed in mind of Aboriginal science, it has nevertheless been constructed within a Western science framework. Fleer argues that the national curriculum needs to be reassessed and that aboriginal science needs to be more inclusive in the new curricula.

EDU CURA 212

Friedel, T. (1999). "The Role of Aboriginal Parents in Public Education: Barriers to Change in an Urban Setting." Canadian Journal of Native Education **23**(2): 139-225.

The author was invited by a group of Aboriginal parents to conduct a study exploring the conditions of schooling for their children in a specific public urban setting. Taking a holistic perspective she focused her study on examining the role of parents in that system. Specifically, the research describes the process of working with Aboriginal parents as they

attempt to forge a new relationship with an existing structure. Their lack of success is evident. The research aims to provide an understanding about the process of change as it relates to Aboriginal parents and urban public school systems (Abstract of article).

EDU CURA 209

Fuzessy, C. (2003). "An Investigation of Teachers' Role Defintions in Nunavik." Canadian Journal of Native Education **27**(2): 195-207.

This study examines perceived teacher role definitions in educating Inuit students in Nunavik. Recent work in Aboriginal, critical, and anti-racism education, along with the Cummins model, build on poststructural theory and constitute the conceptual framework of this research project. The methodology includes individual interviews, short-answer questionnaires, and Likert-scale questionnaires completed by a group of former Kativik School Board members. The data suggest that teacher role definitions may have both positive and negative effects on Inuit students through their classroom and community interactions (Abstract of Article)

This study shows that there exists potentially negative effects when non-Inuit, non-culturally-inclined, teachers instruct Inuit students. The author suggests that, perhaps, more elaborate cross-cultural training, training in Inuit pedagogy, mentoring of non-Inuit teachers and Inuttitut language and culture classes for non-Inuit teachers could help reduce cultural dissonance in the non-Inuit teaching force. Cultural dissonance on its own is not a negative entity. It is rather a process of coping and coming to terms with cultural dissonance that appears to affect the interactions between non-Inuit teachers and their students and host communities.

EDU CURA 203

George, J. M. (1999). Indigenous Knowledge as a Component of the School Curriculum. What is Indigenous Knowledge: Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 79-94.

The chapter begins with an exploration of the concept "indigenous knowledge." This is followed by a brief overview of some forms of expression of indigenous knowledge and some of the areas in the school curriculum in which indigenous knowledge can have an impact. The possible impact of science education is expanded upon and some pedagogical issues are discussed.

The author makes a distinction between indigenous knowledge and school knowledge: (1) Indigenous knowledge is not generated by planned procedures and rules. Instead, it draws upon solving daily problems by drawing on existing societal wisdom and other local resources and uses a large amount of intuition and creativity; (2) Indigenous knowledge is typically passed on from one generation to the next through oral interaction; (3) With few exceptions, indigenous knowledge is not typically found in the school curriculum. The author notes that students who have had far more exposure with school knowledge than their parents, display some ambivalence to indigenous knowledge. However, children growing up in a community that is rich in indigenous knowledge must be influenced by it and there is some evidence to support the view that children bring conceptions from their indigenous knowledge/ backgrounds to formal classes in school.

The author notes that whatever form the indigenous knowledge exists, it has the potential of impacting the teaching/learning situation in significant ways. Since this knowledge arises directly out of a child's real life experiences, its incorporation into school work can serve to motivate students as they begin to see that recognition is given to what they do and say in their communities. The process of incorporating indigenous knowledge into the classroom is not simple. The main hurdle to overcome, that is identified in the text, is the fact that indigenous knowledge is not normally "packaged" as school materials are. The teacher

must, therefore, access the indigenous knowledge, then understand it and its likely relation to what is to be taught in school. Furthermore, s/he must devise teaching strategies to incorporate it successfully. This is a major challenge for some teachers.

There are four categories that the author identifies regarding indigenous knowledge from Trinidad and Tobago and conventional science. With an understanding of the categorization of indigenous knowledge with respect to conventional science, the science teacher would be better positioned to plan effectively for science classes.

Category 1: Indigenous practice can be explained in conventional science terms

Category 2: Conventional science explanation of indigenous knowledge seems possible, but currently unavailable

Category 3: A Conventional Science link can be established with the indigenous knowledge, but the underlying principles are different.

Category 4: The indigenous knowledge cannot be explained in conventional science terms.

Because some students confront indigenous knowledge in their communities, it is important that this knowledge be valued into the school curriculum and incorporated into the teaching/learning process. "With specific reference to the teaching of science, it is important that science teachers first understand the relevant indigenous knowledge, both at the level of concepts and principles and at the level of the pre-suppositions that guide action. This would equip them to plan and employ teaching/learning strategies in science that highlight and value indigenous knowledge, that lay down similarities and differences between indigenous knowledge and conventional science, and that empower students to evaluate both systems and make informed choices" (1999:90-91).

One issue that further needs to be explored is the way that indigenous science may be incorporated into the science curriculum. George recognizes that, in most primary and secondary science, students are introduced to concepts which will serve as building blocks for concepts to be studied at the upper secondary level and at university. This often only benefits a small percentage of students who will continue to study science, but hardly anyone else.

Things that are authentic or based upon life experiences are not included in the conventional science curriculum. This is unfortunate, as lessons made relevant would perhaps be more of interest to aboriginal students and would motivate them more. The author also recommends more training of preservice teachers with aboriginal societies so that they may gain an understanding of the aboriginal worldview and how it diverges from conventional ways of thinking. The author further states that there is a need to highlight, in science teacher education programs, that conventional science is one way of thinking. Teacher trainees need to be encouraged to develop an understanding of, and appreciation for, the traditional wisdom, its characteristics, and the purposes that it serves in the lives of students. The teacher trainee needs to be trained to deal with complex situations in the classroom in the attempt to make conventional science accessible to students, while tapping into indigenous knowledge at the same time.

The author concludes by stating that: "the ultimate goal is to facilitate the empowering of students with an indigenous knowledge base to understand and evaluate what conventional science has to offer, and to make judicious choices between their indigenous knowledge and conventional science when such situations arise" (1999:92).

EDU CURA 234

Goddard, J. (1993). "Band-Controlled Schools: Considerations for the Future." Canadian Journal of Native Education **20**(1): 163-167.

Goddard asserts that Indian education in Canada has developed through four distinct phases. The latest, band controlled schools, is analyzed in discussed. The hypothesis is advanced that band controlled schools, while a necessary development in the 1970s, may no longer be appropriate. It is suggested that a fifth phase of Indian education, that of **establishing partnerships with provincial school boards**, should now be considered. The four stages discussed are: pre-European settlement, the era from Confederation to the late 1960s, a transitional phase and the present. The article suggests that there are three directions in which Indian education can continue to grow. One of these directions, the establishment of closer links with the provincial system, is explored. The author talks about how membership on local school boards of trustees and on school boards, cultural awareness for all non-Native teachers, the influence on teacher evaluation, curriculum development, staff recruitment and hiring, the establishment of school goals and policies, and the review and revision of administrative and operational procedures would lead to aboriginal empowerment and control over their education. Band controlled schools are not the answer, Goddard asserts. Rather, getting First nations involved and partnering bands with school boards is an adequate and positive solution.

EDU CURA 106

Gough, A. (2002). "Mutualism: A Different Agenda for Environmental and Science Education." International Journal of Science Education **24**(11): 1201-1215.

This paper discusses the history of the relationship between science education and environmental education in Australian and international contexts and argues that --given the on-going resistance to environmental education in schools, the static nature of science education practices, and decling student interest in studying traditional science subject--it is time to reconsider the relationship. If we are to achieve sustainable development, then science education must have a role in encouraging ecological thinking. However, the science education that can be an appropriate "host" for environmental education is not necessarily currently practiced, but a reconceptualized form could well be what is needed. From a historical perspective, this paper suggests that it might be time to reconsider science education's function as a "host" for environmental education and try to imagine a more mutualistic relationship. The author argues that environmental education might be an appropriate emphasis for rekindling student interest in the sciences because young people are concerned about the state of the environment. Thus, to make it relevant to students will elicit more participation in the sciences. The curriculum in Australia is found to minimize environmental content in the sciences and this is the leading reason why environmental education is not emphasized adequately. If science education was mutually respectful of environmental education then environmental studies would be better inclusive in the curriculum.

EDU CURA 21

Goulet, L. (2002). "Connections and Reconnections: Affirming Cultural Identity in Aboriginal Teacher Education." McGill Journal of Education **37**(3): 355-370.

This article introduces a cultural camp where, through interaction with elders and the land, students were able to reconnect to their past, connect with others in the present and develop a positive vision for the future. Indian outdoor education courses are offered in Saskatchewan with the aim of providing students the opportunity to experience culturally authentic education out on the land (Goulet, 2002). This article focuses upon the importance of elder teachings and the advantages of such in a culture camp. Such a cultural camp reinforces the cultural identity of aboriginal students though culturally appropriate connections with the land and Elders. The fundamental importance of these camps is the connecting and reconnecting through the elders and producing a sense of

identity to children since cultural teachings are the foundation of First Nations people identity.

EDU CURA 191

Grant, A. (1995). The Challenge for Universities. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 208-223.

This article focuses upon Special Native Teacher Education Programs (TEP) that are offered across Canada. TEPs are not institutionalized; these training programs are offered outside of the university setting and geared towards those who cannot financially afford an education. The TEP system, it seems, shifts away from institutional policy. It attempts to incorporate an aboriginal ideology, whereas universities are predominately westernized. The TEP programs tap into native culture. Some programs are community-based which gives students a chance to receive at least part of their training and fieldwork in traditional settings. So, although the TEPs must adapt to university standards and expectations, they provide students with opportunities not found in a university setting. Elder wisdom is the core of Native education. This is where a dichotomy persists between the TEPs and universities. "White middle-class society devalues the elderly. Knowledge that is respected by formal institutions comes only from within their own ranks" (1995:213). Consequently, a gap exists between the two institutions regarding the importance of Elder knowledge. A project that has resolved this problem is the Bear Lake/Stevenson Island Project. Through this project, elders assessed and evaluated the students according to standards and criteria pre-set by the university. The author also introduces a successful model of evaluation by Jake Redekopp of the University of Manitoba. There are several similarities between this theory of evaluation and Native educational philosophy and cultural values. The author addresses what these similarities are near the end of the chapter. The author suggests that universities should adapt to Redekopp's model of evaluation. Although this would be a very difficult undertaking, the author states that it may be more realistic to merge elder and university wisdom together, so that both works simultaneously together, rather then allow them to reside in complete opposition.

EDU CURA 94

Haig-Brown, C. (1994). Making the Spirit Dance Within. Exemplary Schools and Best Practices. CERIS. Saskatoon, Sask., CERIS. **2003**.

Goals, objectives, mission statement and philosophy of Joe Duquette High School. Joe Duquette High School is an alternative school for native students that was created in 1981. Joe Duquette was from the Mistiwasis Reserve and was the first Elder of the school, dedicated to building relationships between students and staff. (More information about Joe Duquette school found at: *EDU CURA 190)*

EDU CURA 168

Haig-Brown, C. (1995). Taking Control: Contradiction and First Nations Adult Education. First Nations Education In Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 262-287.

Haig-Brown identifies several contradictions that exist within a Native Education Center (NEC) in Vancouver: relationships between First Nations and non-Native society; relationships between success; accompanying growth and increasing bureaucracy; relationships among an urban diversity of First Nations; and the notion of "cultural self-hatred." Very importantly, the article identifies that struggle is integral to development. Haig Brown states that, "the fact that transformative work is often fraught with conflict must be recognized as productive aspect of that work, not as a personal shortcoming" (1995:262). This is what the author defines as dialectical contradiction: it allows for acceptance of conflict as a central aspect of development and, by implication, not as a personal weakness. The conflict of the NEC centered around the disparing commitment to develop awareness and understanding of students' Aboriginal origins and to find

improved opportunities for advanced education or employment in a society often indifferent to and at times actively destructive of First Nations cultures. Haig-Brown asserts that contradiction is necessary in order to elicit control: contradiction allows First Nations to name the tension with which they live and acknowledge that the discomfort inherent in this kind of work is an essential aspect of it not a personal deficiency. Because contradiction is "he essential and continuous principal in the development of all things," contradiction should not attain a negative connotation. Instead, contradiction allows to look at the process of a thing's 'becoming' -there is recognition that even as a thing exists, it is changing and change is essential to existence. So, the NEC exists because it is always evolving; taking control is a process, based on fluidity and changing with everyday.

The main contradiction of the center is its main purpose: it is an institution that simultaneously prepares First Nations people who want to participate in an exclusionary, majority non-native society while attempting to enhance and develop their awareness and appreciation of their First Nations' culture and heritage (1995:266). This is where tension essentially develops: a conflict of values. Those who participate in the center obtain central Native values. Those non-Native funding agencies, prospective employers, educators and others in control in society may know or understand little of these values. Consequently, a struggle between worldviews exists. First Nations people wish to be involved in the institution, but also desire to be involved in the world outside of the center, where misunderstandings exist about First Nations people, the center and aboriginal values.

EDU CURA 194

Hampton, E. (1995). Towards a Redefinition of Indian Education. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 5-46.
Hampton provides an extensive look at aboriginal education in North America. When he defines what Indian education essentially is, he states that "for most Indian students, now as in the past hundred years, Indian education means the education of Indians by non-Indians using non-Indian methods" (1995:6). He states that far too few Indian students have contact with Indian educators who are attuned to their culture and who can serve as models of educational achievement, which is something that has been explored and re-stated by many authors. Hampton proclaims that the education system is not an opportunity for eliciting hope and self-esteem amongst aboriginal students. Rather, the education system promotes aboriginal cultural, spiritual, and psychological genocide. Indian education, according to Hampton, has five different meanings. They are as follows: (1) traditional Indian education; (2) schooling for self-determination; (3) schooling for assimilation; (4) education by Indians and; (5) Indian education sui generis "a thing of its own kind." Hampton then addresses the fact that there fails to be a theory of Indian education. This means that what constitutes as Indian education is a subjective entity (meaning that what is most effective as education is determined by only a select handful of stakeholders involved). Using interviews with Native graduate students at Harvard, existing literature, and his own experiences, Hampton makes explicit themes that an Indian theory should truly encapsulate. From this, he suggests that an Indian theory should address the following:

(1) Spiritual concerns
(2) Indian styles of thought and communication
(3) Indian features and skills relevant to non-Indian societies
(4) Historical analysis of Native education
(5) An aboriginal cultural atmosphere permeated by both strong group bonds and great individual freedom
(6) service-orientated

Hampton then suggests that effective Indian education must address the six-directional patterns

that are similar to that of the pipe ceremony: first to the spirit, then to the east, then to the south, then to the west, then to the north and then to the earth (Refer to diagram, 17). The six directions are not a model but a pattern or an organizing principle. Each direction obtains individual themes and standards that should be incorporated into an aboriginal education.

Spirit
- spirituality
- service
- identity
- affiliation
- freedom

East
- Spring
- Identity
- Culture
- Diversity

South
- Summer
- Affirmation
- Freedom
- Tradition
- Respect

West
- Fall
- Education
- Service
- History
-Relentlessness

North
- Winter
- Education
- Culture
- Vitality
- Struggle
- Conflict

Earth

- Place
- Affiliation
- Transformation

From the interview data, Hampton coded the information into eight categories: place, identity, spiritual, culture, affiliation, education, freedom and service. In the last sections of this chapter, Hampton organizes the eight categories and discusses the interview data in relation to the six-directional patterns, integrating his own experience and other authors' discussions of Indian education. From these interviews, Hampton suggests twelve standards for education that addresses a theory of Indian education. Briefly, they are as follows:

(1) **Spirituality** - at its center is the respect for the spiritual relationships that exist between all things. Education starts with prayer, standing in the center of the world and looking towards the sky.
(2) **Service** - education is to serve the people. Its purpose is not individual advancement or status (such as western education). Aboriginals value group success through individual achievement and not solely individual success as western cultures.
(3) **Diversity** - multiplicity, diversity, tribalism, and community-based education point to the active implementation of diverse cultures.
(4) **Culture** - Indian cultures have ways of thought, learning, teaching, and communicating that are different from, but as valid as, those of white cultures.
(5) **Tradition** - Indian education maintains a continuity of tradition, which define and preserve aboriginal communities.
(6) **Respect** - Indian education demands relationships of personal respect
(7) **History** - Indian education has a sense of history and does not avoid the hard facts of the conquest of America
(8) **Relentlessness** - Indian education is relentless in its battle for Indian children. The battle is not between Indians and whites but between which honors life and that which does not.
(9) **Vitality** - Indian education recognizes and nourishes the powerful pattern of life that lies hidden within personal and trial suffering and oppression.
(10) **Conflict** - Indian education recognizes the conflict, tensions, and struggles between itself and white education as well as with education generally.
(11) **Place** - Indian education recognizes the importance of an Indian sense of place, land and territory. It is clear that a uniquely Indian place promotes involvement rather than isolation or segregation.
(12) **Transformation** - Indian education recognizes the need for transformation in relations between Indian and white as well as the individual and society.

EDU CURA 219

Hanohano, P. (1999). "The Spiritual Imperative of Native Epistemology: Restoring Harmony and Balance to Education." Canadian Journal of Native Education **23**(2): 206-226.
This article examines the spiritual imperative of Native epistemology with the aim of developing a holistic model that integrates culture and education. The study is not meant to denigrate Western society, or pass judgment on Western education, but to point out that even its ardent supporters denote a crisis. The article states that the core of Native epistemology is: the Sacred Circle, Mother Earth, and Elders. They interrelate and interconnect with each other.

In the section labelled 'epistemology', the author claims that epistemology is the study of nature and the attainment of knowledge, which is holistic, and encompasses the intellectual, emotional, physical, and spiritual realms. Calls for reforming the educational systems to better meet the needs of Native students always include Native culture and language. The most distinguishing feature of Native culture and language is spirituality; however, this aspect of native culture is often missed, neglected, or dismissed in Western forms of education. Spirituality is the fundamental principle that Natives have been searching for in their university experience. It is the search from within that will help give aboriginals and other students the harmony and balance that is needed to meet the demands and rigors of university study and lead them to discover their true selves.

The journey toward harmony and balance in Native education begins with the sacred circle. The Circle of Life thus speaks to the interconnectedness and interrelationships of all life. All are looked on as being equal and interdependent, part of the great whole, and this view permeates the entire Native vision of life and the universe. Mother Earth speaks to man's connection to tribal territory and the earth; Native education also encompasses the importance of elder knowledge. The three areas that the author believes that elders are

especially attuned to include stories, ceremonies and values. The Elders bring this knowledge and teachings home to the community and more especially to the children.

Therefore, in his discussion of the incorporation of native epistemology into western education, the author exemplifies the importance of spirituality and how it is prevalent in Native culture. Aboriginal spirituality includes the Sacred Circle, Mother Earth and Elder knowledge. The author claims that if education is truly to be transformed for Native people, then the challenge for our institutions, and for educators, is to find ways for these practices and beliefs to become a normal part of the educational experience.

EDU CURA 210

Harper, H. (2000). ""There is No Way to Prepare for This": Teaching in First Nations Schools in Northern Ontario--Issues and Concerns." Canadian Journal of Native Education **24**(2): 144-157.

This article reports on a qualitative study of 20 female teachers working in two First Nations fly-in communities in northern Ontario. The issues or concerns of these teachers are grouped into five themes: (a) pedagogical goals and purposes; (b) relationship to the community; (c) living in the North; (d) teaching in the North; and (e) teacher education. The findings suggest that more intensive preservice and inservice teacher education programs that focus on the relationship of teachers to First Nations communities and to cross-cultural and multicultural teaching with particular reference to the teaching of English as a second language are needed to prepare educators better for work in the North. The article concludes with a series of questions intended to provoke further discussion of, and more critical planning for, the professional development of teachers employed in remote northern communities.

EDU CURA 129

Harris, H. (2002). "Coyote Goes to School: The Paradox of Indigenous Higher Education." Canadian Journal of Native Education **26**(2): 187.

This article explores the contradictions involved in teaching Native Studies or First Nations studies in Western educational institutions that require us to teach in decidedly non-Aboriginal ways. If we use the kind of experiential, holistic learning techniques that are typically used in indigenous communities, our courses and programs are labeled as unscholarly and frivolous by the more "Academic" programs. The article outlines how as an Indigenous educator I try to negotiate a space in the academy and concludes with one of our most effective teaching tools: A Coyote Story.

EDU CURA 44

Henchey, N. (2001). Schools that Make a Difference: Final Report. Twelve Canadian Secondary Schools in Low-Income Settings, Society for the Advancement of Excellence in Education: 1-79.

This report is the analysis of a two-year study of twelve urban public schools in BC, Alberta and Quebec. The purpose of this study was to examine the inner workings of secondary schools in low-income settings that create high achievement for their students. The final report begins with an overview of the study and a brief synopsis of recent school effectiveness and improvement literature. The characteristics of the set of schools and a brief portrait of each school are provided in Chapters 3 and 4. This is followed by an analysis of the patterns and behaviors found in the sample. Chapter 6 offers broader reflections on some of the perplexing challenges confronting contemporary schools in preparing all young citizens for successful participation in the global economy and democratic society. The implications of these findings are explored in the final chapters with a set of recommendations provided for policy makers and practitioners.

The report shows those schools, which create high achievements among their students demonstrated

the following characteristics:

(a)Positive attitudes and high expectations of their students
(b)Strong and vigilant administration
(c)Focused on academic achievement and other indicators of success and student needs
(d)Recognition of the need to be accountable for performance, and to be innovative if the future of the school is to be assured
(e)Regular analysis of results and linkage of results to school planning and activities
(f)Integrated planning and co-ordination of efforts to improve performance
(g)Importance placed on good teaching and professional development
(h)Sense of engagement and belonging among teachers and students and commitment to the basic mission and core values of the school
(i)Respectful, secure school climate and warm relationships
(j)Initiatives to motivate students and make learning relevant
(k)Structured classroom instruction and "traditional" standards of behavior
(l)Assistance and support for both students and teachers
(m)Variety and flexibility of structures, programs and services

EDU CURA 193

Hesch, R. (1995). Teacher Education and Aboriginal Opposition. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 179-207.
"This case study revolves around the experience of a group of aboriginal interns. The article illustrates the ways in which a state strategy intended to accommodate preservice teachers to schooling as usual-- a schooling which systematically excludes many aboriginal students--is resisted by at least some of the interns. The study illuminates the sources of the stresses and contradictions experienced by the interns and documents the ways in which the internship attempts to homogenize the process of becoming a teacher in Saskatchewan. The study also elaborates on some of the sources of resistance mounted by students to conventional schooling practices and, in particular, the administration and content of the internship. Resistance is facilitated, in part, because interns pass from educational sites where the progressive principles of democracy, child-centered education, critique, contextualized social analysis, and cooperative work are encouraged for ideological reasons to sites where work is essentially undemocratic, the value of student agency is diminished or unrecognized, social and political dimensions of school are hidden by positivist and functionalist discourse and possessive individualism is taken as common sense for ideological, if less explicit, reasons" (1195:179/80).

EDU CURA 31

Hewitt, D. (2000). "A Clash of Worldviews: Experiences From Teaching Aboriginal Students." Theory into Practice **39**(2).
The article begins with a contrast between Eurocentric and aboriginal worldviews and their implementation in the Australian education system. The aboriginal world is found to be more interactional in contrast with the transactional world of the European. Rather than neglecting aboriginal worldviews into the curriculum, the author suggests that inclusion and two-way schooling is necessary. He provides various ways to rectify the lack of aboriginal perspectives in the school curricula so that their beliefs and languages are better represented.

EDU CURA 144

Hill, F., O. Kawagley and R. Barnhardt (2001). AKRSI Holds Forum on Culturally-Responsive Curriculum. Sharing Our Pathways: A Newsletter of the Alaska Rural Systemic Initiative. Anchorage. **2004**.
This section of the *Sharing our Pathways* newsletter addresses the forum on culturally responsive curriculum that was sponsored by the Alaska Rural Systemic Initiative (AKRSI).

The focus of the curriculum forum was to take a look at how education programs and services can best be positioned to push curriculum development efforts beyond just developing more culturally-appropriate units and exploring what a broader culturally-responsive curriculum "framework" might look like. This article concludes with an overview of the recommendations made at the forum and specific steps that could be taken to obtain these.

EDU CURA 95

Hill, M. (2002). Learning Off the Land. Nunatsiaq News. Nunavut. **2003**.

Website reflects an outdoor education/ environmental camp that emphasizes the significance of Inuit elder cultural and land knowledge. This camp is held outside of Iqaluit on Frobisher Bay and lasts for approximately two weeks, focusing on traditional Inuit skills with an eye to specific scientific instruction.

EDU CURA 238

Hills, G. (1989). "Students' "Untutored" Beliefs about Natural Phenomena: Primitive Science or Commonsense?" Science Education **73**(2): 155-186.

Hills raises the issue of how pupils' untutored views are to be interpreted. Worldviews differ in important ways from currently accepted scientific concepts and theories, and they may be responsible for certain obstacles or barriers when attempting to understand science. Studies conducted in the field suggest that ideas or views differ from those science education is committed to foster. A number of important questions must be taken into consideration by educators as a result: what are we to make of these views and what relevance, of any, do they have to the framework of ideas into which science education strives to initiate? Nevertheless, a more careful examination of this literature has revealed that behind these terminological differences and associated differences in perspective lies something much more fundamental: namely, a fairly pervasive, though frequently unstated, commitment to the assumption that the untutored views youngsters bring to science instruction can be interpreted as science - at least in some embryonic sense.

EDU CURA 33

Hodgson-Smith, K. (2000.). Issues of Pedagogy in Aboriginal Education. Aboriginal Education: Fulfilling the Promise. L. D. Marlene Brant Castellano, Louise Lahache. Vancouver, UBC Press: 156-169.

This article focuses upon the issues of pedagogy in aboriginal education, particularly focusing upon the ill-defined "aboriginal learning style." The author suggests that aboriginal children bring their own learning style into the classroom and that, consequent of contrasting learning styles from non-aboriginal students, they tend to be less successful in the western educational setting. The author then suggests that although evidence exists of an aboriginal learning style, it is incorrect to assume that aboriginal people have one unique learning style that is static overtime and place. LS research should not look at differences between groups, but rather differences within groups. LS aboriginal research suggests that all aboriginal learners cannot succeed in the Eurocentric school environment. However, the author points out that "in alternative and supportive environments we may observe a range of styles, with place and time being seen as relevant factors. LS research on aboriginal students is probably representative of the LS of all learners who enter a new culture, a foreign environment and/or antagonistic environment" (Hodgson-Smith, 163). Therefore, the author is suggesting that although aboriginal students have a unique learning style that is highly influenced by child-rearing practices, it is the learning environment that elicits successful learning. She states: "LS research should not be considered in isolation from other elements of pedagogy. The failure to acknowledge the oppressive impact of school environments and to see LS within that context is a likely result of a fragmented approach to investigating aboriginal learning. It is not surprising that many Aboriginal educators have turned their attention to creating whole learning

environments that are infused with Aboriginal values both in terms of curriculum and in terms of pedagogical processes" (Hodgson-Smith, 164)

Significant to curricula development with an aboriginal focus, we must take into consideration some of Hodgson-Smith's findings regarding aboriginal learning style, although we cannot simultaneously forget that a comfortable and supportive learning environment is essential. Hodgson points out that traditional culture and childrearing practices influence the development of an LS. Aboriginal students tend to prefer learning through observation and manipulation of examples and their best learning tends to be supported by the visual interpretation of presented materials. This is affiliated with observing and imitating actions of elders as young children. "Use of imagery when processing information, possibly reinforced by cultural conditioning, is identified as a much preferred LS of aboriginal students" (Hodgson-Smith, 160). Additionally, aboriginal students are identified as field-independent, perhaps consequence of living style and child-rearing practices. Studies have also found that aboriginal students have a preference for visual aids and prefer to follow a model or learn by observation. Hands-on experience, oral tradition in the classroom, storytelling and extensive examples seem to be effective learning strategies (Hodgson-Smith, 161). Furthermore, the author argues that testing needs to be done in aboriginal language as standardized tests are not accurate indicators of ability.

EDU CURA 232

Hodson, D. (1993). "In Search of a Rationale for Multicultural Science Education." Science Education ***77***(6): 685-711.

The awareness of the influence of sociocultural factors on the history and development of western science can be used to question some traditional assumptions about rationality and objectivity and introduce some intriguing questions about alternative sciences rooted in different ideological values and criteria of validity.

Recognition that science and technology are culturally determined allows one to determine the priorities in scientific practice and the societal values that are established to maintain them. The author claims that by illuminating the ways in which science and technology are culturally-determined, science education can play a crucial role in eliminating racism.

This article may not be relevant to the Education Stream of CURA, per se, but does support the argument that science is culturally-laden and that a multicultural education may alleviate racism in school and work towards being more humanitarian and culturally-sensitive.

EDU CURA 161

Holliday, W. G. (1994). "The Reading-Science-Learning-Writing Connection: Breakthroughs, Barriers and Promises." Journal of Research in Science Teaching **31**(9): 877-893.

The article establishes a broad framework from which to interpret and evaluate the reading-science learning writing connection. The presentation of breakthroughs, barriers, and promises is intended to outline the established links between, to identify current bottlenecks in thinking about, and to highlight productive inquiries into, print-based languages and scientific understanding. The ideas presented come from various disciplines connected to science education (Abstract of article)

EDU CURA *77*

Hookimaw-Witt, J. (1998). "Any Changes Since Residential School?" Canadian Journal of Native Education **22**(1): 159-170.

This report discusses why current education practices are not able to empower aboriginal people and how modern education systems are not aimed to improve native drop-out rates. This article emphasizes that by giving aboriginals the power to decide the content of what is taught will significantly improve the quality of life for aboriginal people. The

author proclaims that the situation First Nations are in is partly due to that very "education," which, as a continuation of residential schools, is still breaking down native cultures and societies. Education for Native people can be successful only when it has grown within the culture of the people. The author therefore advocates establishing a combined education where aboriginals see "white" culture from their own perspective so that this Eurocentric culture is not enforced forcefully upon them.

EDU CURA 29

Hudson, A. (2003). "Multicultural Education and the Postcolonial Turn." Policy Futures in Education **1**: 381-401.

Hudson proclaims that the educational system stems from the era of European colonialism and has been modified during this era of decolonization. Multiculturalism and postcolonial thinking has challenged the historic curricula as in most societies, schooling has become influenced by cultural diversity. The author introduces a concept called the "interculturally proactive school" whereby teachers design and implement programs and strategies to promote intercultural understanding and inter-relationships. Such decolonizes the school. The author than introduces the four new interdisciplinary areas of learning introduced in the Australian curricula: life pathways and social futures, multiliteracies, numeracies and communications media, active citizenship, and environments and technologies. She states: "postcolonial teaching involves helping students to identify and critique the different 'regimes of truth' that characterize our social arrangements and to build positive identities that move easily between the local and the global. Changes in the pre-service and in-service education of teachers are necessary to underpin this kind of educational transformation" (Hudson, 2003, 398). The issues discussed in this article may also apply to the Canadian curricula consequent of the presence of an abundance of diverse cultures inhabiting this nation-state's boundaries.

EDU CURA 195

James, K. (2001). Fires Need Fuel: Merging Science Education with American Indian Community Needs. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 1-10.

This introductory chapter provides an overview of the chapters that follow and, additionally, addresses that a problem of low achievement levels amongst aboriginal students exist across North America. The chapters are based upon papers that were presented at a conference held ad Colorado State University in June of 1997. The theme of this conference was finding ways to integrate Indian community goals, needs and traditions with mainstream science and science education. James, who is both the book editor and author of the first chapter, begins by stating that the results of a survey completed by First Nations living across Canada in 1995 showed that the single most pressing issue for community development was the failure of education systems to teach the skills Indian communities need. Referring to a statement made by Gwich'in band member, "there is recognition that skills are needed but also recognition that degrees do not necessarily translate into skills that are effective for Indian communities" (2001:1). James asserts that problems with Indian educational achievement are rooted in a combination of several community-level factors: economic roots, such as high unemployment levels, even for those who are educated; physical conditions of the communities, such as poor infrastructure and equipment; socio-cultural roots, such as family and community problems that weigh down many First Nations students; and institutional or programmatic roots, such as a history of educational materials and systems that are culturally inappropriate at best and assimilationist at worst. Each of these community problems are influenced by poor educational achievement among First Nations people. For example, economic problems may have their external and historical sources, but they have often been made worse by poor financial and resource management and by the inability of tribes and individuals to capture existing economic opportunities and to initiate enough

new ones. Therefore, what is required to alleviate these problematic roots is, therefore, better knowledge and skills of band members. And, although family, social and cultural problems in Indian communities and schools began with the Canadian government and societies, they have been partly perpetuated and exacerbated by Indians' inability to develop systems and strategies for countering negative external influences and marshaling internal strengths to meet the demands of new times.

There are strong links among culture, self-governance, health, economics and education. Therefore, efforts to upgrade these different facets of Indian life must be pursued together if any are to succeed. Education can strengthen rather than weaken communities, but only if implemented differently. James then goes on to discuss ways in which education can assist in all of the problematic roots discussed. He concludes by stating that by incorporating cultural principles and aboriginal languages into education, success rates may increase. He laments that, despite the fact that some aboriginals get through standard mainstream education and achieve conventional success, culture cannot thrive because it is not part of the education system. Education should contribute to the continuity of Indian tradition to maintain, strengthen and celebrate it. One way in which communities can reach this goal of integration of education and community is by sharing information and ideas and learning from other communities. Some communities have attempted to integrate Indian educational initiatives with other issues. Therefore, perhaps by communities working together, new strategies and initiatives will elicit and integration will be successful.

EDU CURA 156

Jegede, O. (1997). "School Science and the Development of Scientific Culture: A Review of Contemporary Science Education in Africa." International Journal of Science Education **19**(1): 1-20.

Jegede argues that school science has been seen to promote a mythic textbook science rather than present the true image of science and reflect the real nature and outcome of scientific enterprise. Globalization is changing the face of science education, where western scientific and technological culture is being imposed upon traditional ones. Looking at rural Africa, Jegede states that the anthropomorphic, African mode of thought is being replaced by the mechanistic, Western mode and is, simultaneously, moving away from traditional worldviews that emphasized sacred science in the modern classroom. Jegede identifies five predictors of sociocultural influences on the learning and teaching of science: authoritarianism, goal structure, traditional worldview, societal expectations and sacredness of science. He then concludes that any western science curriculum in a non-western classroom environment which does not take particular consideration of the traditional worldview of the learner risks destroying the framework through which concepts are likely to be interpreted. He interestingly makes a comparison about a science lesson regarding rainbow making and how this opposes traditional African ideology and concludes that collateral learning is an effective way to make distinctions between the two worlds. Collateral learning means that it is possible to hold a scientific as well as traditional view of the world and not to be lost in between. Therefore, Jegede promotes collateral learning as a way to harness traditional African thought systems and Western science in order to develop an effective culture for Africa in the twenty-first century.

Consequent of globalization, science has become wrapped up by the need to use, appreciate and understand innovations and inventions resulting from science and technology. Jegede claims that all aspects of society will benefit from this knowledge. In Africa, science education must have meaning or relevance to the people. Jegede concludes that, "instilling scientific culture in a people who learn western science with a traditional worldview, must of necessity begin from their cultural attitudes towards, and local knowledge about, their environment" (Jegede, 1997, 17). Communities should be involved in a new type of science that is deeply rooted in their own culture. In other words, science should be made

relevant to the community. In order to compete in this new-age world, the continent of Africa must adapt new ways of thinking. Jegede states, "the continent of Africa must recruit all its resources for the popularization of science and the imbibition of the scientific culture" (Jegede, 1997, 17).

The author reviews and criticizes other authors who similarly address cultural border-crossings and scientific education.

EDU CURA 204

Jegede, O. (1999). Science Education in Northwestern Cultures: Towards a Theory of Collateral Learning. What is Indigenous Knowledge? Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 119-142.
This chapter is concerned with the effect of traditional worldviews (indigenous knowledge) on the learning of science through western worldview and how it affects cognitive processes within a situated context. Jegede suggests that the culture of a learner's immediate environment plays a vital role in learning, determining how concepts are learned and how they are stored in the long term memory through schemata. Collateral learning is taken up in the chapter to explain how non-Western learners attempt to cope with science learning within a classroom environment which is often hostile towards their indigenous knowledge. It is pointed out that although collaterality occurs in every society of the world, the interactions of the two or more worldviews in which the non-Western students learn complicate the learning process.

The chapter commences with a discussion of learning processes. Reflecting the work of Glasser, Jegede proclaims that the way students represent information given in a math or science problem, or in a text they read, depends upon the structure of their existing knowledge (1999:120). In other words, the meaning that each student attaches to his or her experiences of the environment is influenced by social and cultural factors. Jegede then asserts that there exists a strong relationship between prior knowledge, which is now recognized as central to memory and learning and sociocultural environment of the learner. According to Baker and Taylor , prior knowledge seems to be highly resilient in the face of traditional modes of instruction (1999:121). This means that prior knowledge may elicit unintended interpretations of what is being taught. Works of other authors indicate that "concept development in school science is influenced by social influences, especially students' socially-determined perceptions and predilections" (1999:122). In the case of a nonwestern learner in a western science classroom, the ecocultural norms surface through the epistemology of that culture and the meanings adduced to reality. This is why there exists a large gap between Western and nonwestern interpretation of reality with particular reference to school learning.

Table 1 (1999:125) reveals the differences that exist between African and Western systems of thought. Similar to First Nations in Canada, the African view is largely anthropomorphic. This worldview thus influences their thoughts, the way they do things, and the way that they relate to the community. Western systems of thought are opposite, being mainly mechanistic in nature.

Jegede then addresses the idea of collateral learning. Collateral learning, as defined by the author, represents the processes whereby a learner in a non-Western classroom constructs, side by side and with minimal interference and interaction, Western and traditional meanings of a simple concept (1999:130). In other words, the student lives in two domains and learns collaterally. Jegede uses the idea of rainbow making as an example of such collateral learning. Four types of collateral learning are discussed:

(1) Parallel Collateral learning - the learner acquires and maintains in the long-term memory

opposing schema about an idea or concept when learning new science concepts.

(2) Simultaneous Collateral learning - Ideas of two different worldviews about a particular concept are learned at the same time.

(3) Dependent Collateral learning - Occurs when a schema from a worldview is presented to challenge another from a different worldview to an extent that the declarative and strategic knowledge permits a learner to modify existing schemata (1999:134)

(4) Secured Collateral learning - knowledge or intellectual skill occurs through gradual and incremental acquisition instead of the all-in-one fashion as has been though of.

The different types of collateral learning are not necessarily too separated from each other. They are not to be viewed as compartmentalized but rather as a continuum within the purview of learning science concepts in a sociocultural framework. It should also be seen that a learner could be guided to progress from parallel through simultaneous and dependent to securing.

A review of research conducted over a decade into science teaching and learning in non-Western cultures with a particular reference to Africa, seems to indicate that the sociocultural background of the learner is central to learning and teaching. The non-Western worldview seems to cause a student to become involuntarily selective when making observations in a science classroom: knowledge learnt through school science and traditional environment are compartmentalized and drawn up to explain any phenomenon depending on the particular situation. Science teaching that does not take into consideration the culture of the learning risks destroys the framework through which concepts are likely to be interpreted (1999:135).

Recommendations made by the author include that:

(1) Teaching should not only recognize and respect the indigenous knowledge base of the learners, it should be tailored to begin from where the child is taking cognisamce of how they learn;

(2) Expert advice to government, NGOs, and research agencies become meaningful when they attempt to understand the indigenous knowledge base of learners within an educational system.

EDU CURA 68

John, D. (1999(c.)). Reconnections: Final Report: 121 pgs.

Damian John wrote this comic book style final report as a review of the Reconnections education pilot project, describing what worked and what did not work, and reasons for success/failure. This report provides insight into the education situation in Tachie, providing some recommendations that may work towards obtaining school success once implemented. Although the comic style makes this an enjoyable read, one quickly obtains the idea that something must be done in Tachie to get "things moving" in an educational sense.

EDU CURA 201

John, G. (2001). Trodding the Circle from Indian Community to University Research and Back. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 63-68.

John argues that, due to the formal education system and mass-media exposure, reservation children have lost the ability to speak their traditional language and the enthusiasm to be involved in traditional ceremonies. They have gotten caught up with the

mainstream view of how life should be and fail to realize that the things that happen in their lives can be understood through, and integrated with, traditional beliefs and practices.

Today, traditions have been seen as opposing the demands of modern life. Consequently, reservation children feel pressured to move away from traditions, but those who lack connections to tribal traditions often quickly begin to feel isolated from their communities, families and identities. They become lost and alone in life and suffer from it (2001:64). On the other hand, however, remaining involved with tradition can create problems for both Indian students and educators because of the investment of time and energy the traditional system takes. Indian children end up trying to decide how to operate in two systems that often, as they are organized now, conflict with each other. They also find that, if they continue to follow with tradition, it has to remain hidden during their work in mainstream education or mainstream organizations. Teachers, non-Indian students, and even some Indian students fear traditional systems because they do not understand them. This is something that children, who live on the reserve, have to endure (2001:64). They generally do not feel comfortable talking about these conflicts, which makes it hard for them to success in pursuing an education. This is perhaps is occurring in Canadian public schools today.

John suggests that it is crucial that we find ways to balance spiritual life and academic life for these children. He states, "we must show both Indians and non-Indians the benefits of balancing both sides: the spiritual and the scientific" (2001:65).

There are several ways that this balance could be achieved:
(1) Teachers, leaders, and parents act as role models to these children and act with integrity and consistency
(2) Recognizing diversity and honoring it.
(3) The visible presence of skilled resources (i.e. people) in the community

John also mentions a program called the Native Americans in Biological Science (NABS). This program essentially involves reaching out to K-12 students to try to interest them in biological science and to motivate them to succeed at it. Its main component is a summer science camp that uses an inquiry-based approach (2001:67). The program essentially helps students develop the inner strength that is necessary for success not only in school but also in life and in their communities. **When they develop that strength, it becomes possible to bridge Indian culture and Western education**. Most participants of the NABS program have been successful in school and have been involved in the sciences.

Similar to other programs, the NABS is funded by soft money, which is limited to federal or foundation grants. Therefore, maintenance of the program becomes a struggle.

EDU CURA 218

Jones, C. (2003). "Self-Management and Self-Direction in the Success of Native Literacy Learners." Canadian Journal of Native Education **27**(1): 45-54.

The M'Chigeeng Literacy and Basic Skills full-time program, M'Chigeeng First Nations of Manitoulin Island, Ontario, began in February of 1994. It was determined and agreed that this was not just an academic program; its purpose was to help learners become more aware of themselves, their skills, family dynamics, and community involvement. An awareness of the Seven Grandfather's Teachings of the Ojibway helped to identify the philosophies of the program. This article discusses these teachings and how they are incorporated into the program, how the overall program works, the Seven Grandfather's teachings, what self-direction and self-management mean, and a brief overview of the research that has been undertaken by the Ontario Literacy Coalition about the self-

management and self-direction domain.

There program reflects the principles of the Seven Grandfather Teachings. They are as follows:

(1) Respect
(2) Honesty
(3) Truth
(4) Love
(5) Wisdom
(6) Bravery
(7) Humility

The Seven Grandfathers' teachings and the wholistic approach to literacy is to ensure that learners leave the program with the four aspects of themselves more balanced. They had to balance the spiritual, mental, physical and emotional parts to become a whole person and be capable of meeting the goals they had identified. Wholistic program delivery incorporates self-management and self-direction within its framework naturally. By balancing the four aspects of the self, a learner obtains all of the necessary skills to succeed in personal, education, employment and community activities.

EDU CURA 1

Kanu, Y. (2002). "In Their Own Voices: First Nations Students Identify Some Cultural Mediators of Their Learning in the Formal School System." Alberta Journal of Educational Research **48**(2): 98.

This article addresses ways to enhance aboriginal school success so that aboriginal students are capable of participating in the economic life of their communities. The article suggests that by allowing band-controlled schools, hiring aboriginal teachers, using aboriginal language during instruction, and developing a curriculum based upon values, history, and traditions of Aboriginal peoples are all attempts to reduce the cultural discontinuity that are experienced by aboriginal students in the present school system (Kanu, 2002). Utilizing results from a case study, the author suggests several themes relating to cultural influences on aboriginal student's learning that could be implemented into the current curriculum of public education. These include: (1) Traditional aboriginal approaches to learning (2) Effective oral interaction between teacher and aboriginal students assist learning (3) Concepts of the Self (4) Curriculum Relevance and (5) Teacher's Interpersonal Style. The author recommends that practices to enhance participation and conceptual understanding of aboriginal students includes learning through stories, learning through observation and imitation, learning with the support of an integrated classroom community, and learning through visual sensory modes. Using fast-paced talk as a main vehicle for eliciting learning should be minimized as such teaching methods impeded upon student success. Concrete rather than abstract learning should be emphasized, and lessons should emphasize visual learning. Cooperative and collaborative group work should take place in the classroom and "curriculum materials and classroom teaching-learning processes must include aboriginal perspectives, histories, cultures, and successes and should nurture high aspirations for aboriginal students while also exposing them to non-Aboriginal curriculum materials." Lastly, a supportive environment should be emphasized.

EDU CURA 177

Kawagley, A. (2001). Tradition and Education: The World Made Seamless Again. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 1-173.

Kawagley reflects the Yup'ik culture and ways of learning and how such has changed consequent of the dominance of western thinking. Kawagley writes that "through the federal government and the mainstream churches have given their overt efforts to destroy

Yup'ik culture..." (Kawagley, 2001, 52). The author understands that the loss of culture has not been specific to the Yup'ik culture, but has been experienced by various tribes elsewhere. He then moves on to compare western and Yup'ik education systems and ways of learning. Although this article is quite short in length, Kawagley's point becomes clear: Yup'ik education must be emphasized and melded with western thought for its continued maintenance and survival. Kawagley asserts that this melding progression has already began. "Western thought is finally moving closer to traditional Native perspectives," and he uses the curriculum of Chaos as an example where western mathematics and science incorporate traditional ways of thinking. Kawagley additionally reflects upon the Alaska Rural Systemic Inititaive and the Alaska Rural Challenge and the attempt of rural school districts to integrate aboriginal perspectives into the curriculum.

EDU CURA 221

Kawagley, A. (2001). "Spirit, Knowledge, and Vision From our First Nations' Sages." Canadian Journal of Native Education **25**(2): 199-206.

Alaska is utilized as a framework for this article, although the situation is relative to aboriginal education in Canada. The author states that a transformation must take place in the education system, one that takes into consideration of tribal worldviews. In this context, such an education system would include Native languages, ways of generating knowledge, research, ways of making things and ways of using these things respectfully. Harmony, according to the author, can only be achieved when spirituality is made the community's common vision. Using the loon as a metaphor, the author tries to say that aboriginal education needs to tap into traditional ways of life and teaching. Aboriginal students do not need to depend upon western systems of knowledge to learn; rather, aboriginal students need to learn from their own traditional communities.

Using the Yupiaq philosophy as an example, the author attempts to compare western and traditional forms of science. To the Yupiaq, nature is science. Aboriginals learn scientific concepts from their environment. The scientific laws of nature, from a Eurocentric perspective, merely explain the physicist's, astronomer's, astrophysicist's views. The preconditions leading to these phenomena have not been seen and are difficult to see. The Yupiaq accept what is unknowable, uncontrollable and immeasurable. To further this argument, the author states, "mathematics and the disciplines of science have their own language and areas of expertise. Each is isolated from the others, so that there is no understanding of the interrelationships and interconnectedness of all phenomena of this universe. In fact,each area of study has its own contrived language, which makes dissociation with other disciplines and nature easy. Our education skews our view of reality because of the expectations and assumptions it produces as to what reality should be" (Kawagley, 2001, 204-205). What he means by this is that Eurocentric thought is limiting. It does not take into account aboriginal ways of thought. Science does not address spirituality, but to most aboriginal societies, spirituality plays a large role in science. The author further states that, although technological progress and innovations attempt to benefit humans, they often fail to simultaneously benefit nature. Modern inventions and thinking are inimical to living in nature, with nature, and of nature. The author states that by integrating western ways with aboriginal ways, and western science with aboriginal science, perhaps what can arise is the development of a caring consciousness and technology that is kind to humans, to the spirit and to the environment.

EDU CURA 131

Kawagley, A. O. Yupiaq Education Revisited, Arctic Circle. **2004**.

Looks at the philosophy and worldviews of the Yupiaq and how such are addressed in the education of their children.

EDU CURA 119

Kawagley, A. O. (1995). Yupiaq Worldview: The Meeting of Old and New. A Yupiaq World View: Implications for Cultural, Educational, Western and Native Science.
Looks at the philosophy and worldviews of the Yupiaq and how such are addressed in the education of their children.

EDU CURA 184

Kimmerer, R. W. (2002). "Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action." Bioscience **52**(5): 432.
The academic journal Bioscience presented this article by Kimmerer that focuses on why TEK is resourceful and why it should be incorporated into student curricula. The article discusses the difference between TEK and SEK (scientific ecological knowledge). Both are derived from systematic observation of nature. TEK was once thought to be only myths, songs, and legends, but is now proving to be quite accurate. Not until recently has it been offered as an independent course, instead of as small sections of information in other related courses. TEK teaches heritage of the lands, as well as the history of an area. Kimmerer observes that "TEK is being sought by academics, agency scientists, and policymakers as a potential source of ideas for emerging models of ecosystem management, conservation biology and ecological restoration".

EDU CURA 79

Kirkness, V. (1998). "Our Peoples' Education: Cut the Shackles; Cut the Crap; Cut the Mustard." Journal of Native Education **22**(1): 10-15.
This article's bold title reinforces its purpose. Kirkness asserts that aboriginal education is still faced with the monumental challenge of creating a meaningful education that encapsulates tradition. In her section of "cut the shackles," Kirkness proclaims that aboriginals are in charge of shaping their education. Consequently, this means that aboriginals must cut the shackles and make a new start. In her section of cut the crap, Kirkness introduces the three R's: rediscovering (research), respect, and recovering the culture and traditions of our people. Lastly, in her section of cut the mustard, Kirkness states that community members must come together to address five simple questions of education: (1) Where are we know?; (2) How did we get to where we are; (3) Where do we want to go; (4) How will we get to where we want to go?; (5) How will we know when we are there?

EDU CURA 10

Kirkness, V. (1999). "Native Indian Teachers: A Key to Progress." Canadian Journal of Native Education **23**(1): 57-63.
Kirkness makes several arguments regarding aboriginal education in the public school system. She promotes the notion of employing aboriginal educators as this would essentially increase the level of home-school communication and parental or community involvement in the schools. Also, the presence of aboriginal teachers will enable aboriginal students to better relate to their teacher.

EDU CURA 108

Kolstoe, S. (2000). "Consensus Projects: Teaching Science for Citizenship." International Journal of Science Education **22**(6): 645-664.
In the first part of this article, the author argues that knowledge of social aspects of science are of importance and relevance for science education for citizenship. The focus is on the importance of debate, criticism, and evaluation of knowledge claims, within the scientific community. Knowledge of the nature and the limits of science are necessary as tools to interpret and debate statements with a science dimension occurring in debates over socio-scientific issues. The second part of this article presents a teaching model of engaging students in thoughtful decision making on controversial socio-scientific issues. The main features of the teaching model are the evaluation and criticism of knowledge and

opinions and the establishing of a consensual conclusion that includes a recommended action. Using the consensus project model implies an introduction to important social aspects of science concerning evaluation and validation of knowing claims (Abstract of article)

EDU CURA 50

Kynoch, B. (2003). The Brightwater Environmental and Science Project:Respecting Traditional Ecological Knowledge--The Soul of a Tribal People. Building Healthy Sustainable Communities. C. C.-U. I. f. S. Research). Saskatoon, SK, CUISR Resource Center: 1-16.
Kynoch is a research intern at the University of Saskatchewan who is researching Aboriginal values and attempting to incorporate them into existing curricula through the Brightwater Environmental and Science Project. To achieve this, an overview of traditional ecological knowledge was investigated. This out-of-school environmental education program then had the task of making recommendations in preparation for curriculum materials for school settings. It quickly became evident that Western and Aboriginal knowledge could not be hurried, as the differences between the two forms of education were enormous. Other issues also played into this research, including the following: (1) there is guarded trust between Western and Aboriginal people; (2) the approach to teaching these values must be holistic and include a deep understanding of the complex relationship in the natural environment using elements from the ecosystem to sustain traditional lifestyles; (3) building trust between Western and Aboriginal people will take time and patience through proceeding in their traditional ways with gifts, timing, and attaining balance between people who belong to the land and a peaceful existence with other human beings; (4) language, knowledge, and oral transmission also played into this research, for example, experiential knowledge and traditional stories are crucial for an understanding of Aboriginal heritage; (5) political powers and ethical issues make it difficult for TEK researchers to let go of their biases and accept the complexities of Native ways; (6) The acronym TEK for traditional ecological knowledge often makes the Aboriginal peoples uneasy. It is made clear in this paper that integration of traditional and Western ecological knowledge appears to be impossible and should be explored by other means. The task of incorporating Aboriginal knowledge into existing curriculum is enormous, but this may strengthen and enrich Canadians. The process of the Brightwater program is a starting point for great things to come.

EDU CURA 12

Labercane, G. and W. McEachern (1995). "Striving For Success: First Nations Education in Canada." Education **115**(3): 322-331.
This article focuses upon barriers to success in the Canadian classroom particularly for aboriginal children. It claims that the institutional, formal and traditional ways of teaching abstain aboriginal students from obtaining success. It also claims that the education system itself restrains students from obtaining success, from practicing their own language and from celebrating cultural diversity. The authors make recommendations regarding how the education system may be improved to include cultural differences and how different methods of evaluating success should be explored.

EDU CURA 176

Leavitt, R. (1995). Language and Cultural Content in Native Education. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 124-138.
Leavitt addresses the outcomes of a English and Native language teaching course that was offered at Concordia University and taken by both native and non-native educators. The result of the course was that teachers were beginning to see the significance of language and culture in children's schooling. Working closely with their classmates of "other culture," these educators found themselves reevaluating and reshaping their own roles as educators. Additionally, directly consequent of this course, teachers were able to discover

how traditional Native education relies upon ways of knowing, ways of interacting and ways of using language which are not normally exploited in formal school. Non-native teachers, by collaborating with native classmates, discovered how much Native languages, value systems and traditional practices contrasted with their own. The culture-based part of the course allowed teachers the opportunity to look at their own interactions with children to see where and how they might modify their formal teaching to base education *in* Native culture.

The discussion of language in native education is extensive. Leavitt makes a good point that defining the roles of oral and written language in children's education will help teachers determine the best use of language in classroom interactions. He discusses how in Micmac community schools in maritime provinces, Micmac teachers have been using the Native language regularly and comfortably; some teachers have used Micmac stories as a way to practice language and learn appropriate forms of communication. Consequently, the use of native language in schools is a productive way of learning to communicate.

Leavitt states, "the teacher who uses the Native language in instruction will learn how it differs from English. This kind of meta-linguistic perspective helps her to understand the Native language as a valuable component--not a hinderance-- to students' English" (1995:129). Teachers of native students will want to let students integrate their experiences, spiritual beliefs, and social values with what they learn and to utilize their traditional language as a way to express this. Moreover, teachers of native students will want to maintain interpersonal communication --storytelling, talking-while-doing and conversation--as these are frequent methods of communication in Native communities.

Leavitt proposes that, "when instructing native children in English, teachers often strive to create a cultural curriculum, one which takes into account both the mainstream culture and that of the community. The purposes of the bicultural curriculum are to help students feel that the school program is a natural part of their lives and to help them move smoothly back and forth between one culture and the other" (1995:134). Appropriate native education will occur only when educators chose whether programs will include Native cultural content or whether programs will be based on Native culture through the adaptation of traditional educational practices. Leavitt states that "only the latter approach takes advantage of what both cultures have to offer and helps students move more confidently, from what they know into the discovery of what is new and useful in English" (1995:134).

EDU CURA 109

Lee, O. (2003). "Equity for Linguistically and Culturally Diverse Students in Science Education: A Research Agenda." Teachers College Record **105**(3): 465-489.

As the student population in the nation's schools becomes more linguistically and culturally diverse, it is essential to establish a knowledge base that promotes academic achievement and equity for all students. Based on the conception of equity from a cultural anthropology or cross-cultural perspective, the article addresses issues of equity in science learning and teaching for students from diverse languages and cultures. It provides a synthesis of major issues and research findings for effective classroom practices in the multicultural science education literature. Recommendations are also offered for a research agenda that contributes to achieving the goal of science for all, including students from diverse languages and cultures (Abstract in article). Similar to Sutherland's opinion, Lee argues that students' language and culture may sometimes be discontinuous with science disciplines, posing potential difficulties for students who are learning science. Using the recommendations in the article, teachers will be able to bridge the gap between science disciplines and students' language and culture.

EDU CURA 36

Leroy, L. B. (2000). Jagged Worldviews Colliding. Reclaiming Indigenous Voice and Vision. M. Battiste. Vancouver, UBC Press.

The author attempts to compare how aboriginal philosophy, customs and values differs from those in the Eurocentric culture. Afterwards, Leroy focuses upon colonization and how it attempted to destroy the aboriginal worldview. However, he states that all colonial people, both the colonizer (European descent) and colonized (those of aboriginal ancestry) essentially have shared or collective views of the world that is imbedded within their languages, stories or narratives. He claims that "this shared worldview is always contests and this paradox is part of what it means to be colonized. Everyone attempts to understand these different ways of viewing the world and to make choices about how to live his or her life" (Leroy, 2000, 84). In other words, Leroy asserts that no one has a pure worldview that is 100 percent Indigenous or Eurocentric rather, everyone has an integrated mind. This article may be useful to aboriginal education as it addresses aboriginal philosophy and values, which may be important as we begin to assess what aboriginals learn and how they learn.

EDU CURA 118

Lewis, B. and G. Aikenhead (2001). "Introduction: Shifting Perspectives from Universalism to Cross-Culturalism." Science Education **85**(1): 3-6.

The authors argue that all systems of knowledge about nature are embedded in the context of a cultural group and that all systems of science are, therefore, culture-laden; Western Science is the system about nature that is predominant in western culture. The authors look at how science can inform and be informed by the nature-knowledge system of our cultures. Also in question is the role that non-Western nature-knowledge systems should play in the school science curriculum. This articles critiques other authors who also address these concerns, including Snively and Corsiglia, Cobern and Loving, and Stanley and Brickhouse.

EDU CURA 135

Lindberg, T., P. Campeau and J. Makokis (2004). Indigenous Distance Education. Cultural Survival Quarterly**:** 30-34.

This article provides insight into the challenges faced by aboriginals who enroll in distance education. The authors point out that distance education and indigenous education have two things in common: Both are often perceived as less credible than Western in-class educational programming, both models have struggled with issues of individuality and a lack of peer support for students. Distance education requires strong relationships to exist between instructors and students as a means of facilitating students. Additionally, it is imperative that distance education considers the context of indigenous life when developing the curriculum and presenting it. This helps students relate to the concepts and theories being taught and makes the content more relevant to them. This context may be provided by having a number of indigenous members on course development teams, indigenous review panels and cross-cultural training. The article concludes by looking at approaches that the Indigenous Education Center at Athabascan University has undertaken.

EDU CURA 217

Loickers, E. (2003). "Healing the Spirit." Canadian Journal of Native Education **27**(1): 55-60.

This article addresses overcoming barriers in respect to life histories of trauma, completing literacy training programs, and the benefits of a life skills program combined with a literacy program. The Six Nations Literacy Achievement Centre has combined the life skills and literacy programs with great success. The Insights program is a pre-employment program that is fundamental to the Six Nations Literacy Achievement Center. This part of the program provides life skills in self-development.

Barriers to completing literacy programs, identified by the author, include language barriers, lack of transportation, needing babysitting services and lack of money. The greatest barriers of all are identified as mental, emotional and spiritual dysfunction. The effects of these barriers reflect Native reality: Natives have the highest school drop-out rate, alcoholism rate, drug addiction rate, suicide rate, and the highest percentage of people in jail. Perhaps these barriers may be contributed to the deterioration of Native culture and values through the residential experience. The author also claims that low self esteem may be attributed to the lack of belonging aboriginal youth feel to the their family, to non-natives, and to the reserve. A lack of self-esteem, self-confidence and a confused cultural identity impede students as no physical barriers can. Without self-esteem, no matter how much these children learn, they may never be successful at implementing that knowledge.

The author introduces the 12-week Insights Program, which is a pre-employment program that is provided by the Six Nations Literacy Achievement Center. A portion of the program provides life skills in self-development. The overall objective of the course is to help an individual develop a repertoire of problem solving behaviors and skills. The lessons are meant to enhance and enrich the participant's self-esteem. At the end of the program, participants are encouraged to expand their educational achievements and/or enter the workforce in a field of their choice. Essentially, the Six Nations Literacy Achievement Center provides a place for individuals to heal the spirit.

EDU CURA 88

Loving, C. (1995). "Comment on "Multiculturalism, Universalism, and Science Education"." Science Education ***79***(3): 341-348.

Loving's article attempts to critique Stanley and Brickhouse's article, "Teaching sciences: The multicultural question revised." Her concerns regarding this article are: (1) The description of the Universalist view of science; (2) The lack of distinction between multicultural approaches and pluralistic criteria for scientific knowledge; (3) the kind of science they are promoting. Loving compares Stanley and Brickhouse's stance on science with Rakow and Bermudez's and Hodson's stance on science.

EDU CURA 130

MacDonald, R. and M. Bernardo (2003). "The Borderlands Research Program: Re-Conceptualizing Diversity in Higher Education." Journal of Development Education.

This article addresses the concept of the "borderland," where essentially the borderland represents the social, intellectual and emotional dynamics of multiple identities that are made problematic by the overbearing presence of mono-cultural expectations which dominate society (Mcdonald et al, 2003, 11). The borderland metaphor therefore provides an important tool in education, as a means to think about diversity while simultaneously think about the curricular and pedagogic implications which follow. After discussing the borderland theory, the authors analyze their research program, which attempts to provide a way to answer the question: "how does one create a very inclusive and expanding place of belonging for those situated in the borderlands, not only within institutions but also in the conscious?" The authors suggest that by better understanding the dynamic struggles in the borderlands, one may find inspiration and practical guidance for addressing the ongoing struggle for identity, belonging and expression of self, which fundamentally define our human experience. Attached is an insert from the Pathways to Inclusion Conference where the authors discuss science and society in the borderlands.

EDU CURA 162

MacIvor, M. (1995). Redefining Science Education for Aboriginal Students. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, University of British Columbia Press: 73-98.

MacIvor is a Métis woman working at the University of British Columbia for the First

Nations House of Learning. Her interest in First Nations education led her to write this article that sets out the elements that need to exist within a traditional knowledge education system in order for it be successful in working cooperatively with Western science. MacIvor begins by giving a briefing of First Nations education and then continues to describe reasons that this educational change is so important, citing as an example the fact that only 25 percent of the on-reserve population earn high school diplomas. In order to successfully redefine science education, this article stresses the importance of incorporating spirituality, service, diversity, culture, tradition, respect, history, relentlessness, vitality, conflict, place, and transformation into the curriculum. Each of these standards enables reflection on science education. Some of the standards propose a reconceptualization of science; other standards, including service, tradition, history and place, ask for a recontextualization of teaching practices. This reconsideration of science may, inevitably, aid in the development of a curriculum that promotes sustainable use of resources and ensures the continual existence of tribes and of their traditional knowledge.

EDU CURA 188

Mackay, R. and L. Myles (1995). A Major Challenge for the Education System: Aboriginal Retention and Dropout. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 157-178.

Mackay and Myles attempt to pinpoint the factors associated with aboriginal student dropout rates and provide recommendations to alleviate such factors. These authors critically state that there are no objective records that determine how substantial aboriginal retention rates truly are. "There are no provincial or federal databases specially designed to provide information of this type for the purpose of monitoring student progress, evaluating Aboriginal student support programs, or undertaking empirical research. Indian and Northern Affairs Canada (INAC) maintains the nominal roll, a record of school registration for registered Indian students resident on reserve, principally for accounting purposes arising from the federal responsibility to pay for their education" (1995:158). Consequently, the primary purpose of the INAC records is to support the management of education and to disperse public funds.

This study specially looks at the aboriginal student retention rates of Ontario, which have improved from the 1970s to 1980s. However, it is important to note that the rising retention rates are not proportionate across this province; moreover, these authors are leery about making generalizations based upon aggregate statistics. They claim that: "such generalizations disguise the very significant variations in school retention and graduation rates between Native communities and within the contexts in which they receive their education across the province. They also tend to obscure the fact that appropriate solutions to dropping out must be sensitive to particular contexts" (1995:161). Statistics do not provide insight into why students stop attending school or what can be done to influence their behavior.

Mackay and Myles provide forty-two factors in which they believe are reasons for dropping out (refer to appendix of reading). Such factors arose from the results of interviews and surveys with 310 informants, including key people from Native and non-Native communities in Ontario. Of these factors, several significant reasons for high-drop out rates identified, include language and cultural barriers, lack of parental support in education, miscommunication between the home and the school, and feelings of homesickness by those students, who are forced to leave their reserves to attend school.

The authors state: "the overall trend towards higher provincial secondary school retention among Native students resident on reserve is no accident, but reflects the individual and collective efforts of the key players in improving educational conditions for Native students. Because First Nations communities across Canada are unique, with different social and cultural

values, levels of economic development, and internal administrative structures, it is difficult, if not impossible, to apply a universal blueprint for success" (1995:171). The authors believe that success of on-reserve students in completing their post secondary education arises from on-reserve communication where chiefs and councils rank education of children as an essential priority. They not only regard education and graduation from secondary school as desirable, but see it as imperative to the reserve's development. School boards can also increase success, by recognizing the needs of minority students and promoting multicultural and non-racist education. Schools can meet the challenge simply by obtaining a mission statement that promotes maximizing success of their students.

The factors contributing to aboriginal student drop-out rates, locating in the article's appendix, are quite useful as one can perhaps brainstorm solutions through analyzation of these.

EDU CURA 151

Mackenzie, P. Native Students in the Intermediate Classroom: Strategies to Enhance Their Self-Esteem and Achievement. B. C. T. s. Federation. Squamish, BC. **2004**.

Mackenzie provides teaching strategies to address native learning styles in this article. After stating that teachers must become aware of the value-differences and cultural backgrounds of their students, the author provides alternative ways that teachers can successfully teach aboriginal students.

Mackenzie asserts that there exists certain characteristics of native learners which teachers should utilize to help them develop lessons and use strategies that may draw upon their strengths. Other authors oppose this idea of a native "learning style." The date of this article is unknown, but its reference to early resources indicates that this article may have been written sometime in the early 90's. Subsequently, this idea of an aboriginal learning style may be something of the past.

EDU CURA 98

Madar, C. (1998). "Reverence for the Ordinary." Canadian Journal of Native Education **22**(2): 171-87.

The author travels to the northern Albertan community of Moosetrack to understand what type of knowledge is important to community members, which will inevitably elicit learning from aboriginal students in the classroom. In this case study, participants responded in various ways through photography, modelling, storytelling, intuition, the metaphor of Giving Circle or doing ordinary tasks. The author concludes that ordinary Bush Cree way of life and some useful home-to-school connections for teachers and teacher educators are crucial in order to evoke learning amongst this population.

EDU CURA 56

Makhoul, A. (2004). Bamfield, BC: Wonderful Things Can Happen at the End of the Road. Community stories. C. l. o. S. Policy, Caledon Institute of Social Policy. **2004**.

Human Resources Development Canada (HRDC) created the Office of Learning Technologies (OLT) in 1996, in order to encourage innovative, technology-based learning. HRDC staff and representatives from the (then) British Columbia Ministry of Community Development, Cooperatives and Volunteers, in cooperation with community leaders, tailored an OECD model to incorporate lifelong learning concepts and lessons from the learning cities work carried out in the UK. This Caledon series of community stories profiles several communities in BC that secured OLT funds in order to strengthen and extend their community capacities to deal with socioeconomic challenges.

EDU CURA 57

Makhoul, A. (2004). Whistler-Mount Currie Learning Communities Project. Community Stories. C. l. o. S. Policy, Caledon Institute of Social Policy. **2004**.

Human Resources Development Canada (HRDC) created the Office of Learning Technologies (OLT) in 1996, in order to encourage innovative, technology-based learning. HRDC staff and representatives from the (then) British Columbia Ministry of Community Development, Cooperatives and Volunteers, in cooperation with community leaders, tailored an OECD model to incorporate lifelong learning concepts and lessons from the learning cities work carried out in the UK. This Caledon series of community stories profiles several communities in BC that secured OLT funds in order to strengthen and extend their community capacities to deal with socioeconomic challenges.

EDU CURA 59

Makhoul, A. (2004). Lillooet is Learning. Community Stories. C. I. o. S. Policy, Caledon Institute of Social Policy. **2004**.

Human Resources Development Canada (HRDC) created the Office of Learning Technologies (OLT) in 1996, in order to encourage innovative, technology-based learning. HRDC staff and representatives from the (then) British Columbia Ministry of Community Development, Cooperatives and Volunteers, in cooperation with community leaders, tailored an OECD model to incorporate lifelong learning concepts and lessons from the learning cities work carried out in the UK. This Caledon series of community stories profiles several communities in BC that secured OLT funds in order to strengthen and extend their community capacities to deal with socioeconomic challenges.

EDU CURA 139

Malatest, R. A. (2004). Aboriginal Peoples and Post-Secondary Education: What Educators Have Learned. C. M. S. Foundation. Montreal, Que: 1-44.

This report looks at the enrollment levels of aboriginal students in a post-secondary institution and describes practices and initiatives that are believed to help increase enrollment from a qualitative perspective. The first section of this report identifies barriers to aboriginal post-secondary success, these including historical barriers, social barriers, geographic barriers, cultural barriers and personal barriers. The article then turns to discuss the financial dilemma that aboriginal students often find themselves in. The article then turns to address some strategies for aboriginal post-secondary education, based upon stakeholder interviews and research literature, these including governmental strategies, providing access programs, alternative admissions criteria and transitional support, community delivery (operating instruction in Aboriginal or remote communities), having aboriginal-geared programs at mainstream institutions (i.e.. refer to Champagne article (CURA 136)), allowing aboriginal educators control of the curriculum, and promoting self-government (which may essentially elicit an increase in participation in scientific disciplines).

EDU CURA 76

Malatest, R. A. and A. Ltd. (2001). SD# 91 Aboriginal Education Needs Assessment, Prepared for School District 91 and the First Nations Education Council of SD #91: 102.

Consequent of the low aboriginal student achievement/outcomes and high drop-out rates experienced by students in School District 91, this report attempts to address such urgent issues and provide reccomendations that may alleviate these poor results. Refer to executive summary

EDU CURA 206

Maurial, M. (1999). Indigenous Knowledge and Schooling: A Continuum Between Conflict and Dialogue. What is Indigenous Knowledge? Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 59-77.

The purpose of this chapter is to contribute to the re conceptualization of education through the conceptualization of indigenous knowledge. In its attempt to widen a perspective that reduces education to schooling, this chapter pleads for the validation of

indigenous knowledge. This permits a clear view of the social construction of reality in a given "space and time." The context of this essay is settled among indigenous peoples of Peru. Furthermore, this essay proposes a study of the meaning of indigenous knowledge through the view of a 'curricular continuum', instead of a 'straight line through human evolution.' In other words, the essay proposes an alternative view to a colonial perspective that dichotomizes reality in its qualification of societies as being or not being 'progress-orientated', 'civilized,' 'developed' or 'literate' in the process rejecting a belief in these superior truths. The view of a continuum between conflict and dialogue that occurs as a result of indigenous peoples' interactions with the Western world, especially through a canonical knowledge, can be used as a clue to understand the complexity of the problem of education among indigenous peoples.

The dialogical education for indigenous people of Peru implies, first, the validation of indigenous knowledge in schooling and non-schooling settings in the local and second a critical understanding of their local history that could strengthen a dialogue with Western culture and a whole re-link-age with nature. A dialogical education could only be possible through the enhancement of indigenous self-governments

(Refer to Introduction of chapter, 59-60).

Through the use of dialogue, an intercultural education may be fostered. The first aspect is fulfilled among indigenous and western actors of education: teachers, learners, pupils, parents , community leaders, researchers and planners. The second aspect of the dialogue is fulfilled between actors of education and nature. It encompasses indigenous knowledge. The challenge for Western researchers and teachers working on indigenous knowledge is to foster this dialogue and contribute to overcoming the obstacles of: (1) the power of western knowledge over indigenous and (2) Creating an intercultural vocabulary. Overcoming these obstacles is only possible respecting indigenous peoples and acting ethically or seeing broadly (1999: 74).

EDU CURA 18

McAlphine, L. (1994). "Schooling as a Vehicle for Aboriginal Language Maintenance: Implementing Cree as the Language of Instruction in Northern Quebec." Canadian Journal of Education **19**(2): 128.

This article specifically focuses upon the implementation of the Cree language as the language of instruction in northern Quebec schools that are immensely populated by James Bay Cree. In 1988, the Cree School Board passed a resolution that would make Cree the language of instruction at the elementary school level. The article provides an outline of the language curriculum in Cree schools where the purpose of Cree implementation with other education subjects is to ensure maintenance and enhancement of language and literacy skills developed during the first years of schooling. The critical purpose of this program is "that students will gain the compulsory 6-credit mother tongue program required for high school graduation in Cree rather than a mainstream language" (McAlphine, 1994). Consequently, programs will be developed that stress secondary programs in Cree language arts. The article notes that language policies entail a strong commitment to materials development as well as teacher training and the necessary funding to do such effectively.

Constraints exist for the implementation of this program. Teachers responsible for the subject taught are expected to work with an outside consultant, a curriculum specialist to develop the syllabus. Aboriginal elders review such and then the teachers are responsible to create instructional materials and strategies to implement the elders' ideas. However, untested materials cannot be found and so the teacher may continue to use culturally inappropriate materials. The decision to have Cree the language of instruction requires that materials be

developed and that teaching grammars can be used by teachers and material developers to create curricular materials and literacy materials of various kinds needed for reading outside of the instructional setting. The difficulty for implementing this program is the lack of written Cree in community life (lack of reading materials in Cree). However, the proposed strength of this program is that children will become more fluent in their mother language; adults will find the value of their traditional language and children will participate more in the school system because they can understand their own language.

EDU CURA 5

McCann, H. (1995). "Towards A Dynamic Cultural Model in Aboriginal Education." Alternatives **14**(3).

The author introduces a dynamic cultural model for educators to follow when interacting with aboriginal students as a means to deter away from using the psychological deficiency model. The author expresses the importance of culture and the celebration of cultural and learning style diversity in an educational setting. Rather than blaming aboriginal education difficulties on genetics (race), educators should develop cross cultural skills and incorporate these into teaching programs. The author suggests different ways for this to occur.

EDU CURA 202

McKinley, E. (1996). "Towards an Indigenous Science Curriculum." Research in Science Education **26**(2): 155-167.

In 1994, a new national science curriculum was created in New Zealand to better include Maori cultural perspectives. This creation opened up space to contest whose knowledge and whose ways of knowing are included. The paper outlines the background to curriculum development work in Aoteroa New Zealand with respect to indigenous Maori people and science education. Concern is expressed about the fitting of one cultural framework into another and questions are raised about the approach used in the development of a science curriculum. Further research in the area of language, culture and science education is discussed along with how the Maori might move forward in the endeavor of developing a curriculum that reflects Maori language and culture (Abstract of article).

The article begins by discussing the emergence of curriculum policy of Maori. The author questions the legitimacy of such a curriculum since it was initially established by a Nation government--a political party not know historically for Maori educational initiatives-and within a political environment where principles of the "new right" discourse guided preparation for entry into the 21st century. This curriculum was mainly written by Maori teachers and advisors who could (1) speak and write the Maori language well; (2) obtained a sound knowledge of tikanga (cultural forms); (3) obtained knowledge of science disciplines; (4) could represent tribal groups from all over the country. Within the Ministry of Education was a person employed by the Curriculum Implementation Division to oversee all the curriculum development contracts in Maori-science, mathematics and Maori language. This person did not contribute to the writing of the document. This person was responsible for choosing others who would be involved in the project. The only group that was involved in the creation of the document was the Policy Review Group. This group was made up of elders, science teachers, Maori advisors and other interested parties. The purpose of this group was to ensure that all the requirements were met from the report.

Currently, the education system offers a range of Maori education. These are included in mainstream schools, bilingual units or schools, and Maori-based schools. The document created only affects those students learning from Maori-based schools teaching through the medium of Maori.

One of the issues identified about the curriculum revolves around the nature and ownership of

knowledge. "Debates usually center around the notion of "Maori science" and how this might differ from western science and what that might mean for the document being produced. World views and relationships and responsibilities between "he tangata" (people) and "te taiao" (the world) formed the basis of the initial discussions. These debates become much more focused during the second hui when looking at the nature of the strands. Discussion centered around what Maori concepts were going to form the basis of the strands that would also incorporate the 'knowledge' already defined in the English version. The document uses the strands set by the Ministry of Education, but they are modified to incorporate Maori perspectives.

McKinley states, "Maori science education has two facets to it which are interrelated and interactive in their production. First, there is a role in educating people on making science work for Maori. This aspect needs to include all New Zealanders--in English and Maori--and needs to cover a range of ideas from how science affects Maori people to getting our concerns on the science research agenda. The second facet involves the idea of empowering Maori to become genuine participants in the production of scientific knowledge. If we hold onto a national science curriculum, then it must be inclusive of Maori claims and aspirations. With a science curriculum in Maori, we have partially achieved the aspirations with respect to language" (1996:164).

This statement also applies to Canada. A national curriculum should include both western and First Nations perspectives, claims and aspirations. Knowledge of a curriculum needs to be relevant for a wide range of people in different situations and in different times. This is applicable to all places that obtain diverse cultural groups within its boundaries. In order for the curriculum to be all encompassing, it must be recognized that set criteria will never remain static. It will always be changing and always subject to contestation. The process of negotiating the content of the curriculum is always political.

EDU CURA 100

McMullen, B. and A. Rohrbach (2003). Distance Education in Remote Aboriginal Communities. Prince George, Spee Dee Printers.
Refer to executive summary

EDU CURA 163

McNeney, M. (2002). Building Better Partnerships for Aboriginal Education: A Summary of Concepts and Key Considerations. M. o. Education, Ministry of Education. **2003:** 1-14.
The Summary of Concepts and Key Considerations in Building Better Partnerships for Aboriginal Education primarily discusses how to make successful partnerships to create successful education. Many school boards are working diligently with all bodies, educators, community members, school boards, and governments to create a better learning forum. Aboriginal issues are also being slowly addressed with more Aboriginal teachers, liaison persons, counsellors, and cultural days, just to name a few. "Slowly addressed" seems to be the key phrase here: it is difficult to involve Aboriginal parent participation in the various levels of planning, perhaps due to cultural barriers and historic distrust in educating the children after past experiences with residential schools. It must be articulated to Aboriginal parents that successful partnerships between all players will lead to successful education of their children. This article claims that research and experience have proven that parental involvement is imperative to successful learning. Aboriginal parents have been found to lack participation as they often view their roles differently than others. Culture can hinder this communication barrier with Aboriginal families. The system must find a link to create a successful learning partnership. Respect, patience, involvement, successful leadership, and commitment are tools needed to reach this goal. Parental involvement could change-if teachers learn more about how Native culture works and how it accepts and respects others, it will enable them to earn parents' confidence

and then they may be willing to mutually respect teachers' roles in the education of their children. Overcoming parents' fears will be an enormous step, and some of the framework to succeed is in place, but all parties must work diligently to ensure a better partnership between all cultures. The report concludes with strategies that may meet the specific needs of their districts, schools and communities, and create successful partnerships.

EDU CURA 132

Mendelson, M. (2004). Aboriginal People in Canada's Labour Market: Work and Unemployment, Today and Tomorrow. C. I. o. S. Policy, Caledon Institute. **2004**.
Has the labor market situation of Aboriginal People in Canada been improving over the last several years? This paper uses data from the 1996 and 2001 censuses to present comprehensive, factual answers to this question. The paper looks at two main indicators of labor market activity--unemployment and participation rates--past, present and future. It reviews the labor market position of Aboriginal people in comparison to the general population in the provinces and territories, in cities with large Aboriginal populations, and on and off reserves. The report shows that there were 122,390 more working age poeple of Aboriginal identity in 2001 than 1996. Despite this large increase in Aboriginal peoples seeking employment, the Aboriginal unemployment rate dropped by one-fifth from 24.0 percent in 1996 to 19.1 percent in 2001.

But the bad news is that unemployment of Aboriginal workers remains stuck at more than twice as high as the total workforce. Closing the gap in unemployment in 2001 would have required an additional 52, 764 Aboriginal workers to be employed; by 2016 this will rise to 189,842 jobs for Aboriginal people.

Canada's Aboriginal labour market segments in four ways: between East and West, and on and off reserves, In the East and off reserve, the Aboriginal labour market is not too far different from the Canadian norm. On reserva and in the West, even in western cities with large Aboriginal populations, such as Winnipeg and Regina, the Aboriginal labour market is much worse than for Canada as a whole. These realities pose significant challenges for labour markets in the west, where the Aboriginal identity population is of increasing importance to the economy.

The paper cpnlcudes with a number of policy observations. It urges governments and Aboriginal organizations to invest aggressively to assist young children and youth to get a better education. It also encourages Ottawa to appoint a Deputy Minister to reside in the West with responsibility to organize work horizontally among the diz federal departments with major responsibilities for Aboriginal programs (Abstract of Article).

EDU CURA 25

Miller, J. R. (1996). The Three L's: The Traditional Education of the Indigenous Peoples. Toronto, University of Toronto Press.
Miller proclaims that aboriginal populations obtained an educational system prior to the arrival of Europeans. "Instruction was suffused with their deeply ingrained spirituality; an invariable tendency to relate the material and personal in their lives to the spirits and the unseen" (Miller, 1996, 16). Educational approaches all emphasized what Miller identifies as "the three L's:" looking, listening and learning. Throughout this chapter, Miller demonstrates how aboriginal lessons and instruction incorporated these three L's. Miller further states that the common elements in aboriginal education were as follows: "the shaping of behavior by positive example in the home, the provision of subtle guidance towards desired forms of behavior through the use of games, a heavy reliance on the use of stories for didactic purposes and as the child neared early adulthood, the utilization of more formal and ritualized ceremonies to impart rite-of-passage lessons with due solemnity" (Miller, 1996, 17). All of aboriginal instruction required both looking and

listening to learn.

Instruction involved elder teaching of traditional knowledge, parental intervention and instruction, gendered-specific activities, the education of play and recreation, storytelling as a means to transmit ethical, theological, historical, ecological and political information in societies, and the use of rituals as a means to transmit stories and songs. With the arrival of adolescence came an alteration in teaching methods. The teaching of necessary knowledge and skills became more overt and didactic among most aboriginal groups (i.e. The vision quest for young men). What is significant about the aboriginal education system was that it reflected the values of indigenous communities. "It operated in a non-coercive way, relying in the use of models, illustration stories, and warnings to convey the information that was considered essential" (Miller, 1996, 35). The heavy reliance of story telling and the respect for elder wisdom emphasized the social reality that age was respected and accommodated in most of these early communities. Miller asserts that the "curriculum of this instruction told young people who they were, what other beings around them were, and how the humans and the other beings related to each other, It explained where they came from and where they were destined to go, what the dangers and opportunities of the journey were and what obligations and rights, both individual and collective, they had" (Miller, 1996, 38).

This article is particularly useful as it provides an effective overview of aboriginal educational philosophy. Such an education system prepared these children for adulthood, where they would essentially hold the knowledge of their culture and would be able to pass this information onto their own children. The same objectives, techniques, values and attitudes should be implemented in modern curricula.

EDU CURA 150

Miller, J. R. (1996). Indian Residential Schools: An Overview. Shingwauk's vision : a history of native residential schools. J. R. Miller. Toronto, University of Toronto Press: 3-7.
Miller addresses the history of the abuses of Canada's residential school system and how it affected First Nations living in Canada. The residential school system of Canada attempted to assimilate aboriginal peoples and destroy their identity as a distinct people. Generations of aboriginal people today recall memories of trauma, neglect, shame and poverty. Additionally, Miller points out that the residential school system was alone responsible for the conditions of aboriginal lives, but also were governmental policies, which attempted to exclude aboriginals and neglect their identities. This article successfully demonstrates the cruelty faced by aboriginal students and the acts of injustice they have faced in the school system over the generations.

EDU CURA 153

Mitchell, R. (2003). We Learn from the Land, Prepared for the Chuntoh Education Society: 25 (plus Appendices).
This publication attempts to develop and deliver the Yunk'ut Whe Ts'o Dul'eh program that embraces traditional Tl'azt'en education, emphasizing the spiritual, intellectual, psychological, and cultural aspects of the band. The themes and pedagogical approaches of the curriculum center upon traditional knowledge of the land. Thus, the program obtains a camp-like structure, with an emphasis on outdoor, science education.

As Mitchell proclaims, "the Cinnabar resort is in a prime geographical location to deliver an outdoor education program because it provides a beautiful wilderness setting that is in convenient proximity to the local First Nation communities and to many of the Nechako Lakes School District 91 elementary schools" (Mitchell, 2003, 2). Not only is this a cultural-based program, it also approaches education holistically, meaning that the Yunk'ut Whe Ts'o Dul'eh program attempts to attend to the whole child. The program will accommodate

to the psychological and emotional issues that impede a child from learning by creating a trusting environment that fosters a sense of self-worth and accomplishment (Mitchell, 2003, 19). Finally, the program will have concise learning outcomes that will meet the outcomes required of the public school system (Mitchell, 2003, 19). Thus, this outdoor education curriculum may fit into the regular classroom curriculum, where local knowledge is highlighted while simultaneously meeting provincial education requirements.

EDU CURA 229

Monkman, D. (2001). Science Curriculum Review Report, BC Ministry of Education. **2004:** wesbite/ government document.

This document provides an analysis of the science IRPs set in BC and how science is presented to students. The analysis taps into teacher opinion surveys and makes recommendations at the classroom, district and Ministry level in order to improve performance rates in science in the K-7 Grades.

EDU CURA 215

Mosha, S. (1999). The Inseparable Link Between Intellectual and Spiritual Formation in Indigenous Knowledge and Education: A Case Study in Tanzania. What is Indigenous Knowledge: Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 227-242.

The aim of this chapter is two-fold: first, to contribute positively to the ongoing study and appreciation of indigenous knowledge (IK) in education settings and to demonstrate that findings and insights emerging from this study are indeed relevant to contemporary educational programs, beginning from kindergarten and extending to college and beyond.

The author intends to accomplish this aim by systematically studying and reflecting on a recurring observation amongst indigenous Africa, and indeed indigenous populations everywhere, there is an inseparable link between intellectual formation and moral (spiritual) formation in their IK and education systems. This chapter, therefore, specifically examines the IK and education systems of the Chagga people of Tanzania in East Africa.

The author contests that indigenous people experience life holistically. Everything that is thought, said and done is done in relationship to the whole of life experience. So, in order to appreciate and study IK profitably, one has to try to do so from a holistic perspective of indigenous peoples. From them, life is one and knowledge is an intimate part of it.

The chapter consists of three main sections: section one will briefly examine the Chagga (and African) worldview of a person and of the world. The worldview is the foundation on which the link between IK and the whole experience is based. In Section Two, we shall examine the Chagga concept of forming or educating children and youth. Using findings and insights emerging from these sections, the author, in the final section, proposes some general guidelines which he considers fundamental in re-designing contemporary education programs, which will prove to be more formative and holistic in content and pedagogical methods.

EDU CURA 86

Mueller, A. (2002). "Time to Talk: Creating Classroom Contexts where Students Begin to Talk Science." Alberta Journal of Educational Research **48**(2): n/a.

Current research identifies several areas of focus for improving junior/intermediate science education. First, science curriculum documents (American Association for the Advancement of Science [AAAS], 1993; Council of Ministers of Education, Canada, 1997; National Research Council, 1996) attempt to refocus science education internationally by emphasizing the importance of inquiry. Second, researchers (Barnett, 1992; Gallas, 1995;

Halliday & Martin, 1993; Prain & Hand, 1996; Solomon, 1991) suggest that students require opportunities to articulate, defend, and explain their ideas in the classroom context if they are to be active participants in learning science. Third, if students are to be well educated in science, mathematics, and technology they need to participate in science investigations that more closely approximate sound science (AAAS, 1993). These calls for reform are particularly daunting when elementary teachers with little science background (Abell & Roth, 1992; Appleton, 1995) are required to teach a breadth and depth of science content they are unfamiliar with in ways that allow children to be active participants in learning science (Allen, 1997; Dalton, Morocco, Tivnan, & Mead, 1997; Marlow & Stevens, 1999). Without research attention to how teachers and teacher candidates might begin to create meaningful classroom contexts where students begin to talk science and participate in science investigations, the calls for reform noted above may be difficult to implement.

Kelly, G.J.] et al. (2000) point out that it is important to consider what counts as science in a classroom and to provide opportunities for students to engage in science and in the practices of scientists. When classroom members act as a community of scientists, they create a set of practices that includes a classroom discourse to develop an understanding of science. Mortimer and Scott (2000) add that "the teacher and student talk 'around' these activities is at least as important in establishing scientific knowledge in the classroom as the activities themselves" (p. 126). Through three science adventures in this study, students learned about the complexity of scientific work. Specifically, they learned details about the systems in our biosphere, about alternative fuel sources, about simple machines and movement, and about scientific research. However, their progressive ability to develop and communicate their ideas provided evidence about the depth of their learning. Students learned to be responsible for contributing to their group's work, as well as to contribute to other group's work. Collaborative efforts as a class created a community of learners (Rogoff, 1993, 1994) working together toward the same goal. Unique about this learning experience was students' abilities to explain their scientific understandings in their own words and their expressed excitement about the relevance of the science they were learning in school. Something that was missing in these learning contexts, or that might have been applied in retrospect, was actual hands-on investigations that related to these contexts (e.g., water purification tests, soil studies, air quality tests). Moreover, the adventures might be rewritten to reflect better a science emphasis for students (Abstract of Article)

EDU CURA 52

Nadasdy, P. (1999). "The Politics of TEK: Power and the "Integration" of Knowledge." Arctic Anthropology **36**(1-2): 1-18.

"This paper takes a critical look at the project of 'integrating' traditional knowledge and science. The project of integration has been and continues to be the cornerstone of efforts to involve northern aboriginal peoples in processes of resource management and environmental impact assessment over the past 15 years. The idea of integration, however, contains the implicit assumption that the cultural beliefs and practices referred to as 'traditional knowledge' conform to western conceptions about 'knowledge.' It takes for granted existing power relations between aboriginal people and the state by assuming that traditional knowledge is simply a new form of 'data' to be incorporated into existing management bureaucracies and acted upon by scientists and resource managers. As a result, aboriginal people have been forced to express themselves in ways that conform to the institutions and practices of state management rather than to their own beliefs, values and practices..." (Abstract in article)

EDU CURA 71

Neil, J. (2003). Indigenous Knowledge and Rites of Passage in Outdoor Education. Outdoor

Education and Evaluation Center. J. Neil. **2003**.
This article addresses the significance of aboriginal outdoor education and provides insight into an outdoor aboriginal education program in Squamish, where teacher/elder-student relationships are crucial. The author is interested in connecting with other researchers who are also exploring the significance of indigenous perspectives in outdoor education and reflects upon different authors who have utilized aboriginal knowledge and ways of life in their programming or studies. References from this article may be of value.

EDU CURA 141

Ninnes, R. (1991). Culture and Learning in Western Province, Solomon Islands. Adelaide, Flinders University of South Australia.
Refer to abstract of article

EDU CURA 126

Ninnes, R. (2000). "Representations of Indigenous Knowledges in Secondary School Science Textbooks in Australia and Canada." International Journal of Science Education **22**(6): 603-617.
In recent years there has been a growing recognition that presenting principally western perspectives in science texts is a form of ethnocentrism, racism or cultural imperialism. In order to address this problem, a number of science texts have appeared which attempt to incorporate greater diversity of knowledge types. This paper employs discourse analysis techniques to examine the approach taken to minority group Knowledges in two recently published sets of junior secondary science texts, one used in Australia and the other in Canada, with a specific focus on the incorporation of indigenous Knowledges into the texts. An evaluation is provided on the kinds of indigenous Knowledges incorporated in the texts and the strengths and weaknesses of the approaches used (Abstract of Article)

EDU CURA 124

Ogawa, M. (1995). "Science Education in a Multiscience Perspective." Science Education **79**(5): 583-593.
The effects of the multiculturalism movement have emerged, especially in the West, in the form of multicultural science education. Multiculturalism can be a powerful and significant tool to reflect on science education and to improve classroom practices. However, this article argues that a "multiscience" perspective in science education affords richer implications for reflection and practice. A multiscience perspective recognizes the existence of various types of science at play in all science classrooms, especially personal science, indigenous science, and Western modern science (Abstract of article).

EDU CURA 120

Ogbu, J. (1992). "Understanding Cultural Diversity and Learning." Educational Researcher **21**(8): 5-14.
Core curriculum and multicultural education are two major approaches advocated in the current school reform movement. This article argues that neither of these approaches adequately addresses the problem of those minority groups who have not traditionally done well in public school. Core curriculum advocates falsely assume that as a result of instituting a core curriculum, demanding higher standards and patching up supposed individual deficiencies, all students will perform as expected. Multicultural education advocates inadequately design their program to focus on cultural differences in content and form. This article contends that the crucial issue in cultural diversity and learning is the relationship between the minority cultures and the American mainstream culture. Minorities whose cultural frames of reference are oppositional to the cultural frame of reference of American mainstream culture have greater difficulty crossing cultural boundaries at school to learn. Core curriculum and multicultural advocates have yet to understand and take this

into account (Abstract of article).

EDU CURA 157

Ogunniyi, M. B. (1988). "Adapting Western Science to Traditional African Culture." International Journal of Science Education **10**(1): 1-9.

Ogunniyi commences this article by comparing the scientific and traditional views of the universe. He claims that both systems of thought are based on prototype experiences: Science is based on things while African cosmology is based on people. Where Science is a body of conjectures and refutations, African cosmology is shrouded in great secrecy and is embedded within religion and magic. Modern science is a product of western culture; hence, it is not readily amenable to the African worldview. The author then turns his attention to finding a meaningful point of contact between these two viewpoints. He states that "the although both systems are concerned with the problem of interpreting events in nature, they are based on different conceptual models: Science is based on a mechanistic explanatory model, while the traditional worldview is based on an anthropomorphic explanatory model" (similar to Jegede's notion) (Ogunniyi, 1988, 6). After looking at the results of a study conducted in southern Nigeria, the author concludes that collateral learning can exist - it is possible to hold a scientific as well as traditional view of the world (Refer to Jegede). People's traditional worldview could be enlargened to accommodate the scientific point of view despite the variances between the two views.

In terms of science education, the author suggests that it is not impossible to hold two worldviews. In fact, he suggests that the aim of scientific education should be to help people meet modern challenges and absorb technological products without mental conflicts (Ogunniyi, 1988, 8). At the same time, however, people should be allowed to invest in their own culture. Through collateral learning, this seems possible.

EDU CURA 236

Okebukola, P. and O. Jegede (1990). "Eco-Cultural Influences Upon Students' Concept Attainment in Science." Journal of Research in Science Teaching **27**(7): 661-669.

"It is becoming increasingly evident that the nature of the environment (ecology) influences the culture of a people. The prediction that such eco-cultural variables could exert influence on students' concept attainment in science was tested in this study using a 2 (general environment) x 2 (reasoning pattern) x 2 (nature of home) x 2 (goal structure) fixed effect ANOVA design. The results show that (1) students who live in a predominately automated environment did better than those in a predominately manual environment; (2) students whose reasoning patterns were predominately magical and superstitious performed significantly lower than those who were empirical in reasoning; (3) rural dwellers were predominately cooperative in outlook; (4) students who expressed preference for cooperative learning did significantly better than those who expressed preference for competitive and individual work; and (5) students from authoritarian homes achieved less well on the science concept test when compared with those from permissive homes" (Abstract of Article).

EDU CURA 13

Paulsen, R. (2003). "Native Literacy: A Living Language." Canadian Journal of Native Education **27**(1): 23-28.

This article explores the importance of native literacy to aboriginality. Literacy is rooted in intergenerational teachings and is active in everyday living. Paulson also addresses how literacy becomes important when aboriginal students are measured against Euro-Western standards and their learning ability and aptitude measured accordingly. Literacy is a part of every day life: a part of one's culture: one's sense of identity. This article fundamentally relates with the Curriculum Development and Outdoor Education Culture-Based Science Camp put forth by the Chuntoh Education Society, which also stresses the significance of

literacy to native culture.

EDU CURA 170

Peoples, R. C. o. A. (1996). Report of the Royal Commission on Aboriginal Peoples. I. a. N. A. Canada. Ottawa, Indian and Northern Affairs Canada.

Education for children is imperative; a child has worth and integrity and must be respected by all cultures. Aboriginal societies strongly believe this, placing it as one of their highest priorities. Education has been a goal to fulfill economic and social endeavours within Aboriginal communities. Unfortunately, Native heritage was stripped of this fundamental right with the imposition of residential schools to bring about European-style education to the Aboriginal peoples. Families were displaced, cultural origins were uprooted, Christian and European values were forced upon students against family wishes, parents were not consulted in their children's education process, Aboriginal language and elder teachings were destroyed, abuse abounded, and children who could fled these situations, often receiving little or no education. In 1972 these schools were disbanded as it became clear that this was not a positive means of educating Aboriginal children. Curriculum development in First Nation reserves, the Northwest Territories, and the Yukon began developing roles to enhance the school system based on culture and formal education. An important part of this task is extensive community leadership including government, school boards, Native bands, and, foremost, family involvement. Funding and claim settlements play an important role in improving jurisdiction for Aboriginal education. Fundamental adjustments will allow for change and a vision of better education within our systems. Respect and participation will allow innovative programs for all parties to be partners in providing fundamental education for Aboriginal children and all children to learn about their Canadian heritage.

EDU CURA 197

Pewewardy, C. (2001). Indigenous Consciousness, Education and Science: Issues of Perception and Language. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 16-21.

Pewewardy argues that myths and images of aboriginals elicit negative stereotypes regarding aboriginal culture and ways of life. These myths (such as the noble savage) have caused pain to both Indian communities and students, relative to schooling. Traditional aboriginal ways and culture are not seen as valid entities in mainstream society consequent of these derived fallacies. One of the ways in which to successfully educate aboriginal students is to forget the myths and to celebrate diversity. Pewewardy states:

" I feel that in motivating and preparing Indian students to be successful in their lives, we must help them to understand and to include their tribal worldviews. Myth is a form of language and the language of mainstream society and science predisposes us to attempt to understand ourselves and our world by superimposing dialects, dichotomies or dualistic grids upon experiences that they may not fit. We need to reverse the colonization of our minds so that we can think holistically again. We need to rediscover and recreate our own fundamental myths that will integrate the paradoxes of our experiences and our natures. Only then will we be able to link who we are with what science has to offer" (2001:21).

Science should not be a privileged field that is limited to those who accept a particular mythic tradition. If aboriginals are forced to reject their own knowledge and their ways of thought to participate in science, it will only lead to cultural extinction. Mainstream science promotes myths regarding what information is valid and what is not. Therefore, if aboriginal knowledge is just a construction, is also not mainstream science in its distinction of what is valid and what is not? Pewewardy asserts that it is necessary that we move away from the myths created in our subconscious mind, regarding the validness of

aboriginal knowledge, as such is destructive to aboriginal ways of life and perhaps to aboriginal success in obtaining an education (since these myths are also instituted within the education system).

EDU CURA 154

Phelan, P., A. L. Davidson and H. T. Cao (1991). "Students' Multiple World: Negotiating the Boundaries of Family and School Cultures." Anthropology and Education Quarterly **22**(N/A): 224-250.

This article presents a model of the interrelationships between students' family, peer and social worlds, and in particular, how meanings and understandings derived from these worlds combine to affect students' engagement with schools and learning. In addition, the model focuses attention on students' perceptions of boundaries between worlds and adaptation strategies they employ to move from one context to another. We use a typology to illustrate four patterns we have found among 54 students in four desegregated high schools as they move across settings: (1) Congruent Worlds/Smooth Transitions; (2) Different Worlds/Boundary Crossings Managed; (3) Different Worlds/Boundary Crossing Hazardous; (4) Borders Impenetrable/Boundary Crossings Insurmountable. Unlike most other approaches, the model we present is generic. It transcends ethnic, achievement, and gender categories to consider multiple worlds, boundary crossings and adaptation for all students (Abstract of article)

EDU CURA 179

Poodry, C. (2001). How to Get What Indian Communities Need from Science. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 29-35.

Poodry identifies several barriers which, he feels, has contributed to the lack of aboriginal involvement in the sciences and higher education. The first set of barriers identified are the negative voices that arise and impede upon the ability to move forward and find ways to contribute to community needs. Three sources of such a barrier are: community politics, social stereotyping, and preconceptions. Poodry writes, "these three are often tied together and they are by no means the only causes of the negativism that impedes efforts by Indian academics to contribute to communities" (2001: 30). After describing how each essentially act as barriers, Poodry identifies a second barrier to education within aboriginal communities: personal and professional cost of volunteering in communities. Poodry proclaims that it is important that scientists or educators build upon their profession rather than spending all of their time trying to serve the community. Young native scientists can only do a limited amount of community work while they are striving to start their careers. Poodry asserts, "those young people who do come back to try to serve the people do so at a personal cost..." (2001:32). It seems that Poodry is trying to say that those aboriginals successful in obtaining a post-secondary education should try to start themselves off first and then try to improve the community later. A third barrier to the cross fertilization of academic science and Indian communities is knowing who is who. In other words, not knowing resources inside and outside of the community poses considerable problems, especially if one is in need of a certain type of training or a certain type of expertise. In conclusion, Poodry asserts that the greatest hinderance to increasing Indian educational success is that too many aboriginals have been brought into a particularly evil myth that their abilities are more determined by genes or by the nature of the system than by their efforts. This means that the failure to succeed in school is largely a result of poor success on behalf of the student.

EDU CURA 200

Porter-Locklear (2001). Water and Water Quality Issues in and for American Indian Communities. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska Press: 111-118.

Porter-Locklear suggests that it is important not to just limit concerns to inside the boundaries of Indian communities because pollution from surrounding areas breaches those boundaries. Water pollution does not respect community boundaries. For example, dumpage of sewage into the water causes fish to die and E. coli upon humans. Farm run-off also causes fish to die and disables people from fishing and swimming in the water. The author uses the Lumbee people as an example of a group of aboriginals who are no longer able to use their traditional waters consequent of its pollution. Hog farm waste is an additional concern in the Lumbee area and has caused several illnesses. Apart from agricultural pollution and municipal waste plants, the Lumbee people have been dealing with a paper mill in the area, where the company has illegally ran wastewater drain lines into the Lumber River.

Of course, these types of problems are not limited to North Carolina. The Tl'az'ten people in British Columbia blame pollution for untimely death as well as epidemic rates of cancer, arthritis, lupus, and kidney disease. Cominco Ltd. operated a mercury mine on the shores of Pinche Lake and the Company's own reports reveal waste mercury was sluiced into the lake every day and that mercury-laden tailing created a long island on the lake. This mercury was consumed for decades by Carrier people, who drank the water and ate poisoned fish in the lake (Refer to the Prince George Citizen, May 29, 2003 <Found in Health File>).

The author suggests that we need to bring more Native Americans into hydrology and the environmental sciences. There certainly is great impotence right now in most Native American communities concerning water pollution and other environmental issues. These communities are at the mercy of others because they lack the skilled people who can identify the problems, develop solutions, and make those solutions work. A water quality program needs to be established on these reserves to address the needs of those who inhabit them. One can certainly see that, therefore, the education of aboriginal youths into the sciences is vital as a means to improve the general health and welfare of the reserve.

EDU CURA 214

Prakash, M. (1999). Indigenous Knowledge Systems--Ecological Literacy Through Initiation into People's Science. What is Indigenous Knowledge? Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 157-178.

The author commences by contrasting science and indigenous knowledge systems. The author claims that where Science is to be impartial and free from cultural bias, indigenous knowledge systems are inextricably defined, shaped, and linked to culture. Ethnicity, place, soil and other elements localize, confine, and define them. "In radical contrast, the principles and practices that constitute science are neither shaped nor determined by culture, ethnicity, class, race, gender, age and other non-universalizable characteristics" (1999:158). The author claims that science that includes traditional and indigenous systems of knowledge is "science by the people," whereas western science is "science for the people," meaning that the concepts and theories, whether they are culturally-defined, are the more dominant ways of thinking as opposed to indigenous thought.

After making this distinguishment, the author compares what they mean, claiming that both are in opposition from each other. Science for the people is done is research that is funded by institutions, governments and sponsors. People's science, in contrast, is research done with no funds, no access to publications, and with results that will elicit few interest from the general population (1999:159). The author claims that in the scientists' war of "science for people" imposed on "science by the people," knowledge continues to shrink. Although lay society believes that modern science has expanded the possibilities for real knowledge, in actual fact, it has made knowledge scarce. Science should have been critically understood not as an instrument for expanding knowledge, but for colonizing and controlling the direction of knowledge, and consequently, human behavior, within a straight and narrow

path conducive to the design of the project. In other words, western science has caused the gradual degradation of indigenous science.

The author claims that the growing realization of the danger of this war is not only for humans, but for most forms of life on earth. Indigenous knowledge offers radical alternatives to modern epistemologies, institutions and technologies. It is only now that such traditional ecological knowledge is growing in importance. For example, postmodern environmental educators are drawing important distinctions between technological sustainability and ecological sustainability. This distinction reveals the serious limitations of the most 'advanced' varieties of 'techno-fixes' while advancing or underscoring the importance of regenerating indigenous knowledge systems in the interest of ecological sustainability.

In the concluding chapter, the author draws upon the indigenous cultural practices to reflect upon sustainable ways of living, as well as modes of teaching ecological literacy that are inextricably linked to the cultural ideal of sustainability. Learning such traditional ecological knowledge perhaps enriches the education of the indigenous youths, who may, in fact, be more aware about environmental sustainability and how to achieve such then "the west". Western science has caused severe damage to the environment. The author recommends that, in order to alleviate the damage done, perhaps we must look to indigenous knowledge systems and ways of sustainability to enrich western knowledge systems. Their knowledge systems may be, perhaps, more supreme.

EDU CURA 226

Quiroz, C. (1999). Local Knowledge Systems and Vocational Education in Developing Countries. What is Indigenous Knowledge? Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 305-316.
This article proclaims that a significant problem of vocational schools in developing countries is the lack of Indigenous Knowledge that are integrated into the curriculum. The purpose of these vocational schools is to inspire and educate youth to stay and work in rural areas; however, such schools tend to be far more academic than vocational in their approach. Consequent to the irrelevancy of teachings to their worldviews, these youths tend to drop out of school.

The author begins with a discussion of what local knowledge systems essentially are. He states, "local knowledge systems, broadly defined, are the systematic information that remains in the informal sector, usually unwritten and preserved in oral tradition rather than texts. In contrast, formal knowledge is situated in written texts, legal codes, and canonical knowledge" (1999:306). He also states that "local knowledge must be understood within the framework of the cultures of local people; to separate it from its cultural context is to lose sight of meaning that it has for the survival and integrity of these communities" (1999:306).

These is an ample jurisdiction to integrate local knowledge systems in the educational system and the vocational educational curricula in particular.

(1) Schools are established by a society to ensure the continued existence of the society. In other words, schools are the agencies through which knowledge is transferred.
(2) Local knowledge systems ensure the relevance of student's experiences, interests, capabilities, and cognitive development. "Subjects should be related more closely to the learner's societal or cultural environment so as to minimize as much as possible the conflicts that might arise from their view of the world and that of the subjects being taught" (1999:307).
(3) The objective of the vocational school is to provide skills for self-employment in the local community. Thus, students should be able to relate to people of the society at a grassroots

level. These students will be in a better position to interact with the community by being knowledgeable about LKS. One reason being that understanding and using local terminologies and classifications ensures a better communication process between them and the community.

(4) There is now increasing awareness about the fact that LKS represent invaluable national and global resources.

The inclusion of local knowledge systems into vocational education can be achieved in two fundamental ways, as noted by the author.

(1) Integration of local knowledge systems into existing disciplines

(2) Inclusion of local knowledge systems into new subject matters in the curricula - ie. environmental science

The incorporation of local knowledge systems into the vocational education curricula is one of the important factors which could contribute to enhance the relevance of this kind of curricula. In this way, curricula will become more pragmatic, meaningful, and purposeful for students. This could help to diminish the high drop out rates in schools and improve the self image of students who will learn the contributions of their own communities to knowledge.

EDU CURA 32

Ray, N. and J. Robinson (1999). "Pedagogical Challenges in Making Mathematics Relevant for Indigenous Australians." International Journal of Mathematical Education in Science and Technology **31**(4): 495-504.

The article commences with an examination of the characteristics of traditional Indigenous education prior to European occupation in Australia. Similar to Canadian aboriginal history, after European settlement, aboriginals were introduced to the European, basically British, form of education. Consequent of the perception that aboriginals were "savages," their cultural practices were disvalued and the education system came to represent dominant European knowledge. The author demonstrates that despite Western methods of teaching, "modern constructivist inquiry based approaches" to mathematics encourages students to discover the law or concept by experiment with tactile and passive teaching aids. The teacher appears to have less dominance in learning. In cases where students work collaboratively, with less intervention from the teacher, the paper finds that aboriginal students take far more interest in mathematics, consequent of the ability to take ownership of their learning.

The authors list several characteristics of indigenous pedagogy. (1) Holistic learners (2) Imaginal learners (3) Kinaesthetic learners (4) Cooperative learners (5) Contextual learners and (6) Person-Orientated learners. They then look to pedagogical strategies that can be used to make mathematical learning more accessible to aboriginal students. The authors further argue "that students of mathematics, in Australia and elsewhere, need to have positive relationships with their teachers, a sense of ownership of knowledge, appreciation of their cultural background, and to know that the school is a relevant and productive environment."

EDU CURA 190

Regnier, R. (1995). The Sacred Circle: An Aboriginal Approach to Healing Education in an Urban Highschool. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press.

John Duquette high school has selected the Sacred Circle within Cree cosmology as a foundation for education practice. The school demonstrates how a non-Eurocentric framework for emancipatory education in an urban context can offer insights for other First Nations. The mission statement of the school is as follows:

"The Joe Duquette high school is a healing place which nurtures the mind, body, and soul of its students. The school offers a program of studies which affirms the contemporary worldview of Indian people. The school supports the uniqueness and creativity of the individual and fosters self-actualization in a cooperative environment" (1995: 312).

In order to address the social issues in students' lives directly, the school uses several approaches. (1) Peer self-help groups; (2) Drug and alcohol treatment centers; (3) workshops; (4) Events (i.e. Drug and alcohol awareness week); (5) survival skills in the curriculum (6) Work contact groups such as Alcoholics Anonymous. The sacred circle approach was utilized after discovering that such was being used by Aboriginal drug and alcohol treatment centers in Saskatchewan and some aboriginal communities in Canada. "The Sacred Circle offered a healing approach to education based on a holistic spiritual perspective on students and their place in the world" (1995:315).

Joe Duquette high school is therefore a school that offers imaginative educational practices for advancing First Nations urban culture. The healing (medicine wheel) and Sacred Circle foundations provide for movement towards the "good" towards positive human growth and development, and towards creative responses to many challenges faced by urban First Nations youth in their quest for a good life. The article extensively describes the school practices, programs and initiatives. The academic program of the school has been altered and adjusted to incorporate First Nations perspectives, cultural development and spirituality. Described in the article are ways in which the school has institutionalized ceremonies and rituals, social support practices, cultural activities, classroom approaches, and healing education programs.

(Also refer to EDU CURA 94 for more information)

EDU CURA 185

Resoutle, J. P. Castello et al Review. Toronto. **2003:** Book review.

Restoule provides a review of Castellano, Davis and Lahache's book, Aboriginal Education: Fulfilling the Promise, which addresses *the Report of the Royal Commission on Aboriginal Peoples*. The book, although providing some case studies that have elicited success, such as the Akwesasne Science and Mathematics Pilot Project, the First Nations House of Learning, education in Nunavik, and the Gabriel Dumont Institute, the authors also identify challenges to achieving success, including funding and institutional resistance to change. A significant quote that these authors state that summarizes the situation well follows:

"This collection of case studies and research reports presents a snapshot of the complex landscape in which Aboriginal education is taking place, a landscape in which hope and possibility live side by side with constraint and frustration"

EDU CURA 53

Restoule, J. P. (2000). "Walking on One Earth: The Akwesasne Science and Math Pilot Project." Environments **28**(2): 37-48.

The Akwesasne Science and Math Pilot Project, undertaken in southeastern Ontario, is essentially an attempt to increase the presence of aboriginal students in these disciplines. The main goal of this project is to decrease inequality of education and increase ecological sustainability through aboriginal control of education. The curriculum, which is described in this paper, emphasizes the cultural relevance that these subjects have in relation to the way of life of the Mohawk. This project relates education to the utilization of the medicine wheel. It also has four main goals for students to achieve: (1) To learn to use symbols; (2) To have a strong sense of local place; (3) To learn how to live in two worlds and ; (4) To learn how to live with contradictions. With this project as an example,

"Aboriginal people have begun the processes of reclaiming knowledge of how to live in this world and must lead the way for those who have forgotten how. We all walk on one earth."

EDU CURA 23

Richardson, C. and N. Blanchet-Cohen (2000). "Post secondary Education Programs for Aboriginal Peoples: Achievements and Issues." Canadian Journal of Native Education **24**(2): 169-185.
The article first assesses three principal approaches to aboriginal education: the add-on approach, the partnership and the First Nations control approach. The article then turns its attention to the Nunavut Sivuniksavut (NS) Program, an educational program that responds to the specific needs of Inuit Youth. Although this program essentially combines culture and academics, and attendance is high, funding is not, and therefore the program is continuing to seek long-term funding. Furthermore, the case study reveals that students who have graduated from this program fail to graduate from university consequent of the poor transition made between NS and any post-secondary institution. Another issue these students face is the lack of funding they receive as university students. A further obstacle to university study is the abstract nature of academia in contrast to most training and readiness programs. The article shifts its focus then to the First Nations Partnership Program at the University of Victoria. The program centers around seven principles known as the "generative curriculum." These include: the incorporation of community-initiated/community-based concern for community wellbeing; the program's incorporation of community-relevant and broad social concerns of child and youth care services in the training of early childhood care workers; training provided in the form of a career ladder; and a bicultural approach respecting both bicultural and multicultural learning. Some challenges identified include "balancing the personal and cultural commitments of life in a First Nations community with the expectations of academia life, especially for women (for example, the lack of accessible child care programs). The article also focuses upon the First Nations House of Learning at the University of British Columbia and then on the Sannich Adult Education Center. The author identifies several variables that challenges school success. These include: "the nature of the K-12 school system, low expectations of aboriginal students, inadequate financial support, racism and experiences with the educational system that have resulted in low self-esteem, low skills development, and emotional barriers, stress relating to relocating, etc." The author recommends Indian control over education as it is the only way that specific needs of aboriginal peoples can be efficiently addressed.

EDU CURA 85

Ritchie, S. (2001). "Actions and Discourses for Transformative Understanding in a Middle School Science Class." International Journal of Science Education **23**(3): 283-299.
In order to better understand how the discursive practices of classroom participants lead to students' transformative understanding, the authors immersed themselves in a Grade 8 science class for an extended period of observation. The observation and interview data were interpreted from two overlapping perspectives, namely, an action orientation and a discourse orientation. The authors found that the teacher's actions encouraged univocal discourse between students and their reproductive understanding of scientific concepts. The authors argue that before a class can become more like a scientific discourse community, teachers need to promote dialogic discourse and transformative understanding. The contextual descriptions and interpretations presented might help teachers form images of classroom practices that will be conductive to students' transformative understandings of science (Abstract of article)

EDU CURA 127

Ritchie, S. and J. Butler (1990). Aboriginal Studies and the Science Curriculum: Affective Outcomes from a Curriculum Intervention. Research in Science Education. P. Gardner. **20:** 249-254.

This study of Aboriginal culture in schools is supported by an increasing number of educators and government committees. However, in the absence of substantial research evidence, it has been difficult to propose justifiable curricular recommendations. The results of this exploratory study suggests that student attitudes towards Aborigines and Aboriginal culture can be improved by a science program which features an Aboriginal Studies component. Further, it is suggested that there is scope for the development of up-to-date curriculum materials and more comprehensive studies (Abstract of article). The results of this study show that there are changes in attitudes towards aboriginal peoples.

EDU CURA 192

Robertson, H. (2003). "Decolonizing Schools." Phi Delta Kappan **84**(7): 552-554.

This article reflects both the Royal Commission of Aboriginal Peoples report and the Winnipeg Inner City High School report, which was published by the Manitoba branch of the Canadian Center for Policy Alternatives (CCPA). The author suggests that, where the Royal Commission of Aboriginal Peoples makes recommendations on how to improve achievement/ enrollment rates of aboriginal students, the Winnipeg Inner City school report, in complete opposite, states that it is the school system and not the aboriginal individuals who are at fault. The transformation to school success cannot be achieved solely by adding an aboriginal novelist here or by creating an after-school "Pow-Wow Club" there, which is suggested by the Royal Commission report. According to the Winnipeg Inner City high school report, until both the curriculum and those who teach it become more aboriginal, schools will retain only those aboriginal students willing to renounce their culture and their communities in favor of a diploma (Robertson, 2003). It is therefore up to the school to eliminate what the authors call the "cultural/class/experiential divide" that separates aboriginal students and their families from the school system" (Robertson, 2003).

The Winnipeg Inner City report emphasizes the need to move aboriginal content and perspective from the margins to the center of the curriculum. Robertson questions how realistic this recommendation truly is. She states, "how might such a substantive change be accomplished within an education system that is itself being "colonized" by the forces of corporate globalization?" An additional recommendation that is made by the report is that there should be significant investment in recruiting, training and hiring aboriginals to teach in Winnipeg's inner-city schools. However, Robertson asserts that "by inference, such teachers are at risk of being asked not only to bridge 'the divide,' but to inhabit both sides of it simultaneously. As other aboriginal scholars have noted, many aboriginal teachers are weighed down by community and collegial expectations that, by virtue of their ancestry and life experiences, they possess special knowledge and skills to solve intractable problems others have abandoned" (Robertson, 2003).

EDU CURA 121

Rodriguez, A. (1997). "The Dangerous Discourse of Invisibility: A Critique of the National Research Council's National Science Education Standards." Journal of Research in Science Teaching **34**(1): 19-37.

In this critical review essay, the author argues that the National Research Council's (NRC) 1996 "National Science Education Standards" uses a discourse of invisibility to lay out its massive reform for science education in the USA. This invisibility discourse dangerously compromises the well-intended goals of the NRC by not directly addressing the ethnic, socioeconomic, gender and theoretical issues which influence the teaching and learning of science in today's schools. Herein, the author proposes that the Standards ought to provide strong arguments and evidence in support of the reasons why equity should be a guiding principle in science education reform. In the same manner, the Standards must articulate the theoretical frameworks and empirical evidence on which the numerous recommendations are based. Only then would the Standards provide the conceptual

guidance necessary to encourage teachers, administrators, parents and politicians to spring into action and take the necessary risks associated with radically transforming schools (Abstract of article).

EDU CURA 160

Rodriguez, A. (1998). "Strategies for Counterresistance: Toward Sociotransformative Constructivism and Learning to Teach Science for Diversity and for Understanding." Journal of Research in Science Teaching **35**(6): 589-622.

This article reports on two types of resistance by preservice science teachers: resistance to ideological change and resistance to pedagogical change. The former has to do with the feelings of disbelief, defensiveness, guilt and shame that Anglo-European preservice teachers experience when they are asked to confront racism and other oppressive social norms in class discussions. Resistance to pedagogical change has to do with the roles that preservice teachers feel they need to play to manage conflicting messages about what they are expected to do from cooperating teachers (cover the curriculum and maintain class control) and from university supervisors (implement student-centered, constructivist class activities), and about what they desire to do as emerging teachers. Although these two forms of resistance are closely linked, in the literature, they are extensively reported separately. This study suggests a sociotransformative constructivist orientation as a vehicle to link multicultural education and social constructivist theoretical frameworks. By using this orientation, specific pedagogical strategies for counter-resistance were found effective in helping preservice teachers learn to teach for diversity and understanding. These strategies for counterresistance were primarily drawn from the qualitative analysis of a year-long project with secondary science preservice teachers (Abstract of article).

EDU CURA 110

Roth, W. (2001). ""Enculturation': Acquisition of Conceptual Blind Spots and Epistemological Prejudices." British Educational Research Journal **27**(1): 1-27.

Traditional science teaching has relied on 'chalk and talk'. In recent years, 'authentic science' has become an alternative slogan that many educators easily adopted in their pedagogic discourses, for it was associated with 'getting students to do the real stuff.' However, authentic science when it is not accompanied by reflection on representations of knowledge more generally, can also mean to enculturate (and worse, indoctrinate) students to a particular epistemology. In this article, the author provides two examples of invisible ways in which students of ecology are enculturated to particular ideologies. The unreflected matter-of-factness of the discursive and mathematical representations in lectures and textbooks makes the world appear to be typologically decomposable (into variables) which have clear, mathematically fully determined relationships. In this way, school science has a certain likeness with indoctrination. The author concludes by suggesting that science courses need to have built in moments in which students can critically examine disciplinary knowledge representations and the way these are constituted (Abstract of article).

EDU CURA 3

Ryan, J. (1996). "Restructing First Nations' Education: Trust, Respect and Governance." Journal of Canadian Studies **31**(2): 115.

Ryan stresses the significance of education as a means to secure a true aboriginal identity. Ryan asserts, "…the above evidence suggests that improvements in self perceptions will enhance [aboriginal] school success." Ryan suggests three fundamental ends to achieve this: (1) Through self-determination, aboriginal communities have total jurisdiction over education; (2) Education incorporates unique Native cultural values, including Native languages into its operating structure; and (3) Parents and community members have a substantial role in the education into education. As many articles attest, improvements in First Nations education will only occur once relationships between aboriginal and non-

aboriginal groups improve. This requires that education systems no longer try to assimilate aboriginals into Canadian society, but rather allow them to celebrate their own cultural diversity.

EDU CURA 227

Schmidt, L. f. and P. w. Halverson (2004). Strategies for FAS Parents and Caregivers. Jefferson City. **2003**.

EDU CURA 66

School District, N. (2004). Aboriginal Education in School District 91: Five Year Growth Plan 2001-2006, School District 91.

This five-year growth plan provides a detailed overview of goals for the school district (School District 91), information regarding project costs, resources and ideas of how to achieve aboriginal student success. It looks at strengths in 2000-01 in order to analyze what worked and what did not, an evaluation plan and a communication plan.

EDU CURA 223

Semali, L. (1999). Community as Classroom: (Re)Valuing Indigenous Literacy. <u>What is Indigenous Knowledge? Voices From the Academy?</u> L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 95-118.

This article specifically addresses indigenous education in Tanzania. The author states that a western-style educational system is currently in place in Tanzania, where indigenous literacy is seen as "inferior." Modern education is associated with Western thought and is perceived by the Western-oriented educators as the better of the two. Consequently, this situation has widened the gap between youth and elders in many parts of rural Africa and perpetuates a false assumption that modernization is a unidirectional process. A curriculum divided between indigenous and modern fails to teach students the unique cultural patterns by which people develop and advance their social worlds, and it ignores the ways in which cultural beliefs and practices, identified as "modem" combine with folk and indigenous ways of doing things.

The author begins with a definition of indigenous knowledge. He then examines the dilemmas that undermine and disregard or undervalues efforts to integrate indigenous literacy in the formal school curriculum. In the third section, the author outlines the rationale for revaluing indigenous literacy.

Relative to science and mathematics, the author states that if these studies are to capture the interest of students and challenge their intellect, indigenous literacy must be valued. One way to value indigenous literacy is through the integration as a critical means to explore and discover scientific concepts and inquiry procedures. By acknowledging indigenous literacy in the classroom, the author asserts that the classroom becomes an interactive environment of knowledge production which engages both the student and the teacher. The author also states that by acknowledging teachers as partners and creators of the curriculum, teachers are given the responsibility to actively participate in the design and development of the curriculum. The author argues that the integration of literacy skills in classrooms empowers students with ownership of knowledge.

The author also asserts that community involvement in formulating curricula is key. The traditional role of the community in the well-being of individuals within the society is in decline, partly due to the de-emphasis in postcolonial curricula, the introduction of market economies and competition, and because of the fear of strengthening cultural plurality over nationhood and nation-building efforts. Curriculum experts get to decide curricula issues, school management and the choice of textbooks used, not the parents. The tragedy of relegating the responsibilities of planning, implementing, and evaluation to the "experts" is that many

of these experts have been educated outside of the local communities and are living outside of indigenous spaces. An additional tragedy identified is the fact these communities are the preservers of cultural, social and moral norms of African society. Their exclusion from the curricula means that African indigenous culture is also excluded.

To conclude, the author states that education involves the engagement of teachers and students in the mutual construction of the meaning of knowledge and practice. From this point of view, therefore, it is imperative that planners direct their curriculum design efforts towards a new way of knowledge production. It is very important that the curriculum is flexible enough to include spaces for indigenous literacy as part of the local history, indigenous languages, metaphors, and folklore to nurture and support African identity.

EDU CURA 205

Semali, L. and J. Kincheloe (1999). What is Indigenous Knowledge and Why Should We Study It? What is Indigenous Knowledge? Voices from the Academy. L. Semali and J. Kincheloe. New York, Falmer Press. **2:** 3-57.

This extensive chapter provides a general overview of what indigenous knowledge truly is. The authors define indigenous knowledge as "the dynamic way in which residents of an area have come to understand themselves in relation to their natural environment and how they organize that folk knowledge of flora and fauna, cultural beliefs and history to enhance their lives. The chapters of this book fail to reflect the indigenous perspectives in Canada, and tend to focus more specifically on Africa, Latin America, Oceania and Asia. However, circumstances across these continents seem very similar.

Relevant to the CURA Education stream is Semali and Kincheloe's discussion regarding western science and how it varies from indigenous science. The authors contest that indigenous knowledge is not a resource to be exploited (for the economic benefit of the West), but rather that it is a perspective that can help change the consciousness of Western academics and their students. The goal of such learning process is to produce a transformative science, an approach to knowledge that synthesizes ways of knowing expressed by the metonymies of hand, brain and heart (1999:44). The authors are concerned with initiating a conversation that results in a critique of western science and leads to a re conceptualization of what western science is. "One notion of an indigenously-informed transformative science is not one that simply admits more people, but challenges the epistemological foundations of the enthoknowledge known simply as science" (1999:45). Science is a social construction that was/is produced by a particular culture in a specific historical era. This means that if science is constructed via culture there are various interpretations of scientific concepts.

If the inclusion of indigenous knowledge will broaden the understanding of science, it can also help produce a transformative education. The notion of locality and the social construction of science can help formulate a far more reflective and insightful science education. These concepts rest at the center of the growth of STS (Science, Technology and Society) programs in colleges and universities. Such programs at their best provide curricular examples for integrating indigenous knowledge into Western mainstream curriculums. Therefore, indigenous knowledge can, essentially, transform and inform disciplinary curriculums from elementary schools to graduate studies.

Understanding that there exists diverse ways of seeing and learning provides indigenetiy a level of respect that is has traditionally not received in Western education. Such a way of seeing helps both teachers and students to clarify the purposes of their own educational activities and facilitate their attempts to answer the question: what are schools for? Hopefully, encounters with indigenetiy will induce educators and their students to answer such a question with awareness of the power of difference.

The authors look at various topics in this chapter, providing a general overview of the entire book. However, perhaps two of most relevant topics addressed are: Learning from Indigenous Knowledge: Rethinking Western Science (43-46) and Using Indigenous Knowledge to Transform Education (46-51).

EDU CURA 122

Siegel, H. (1997). "Science Education: Multicultural and Universal." Interchange **28**(2/3): 97-108.
In this paper, the author explores the reasons for embracing multiculturalism, arguing that multiculturalism is best conceived and defended in universalistic moral, rather than epistemic, terms. The author then criticizes the common view that multiculturalism is incompatible with a universalistic conception of science, and argues that multiculturalism is compatible with a suitably characterized epistemic universalism. Finally, the author considers whether or not that sort of universalism is itself morally objectionable, and argues that it is not. The upshot is that science educators ought to embrace both a universalistic conception of multiculturalism (on moral grounds) and a universalistic conception of science (on epistemic grounds) (Abstract of article).

EDU CURA 155

Silver, J., K. Mallett, J. Greene and F. Simard (2002). Aboriginal Education in Winnipeg Inner City High Schools. Canadian Centre for Policy Alternatives-Manitoba. W. I.-C. R. Alliance, Canadian Centre for Policy Alternatives: 1-62.
Refer to executive summary

EDU CURA 73

Simpson, L. R. (1998). "Aboriginal Peoples and the Environment." Canadian Journal of Native Education **22**(2): 37-41.
"Contemporary Aboriginal communities in Canada face numerous environmental issues. In response to a Canada-wide needs assessment of First Nations communities, the Center for Indigenous Environmental Resources (CIER) located in Winnipeg, created the First Nations Environmental Education and Training Program. This unique program was based on both Indigenous and Western environmental knowledge and uses these knowledge systems to assess, monitor, and audit the environment from Indigenous perspectives. This article reports to a qualitative research project that used a participatory/collaborative research design to evaluate a community-based course taught in this program from the perspective of the students and one course instructor. The article also discusses some issues in hands on learning in First Nations communities, community-based research and Aboriginal adult education (Abstract of article).

EDU CURA 149

Slay, J. (2001). "Research Perspectives on Culturally Sensitive Science Education." Intercultural Education **12**(2): 173-184.
Issues of culture and worldview, and their impact on students' learning of science, have become increasingly important to science teachers. This paper provides a review of the development of science education research perspectives on culture and multiculturalism within the science classroom. The review draws on cross-disciplinary sources for its understanding and examines the work of Western and non-Western science education researchers. Reflections on the literature provide an insight into the Australian cross-cultural situation as the author considers the effect of culture on her own practices as a science educator and in a multicultural classroom (Abstract of article).

EDU CURA 74

Sloan, G. L. and B. Welton (1999). "Holistic Education in the Natural Resources." Journal of Forestry(November): 37-41.

This article focuses upon the natural resources program at Haskell Indian Nations University in Kansas which prepares indigenous students to manage tribal forests without sacrificing their traditional beliefs and practices. After identifying four major obstacles to the entry of students in natural resource careers, the article turns to address how Haskell Indian Nations University works to relieve these barriers to education. Haskell chose to build its natural resources curriculum as a transfer program, not a technical-vocational one, therefore enabling students to transfer into a natural-resources-related program at a university granting a bachelor's program. This article addresses how Haskell University works and creates success for its students despite its limited funding. Not only do tribes and potential employers provide input, the Forest Service supports the program by funding the natural resources liaison position and the Bureau of Indian Affairs trust division provides money for administrative support and travel. The article concludes by addressing four factors that attribute to student success at Haskell University. The keys to success are: the ability to maintain cultural identity, the acceptance of challenges and opportunities offered by modern society, and the ability of bridging traditional and modern cultures.

EDU CURA 93

Sloane-Seale, A., L. Wallace and B. Levin (2001). "Life Paths and Educational and Employment Outcomes of Disadvantaged Aboriginal Learners." Canadian Journal of University Continuing Education **27**(2): 15-31.

This paper examines the linkages between education and training and labour market outcomes. It is based on a study that sought to improve our understanding of the longer-term relationship between disadvantaged and educational/economic achievements. The population used this study as well, as in two previous studies comprised Manitoba adults with backgrounds of low educational achievements. The study investigated factors that help adults overcome disadvantages to become successful post-secondary learners. Specifically, the impact of agency (decisions and choices that adults make) and biography (negative and positive personal experiences) on labour force participation, income, and skill acquisition was investigated (Abstract of article).

EDU CURA 180

Snively, G. (1995). Bridging Traditional Science and Western Science in the Multicultural Classroom. Thinking Globally About Science and Mathematics Education. G. Snively and A. Mackinnon. Vancouver, Research and Development in Global Studies, Center for the Study of Curriculum and Instruction, UBC: 53-75.

Snively's article stresses the importance of developing a science curriculum that incorporates the contributions of First Nations peoples, as there is great need for this change. The essay argues for a broadening of the perspective of science curriculum, so that schools can prepare all students to function in a world inhabited by people who are viewed and treated as interdependent equals (1995:54). Snively asserts that during the 1980s and 1990s, science educators created an emphasis in science education which would be more society orientated and learner centered. This essentially meant that science would take account of *all* children. She points out that aboriginal children are oppressed in the science discipline, and, therefore, seldom learn about their own contributions to knowledge, their own beliefs about the world, their history or their values. Consequently, in order to develop a multicultural perspective in science education, one must recognize the need for this perspective. A multicultural view of science education is not presently widespread in schools. Furthermore, while other authors commend that the problem of lower retention and enrollment rates rests in the child, Snively asserts that the problem stems from the education systems itself, which are not designed for nor address the presence of multicultural children.

Snively points out that all provinces except British Columbia have programs in Native education,

but do not include traditional knowledge and wisdom. It is possible that traditional knowledge to be introduced into on-going science programs, and this article gives examples of primary, intermediate, and secondary levels of curriculum topics where it could be incorporated (Refer to Table 1: Traditional Science Topics in text). Significant to this article is also Snively's suggestions on what teachers can do when teaching in a Native community or in classes with native students. She also formulates a five-step process for exploring multicultural science that acts as a general framework for exploring the two perspectives while teaching. These five steps are as follows:

(1) Choose a Science Concept or Topic of Interest (i.e.. medicine)

(2) Identify Personal knowledge (identify personal beliefs, ideas and opinions)

(3) Research the various perspectives (western and local traditional science perspectives)

(4) Reflect and Decide (through consensus)

(5) Evaluate

By following these suggested steps, Snively asserts that science education will become more sensitive and appropriate to the needs of First Nations students. She also provides several recommendations for preservice teachers regarding multicultural science education. These can be found in a list-format (refer to text: 71). She concludes by stating that: "if teachers learn how the purposes of scientific activity have varied in different cultures and historical times, and how different cultures have developed sciences to meet their needs, then they can work towards developing innovative and sensitive resource materials and teaching strategies that encourage students to broaden their understanding of the nature of science and of the relationship between science and culture" (1995:71).

EDU CURA 17

Snively, G. (1997). "Knowing Home Nisga'a Traditional Knowledge and Wisdom Improve Environmental Decision Making." Alternatives **23**(3): 22.
Snively and Corsiglia focus upon the Traditional Ecological Knowledge of the Nisga'a people and how such is significant to the sustainability and maintenance of the environment. Through this article, it becomes clear that remembered sensory information is significant to the maintenance of the Nisga'a culture. It differs from conventional science which generally is culturally neutral and value free. TEK is transferred via oral stories and is contextual. Upon articulation of this article, it becomes clear why TEK should be a significant aspect in the educational curricula.

EDU CURA 11

Snively, G. and J. Corsiglia (1998). "Discovering Indigenous Science: Implications for Science Education." Science Education **85**(1): 6-34.
This paper discusses aboriginal contributions to science, environmental understanding and sustainability. Western science is only one "type" of science that should be addressed within the science class. Aboriginal traditional ecological knowledge is also an important element of science that should be incorporated. Ideas for curriculum development and instructional strategies are presented in this article that will essentially help both aboriginal and non-aboriginal learners negotiate border crossing between western science and aboriginal science (Snively and Corsiglia, 1998). The article includes a sectionon the universalist verses relativist debate, an explanation of what science is and how it fits into everday life, and a description of indigenous science and the important contributions it has made. The article explains the characteristics of TEK, along with its strengths and limitations; it also explains cultural border crossing and provides suggestions

on different ways to redesign the science curriculum.

EDU CURA 104

SOAR (2003). Success Orientated Achievement Realized. SOAR. **2003:** wesbites pertaining to SOAR courses.

Introduction to SOAR programs, which are designed for those individuals whose primary learning style is experimental and/or kinesthetic in nature. Individualized education is emphasized where students are provided instruction utilizing alternative teaching methods. Website provides information regarding the history of SOAR, Program development and program dates.

EDU CURA 16

Stairs, A. (1994). "Education as a Cultural Activity: Stories of Relationship and Change." Canadian Journal of Education **19**(2): 121.

Aboriginal educational development in Canada is highlighted in this article as is the notion that the nature of formal education is changing with a movement away from Western educational tradition to one that celebrates cultural diversity. There has been an ongoing change in formal school systems through a process of cultural negotiation between aboriginal communities and the western educational tradition, "a process through which a rich diversity of aboriginal "ways to go to school" is emerging despite great obstacles" (Stair, 1994). The article concludes with stories that offer multiple levels of focus on aboriginal educational development.

EDU CURA 165

Stairs, A. (1995). Learning Processes and Teaching Roles in Native Education: Cultural Base and Cultural Brokerage. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 139-153.

As a cultural psychologist who researches education as cultural negotiation, a cultural model of learning, and indigenous language literacies, Stairs is a reliable academic source. Stairs focuses this article on the changes that Native education have undergone in the past, for example, "from cultural inclusion to cultural base in the conceptualization and implementation of Native education" and the "attention to and incorporation of certain Native ways of learning into mainstream formal education". Native education has made great strides and continues to do so. This article is useful in attaining a general understanding of some of the transformations that Native education has made.

EDU CURA 123

Stanley, W. and N. Brickhouse (1994). "Multiculturalism, Universalism, and Science Education." Science Education **78**(4): 387-398.

Multiculturalists have recently raised a number of important challenges to the school curriculum, including whose knowledge are we teaching? and who benefits and loses by existing approaches to the curriculum? In this article, the authors examine a number of issues in this debate that are of primary importance to science educators. These issues include: (1) problems with the Universalist account of the nature of science that has been the most powerful defense against multiculturalism; (2) An examination of some historical cases that illuminate the consequences of maintaining a Universalist perspective on science; and (3) an argument for a multicultural perspective on scientific knowledge. These issues are examined in the context of a national science education reform in which there is considerable consensus that the science curriculum should include teaching about the nature of science. The authors argue that the nature of science taught in school should reflect a multicultural perspective on scientific knowledge (Abstract of article).

EDU CURA 90

Stanley, W. and N. Brickhouse (2000). "Teaching Sciences: The Mulicultural Question Revisited."

Science Education **85**(1): 35-49.
Science education should be multicultural. Stanley and Brickhouse argue that a universalist view of science is neither compatible with a multicultural appraoch or fully coherent as a foundation for the science curriculum. The article begins by summarizing the case for a universalist approach to science education, showing the weaknesses of this approach. Then, the authors argue that it would be valuable for students to understand the nature of the debates regarding multicultural and universalist perspectives on science. The authors conclude by emphasizing the importance of multicultural education since it introduces students to other ways of thinking about the natural world. This type of education not only helps students understand other ways of thinking but also helps them to understand some of the fundamental tenets of Western ways of thinking.

EDU CURA 239

Stephens, S. (2000). Handbook for Culturally Responsive Science Curriculum. Alaska Native Knowledge Network. A. S. C. a. t. A. R. S. Initiative, Alaska Science Consortium. **2004:** Report.
The culturally responsive science curriculum attempts to integrate Native and Western Knowledge systems around science topics with goals of enhancing the cultural well-being and the science skills and knowledge of students. It assumes that students come to school with a whole set of beliefs, skills and understandings formed from their experiences in the world, and that the role of the school is not to ignore or replace prior understanding, but to recognize and make connections to that understanding. It assumes that there are multiple ways of viewing, structuring, and transmitting knowledge about the world--each with its own insights and limitations. It thus values both the rich knowledge of Native Alaskan cultures and of Western science and regards them as complementary to one another in mutually beneficial ways (Introduction to Handbook).

EDU CURA 175

Sterling, S. (1995). Quaslametko and Yetko: Two Grandmother Models for Contemporary Native Education Pedagogy. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 113-123.
Using the stories told by her mother, Sterling recalls the methods of teaching that were utilized by her two grandmothers, Quaslametko and Yetko. Two pedagogical approaches are considered in this article: one that is authorial and another which is humanitarian. It seems that Quaslametko obtained a more authorative method to education. Her way of teaching almost equates to the method of teaching in mainstream pedagogical practice (with teachers situated on a higher level than students) Sterling addresses the hierarchical system and how Quaslametko's teaching was a reflection of this. It is questionable how effective Quaslametko's teaching strategies were, although such did require motivation and effort on behalf of the children.

Yetko's teaching approaches were more friendly in nature (she acted as a facilitator). She obtained a respectful manner towards the children and her way of working reflected a more equalitarian style of interaction which can be symbolized by a circle (interaction through stories). The circle is often representative of Native societies and philosophies. The circle represents an opposite to hierarchies (shaped like a triangle), and it generally represents Native philosophy and egalitarianism. Sterling proposes that Yetko's style of teaching represents a humanistic view of learning as her teaching methods encouraged students to experiment and learn. Moreover, Sterling asserts that this pedagogical approach is more effective in teaching. In a quote provided by Winzer and Grigg:

"[students of] highly facilitating teachers missed fewer days, had increased self-concept, made greater academic gains, presented fewer discipline problems, committed less vandalism, increased scores on IQ tests, made gains in creativity scores, were more spontaneous, and

used higher levels of thinking."

Therefore, this article suggests that a more facilitator approach to teaching may be more effective than an authorative approach because it allows children freedom and flexibility in their learning style. Although Sterling's analysis is supported by other authors, it remains perhaps subjective consequent of her reliance on her mother's stories.

EDU CURA 107

Sutherland, D. (2002). "Exploring Culture, Language and the Perception of the Nature of Science." International Journal of Science Education **24**(1): 1-25.

This study explores the views that some First Nations (Cree) and Euro-Canadian Grade 7 students in Manitoba had about the nature of science. Using both qualitative and quantitative analysis, it was found that the two cultural groups differed significantly between some of the tenets in a Nature of Science Knowledge Scale. The authors suggest that science teaching tends to obtain reference to an object that is familiar to a particular culture (western) and fails to consider another cultures' perception of that object or phenomenon. Therefore, science education is exclusive of aboriginal knowledge and hence, collateral learning does not occur. Referring to the notion that science teachers in the multicultural or the non-Western classroom are cultural brokers (Aikenhead), the authors suggest that effective learning only occurs when teachers recognize that culture and language influences the perceptions that students have about scientific phenomena. The results of this study indicate that differences between language groups (Cree and Euro-Canadian) does not essentially influence perceptions of science, but differences in culture does. Linked to Gough's analysis of environmental education and mutualism in science, these authors suggest that if a greater focus on environmental studies existed and was properly introduced during the initial period of exposure to science, the contrast between students of diverse cultural and language backgrounds would not be so significant in the upper-grade levels.

EDU CURA 62

Svennbeck, M. (2000). "Rethinking the Discussion about Science Education in a Multicultural World: Some Alternative Questions as a New Point of Departure." Science Education **85**(1): 80-81.

After reviewing several authors' work in their discussion of science education, the author proclaims that science education should not be centered around universalism verses relativism. Instead, science education should be organized so that it touches upon the future of society, human relationships and the environment. The author also stresses that science education must recognize and respect different ways of knowing-by this way, TEK and Indigenous Knowledge,and feminist ideas can be taken seriously and addressed appropriately.

EDU CURA 211

Swanson, S. (2003). "Motivating Learners in Northern Communities." Canadian Journal of Native Education **27**(1): 61-73.

The mandate of the literacy program for the Moose Cree Education Authority in Moose Factory, Ontario is to help learners attain the necessary skills to secure employment, enroll in further training or education, and achieve personal independence. The commitment of the program to the learners is to improve their literacy and numeracy skills, to provide a supportive learning environment, and to offer constructive ongoing feedback on the learners' achievements. On the other hand, the learners' commitment to the program is to take control of their learning, to set their own goals, and to participate in the development of their individual training plans (Abstract of article).

EDU CURA 128

Tait, H. (1999). Educational Achievement of Young Aboriginal Adults. Canadian Social Trends. S. Canada, Statistics Canada: 6-10.
This report, looking at statistical findings of 1986 and 1996, reveals that there has been an increase in the educational achievement of Aboriginal people aged 20 to 29, although aboriginals continue to suffer low achievement levels and high unemployment rates compared to other Canadian populations. Opportunities to pursue higher education and find employment tend to be limited in rural areas and so the report demonstrates that those aboriginals living in large cities tend to hold degrees and obtain employment. However, the problem continues to exist. Higher education is one factor which may help Aboriginal people compete in a rapidly changing labor market. More advanced levels of schooling and a narrowing of the education gap between Aboriginal and non-Aboriginal people may improve young peoples' chances of finding suitable employment. As well, younger generations of Aboriginal children may also benefit, by having role models to follow. These events, in turn, may reduce some of the socio-economic disparities that continue to exist between Aboriginal people and other Canadians.

EDU CURA 216

Taman, E. (2000). Aboriginal Teachers' Program Maintains Success [Indian Teacher Education Program]. Windspeaker. Edmonton, Alberta. **18:** 31.
The article addresses an Indian Teacher Education Program (ITEP) held at the University of Saskatchewan which is aimed to improve the quality of on-reserve education. The article claims that the ITEP program is a flagship program for Aboriginal Education and that it is, arguably, one of the most successful Aboriginal teaching education program in Canada. The article provides detail about the program.

- It is funded on a budget which is granted annually by the federal government
-The program takes 75 students; most have stayed in the province and moved to First Nations controlled institutions
- Enrollment is not limited to Saskatchewan students
- Contract with the Aurora College of the Northwest Territories; program allows 20 students a year from this college
- Non-political program that does not get involved in university, provincial or First Nations politics or research because their focus is on teacher education and preparation. They follow a **triangle** model - the program, the teacher, and the child
- Future goals include tripling the intake of students, expanding the secondary program and having stronger Elder in residence program.

EDU CURA 28

Tamisari, E. and T. Milmilany (2003). "Looking for a Pathway to Knowledge: Towards a Vision of Yolngu Education in Milingimbi." The Australian Journal of Indigenous Education **32**: 1-10.
This article focuses on the education system in Milingimbi, Australia which is challenged by the simultaneous presence of Balanda (white) and Yolngu students. The article looks at the difficulties and challenges of implementing a bicultural curriculum encountered by Yolngu educators, leaders, and elders, as they must meet the social and political principles, needs and aspirations of mainstream society while trying to integrate their traditional knowledge and ways of teaching into the curricula. The article presents some of fundamental values of the Yolngu and their vision for the curriculum and introduces a program called the "dhanarangala murrurinydji gaywanagala (DMG)," its aim to integrate 50% of Yolngu content into the curriculum. The aims of the DMG are discussed within this article in addition to the difficulties of its implementation. The article concludes a discussion of the skills and activities of different Yolngu educational phases to demonstrate that Yolngu education is a complex social and political process that demands recognition of fundamental values and principles. *Phases of Balanda and Yolngu education detailing skills to be achieved

EDU CURA 233

Taylor, D., M. Crago and L. McAlpine (1993). "Education in Aboriginal Communities: Dilemmas around Empowerment." Canadian Journal of Native Education **20**(1): 176-183. Aboriginal communities are in the process of coping with various degrees of empowerment. Although educators tend to see empowerment as a solution to problems related to Aboriginal education, the authors discuss a number of fundamental dilemmas raised by empowerment. Specifically, the authors focus discussion on decision making in Aboriginal communities, the goals of education, the culture of school, the language of instruction, Aboriginal content in course material, the training of Aboriginal teachers and the testing of Aboriginal students. It is our contention that dilemma in these areas arise because empowerment has been introduced suddenly in the context of a long history of subjugation of Aboriginal peoples. Recognizing these realities will, the authors believe, avoid placing unrealistic expectations on the empowerment process and convince both mainstream and Aboriginal educators that empowerment is not the end but rather the beginning of a fundamental societal change (Abstract of Article).

EDU CURA 189

Taylor, J. (1995). Non-Native Teachers Teaching in Native Communities. First Nations Education in Canada: The Circle Unfolds. M. Battiste and J. Barman. Vancouver, UBC Press: 224-242. Taylor commences this article by describing his own experience, as a non-native teacher, of working within a reserve school. He suggests that, frequently, on-reserve students are taught by non-native teachers, who battle crossing a cultural border as a means to communicate with community members. In his first section, teacher motivation and predisposition to change, Taylor asserts that, often, non-native instructors perceive the reserve as a temporary station to achieve or begin to achieve personal goals. Therefore, one of the major challenges of the presence of non-native teachers on the reserve is the negative perceptions they obtain about their surroundings. Taylor comments that some teachers seclude themselves because they do not feel safe. Others felt that, because the reserve was not their permanent location, they would not communicate or be involved with the community. Taylor argues that "interaction between non-native teacher and community is important because it helps define how that community and its students perceive the teacher" (1995:226). The teacher, therefore, needs to consider being involved in the community, regardless of discomfort, in order to improve their work and daily life. They will be accepted by community members and, in turn, the teacher will be able to understand community ways of life.

The next section of the article is Culture Shock. Non-native teachers often feel discomfort on the reserves because they do not understand the culture of the people. "The reserve presents the non-Native teacher with a different culture and different set of cultural values and behavior" (1995:228). The teacher must address various variables, including: "a lack of parental involvement, multiple social problems, an unstable teaching population and a lack of resources. Acceptance of and interest in the student's community and way of life should provide the teacher a better understanding of the students' difficulties" (1995:228). Therefore, it is imperative that the teacher enter Native communities with an open mind and be aware that life will be different, but not necessarily threatening.

Taylor provides several coping mechanisms that teachers often use to aid them from the cultural shock. Such include escape (teachers avoid the native community as much as possible), confrontation (achieved through conversation and complaint), encapsulation (creating a cultural bubble in which to exist) and integration (making an effort to become part of the community but not assimilating into it). Taylor recommends the latter as being most effective.

Building a strong student-teacher relationship is imperative. Lack of acceptance by the non-native teacher of the student's community very likely will impair the effectiveness of learning.

Building a strong interpersonal relationship with each student, at the beginning of the school year, is a necessary foundation. One way to develop a positive relationship with students is through incorporating Native content into the curriculum. "Many non-native teachers feel that time spent on Native content materials is time spent poorly because they are prevented from achieving their goals for the year and students are prevented from accumulating the required academic knowledge by year's end" (1995:236). Incorporating native content will vary from community to community but may be a necessary prerequisite to elicit positive teacher-community communication.

Taylor concludes by stating that perhaps the hiring process should consider those individuals who are suitable for cross-cultural teaching (i.e.. native teachers). Additionally, better training is necessary in order to improve the abilities of non-native teachers when they enter reserves. Moreover, non-native teachers should be responsible for educating themselves about the community, culturally-appropriate content and culturally appropriate teaching methods. "Non-native teaching on reserves could be more easily achieved through organized teacher education in cross-cultural teaching specific to Native people" (1995:241).

EDU CURA 72

Thorne, S. (2001). Bridging the Gap Between Science and Indigenous Peoples' Knowledge. FORREX. S. Thorne. **2003**.

This electronic source addresses a conference held in 2001, its aim mainly to promote the understanding of Indigenous Peoples' Knowledge in natural resource management. It discusses the conference's objectives as well as distinguishes the differences between Western Science and IPK (Indigenous People's Knowledge)

EDU CURA 241

Trudel, M. (2000). The Contemporary Concepts of At-Risk Children: Theoretical Models and Preventive Approaches in the Early Years, University of Sherbrooke: 1-16.

This paper introduces some of the conceptual issues in the study of risk and protective factors in young children. A preliminary, albeit critical description of the contemporary conceptions of risk, and of the ecosystematic and biosocial models will also be presented. The analysis of these factors will be carried out in reference to the individual characteristics and to the various childhood developmental contexts, such as family and peer group experiences. A summary review of the literature in this domain enables an identification of the limits and a circumscription of the orientations for prevention research. Finally, from the standpoint of prevention, we begin a reflection on the summary's repercussions on early intervention and the child's subsequent school adaptation.

EDU CURA 61

Tsai, C.-C. (2003). "Using a Conflict Map as An Instructional Tool to Change Student Alternative Conceptions in Simple Series Electric Circuits." International Journal of Science Education **25**(3): 307-327.

"Research in science education has revealed that students have alternative conceptions when learning various domains in science. The conflict map uses a series of discrepant events, critical events, relevant scientific conceptions and preconceptions to promote student conceptual change. This study was conducted to examine the effects of using a conflict map on eighth graders' conceptual change and ideational networks about simple series electric circuits. Through a quasi-experimental research design, 93 of Taiwan's eight graders were assigned to a control group, receiving traditional instruction, while 97 eighth graders were assigned to an experimental group, which used a conflict map as an instruction tool. Research data gathered from a two-tier test revealed that the conflict map could help students overcome alternative conceptions about simple series electric circuits. Student interview data, analyzed through a flow map method, also showed that

the use of conflict map could help students construct greater, richer and more integrated ideational networks about electric circuits" (Abstract in article).

EDU CURA 96

Tsuji, L. (2000). "Modified School Years: An Important Issue of Local Control of Education." Canadian Journal of Native Education **24**(2): 158-168.
The author advocates for modified school years to allow First Nations the opportunity to contextualize the learning process through participation in traditional activities by following the rhythm of the seasons. Modified school years are imperative for First Nations culture as certain stories, legends and specific skills can be acquired only at a specified time. The article looks at the utilization of modified schools in Moose Factory and in Fort Albany and their outcomes (Refer to abstract in article) .

EDU CURA 183

Turner, N., M. Ignace and R. Ignace (2000). "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia." Ecological Applications **10**: 1275-1287.
This article focuses on traditional ecological knowledge and Wisdom (TEKW) and strategies for sustainable resources. Emphasis is made on the amount of knowledge that can be learned from indigenous peoples. The article proposes a model for analysis of TEKW systems, providing examples of their various features, and makes recommendations about potential applications of TEKW. Figure 1 in this article is informative in learning the different components of TEKW of Aboriginal peoples, and there is a small section, "Communication and exchange of knowledge and wisdom," that explains how this form of knowledge is passed on from generation to generation. This section gives examples of the importance of story telling and the hidden meanings that can come along with the stories.

EDU CURA 213

Van der Woerd, K. and D. Cox (2003). "Educational Status and its Association with Risk and Protective Factors of First Nations Youth." Canadian Journal of Native Education **27**(2): 208-222.
This study involved the administration of the 127-item Aboriginal Youth Health Survey. In total, 131 Aboriginal youth from Alert Bay, BC participated. It was found that school connectedness and family connectedness were not associated with delinquency or health and well-being measures. When individual delinquency items were contrasted, participants who dropped out were more likely to be addicted to alcohol and marijuana than participants who were in school or had graduated. Both participants in school or graduated and youth who dropped out reported similar levels of health and well-being. Limitations and possible interventions to keep First Nations youth in school are discussed (Article of Abstract).

EDU CURA 166

Waldrip, B. and P. Taylor (1995). "Understanding Students' Cultural Background: A Pre-Requisite of Effective Teaching." Papua New Guinea Journal of Education **31**(1): 1-9.
Waldrip and Taylor, throughout this article, proclaim that unless students can relate the application of what is taught to their own cultural background then the teaching strategies are likely to be less effective in enhancing learning. In other words, if students cannot understand or appreciate what is being taught in the classroom, largely due to their own diverse culture, efficient learning is unattainable. Consequent of a lack of optimisation between teaching strategies utilized by the teacher and the natural learning styles of the learner, students obtain severe learning difficulties. Walberg's model of educational productivity suggests 9 factors that require optimisation to be effective, and they include such things as: aptitude variables (i.e. motivation), instructional variables (quantity and quality) and a set of environmental variables (home environment). Arguably, an additional variable is culture. Science education poses significant constraints to effective learning

because a disparity exists between student's world views and the official school view. Teachers tend to emphasize the latter. Waldrip and Taylor proclaim, "in our experience of science teaching in developing countries, many teachers try to enforce the school view while failing to recognize the existence of the student's worldviews" (1995: 2). In many developing countries, curricula are usually taken directly from Western nations, without much adaptation. This means that education is taken outside of the local context, and is, therefore, unfamiliar and irrelevant to local students. Consequently, it is essential that teachers have an understanding of traditional models of belief about the natural world and move away from just teaching standard science (which obtains western undertones).

This article reflects a case study that was done in Melanesia, where the main objective was to look at the disparity that exists between students' worldviews and the official Western worldview. In this case study, the researchers found that the science curriculum had been imported directly from a nearby Western country. Additionally, the research team found that the teachers had very didactic approaches to teaching which would allow for very little adaptation. The authors, during this study, revised their research agenda and sought to focus upon the extent to which the school view was perceived as being relevant to traditional village lifestyle. From the results of this case study, the authors were able to prove that (1) the process of enculturation into a Western school view involved an implicit devaluation of students' traditional worldviews which govern village lifestyles and (2) a western school view is of limited viability in relation to traditional values and practices. Thus, they conclude that if the schooling process is not meeting cultural expectations, it is likely that the resultant learning will be less than effective and less meaningful.

EDU CURA 47

Walton, P. (1999). An Evaluation of First Nations Education in North Okanagan-Shuswap S.D. 83, Ministry of Education. **2004:** Case study reflecting aboriginal education in School District 83 and recommendations to elicit success amongst secondary aboriginal students. Walton provides a detail analysis of his case study with First Nations students of the North-Okanogan Shuswap District. The study makes several recommendations reflecting student success from the responses provided within interviews and focus groups with aboriginal students and teachers. The study concludes with appendices of the student questionnaire and band representative, teacher, administrator, FNSW Questionnaire that the researcher utilized during his study.

EDU CURA 142

Watt-Cloutier (2000). Honoring Our Past, Creating Our Future: Education in Northern and Remote Communities. Aboriginal Education: Fulfilling the Promise. L. D. Marlene Brant Castellano, Louise Lahache. Vancouver, UBC Press.
The article addresses the importance of empowerment and self-controlled education in Nunavik from a first-person perspective. Consequent of the lack of empowerment and self-control of educational systems, aboriginal students have experienced low achievement levels in school. Consequent of westernized institutions, elder knowledge is no longer seen as significant as local education is often dominated by foreign systems of knowledge. The author claims that such are "dependency-producing institutions," as they make aboriginals depend upon substances, processes, people and systems. Furthermore, the author states," many dependency-producing institutions make the big mistake of growing with the problem and this, embracing dependencies/ addictions rather then confronting them and finding concrete ways to empower people, is the main problem. The school systems that do not make true empowerment and independence the key themes to their programs are adding to the problem rather than solving it" (Watt-Cloutier, 2000, 121).

The author claims that individuals are capable of obtaining an education without going to school, meaning that there are many formal and informal ways to learn. Schools may be helpful

only when they are well-designed, capably staffed and learning is independent.

Effective education involves translating community needs and aspirations into effective programs. Looking at community needs is a good way to point out the problems of education systems. Education systems that do not reflect upon community needs fail to empower the community. The education system must develop parallel to the community's emerging self-government status in order to elicit positive effects for the community. The authors conclude that rather than imitating southern educational institutions, both the design and development of education systems in Nunavik should occur slowly and incorporate what works best for the specific community, rather than incorporating what works best for the education system at large. Furthermore, the author states, " the relinquishing control will require open and honest dialogue on the part of both the Non-Aboriginal and Aboriginal nations if we are going to genuinely empower ourselves and regain control over our lives. It will require political commitment, leadership and determination" (Watt-Cloutier, 2000, 127).

EDU CURA 45

Wendel, T. (2000). Creating Equity and Quality: A Literature Review of School Effectiveness and Improvement, Society for the Advancement of Excellence in Education: 1-73.
This study is based upon the premise that schools themselves can and do add significant value to students' educational experiences. Reflecting the Manitoba School Improvement Project, this report provides some valuable insights into the school improvement process and conditions under which it can succeed. Most importantly, the evaluation points to the phenomenon that the drive to improve and to offer students the best possible education needs to come from within. Schools that take the time, devote the energy, have the vision, and reflect upon what they do and how well they are doing it have the greatest chances for success. Those schools that obtain supportive, caring school environments and emphasize individual effort and improvement facilitate adaptive patterns of cognition, affect and behavior. In return, these SES-students connect to the school. Effective schools, as this report states, have the following characteristics:

(a)Promotes progress for all of its pupils beyond what would be expected given consideration of initial attainment and background factors;
(b)Ensures that each pupil achieves the highest standards possible;
(c)Enhances all aspects of pupil achievement and development; and
(d)Continues to improve from year to year

Although social-economic status plays an important role in student achievement and outcomes, schools can make a difference. Teachers that offer quality instruction that promotes equity amongst students is a large contributor to SES-student success. Committed teachers who focus upon student learning, make the difference in school improvement efforts.

EDU CURA 145

Wheaton, C. (2000). An Aboriginal Pedagogical Model: Recovering An Aboriginal Pedagogy from the Woodlands Cree. Voice of the Drum. R. Neil. Brandon, Man., Kingfisher Publications: 151-166.
The author provides four processes of learning and their applicability in the context of teaching in settings that are aboriginal. She states that by "incorporating observation, experience, introspection and inquiry during the education process, we will begin to create linkages from the experiences of human beings and transmit them wholly to students in the classroom. We are, unfortunately, limited, by this setting within school classrooms of being able to convey all dimensions of human experience..." (Wheaton, 2000, 163). She analyzes different ways something is taught in woodland Cree culture and how each process applies. All of these processes, the author verifies, demand critical skills from its

student and yields a total learning experience.

EDU CURA 143

Williams, L. (2000). Urban Aboriginal Education: The Vancouver Experience. Aboriginal Education: Fulfilling the Promise. L. D. Marlene Brant Castellano, Louise Lahache. Vancouver, UBC Press.

This article provides insight into aboriginal education in Vancouver. It documents the historical evolution and current profile of services developed in response to the needs of First Nations students in the Vancouver school district. The author also discusses the way in which Israeli educator Reuven Fruerstein's mediated learning approach was integrated into BC's programming. The author also reflects upon the experiences of First Nations education in the district over the past fifteen years and the challenges it continues to face.

EDU CURA 19

Wilson, P. (2000). "Circles in the Classroom: the Cultural Significance of Structure." Canadian Social Studies **34**(2): 11.

The article claims that architectural structures and classroom arrangements carry cultural biases and affect the way that students learn and perform. Linear rows carry a European structure whereas circular set-ups reinforce aboriginal structures (talking circles is an aboriginal custom that represents the holism of Mother Earth and the equality of all members. Open circles provides an open forum for students to air their concerns and share their lives, students are found to be more open to learning and more prepared to take in new information if they can first establish their presence in the classroom. "In this way, every student has a voice, a name and a place of importance" (Wilson, 2000).

EDU CURA 222

Wotherspoon, T. and B. Schissel (2000). Risky Business? "At Risk" Designations and Culturally Diverse Schooling. Saskatoon, The Council of Ministers of Education Canada Pan-Canadian Education Research Agenda: 1-21.

This paper examines the discourses and practices associated with the designation of specific categories of children and youth as being "At-risk" in terms of their potential failure to complete school and develop meaningful integration into out of school social contexts. The authors argue that effective responsiveness to problems related to "at risk" learners requires a refocusing of much conventional policy and research, accompanied by informed political and administrative will, effective utilization of sufficient resources and systematic co-ordination of existing knowledge bases about effective educational practices across professions and jurisdictions.

The authors begin their discussion with a critique of conventional discourse associated with the identification of learners as being "at-risk". The authors point specifically to the potential for such designations, however well-intended they may be, to becomes means by which power and resources are diverted away from constituencies that require them the most. Next, the authors examine some key factors involved in the analysis and education of "at-risk" learners. Although the focus has particular relevance to those designated "At risk" through their status as members of social or cultural minorities, the authors are concerned with more general student populations as well. The authors then proceed to outline educational practices and school-community relations that are characteristic of a vision of schooling and child development based upon principles of social justice, arguing the need to locate effective strategies in the integration of activities and initiatives across school, community, social structural and public policy spheres (Introduction of report).

EDU CURA 207

Wright, D. (1998). "Preparing First Nations Students for College: The Experience of the Squamish Nation of British Columbia." Canadian Journal of Native Education **22**(1): 85-92.

The Squamish Nation of British Columbia initiated a program to improve the success rate of their post secondary students through a partnership with a local community college. Accepting principles of First Nations self determination, the partnership empowered the Squamish Nation to participate fully in developing a college transition program. The program assisted students by providing an initial skill assessment, developmental instruction, and ongoing support services. The success rate of students enrolled in the program demonstrated the benefits of the partnership. The experience of the Squamish Nation indicated that as colleges accept First Nations self-determination more First Nations students will succeed.

The First Nations people of Canada are seven times less likely to graduate from university as are members of the general population. They are twice as likely to not complete high school, and of those graduating fewer than 23% go on to college and only 24% of those earn degrees (Armstrong, Kennedy, & Oberle, 1990). These rates are significantly below those of the general population and indicate the serious problems facing First Nations leaders as they encourage their members to seek post secondary education.

The response of post secondary institutions to this problem reflects limited understanding of the First Nations perspective. Colleges and universities often view the lack of success of First Nations students as an acculturation issue. This results in programs designed to adjust students to the realities of a conventional post secondary institution rather than to modify existing programs to better assist and suit First Nations students. Such programs are generally unsuccessful.

An alternative is tribal colleges, which provide evidence of an increase in student achievement when First Nations people manage their own educational experience. The two-year retention rates and number of students successfully transferring to traditional institutions are significantly higher for students enrolled in tribal colleges. The Carnegie Foundation for the Advancement of Teaching (1990) reported retention rates at some colleges increased more than 20% and that half of those who complete a two-year degree go on for further study. Empowered to design local post secondary experiences that reflect community values, the tribal colleges succeed where other institutions fail. Kirkness and Barnhardt (1991) observed that when First Nations people assume control of their educational process the result is a better education, "An education that respects them for who they are, that is relevant to their view of the world, that offers reciprocity in their relationships with others, and helps them exercise responsibility over their own lives" (p. 14)

The Squamish Nation of British Columbia examined the advantages of the tribal college and elected to develop a relationship with existing post secondary institutions that would accept a First Nations perspective. Motivation for this decision came from the Squamish experience that indicated their students preferred attending traditional educational institutions. Although experience working with traditional colleges was negative, Squamish leaders remained convinced that existing colleges could provide a viable alternative. Their educational experience prepared them to make a strong initiative to establish a productive relationship with Capilano College. Determined to improve the success rate of their students, they approached the college and suggested a partnership. The Squamish Nation felt that the right kind of partnership could result in a productive opportunity for their students.

(Introduction of article)

EDU CURA 6

Zarry, L. (2002). "A Multicultural Science Curriculum: Fact or Fantasy?" Educational Research

Quaterly **25**(4): 8.
"This article explores the possibilities and benefits of developing a multi-cultural science curriculum using Aboriginal input through factual disclosure and metaphorically in literature. Environmental concerns are cited. Science curricula used presently in schools are challenged and an outline for creating a multicultural science unit is provided" (Zarry, 2002, 3).

EDU CURA 199

Zepeda, O. (1995). Rebuilding Languages to Revitalize Communities and Culture. Science and Native American Communities: Legacies of Pain, Visions of Promise. K. James, University of Nebraska: 57-62.
The American Indian Language Development Institute (ALDI) , which is part of the University of Arizona, creates an integrated learning situation for educators of Indian students and for Indian community members that focuses on tribal languages. Most of the participants of this program are aboriginal educators in both tribal and public schools that obtain a high percentage of aboriginal students. The ALDI also encourages parents, elders and tribal leaders to attend so that they may become better educated about their language and about what the teachers from their communities are trying to do. Community members help teach the language in order to help teachers come up with language programs and lesson plans.

The ALDI offers courses in bilingual education, language policy, Native American linguistics, Native American literature and related issues. This program has assisted a number of Native communities with developing new systems for writing their languages. Grammar books and dictionaries are established, which are accurate, practical and useful to the community. The ALDI also acts to assist and train people in developing curriculum materials that incorporate tribal languages. The teacher and parents are taught how to write books in the native tongue for curriculum purposes. These books are then designed using computers and graphics to create polished Native language curriculum materials.

The ALDI has been very successful in all areas except for funding. The institute has operated on soft monetary funds. Therefore, its stability has often been questioned. The author discusses the importance of maintaining this type of institution, since American Indian languages have been declining over centuries. Experts say that all American Indian languages in the US are "endangered," which means that the language is not used enough by children to keep it alive in the future. Similar problems exist in Canada. Some band languages are at the extinguished stage now, and some are already extinct. The author wishes to establish a Native Center that will attempt to maintain, promote and revitalize Native American culture. Native elders, children, researchers, and aboriginal high school drop-outs, may come to the center and work together to preserve, rekindle and understand Native languages. This center would be an additional service not inclusive of the ALDI institute.