THE RESIDENTIAL SCHOOL EXPERIENCE: RESIDUAL EFFECTS UPON FIRST NATIONS STUDENTS IN THEIR UNDERSTANDING AND MASTERY OF TASKS WITHIN THE MATHEMATICS CURRICULUM

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ABSTRACT

THE RESIDENTIAL SCHOOL EXPERIENCE: RESIDUAL EFFECTS UPON FIRST NATIONS STUDENTS IN THEIR UNDERSTANDING AND MASTERY OF TASKS WITHIN THE MATHEMATICS CURRICULUM

KENNETH J. A. MACDOUGALL

We examine the influence of Canadian governmental policies upon the ability of First Nations students to succeed in the understanding of mathematical principles. The materials used in the task consist of mathematical curriculum (the introduction of mathematical descriptors and geometric manipulation), pre-evaluated in Quebec, and having common syllabus in British Columbia. After establishing standards of comparison with a Montreal sample population, materials are taught to two separate, small communities of First Nations students. One group attends a Band-administered institution, while the second set is subject to the regulations of the public sector.

It was assumed that there is no readily identified impediment to Aboriginal students succeeding in mathematics, beyond those that influence other normal populations. Whatever factors contributed towards the failure of Native students to maintain demographic consistency was due to external issues not relevant to the curriculum, but affecting its instruction.

Our study shows that, despite using Euro-traditional instructional methods and evaluation tools not screened for cultural bias, Aboriginal students actually fared better in the materials presented than did the comparative group. It also suggests that subsequent success becomes a function of teacher influence isolating classroom issues emanating from prior generations, and debilitating the children's learning paths. Such resistance may be overcome by non-Aboriginal teachers when they are attuned to the historical imperialism of their roots, and integrate curriculum needs with traditional Aboriginal learning methods. Further research is also required to assist teachers in isolating social behaviour from true learning, which may have application in multi-racial institutions.

ACKNOWLEDGEMENTS

This document has been a long time in production. I enrolled at Concordia in 1976 after meeting Dr. Harold Proppe and Professor David Wheeler in late 1975, but regrettably didn't complete my project, wandering instead to Western Canada, where budgetary cutbacks, administrators who didn't like the idea of paying for "extra" teaching credentials, and increasing disillusionment with teachers more worried about job security than teaching, caused me to change vocations.

In 2001, my son Geoffrey caught me in a state of catatonic funk, increasingly depressed by the work I was doing, and worrying more about Native street kids who were turning towards drugs and prostitution, rather than staying in school. He managed to convince me, intellectually, to try to get back to my roots, which were in teaching, and returning to school. In early 2002, I reapplied to Concordia where, in spite of my history, Dr. Hillel agreed to accept me back into the programme, probably on faith alone.

Over the past five years, I have met some astounding people, who have provided me with much insight into the issues under examination. I credit Donna Heimbecker and her partner Kennetch Charlette with inculcating in me an awareness of the traditions of First Nations people. I thank Foster Walkus, Clifford Johnson and Billy Andy, Jr. with showing me how this pride can manifest itself in following that life. In Herman Crain, I found one who could acquaint me with the realities of to governance of his people, and from my partner, Beverly Crain, as well as her grandmother, Nancy Crain, women whose stubbornness equals mine, strength to realize that my skin colour was no impediment towards understanding the problem's nature.

To my friends and colleagues, Warren Beatch, Kevin Nesdoly, Don Beggs, Chris Nelson, Lesley Lee, Robert LaVoie, Tessie Smith, Natalie Jack, Nancy Gillette, Brenda Leo, Andris Freimanis, and Jerry Lang, I thank whatever God is theirs for providing me with their insight and wisdom. To students James Ottereyes, Lori George, Mercy Windsor, Tammy Billy and Sarah John, I thank for your honesty and contributions to my classes.

Would it be that this knowledge could be administered to those Aboriginal peoples now wandering the streets of our cities, in need of this wisdom and counsel, and help them in their journeys throughout life.

DEDICATION

My mother, Mary Kurkowsky MacDougall, wanted me to be a doctor. My teachers, be they Sister Yvonne or Mr. Henderson, just wanted me to sweat a little while doing my school work. My brothers, Gerry and Peter, wanted me to stop arguing with them, believing that, although I was the eldest son of the family, I should defer to their inherent wisdom. To be honest, none of them actually "influenced" me into becoming a teacher – at least, so I thought.

Early in 2006, my father, James Alban MacDougall ("Al", as his friends called him), passed away after complications from pneumonia caused his heart to fail. Now, as the oldest son in the family, I wasn't exactly "close" to my father, having to be the guinea pig of his experimentation with parenthood. The only thing I remember (selectively) is my more fortunate brothers profiting from his mistakes in parenting and my perseverance in gaining privilege and favour for them, particularly in their teen years.

In actual fact, I never even realized that I loved my father until, wandering through Winnipeg International Airport while carrying the cremated ashes of my mother, going home to be buried alongside her parents, my aunt pointed out to me the loneliness inherent in that passage.. After that, I vowed to pay more attention to his feelings.

My father was a brilliant man, often maligned for that trait, but always willing to forgive others their own foibles. His capacity for extracting significance from even the most obscure of mechanical facts, and applying them to efficiencies in the trucking industry that was his second love, was profound. After he retired from the Canadian Armed Forces around 1970, I tried to encourage him to go back to university and obtain an Engineering degree, a task which I am certain he could have mastered with ease. He thought I was kidding and, even up to the age of 80, continued to work to support his family, and then a second family, which he inherited upon remarrying. His death at the age of 85, even in frail health, took a life of infinite promise, even then.

In the Spring of 2002, after taking my son's advice and deciding to return to school, dad had sat down with me and asked the question: What did I plan to do with my life? Now, at 57 years of age, that is a "weird" question to be asked by one's parent, but considering the enormity of my decision, was probably merited.

This thesis, I hope, will be the start of my response to his inquiry.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

My first-ever teaching assignment came in the Fall of 1976. It was to be in a small town by comparison with Halifax, some 160 clicks north of Trois Rivieres, Quebec; however, since new positions were already becoming scarce, I was running low on cash, and the recruiter had tried to make it sound like Seventh Heaven for Mathematics Teachers, I accepted his kind offer. The only thing I really knew about the region, however, was that the air and water were filthy with the stench of poorly maintained pulp and paper mills, Rene Levesque was probably going to be the next premier of the province, and that our federal representative to Parliament was Jean Chretien, "the little man from Shawinigan", which wasn't a particular source of comfort, either. Now, however, I had to look forward to trying to impress the hearts and minds of a bunch of high schoolers in an English-instruction school, with a knowledge of French that was, to put it mildly, poor in the extreme.

They should have named the school Purgatory High. You could cut the French-English political tensions in the staff room with a knife. The kids, ever suspicious of "new blood" and seeking weaknesses in my personal profile, would lace their descriptive narrative of my efforts (in French, of course) with a cultural profanity I would quickly have to learn, if I were to survive. However, our teaching duties were suddenly, if not miraculously interrupted, by a province-wide teachers' strike. The recruiter, of course, had failed to mention during the interview that this might occur; he also neglected to mention the fact that we wouldn't get paid if it did. Fortunately, there were no picket duties, just long days helping my wife unpack, babysitting my newborn son, and worrying about how we were going to pay the bills, afford groceries if this continued for too long. Fortunately, we settled within the first month, and the staff room debates recommenced. The kids now turned their attention to pretending not to know anything I was trying to teach them, and a strange, if welcome, routine ensued – that is, until a young Cree male from the Mistassini Reserve one day in October walked into my Grade 10 Mathematics classroom.

My first impression of the boy was that he was more interested in the young females in the classroom than he was in my mathematics lectures; the female students, sensing some form of opportunity to embarrass their teaching foe, openly returned his affections. Nonetheless, everyone was going to receive a unit test the next day, so I had to return their minds to the task at hand; for that, I required all the skills I'd learned in my Math Methods lectures: begging, pleading, coaxing or coercing answers as required. As I was born with the gift of stubbornness, order eventually prevailed, and things sort of returned to normal.

Being pragmatic as well, I chose to offer this young man the option of writing the test, then being eligible for a make-up, should he not do that well – which I immediately assumed would be the case, given that even this small gesture of politeness was being overshadowed by his eyes still not making contact with mine, remaining instead focussed in upon the glances of one of the young and more aggressive females in class. Just as the bell rang, he grunted some response which I assumed was to be an affirmative understanding of the situation, before wandering off to introduce himself to his new classmate.

The next day, he wrote the test, acing it, and in the process posting a higher mark than all but one of whom I considered to be my most gifted students.

First impressions, I suspect, are overrated in the teaching profession...[1]

It can be reasonably stated that the Canadian educational system is currently failing First Nations people, particularly in the areas of understanding mathematics and science. Our Aboriginal population is the most rapidly growing demographic in Canada, and its ranks are swollen by a disproportionate numbers of inadequately educated youth and young adults. Few within this particular segment of indigenous society have

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[1] Ken MacDougall, "***Introducing Mr. Ottereyes***", **Some You Remember - Even Those You Forgot** (Saskatoon SK: Unpublished, April 2007).

completed high school, nor are likely to do so.[2] Moreover, many of its senior members have been prevented from contributing towards the attainment of First Nations-defined economic objectives, either through a lack of similar education, or by inappropriate programmes designed by our federal government for combating economic disparities within their communities. The net result of such failings has resulted in the creation of social ghettoes of indigenous populations in the Canadian mosaic, banded together through common bond with missed economic opportunity, questionable literacy and the personal frustration that accompanies such displacement.

At the root of this story is a federal government educational initiative, begun in the mid-1880's, wherein Native children were required to attend off-reserve schools, and live in the residences provided these same institutions. Often these schools were run by the predominant religious order of the region. More often than not, the children became the subjects of cultural deprivation, denial of their own traditions, and indoctrination, often through brutality and oppressive methods having no relationship whatsoever to the purpose and intent of educating individuals. The result of such treatment was to become known in our contemporary literature as the "residential school experience".[3]

It is safe to say that not all students were adversely affected by that attendance, nor were abused; all, however, were isolated from family, culture and tradition, and were deprived of an exposure to normal interaction in the raising and caring for family

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[2] David K. Foot, **Boom, Bust and Echo: How to Profit from the Coming Demographic Shift** (Toronto ON: Macfarlane Walter & Ross, 1996), pp. 195 – 197.

[3] Ontario Federation of Indian Friendship Centres, "***A Brief History of Aboriginal Health***", **OAHIA Manual** (Toronto: OFIFC, October, 1999), p. 6, [http://www.ofifc.org/oahai/Acrobatfiles/briefhist.pdf].

members, fundamental lessons in the learning of life skills and the nurturing of future generations of their people. These afflicted generations of First Nations people would eventually experience difficulty in providing for family members, and were less capable in raising their own children with the care and skill of their ancestral parents.

Without adequate counselling services or life skills programmes, succeeding generations of adults today still can't compensate for that lack of training in becoming effective parents, unless they have developed their own "trial and error" process (based, perhaps, upon an observation of successful child rearing processes and an intuitive appreciation of that technique.) Thus, these latest additions to our Native populations – children of the residential school "survivors" – are inheriting their parents' failings through the normal processes of social transference and personal interaction. It can therefore be surmised that these carry-over conditions of residential schooling have produced their own deleterious effects upon all educational issues found in First Nations – including the prevailing research indicators that illustrate the collective failure of indigenous populations to make any acceptable progress in the understanding of either mathematical or scientific principles. Assuming this position, this thesis therefore intends to examine the educational issues affecting Aboriginal populations, whether on or off-reserve, with particular emphasis being placed upon pedagogy that may be inhibiting the development of adequate numbers of mathematically literate First Nations students.

I) STRUCTURING THE STUDY'S CONTENTS

Chapters II and III of this investigation start by examining the underlying historical, cultural, political and sociological conditions that have inhibited development

of an educational system in which First Nations students could succeed. This review is followed by an investigation of the mathematical potential to be found within three schools at which the author taught, each of which experienced their own list of difficult social issues and environments in which classes had to be maintained. Two of these schools (one administered by the public sector, the other being Band-run), can be found in British Columbia, and are comprised almost exclusively of Aboriginal students. The third, an inner city school in Montreal, Quebec, draws its population from a principally immigrant community, none of whom is of First Nations ancestry.

Students in these three schools were given instruction in the same geometry module. This unit examines spatial concepts of tangible objects, while describing and illustrating how such objects might be mathematically measured or classified. In turn, it develops the framework for using the techniques thus mastered to assist in problem solving processes of both similar and non-related mathematical systems. A hint is also provided as to how these materials will be used in more intensive mathematics discussion in later grades. Using similar examination criteria, the test results of the two schools populated by First Nations students are then compared with students from the inner city school (Chapter IV).

In the concluding portion of this thesis, the author reflects upon the conditions and experiences that were observed during the teaching of both the Montreal test group and First Nations students, and the results of the Chapter IV comparisons. Patterns of both student academic and sociological behaviour found within all three schools, especially as they relate to both family background and student lifestyle, are in turn identified and discussed. This analysis is undertaken so as to give weight to the recommendations as to

the changes that should be made in both First Nations' educational structure and general teaching methodologies, so as to allow Aboriginal children to achieve to their full potential - whether in their general studies, or mathematics, in particular.

II) CONFLICT: EXAMINING FIRST NATIONS EDUCATIONAL HISTORY

The literature review accompanying this paper highlights complex and competing variables that have contributed to the problem of creating a First Nations mathematical and scientific intelligentsia in Canada. This statement should not be construed as a comment upon the Aboriginal intellect, but rather of emphasizing the fact that First Nations individuals have to this point in our history, at least, been unable to fill their adequately educated quota for any but the least paying of professions, commensurate with their percentage of our population as a whole. Therefore, we should not be surprised to learn that Aboriginal children also have the highest drop-out rates from school, when measured as a percentage of demographic,[4] while prison populations hold an equally disproportionate number of Natives, relative to that same census analysis.[5]

The failure of educational initiative in First Nations populations has, at its roots a history of federal governmental policy failures, combined with provincial governmental indifference towards Aboriginal conditions. Central to this problem is the original Canadian government's decision to have all Native children attend residential schools.

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[4] Julie Luce Desroches, **Aboriginal Education Programs in British Columbia's Public School System and their Relation to Aboriginal Student School Completion** (Burnaby, BC: Simon Fraser University, 2005), p. 27, [http://ir.lib.sfu.ca/retrieve/2168/etd1813.pdf].

[5] Native Women's Association of Canada, **Number of Aboriginal People in Canada's Prisons Growing** (Ottawa ON: NWAC, October 16, 2006), [http://www.nwac-hq.org/_includes/pdf.php?press_id=24].

Aboriginal leaders wanted their people to attend "white" schools in order to both understand the emerging European influences, and to develop the tools for economic survival within that culture. Governmental reasons for the establishment of such institutions were far less altruistic; they merely saw education as a means for Natives to take control of their own economic survival, thus lessening their "burden" upon the public purse.[6]

How these schools delivered upon their educational mandate became the task of the various Christian denominations charged with overseeing these Aboriginal schools. All such sects shared the belief that First Nations populations were in dire need of a conversion of faith from their traditional beliefs; their underlying assumption, shared by both parliamentarians and European churches alike, appeared to be that traditional Aboriginal practices were pagan, barbaric or uncivilized. It is therefore reasonable for us to chart the evolution of this education policy's influence upon Aboriginal literacy expectations, from that inauspicious inception to its now-accepted failure, in mapping out the government-church alliance's role in handicapping First Nations educational success.

The second component of the literary review focuses upon the factors influencing the current means of educational delivery, and drives the functionality of that process among First Nations students. In this system, duly accredited university teaching faculties both study and report upon pedagogical issues, and map out the strategies necessary to provide proper instruction and subject insight. Their collective thoughts are then passed down to deliverers of the process, governmental departments of education, teachers,

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[6] J.R. Miller, "***Residential Schools***", **The Canadian Encyclopedia** (Ottawa ON: Historica Foundation of Canada, 2007), [http://www.canadianencyclopedia.ca/PrinterFriendly.cfm?Params=A1ARTA0011547].

administrators and boards of education.

It is the educational department's prerogative to design curriculum expectations, based upon such research. At the Board level, however, local authorities may choose to follow such outlines, modify their approach to teaching based upon local condition and intellectual initiative,[7] [8] or, in the absence of any overseeing authority charged with certifying that the pedagogical methods are in fact followed, simply ignore such advice in favour of maintaining a "status quo" within the classroom's existing regimen.

In First Nations communities, it is the influence of family structures that determine not only which school a child will attend (if such an option is available), but also what the child will study while attending classes. Thus, the children's behavioural tendencies and learning potentials are heavily predicated upon the learned practices and cultural influences governing their own upbringings; as such, the potential for conflict with the objectives of the school system might already have been sewn long before the child has even begun any formal educational process. Also playing prominent roles in influencing the child's learning process are the social, economic and psychological factors at play in the Aboriginal community itself, key elements upon which this thesis

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[7] British Columbia Ministry of Education, ***"Individual Education Planning for Students with Special Needs"***, **Special Education** (Victoria BC: BCEd: 2007), [http://www.bced.gov.bc.ca/specialed/iepssn/whatiep.htm]. British Columbia's educational system provides for individualized programmes (IEP's) for students with learning difficulties, allowing teachers to "water down" curriculum intent. Since many First Nations students are classified as "special needs", it is reasonable to question the role of IEP's in the degradation of the Native student's educational experience.

[8] Desroches, pp. 78 – 90. This study compares high school graduation rates in so-called "special education" programmes, using classifications such as "always Aboriginal" or "sometimes Aboriginal". Both statistics are high, but the category of "sometimes Aboriginal" may hide a larger picture of Native failure rates in school divisions having placed students in this "grey" area.

focuses, particularly when these external pressures influence mathematical literacy potential.[9]

The crux of issues affecting the establishment of proper learning environments for First Nations students lies in the political expression of "control" of the educational process itself. To First Nations leaders, gaining access as to how educational delivery is structured is almost as important as the delivery of the education itself. Compounding their frustration in addressing the educational concerns of their people is the simple fact that the Canadian constitution places responsibility for the delivery of education upon provincial governments. This structure has thus replaced the ancient enemies of church and state with an almost hydra-like foe of bureaucracies with which Aboriginal leaders must interface. Invariably, the existence of these impeding structures forces First Nations and Inuit leadership to re-argue on a case-by-case basis the rationale behind proposed solutions to educational issues found within their respective communities – even when it can be demonstrated that a successful programme does exist in other jurisdictions.

Currently, with our society's preoccupation upon "political correctness" and the impropriety of using "failure" as a learning tool,[10] older and more traditional methods of teaching mathematics to students are used with considerably less frequency in the classroom, particularly when a concept is introduced that requires much diligence and

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[9] The Legacy of Hope Foundation, "***Healing the Legacy of the Residential Schools - Intergenerational Impacts***", **Where Are The Children?** (Ottawa, ON The Legacy of Hope Foundation, 2005), [http://www.wherearethechildren.ca/en/impacts.html] . An abridged list, modified to reflect conditions to be expected within a school environment, is contained in ***Appendix I***.

[10] Russel N. Cassel, "***Student Failure Must Always be Associated with Teacher Failure***", **Journal of Instructional Psychology** (Mobile AL: Journal of Instructional Psychology, June, 2000).

study in order to master. This in turn often denies students, Aboriginal or otherwise, of the opportunities to tackle enriched tasks requiring introspection and possible difficulty upon first pursuit of a solution, but which would engender confidence in the lessons learned upon such mastery.[11] The overall effect of these emerging conflicts is one of a failure to grasp opportunities for First Nations students to reach a theoretical plane in the mathematical thinking process, or to profit from the wealth of problem-solving potentials already being offered by the life experiences unique to the Aboriginal culture.

Thus weighted, any pedagogical development into the teaching of mathematics to indigenous populations degrades itself from the pathways of thoughtful introspection, giving way instead to finger-pointing and educational disharmony, without any acceptance of responsibility for the performance of the educational process itself.

III) ASSESSING THE DIRECTION TAKEN IN THIS INVESTIGATION

We must assume that Aboriginal students have a uniform capacity to handle and, indeed, excel at mathematics. Whether this assumption is merited is not the major concern of this exploration; the point is, this research had to proceed from a normal base point of intellectual reference, and could only be justified as worthy of study if the applicable populations were viewed with minimal racial bias attached to the study.

Taylor (1995), in examining his own role as a non-Aboriginal teacher, observed:

> ***Non-Native teachers should be responsible for educating themselves about the community, culturally appropriate content, and culturally appropriate teachings methods. However, more effective non-Native teaching on reserves could be more easily achieved through organized teacher education in cross-cultural teaching ...The people responsible for hiring need to give greater***

[11] This aspect of tying possible "failure" with self-worth is dealt with in more detail in ***Chapter III***.

> ***consideration to hiring people who are suitable for cross-cultural teaching...When this issue is addressed... the results should benefit Native students immensely.***[12]

Taylor sees the teaching experience, while being separate from the cultural learning undertaken by the teacher, as a flexible and adjustable process – but only as the cultural experiences of the teacher are absorbed into personal lifestyle changes. This, in turn, implies that First Nations students should be fully capable of learning mathematical and scientific concepts at rates comparable to these normal populations – if we can adjust ourselves as teachers towards spotting the cross-cultural signs of learning acceptance.

By tracing student behavioural histories through family histories, it is hoped that a more conclusive linkage may be found between the effects that residential school attendance had upon the mathematical skills development of First Nations students, both past and present. Further, by including both the sociological and psychological conditions present during instruction as part of our observations, this would allow us to assess what modifications to pedagogical procedures might have the greater potential to improve classroom learning.

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[12] John. Taylor, "***Non-Native Teachers Teaching in Native Communities***", **First Nations Education in Canada: The Circle Unfolds**, Marie Battiste and Jean Barman, Editors (Vancouver BC: UBC Press, 1995), pp. 240-241.

Chapter II

FEDERAL EDUCATIONAL INITIATIVES: COMBINING POLICY FAILURE WITH CULTURAL DEPRIVATION IN FIRST NATIONS COMMUNITIES

J.R. Miller, in his analysis of Canadian governmental policy, paints a stark reality into the political landscape of First Nation educational initiatives and result. His conclusions may be best summarized in two words: total failure.[13]

The concept of a church-operated residential school was a creation of federal policy released in the mid-1880's. However, had our governors examined the precedents leading to the creation of these industrial schools, historical awareness would have shown that their proposed strategy had already been tried by the French landlords of New France in the 1650's, only to be phased out for their inability to assimilate Aboriginal peoples into European customs and traditions. [14] [15]

There is little disputing the actual historical conditions that First Nations students encountered in these schools. So, in order for us to understand the significance of the educational chaos now afflicting Aboriginal communities (not just in the arena of

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[13] J.R. Miller, **Shingwauk's Vision: A History of Native Residential Schools** (Toronto ON: University of Toronto Press, 1996). Miller's results-orientated approach to writing this historical analysis of the interaction between governments, missionaries of various Christian denominations, and First Nations students, allows the reader to reach his or her own conclusions as to policy failure and genocidal practices.

[14] George Santayana, "***Reason in Common Sense***", **The Columbia World of Quotations** , Robert Andrews, Mary Biggs and Michael Seidel, Editors (New York: Columbia University Press, 1996), Chapter 12, pp. 1905-1906, [http://www.clevelandpress.com/Kellyferjutz5.21.htm]. Santayana traces the origin of common sayings; in this instance, "Those who forget the lessons of history are condemned to repeat it."

[15] J.R. Miller, "***Residential Schools***".

mathematics and science), we must be first able to trace that history's influence upon the teaching of all subject matter. In this evolution, there are four distinct phases:

- **the formation of the schools that became responsible for Native education,**
- **the processes that went into providing that education,**
- **the role that others, particularly the prevalent Canadian churches, had in destroying that educational fibre, and**
- **finally, the continued failure of government to recognize the harm done to First Nations communities by the residential schools, to confront the social and educational issues that had arisen from this experience, and of the resultant reluctance paid to the need for a healing process to occur.**

Since the closure of Canada's residential schools, there has been a gradual, if grudging, acknowledgement by government and church groups of the need to correct these historical injustices. Regrettably, that muffled recognition may have had more to do with individuals now coming forward to document the true nature of conditions prevalent in these institutions, as opposed to any "awakening of conscience" within church or state.

This now ongoing process of confrontation and recognition by government of the abuse undergone by residential school students, requires us to also examine the role that First Nations leaders have played in resolving outstanding educational issues. This investigation must assess whether the Aboriginal leadership has adequately concerned itself with the need for healing of its people, or has become side-tracked by other political issues and "playing the game" of politics itself with its federal and church adversaries.

Thus, to best understand the problem of teaching mathematics to Aboriginal students, we must fully understand the political, social and economic circumstances under which we are required to perform that very task.

I) RESIDENTIAL SCHOOLS AND THEIR POLITICAL EXPECTATIONS

This discussion on Native residential schools confines itself to an examination of the Canadian experience, post-Confederation. We now know that it was always the intention of the government to "Canadianize" Aboriginals - which really meant that First Nations should adopt European culture and practices as their own. Implicitly understood in this schooling mandate (which, in turn, was given over to the various missionaries to implement) was that these Native children were not only to be properly schooled, but "Christianized".[16]

In order to fulfil these mandates, the school custodians imposed the harshest of conditions upon their students, and enforced obedience with a harsh brutality. Denial of language and tradition, even extending to the child not being allowed to communicate with others in his or her mother tongue, were rules to be etched in stone. The imperialistic mentality influencing the formation of such demands upon these young charges was simple: if one eliminates language, one eliminates its cultural influence; if one, in turn, eliminates the culture and its spiritual derivatives, one then is free to instil within these freed minds the historical supremacy of European beliefs and social expectations.[17] Therefore, any reference to spiritual and cultural traditions was deemed to have its foundation in superstition. This touchstone to the darkness of spiritual powers for which

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[16] Public Health Agency of Canada, "***Why Were Residential Schools Created?***", **Canadian Health Network** , (Ottawa ON: Public Health Agency of Canada, October, 2006), [http://www.canadian-health-network.ca/servlet/ContentServer?cid=1007043&pagename=CHN-RCS%2FCHNResource%2FFAQCHNResourceTemplate&c=CHNResource&lang=En#residential].

[17] Jeff Thomas, "***Healing the legacy of the residential schools: Beginning the Dialogue***", **Where Are The Children?** (Ottawa ON: The Legacy of Hope Foundation, 2005), [http://www.wherearethechildren.ca/en/impacts2.html].

the Church had no comparison then became a necessary and sufficient justification for the eradication of such belief.

Isolated from their parents and extended families and left to miss their loved ones, students would run away, only to be caught, returned to the school, and beaten for trying to "escape". Sexual or physical abuse was to become everyday occurrences for some; still others fell into a profound depression and committed suicide. Those most committed to escaping spiritually prepared themselves to accept lifestyles where the only skill necessary for survival was the will to do so, even if this meant living on the margins of society, very often in the pursuit of criminal activities. Inevitably, there too, they would be subjected to exploitation, and emotionally and psychologically destroyed.[18] The methods by which "teachers" tried to purge these "wrong beliefs" would, ultimately, lead to the destruction of whatever humanity or capacity for survival these students had within themselves.

II) FURTHER STIFLING OF ABORIGINAL TRADITIONS

First Nations languages, lifestyles and history owe their continued existence to an oral tradition, wherein knowledge is passed from tribal Elders to the children and expanded upon with each new generation. In the "new order" of Canadianized education, these practices were deemed expendable, simply for their inability to withstand scrutiny

[18] Amy Fisher and Deborah Lee, Compilers, **Native Residential Schools in Canada: A Selective Bibliography** (Ottawa ON: Library and Archives Canada, April 2002), [http://www.collectionscanada.ca/native-residential/index-e.html]. This reference lists scholarly texts dealing with education and the influence of the residential schools upon First Nations educational progress. It also cites newspapers, government policy directives, and Native bands who have set up programmes and offer counselling services to those in need of healing.

of the documented word and scientific tradition more familiar to European cultures. In similar fashion, traditional commercial enterprise was forbidden (or outlawed), principally because such initiative was deemed to be based upon the spirit of communal need and purpose, as opposed to the individualized expectation of reward as taught within the capitalistic traditions of European settlers.[19] This in turn only further compounded the problem of survival by Aboriginals in an increasingly complex society, dominated by materialistic obsession that is foreign to most Native cultures.[20] [21] Yet, even when federal educational and economic policy decisions were successful (as they were in agriculture), this very success could potentially provoke backlash among non-Aboriginals, even if these experimental projects were executed upon reserve lands.[22]

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[19] Scott Rushforth, "***Political Resistance in a Contemporary Hunter-Gatherer Society: More about Bearlake Athapaskan Knowledge and Authority***", **American Ethnologist**. (Arlington, VA: American Anthropological Association,: May 1994), Vol. 21, No. 2, pp. 335 – 352.

[20] Ibid.

[21] Civilization.ca, "***Late West Coast Culture***", **A History of the Native People of Canada** (Gatineau, QC: Canadian Museum of Civilization, September 2001), Vol. 11, Chapter 28. [http://www.civilization.ca/archeo/hnpc/npvol28e.html]. Aboriginal families shared their wealth communally, attributing their good fortune to Mother Earth. West Coast potlatch ceremonies allowed communities to share the rewards of families thus blessed. To an "outsider", some of the practices of a potlatch did seem peculiar and barbaric, such as families symbolically feeding their ancestors at such ceremonies, a practice which upset Christian missionaries, or an Elder randomly and beheading a slave, to demonstrate that this, too, was a wealth to be given. However, Europeans equated wealth with individual "gifts from God"; families giving this "gift" away were seen as showing contempt for God's given riches.

[22] Doug Cuthand, ***"Time Natives recapture the agricultural dream"***, **The Star Phoenix** (Saskatoon, SK: CanWest Global Communications Corp., April 22, 2005). Agricultural programmes designed to teach First Nations how to farm, a policy dating back to the 19th Century, were usually attacked by farm lobby groups whenever harsh economic times put pressure on income. Communities adjacent to successful First Nations agricultural enterprises would view their success as "unfair competition" through subsidization.

III) CULTIVATING A RESPECT FOR FIRST NATIONS TRADITION

It is reasonable to state that not all residential schools were inherently "evil" in their influence upon Aboriginal culture, traditions and teachings. There are innumerable stories of success attained by First Nations students integrating into so-called "traditional" society and, indeed, of Aboriginal peoples educating European descendants in the inherent sensibility that sprang forth their peoples' heritage, particularly in the husbanding of the environment and managing this planet's resources. However, this is only a recent phenomenon.[23]

Ken Coates, a noted Canadian historian, observed that, before Mr. Justice Thomas Berger began examining the potential impact development in the North might have upon indigenous populations, non-Aboriginals, particularly those in southern Canada, contemptuously perceived northern Natives and Inuit as small populations of nomads living in ice houses, eating fish, whale, caribou and seals, and spending the remainder of their time hunting polar bears. The federal government saw no need to seek an opinion from these people as to what direction this development should take, as it could not – or would not – identify any qualified individuals from these groups with an expertise in the commercial harvesting of non-renewable resources within the affected regions.

Starting in 1974, Berger, accompanied by television crews from the Canadian Broadcasting Corporation, went into small Inuit communities, seeking the opinions of

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[23] Canadian Taxpayers Federation, ***"The Legacy of Indian Residential Schools"***, **Let's Talk Taxes** (Calgary, AB: CTF, April 2006), [http://www.taxpayer.com/main/news.php?news_id=2275]. Despite there being a general acceptance of the need for both church and state to confront the issues of abuse that took place in residential schools, the Canadian Taxpayers Federation, even in 2006, still opposed compensation for its survivors and the spending of taxpayers' monies to help with the healing processes.

these indigenous people on that very topic. CBC's television images ended up reflecting a northern lifestyle having some substance; moreover, Berger was unearthing facts to suggest that resource development projects had a potential to produce a dramatic upheaval upon the daily lives of the land's traditional dwellers. Eventually, the daily transmission of images from the north changed the opinions of other Canadians, who began to see these people as not unlike themselves. Once this transformation of opinion occurred, the federal government could no longer ignore the existence of these unique northern peoples. Policy decisions, particularly those which had the potential to affect a way of life, would henceforth require consultation with these communities' leadership.[24]

Berger's success in educating Canadians as to the potential of First Nations people should not, however, be used as a foil to ward off criticism of the damage inflicted by residential schools upon Aboriginal populations; it is merely a starting point of understanding. From a functional perspective, there are still too many Natives staggering through life with personally overwhelming emotional issues, laden with hurt and guilt, and still not understanding what place they were to take within the Canadian mosaic.

IV) LITIGATING, HEALING AND CONTROLLING EDUCATIONAL REFORMS

The Assembly of First Nations (AFN) has since the early 1970's been engaged in a struggle with the Government of Canada not only to establish Native-controlled schools located on First Nations land, but to have some influence in the management of curriculum. The Assembly has deemed it essential that instruction and course content

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[24] Ken Coates, "***The North: Treasure Trove or Partner in Confederation***", **Aurora Online**, Jeremy Mouat, Interviewer (Athabaska, AB: Athabasca University Distance Education, April 2002), [http://aurora.icaap.org/archive/coates.html].

reflect Aboriginal tradition, culture, and historical placement in the formulation of the Canadian identity;[25] however, even these meagre objectives are at times overwhelmed by the more pressing issues of economic stagnation, lack of employment opportunities for Aboriginal people, denial of treaty rights, or the settlement of land claim issues.

Economic issues on reserves can trace their inception to one primary source: the lack of an educationally qualified population trained to manage development of community infrastructure. This fact, in turn, relates back to the original purpose for starting residential schools, namely, to assimilate and eventually eradicate unique Native populations within the Canadian mosaic.

The notion mouthed by politicians and clergy alike, that residential schools were a "right idea gone horribly wrong", was always an exercise in "plausible deniability". Even as recently as 1969, Parliament was still prepared to entertain legislation to hasten Aboriginals assimilation, to abandon previous commitments to respect their rights as previously established by the Crown, and to not honour land claims promised by past treaties and negotiations. This parliamentary assault upon Aboriginal traditions, lifestyle and treaty rights galvanized Native communities into initiating a sequence of legal actions that would ultimately force the government to seek avenues of redress for First Nations.[26] Once this litigation began, it would soon be found that the damage caused by

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[25] Assembly of First Nations, **First Nations Education Action Plan** (Ottawa ON: AFN, May 31, 2005), pp. 1 – 4.

[26] CBC News, "***Natives Speak Out: Native people air long-held grievances at the Berger Commission***", **Canada: A Peoples History** (Toronto, ON: CBC Television, 2001), Episode 17, [http://history.cbc.ca/history/webdriver?MIval=EpisContent.html&series_id=1&episode_id=17&chapter_id=2&page_id=1&lang=E].

the residential school experience reached far beyond the experiences and feelings of those who actually attended these schools.[27]

When the AFN first began its educational lobbying efforts, it fully expected to encounter resistance from two extremely strong forces: the Canadian government's bureaucracy and the various Christian churches self-righteously denying the historical reality of abuse having occurred within most residential schools.[28] However, the Assembly would also find itself the victim of an unforeseen enemy from within: some chiefs, councillors and Band employees who sought to profit from the concessions obtained in negotiation with the federal government, by improperly administering programmes designed to help reserves staggering under the oppression of poverty, social upheaval and appalling living conditions. Not surprisingly, however, even when such victimization was exposed (often through the persistence of an Aboriginal band member or media source), there were always the "apologists" for this cannibalism, ready to drop even the source of that corruption back upon the teachings administered in the residential schools, and the values that were imported from European culture.[29]

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[27] United Church of Canada, **Indian Residential Schools**, (Toronto ON: United Church of Canada, 2001) [http://www.united-church.ca/residentialschools/2001/0323.shtm].

[28] Canadian Taxpayers Federation, ***"The Legacy of Indian Residential Schools".*** This opposition is often led by sources allied to either the federal government or church groups, such as federal resource sector lobbyists, many of whom have ties back to the political parties drafting legislation in an attempt to resolve residential school issues and rights promised by treaty.

[29] Anonymous (Chris, commentator), **The Tyee: A Feisty One Online** (Vancouver, BC: The Tyee, September 2004), [http://thetyee.ca/Photo/2004/08/23/CanoeNations/]. This comment suggested that, "*Undoubtedly there are some problems with aboriginal governance. However... Most recipients of the "corruption" charge - often justified - are groups of people who have had their previous social and governance systems destroyed... by colonizers who... disregard of democratic will of the people.*"

Eventually, however, progress was made in addressing the issues of abuse brought forward by the survivors coming out of the residential schools. Compensation would be eventually forthcoming for these survivors,[30] thus allowing First Nations leadership to begin focusing upon the more pressing economic, social and educational issues still causing hardship amongst their people.

In the case of the churches, denial finally gave way to an admission of responsibility for the actions taken by its administrators of residential schools. In 2001, Coleman and Thorpe published this statement on behalf of the United Church of Canada:

> ***... the national residential schools system was an integral part of a national policy intended to assimilate First Nations people into the dominant Euro-Canadian culture. While this policy may have been generated by good intentions there are simply too many stories of the pain... to conclude that the policy and its expression in the residential schools system represents anything but a profound failure...***[31]

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[30] Assembly of Manitoba Chiefs, **Biography of Former National Chief Phil Fontaine** (Winnipeg: AMC, 2004), [http://www.manitobachiefs.com/education/efa/philfontainebio.html]. Once agreement was reached that suitable compensation for residential school survivors could be attained through class action, a carpetbagger mentality seemed to engulf the mindset of lawyers who were to work on this civil suit. Phil Fontaine, who also attended residential schools, and was a strong advocate for compensation to its survivors, addressed that problem in an open letter to all of the law societies in Canada: "*We have heard complaints from survivors that lawyers have rented halls and advertised their services to sue the government and the churches on a contingency basis...We have been informed that this tests the boundaries of taste and ethics ...this behavior may be exploiting a situation that requires the utmost sensitivity... The care required to ensure that our people are not re-victimized by processes without counselling support cannot be stressed enough.*" His call for an understanding of the issues is credited with not only curbing this abuse by lawyers, but insuring that the class action was eventually successful.

[31] Virginia Coleman and Brian Thorpe, "***Researcher Defends Residential Schools***", **National Post** (Toronto: CanWest Global Corp., March 17, 2001), [http://www.united-church.ca/residentialschools/2001/0323.shtm].

Mere months after this publication, however, federal lawyers were still trying to argue that, because there were so relatively few First Nations students, proportionately, who attended either residential or day schools (about 18,000 in all), the amount of funds that the Assembly of First Nations was asking Parliament to commit to Aboriginal schools and to establish healing lodges for residential school victims, was overly excessive.[32] Again, the United Church voiced its objections to this strategy, even knowing that, to do so would also cost them dearly in litigation damages:

> ***To argue, however, that because not everyone attended the schools, therefore the impact of the institutions on First Nations communities cannot have been that significant, is wrong. What this assumption ignores is the fact that for every child in a residential school there is an entire extended family and community which would have experienced loss. What this assumption ignores is the fact that the testimony of First Nations survivors reveals over and over again the impact which the schools had on succeeding generations.***[33]

The conclusion, to the churches, at least, was obvious. By the federal government being unwilling to address the issues of healing, it would result in First Nations having to deal with more suffering from residential school after-shock, extending the problems of educational inadequacies into future generations.

V) THE CULTURAL CONFLICT IN FUNDING NEW EDUCATIONAL INITIATIVES

Once Canada's parliamentary leaders finally began to address the Assembly of First Nations' concerns respecting education, various bands took advantage of budgetary accommodation to build their own schools on reserve, and established local authorities to

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[32] Canadian Taxpayers Federation, ***"The Legacy of Indian Residential Schools".***

[33] Coleman and Thorpe.

oversee the instruction given in their classes. As to the expectations of literacy training First Nations individuals could expect, the government would ultimately see fit to embrace the United Nations philosophical approach as to the need for the universality and availability of educational opportunities for all people. It also agreed, in principle, to provide learning conditions in Aboriginal-run schools consistent with these objectives:

> ***The inalienable right of every human being to education is recognized in the...Declaration of Human Rights. The right to education is assumed to include a right to be literate. The only existing international human rights instrument specifically addressing the situation of indigenous people includes a number of principles relating to education, including the right of indigenous children to learn to read and write in their own indigenous language...***[34]

However, while literacy might be the idealized goal of an adequate First Nations educational experience, its attainment still doesn't guarantee a freedom of choice with respect to both lifestyle and economic opportunity; neither does its intention prevent government from tabling economic developmental programmes for First Nations that might run counter to that goal's attainment. This is precisely what happened when Parliament moved, in the late 1990's, to initiate several programmes designed to create employment for Aboriginal groups.[35] Within this confusion of interests, a new economic "reality" was establishing itself, one that saw federal educational funding initiatives not

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[34] Ken Hughes, M.P., Chairperson, "***Aboriginal Literacy and Empowerment***", **Standing Committee on Aboriginal Affairs** (Ottawa ON: House of Commons, December, 1990), p. 51.

[35] Marilyn Highway, **Interview: Interim Director, Prince Albert Grand Council Urban Services**, Ken MacDougall, Interviewer (Prince Albert SK: September 2005). A tie between trades training and chronic youth unemployment ignores the fact that targeted students often don't have the skills necessary to complete such programmes. Tying funding to performance, and substance abuse monitoring and first targeting mid-to-late twenties adults is her preferred option.

producing results, monies being misspent on programmes not relevant to the educational process, and the economic conditions for First Nations people still not improving. [36] [37] [38]

In late 2000, the Auditor-General placed the blame for programme conflicts squarely upon administration at Indian and Northern Affairs Canada (INAC):

> ***... this year, we reported on our audit of... education for Indian children who live on reserves... (INAC) allocates about $1 billion each year for this purpose ...The audit found serious gaps in the academic achievement of First Nations students...The dropout rate... is six times higher than that of the general Canadian population. The proportion of the on-reserve population with a high school education is significantly lower than in the general population. Moreover, it is questionable whether the education received by Indian students meets their cultural needs...the Department has not articulated its role in education. Clarification... is essential both for accountability purposes and for the Department to know whether its existing...resources are sufficient to fulfill that role... In the absence of satisfactory progress, there will be high financial cost in social programs, an increased waste of human capital, and degradation of the relationship between the government and First Nations peoples.*** [39]

The message to be gleaned from the Auditor-General was two-fold; first,

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[36] Roger Boe, "***Future demographic trends may help Canada's Aboriginal youth***", **CSC Forum** (Ottawa ON: Correction Service Canada, September 2002), Volume 4, Number 3. Boe's suggestion that Canada's aging population could open up opportunities to integrate Aboriginal youth into the labour force, is a rather rosy assessment, given that these students have such a drop-out high rate, and would still require training.

[37] Human Resources Development Canada, **"Skills and Learning", Innovation in Canada – Summit Report, Regina Region** (Ottawa ON: Government of Canada, September, 2002). While recognizing the reality of high drop-out rates, HRDC still suggests that schools try to encourage Aboriginal youth to follow educational paths so they might qualify for trade positions.

[38] Foot, p. 194 – 197. Foot points to a high birth rate as inhibiting Native economic progress.

[39] Sheila Fraser, **"Matters of Special Importance – 2000", 2000 Report of the Auditor General of Canada** (Ottawa ON: Office of the Auditor-General - Canada, December, 2000), [http://www.oag-bvg.gc.ca/domino/reports.nsf/html/00sice.html].

educational programmes destined for distribution within the First Nations communities were either inadequately prepared, under-funded or mismanaged, or, secondly, existing funding initiatives were failing to improve the educational status of most Aboriginal students – which, in turn, meant that financial resources were being wasted or insufficient for the need, and therefore should be scrapped.

The subliminal point of Ms. Fraser's report was that First Nations leaders and their counterparts in the federal governmental agencies were wasting valuable resources by trying to control the direction of, and by extension, the content of programmes to service the educational needs of First Nations communities. Resolution of conflicting issues had to be achieved, or goals would never be met. Yet the areas of concern to which the Auditor General had pointed were more than just mere disputes between two bureaucratic forces seeing control of funding as a source of their "power"; this was a clash between two distinct cultural values and worldly views – one based upon European principles, the other drawing its inspiration from First Nations heritage.

There was never any question that funding of programmes intended specifically for Aboriginal populations had to come from federal coffers; the "where, how and why" of its spending, however, were less easily defined. On the one hand, the parties were addressing the commonality of goals in providing educational emancipation for First Nations students by funding "regular" schools (on reserve, or off). Government, however, was far more anxious to rid itself of the economic burden of a social net designed to assist First Nations adults or school drop-outs who, indirectly or otherwise, had suffered through the effects of the residential school experience.

This "bureaucratization" of the educational funding process is what truly

frustrates First Nations leaders. They perceive budgetary "limits" as irrelevant, as the problems facing their people must, sooner or later, be resolved.[40] This clash can be explained in the following terms:

> ***Control of...programs through funding is an on-going concern. Unlike most colleges and universities, there is no core funding. Each year, hours are spent record-keeping and preparing grant applications to ensure the continuation of existing programs. The relationship between values and beliefs and administrative needs and procedures related to government accountability is a complex one which underlies at least some of the concerns (regarding the continuation of funding for required programs)...***[41]

So, while funding mechanisms for First Nations schools and programmes might now be more fully developed, the fundamental issues facing other cultural or healing processes, and the conflicts over the role culture and tradition should play in the overall education of the First Nation individual still remain:

> ***... First Nations people... want to participate in an exclusionary, majority non-Native society while attempting to enhance and develop their awareness and appreciation of their First Nations' cultures and heritage. While some students decide to work in First Nations organizations and communities, many move into jobs and further education in predominantly non-Native institutions...(people) talked about respect as central to Native values: respect for land, for elders and for all life...others in control in society may know or***

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[40] Highway. Highway believes that you cannot "educate" and "train" an individual, if that person has no concept inwardly framed recognizing the need for that information to be provided. Many First Nations adults must still "learn" to do simple things, such as why one should up in the morning, what is the purpose of personal hygiene, or why the body requires proper nutrition. Thus, this heavy emphasis upon "life skills" development forms the basis of every programme she funds and administers.

[41] Celia Haig-Brown, "***Taking Control: Contradiction and First Nations Adult Education***", **First Nations Education in Canada: The Circle Unfolds**, Marie Battiste and Jean Barman, Editors (Vancouver BC: UBC Press, 1995). p. 267.

understand little of these values...[42]

When seen in these contexts, the solutions to Native education will ultimately be found in the dynamic reality of "give and take" lifestyles.[43] Until such time as First Nations groups can look forward to the prospect of having "one of their own" qualified to assume any position society has to offer them, there will be an interaction of cultures. Yet, even when the educational objectives of Aboriginals have been achieved, there will still be the opportunity for such exchange; however, in this final phase, that process will be voluntary and arrived at by recognition of the need for such involvement to be entered into as "equals", and not merely as an imposed, assimilated process.

Neither side can "work alone" in this evolution. Bands cannot go their own direction without accountability, and governments cannot fund First Nations programmes simply to be seen as "greasing the squeaky wheel" of Aboriginal social protest. As a corollary, Native leaders, in gaining "control" of the educational process, must also be prepared to incorporate values beyond traditional teachings, so as to assist in the educational emancipation of Aboriginal students. Once the social status of Native Canadians has been dramatically enhanced, the newly created educational leadership can then concentrate its efforts upon teaching the values of their culture to the non-Aboriginal population, thus reaffirming the role of "respect" in their traditions and teachings.

VI) UNDERSTANDING THE ROLE OF NATIVE EDUCATIONAL AUTHORITIES

The control of the school on reserves is a matter assigned to the community itself.

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[42] Ibid, pp. 266, 267.

[43] Ibid, p. 263.

Treaty terms of all Bands in Canada define education of First Nations students as a right, to be directly funded through federal initiative (INAC sourced).[44] The accounting for monies spent is, in turn, normally assigned to Chief and Council. From that point onward, how Council "passes down" authority to allocate such funds and to what extent these transactions are monitored usually determines whether or not the educational budget is properly spent, or misallocated.

In delegating authority to oversee the school's operational budget, individual bands may choose to appoint, or have elections held to appoint, community members whose duties include the drafting and updating of school operational policy, maintaining records on behalf of the students attending these institutions, and, if required, assisting in the staffing of school administrators, teachers, support staff, and a Director, who is charged with planning the direction school policies and procedures should take.

Each responsibility, including the operation of the physical plant itself, has its own budgetary impact. Without appropriate guidelines in place, the percentage assigned to each responsibility is often left to "choice"; this, in turn, ultimately leads to the budgeting concerns as previously expressed by the Auditor-General.[45] First Nations that do not meet "budgetary expectations" are currently placed under federal audit control until the problem is resolved.[46]

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[44] Herman Crain, **Interview: Senior Councillor and Vice Chief, Muskoday First Nation**, Ken MacDougall, Interviewer (Muskoday SK, August, 2005).

[45] Ibid.

[46] Michael Posluns, **First Nations Governance Act Dies: Will A New Government Do Any Better?** (Toronto ON: KAIROS, 2003), [http://www.kairoscanada.org/e/aboriginal/fnga/fngaDies.asp]. When bands are placed under federal receivership, all spending is then questioned, including funding for social programmes, housing initiatives, or even the salaries of teaching staff at reserve schools.

When an audit crisis occurs in a school environment, there may be staff resignations, or a portion of the academic year cancelled. When either occurs, it is very often the case that the classroom environment of the student is not adjusted in the following year to accommodate the loss of learning that ensues. This, in turn, leads to deterioration in the overall retention of fundamental skills that might be building blocks to further knowledge acquisition by these students in later years. [47]

Most Authorities take their mandated tasks very seriously. However, these *de facto* school boards suffer in experience in that there are preciously few people within these small communities with the credentials or experience to effectively manage school issues. For such overseers, as but one example, the first indication that a monetary issue even exists could be when a critical cheque comes backed stamped "non-sufficient funds". As for their ability to control what is actually "taught" in the classroom, it is even harder to know when a curriculum problem exists, especially if their administrative officers are being less than honest in their evaluation of student potential.[48]

Grade levels that are serviced by local facilities can vary with the curriculum being offered, and the effectiveness of teaching is often left unmeasured, as was seen in

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[47] CBC News, **Government will evaluate education at Piapot school** (Regina, SK: CBC Radio, October 14, 2004), [http://www.cbc.ca/sask/story/piapot_protest041014.html]. Parents at the Piapot school started a protest just after a substitute teacher discovered that the Grades 8 and 9 classes were using mathematics textbooks normally used in Grades 4 and 5.

[48] Ibid. Piapot administrators claimed to have provincial permission to "modify" the mathematics programme, but did nothing to advise parents of curriculum discrepancies. The administrative change was actually made to help resolve disciplinary issues in crisis, and students were merely being "pushed up" to the next grade level, based upon these watered-down standards. This capitulation of academic responsibility by administrators regularly occurs in First Nations schools. Teachers will "accept" this fact because it makes it "easier" to perform his or her duties without encountering administrative conflict.

Piapot in 2004. Moreover, such facilities are often ill-monitored by the supposedly "overseeing" educational authority, the provincial government, because the schools are, theoretically, under federal jurisdiction. Therefore, although classes offered at the schools are supposed to be tied to provincially-based curricula, there is really no formal ratification of the standards that might be applied to the results of teaching, unless the will exists within the community to enforce such regulation.[49]

Hiring practices at reserve schools also pose as a concern for the Authority. Its members may choose to employ support staff, or even its Director, based upon family ties, or on the basis of "showcasing" someone within the community who has obtained higher-than-normal academic credentials – regardless of experience. This dynamic of "community relationships", in addition to imposing a political perspective upon the teaching environment, creates its own issues relating directly to classroom discipline and student expectations as to how they will be evaluated within the system itself. This, in turn, tempts students or parents to exploit family or political connections for personal benefit, under the assumption they have "entitlement" due to family "status".[50] [51]

Crain sees patterns of staff discrimination or abuse of power as a major issue in need of redress by bands, but one that would, under the rules governing conflicting

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[49] Kevin Nesdoly, **Interview: Principal, Acwsalcta School**, Ken MacDougall, Interviewer (Bella Coola, BC: March 2003). The British Columbia-based First Nations Educational Steering Committee monitors educational offerings at First Nations schools, and approves curriculum objectives for any new offerings. Once approved, these course outlines are then submitted to the Department of Education for inclusion within their respectively defined areas of study. This autonomy satisfies the political needs of the independent Band schools, but also assures classes meet provincial grade expectations.

[50] Ibid.

[51] Crain

interests, normally be out of a Council's control. Educational Authorities do not generally report directly to Council, even though they owe their existence to continued funding from the senior government. It is only when the educational representative reports concerns that the leadership can respond. Such changes as are then required must then be drafted into policy, a time-consuming process requiring community consensus before implementation. However, since these are the processes under which the public sector also functions, these weaknesses must be perceived as part of the democratic process, and await their own evolution and resolution.

VII) TEACHER HIRING: THE PROBLEMS OF STAFFING A BAND-RUN SCHOOL

Band school staffing almost always is done with the philosophy in mind of providing Aboriginal students with a Native role model for any position – if at all possible. These considerations should be perceived as a "guideline only"; however, this condition usually ends up becoming a "requirement", as opposed to an "option."[52]

The difficulty in building bridges of understanding is also a product of the supply and "quality" of the candidate offering to teach in a First Nations environment, particularly in mathematics and at the secondary levels.[53] For instance, a non-Aboriginal teacher with good mathematical or scientific teaching credentials is most likely to be

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[52] Nesdoly.

[53] British Columbia Public School Employers' Association, **Backgrounder: Teacher Supply and Demand. Is There A Teacher Shortage?** (Vancouver BC: BCPSEA, May 2006), [http://www.bcpsea.bc.ca/public/emplgroups/teacher/bargaining/teachbarg/06-may19-shortage.pdf]. The Employers' group argues that there is no teacher shortage, save for science and mathematics teachers.

employed in the public school system, which is where they usually first apply for work.[54] Native educational institutions then become wary of any non-Aboriginal applying for a position at a Band-run school, believing that these candidates are already of "inferior quality" – or they'd already have employment in the public sector. This "suspicion" of the teacher often manifests itself in the requiring of "special treatment", including extensive reference and background police checks, as well as more interview questioning, particularly as to how their methodology will utilize culturally "relevant" materials.[55]

If hired, a non-Aboriginal teacher may still be subjected to scrutiny from the community, particularly from those parents who have had poor experience in non-Native educational settings. Thus, non-Native teachers are also most likely to not have their contracts renewed at year's end (despite being a "successful" teacher), or will leave of their own volition, preferring to seek employment elsewhere.[56] This deterioration of the teaching resources of the school is "accepted", as many of the Authority's members perceive these "outsiders" as being part of the culture that is responsible for the social issues which now fester on reserve lands. Their "hiring", therefore, is seen as a "temporary" solution to the needs of the system, and an undesirable necessity, at that.[57]

It could be effectively argued that non-Aboriginal teachers "deserve" such treatment, based upon past experiences by Band-run schools. During the years between

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[54] Nesdoly. Aboriginal candidates with good teaching skills are also usually hired by public sector employers because this system has its own problems in meeting First Nations student expectations.

[55] Ibid.

[56] Ibid.

[57] Crain.

1978 and 1994, public school boards were drastically cutting staffing positions, due in large measure to government cut-backs and the federal government off-loading its budgetary deficit onto provincial counterparts. The first positions targeted for "redundancy" were usually the ones occupied by teachers with seniority and more than one post-secondary degree.[58] To circumvent this rather obvious tactic of "financial discrimination", teachers looked for positions of "unique status", so as to enhance their potential to become re-employed in the public sector.[59] Many of these people found their way into teaching at Band schools, where their "federal status" put their staff outside provincial bargaining units, and pay level guidelines were not so precisely drawn.

Band schools usually had no qualms about hiring teachers with better-than-average education, on the assumption that the school could only benefit from this wealth of experience and higher learning. In some situations, this was the case; however, in far more situations, teachers simply "showed up" for work, vented their frustrations for having lost their status within the public sector, and failed to integrate themselves into the new community's social structure.[60] [61] When the teacher finally left (usually in less than two years), it would invariably be found out that their students hadn't been taught all that

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[58] Jerome F. Ell, "***The Controversial Eighties***", **A Brief History of Public Education in Alberta**. (Edmonton AB: Alberta Teachers' Association, October 2002), [http://www.teachers.ab.ca]. All provincial teaching contracts, except Ontario, use a combination of total experience (to a maximum of 10 years) and post-secondary credits as the basis for paying teachers.

[59] In 1979, a Human Resources Officer in Toronto freely admitted to this researcher that the Board would not hire anyone without there being some "unique quality" to their resume, as Toronto was having difficulty in coping with the increasing ethnicity and "special needs" of its inner city schools.

[60] Nesdoly.

[61] Taylor, p. 224 – 230.

was required by the curriculum, making student grade transition difficult at best.[62]

The teaching market of the 2000's dictates that beginning teachers, particularly with mathematics and science backgrounds, can now be more selective in their choices of school districts with which to work. Thus, if a non-Aboriginal teacher "with qualification" applies to a Band school, he or she will usually be interviewed for the position, and be hired – despite there now being more teachers of First Nations heritage seeking employment. That such teachers are only grudgingly employed is irrelevant; Band school, as with everyone else, must seek credentials where they exist.[63]

As to meeting the need for First Nations communities to have role models in the teaching profession, many universities, particularly in Western Canada, have gone out of their way to devise special streaming programmes in education to ameliorate an obvious shortfall in personnel. Even so, when First Nations teaching candidates are successful in obtaining academic certification, they are still burdened by non-Aboriginal suspicions that these credentials are inferior or "watered down". Thus, regardless of a demonstrated excellence within the profession, such "special graduates" are usually deemed to be only "suitable for placement" within the Aboriginal community, or in public sector classes with predominantly Native enrolment, and where academic achievement is a secondary issue to the maintaining of "order" within the school.[64]

Hesch suggests such prejudice is due to the subjectivity of the university's

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[62] Nesdoly.

[63] Ibid. This issue will be explored in more detail in ***Chapter III***. As Aboriginal students are not attaining mathematics and science credentials, there is a paucity of Native candidates to fill these positions.

[64] Terry Wotherspoon and Bernard Schissel, **Marginalization, Decolonization and Voice: Prospects for Aboriginal Education in Canada** (Saskatoon SK: University of Saskatchewan, December 1998), p. 9.

specialized curriculum and targeted audience, not in the worth of the individual himself or of the societal need. By schools having to develop a programme such as the Saskatchewan Urban Native Teacher Educational Program (SUNTEP) - or its derivatives – insinuates that the prospective candidate may have difficulty in functioning within the normal parameters of the Canadian-Eurocentric classroom. Thus, the "special needs" label with which many Aboriginal students have been branded in high schools continues on into this next level of academic attainment.[65]

Only time, it would then seem, is going to change society's perception of these special graduates of Aboriginal school need. Their professional success, however, will go a long way towards healing the staffing needs of Band schools, and minimize the collective effects of a century of educational neglect upon First Nations people.

VIII) PARENTAL INFLUENCE: EXPECTATIONS OF STUDENTS AND SCHOOLS

As with any loved child, students who attend First Nations-administered schools may have different expectations of education, depending upon the conditions under which they're raised and the goals set for them by their parents. In addition, they attend classes within an educational environment that is highly politicized and prone to radical change, whether within the areas of school staffing, its administration, or its course

[65] Rick Hesch, "**Teacher Education and Aboriginal Opposition**", **First Nations Education in Canada: The Circle Unfolds**, Marie Battiste and Jean Barman, Editors (Vancouver BC: UBC Press, 1995), pp. 179 – 183. Hesch argues that such academic prejudice shown to towards such programmes as SUNTEP will continue until such time as these institutions realize that First Nations academic achievement has been hobbled by Canada's past historical cultural displacement of Natives. Once these facts have been made known – and taught – within "mainstream" classes, non-Aboriginals will only then finally understand the "need" for Natives to be seen as having a "level playing field" in educational circles.

offerings. As a result, parents often have extraordinary influence over the final grades their children receive, in what grade they are placed, or even what materials used in class for instructional purposes.

Some aspects of this parental influence might yield positive results, were it not for the influence of such political issues as control and outcome of the educational agenda, or of the parents having a cultural conflict with the school's policies. For these reasons, actions taken by First Nations parents within the school's environment can be extreme, and are not always executed with the best interests of the student in mind. Parents may, as but one example, withdraw their children from school for indefinite periods, ignoring the consequences they may be inflicting upon the learning, discipline, peer conditioning and development (whether intellectual or physical) skills of their child.[66] [67] Alternatively, parents may choose to over-emphasize the teaching of so-called "traditional values" of their people in school, to the exclusion of other subjects which First Nations educational groups deem essential to the inclusion of curriculum taught to Native students.[68]

In extreme cases, there may also be a complete withdrawal by parents of a sense of responsibility for the actions of their children while attending school; in such circumstance, they not only abdicate their role as a parent, but as the founder and role

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[66] Nesdoly. Reasons for this occurring include a parent's past experiences with education (usually at residential schools), or believing that a formal education is not relevant to the survival of their children.

[67] CBC News, **Government will evaluate education at Piapot school**.

[68] Nesdoly. In 2002, the ***First Nations Educational Steering Committee*** started a campaign among its member schools to keep Aboriginal children interested in such core subjects as Mathematics, English and Science. However, potential FNESC graduates may have already been pre-disposed to avoid these options, either through choice or by not having been taught foundation skills in earlier grades.

model for the moral and social values absorbed by the child.[69] In addition, social, psychological or emotional factors are often at play in Native communities which entirely disassociate parents from assuming any role whatsoever in their children's lives,[70] thus leaving this task to a member of the extended family or any number of social agencies charged with child welfare responsibilities.[71]

Unfortunately, such behavioural factors also demand the most attention of teachers, counsellors and administrators.[72] Thus, amidst the chaos these conditions generate within the school itself, the role of responsible parent is lost in the glare of administrator -prioritized issues having more to do with restoring "order" than truly "teaching" the child.

IX) MAKING A CHOICE: PARENTAL IMPRESSIONS AND SCHOOL ENVIRONMENTS

In 1880, the First Nations child requiring an education had but one direction to

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[69] Ibid. When disciplinary methods are left by parents to the sole discretion of school authorities, and a child is punished, the parents may simply condemn those values of the educational system that perpetuated the need for the corrective measure to be taken in the first place.

[70] Crain. Behavioural influences upon First Nations children include ssexual abuse, incest and battery, experiences which many Aboriginal parents faced at residential schools. Typically, the parent would have hid that treatment through silence and shame, or abused their own children. The child would see this as "normal", and accept the process as his "due", perhaps to be passed on to the next generation of children.

[71] Nesdoly. Since most residential school survivors had no parenting role models, they have problems raising their own offspring. So, it is not surprising that Social Services agencies receive reports of child abuse or neglect happening within Native families, they often place the children under foster care in intervention status. Even when the agencies can find a member of the extended family to accept guardianship (a grandparents, usually), that person may not be the ideal candidate for raising the child, as he or she might also have undisclosed issues of their own stemming from residential school abuse.

[72] Ibid.

take - the residential school. It is obvious – now - that this solution was insufficient for the needs of these youth. Today, Aboriginal children have many more choices as to the "brand" of education they may pursue: private schooling, home schooling, sending the child to a different community where the extended family influence is the strongest, attending classes in the public sector, or simply going to one of the increasing number of Band-run institutions being established through INAC. The question is, "Is this diversity of choice any better for the student?"

We in Canada see public sector education as a "right"; First Nations parents, on the other hand, aren't nearly as convinced as to the sanctity of this privilege, nor are they prepared to place as much weight upon the standard reasons for obtaining an education, much less allowing it to have undue influence upon the child's day-to-day activities.[73]

Even when there is parental agreement that the child must receive an education, opinion as to how this should be provided can vary within a community. For instance, as with any hierarchical society, those in an Aboriginal community with influence who can, and do, choose to send their children to private schools.[74] They do so, however, with the

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[73] Ibid. The FNESC campaign to encourage Aboriginal students to take more English, Mathematics and Science academic programmes was conducted as more of a "suggestion" than a recommendation for change; this is because heavy emphasis is placed upon the teaching of traditional languages, art, and the role First Nations people played in Canadian history. Moreover, Aboriginal students usually end up with an FNESC-approved "Dogwood equivalent" graduation diploma. Few Band educators consider this to be a pressing issue, and prefer seeking remedial academic solutions later in the school's evolution.

[74] Ibid. Students who attend private institutions usually come from the privileged ranks of the First Nations political kingdom: children of the Chief or prominent Councillors, or of parents who act in some overseeing capacity with the Band itself. By sending their children, parents acknowledge that the student could incur the same types of problems as befell residential school victims; however, in accepting this fact, they are also looking for the child's possibility of advancement in a cross-cultural society upon graduation.

knowledge that their children won't have to face the same conditions affecting a majority of First Nations students on reserves, and will have little contact with these individuals, unless it is through family ties or to move back into service of the First Nations they came from, in a position of power and influence similar to that enjoyed by one or more of the child's parents.[75] The overwhelming majority of Aboriginal students, however, still go to standard, publicly-funding schools, even when Band-run schools are available for them to attend.[76]

Comparisons as to the benefit of one school system over the other are purely subjective, and depend only upon "the eyes of the beholder". There are, for instance, parents who believe that course content at Band-administered schools is "watered down", and do not instil sufficient competitive spirit in students; conversely, parents may find student progress stymied in a public school, with First Nations pupils often labelled "special needs", and conclude that their children could do better if in attendance at a Band school, or, more pessimistically, "couldn't do any worse" in such an environment.[77]

Nonetheless, if one eliminates the influence of geography or politics upon the

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[75] Crain. The "reality" of reserve schooling is that for children to have future career success, they will invariably have to find employment off-reserve, as most First Nations communities cannot support a diversity of career opportunities, unless they are located near a centre with sustainable jobs.

[76] Nesdoly. As Principal of a Band-run school, Nesdoly was aware that parental "perception" of schools is totally subjective. Band schools might want to offer a diversity of course offerings, but most have been set up to provide touchstones with Aboriginal culture, particularly in Art, History and Language.

[77] Sharon Laflamme, **Interview: Principal, Muskoday First Nation Community School**, Ken MacDougall, Interviewer (Muskoday, SK: March 2006). Foundation Skills Assessment (FSA) tests and Canadian Test of Basic Skills (CTBS) results indicated that many Muskoday students were struggling with Math and English. If placed in a school where race was not a "crutch", Laflamme believes that the school could deal with learning issues in a more timely fashion, and have greater academic success as a result.

school selection process, parental decision-making considerations are as varied, and complex, as those facing similarly concerned non-Aboriginal parents in any other community in Canada.[78] [79]

X) THE PUBLIC SECTOR AND SENSITIVITY TO NATIVE CULTURAL VALUES

Every educational system "costs" society; whether that expenditure can be justified is a question often undergoing serious debate. In the era spanning 1980 to 2005 (when most Band-administered schools were built), the Canadian public was inundated with calls for budgetary restraint. Still other groups demanded the removal of the right of teachers to strike during provincial bargaining, or for taxpayers to refuse to pay the educational component of their taxes, should they be dissatisfied as to how these dollars were being spent.[80] [81] Throughout this period, Native schools became prime targets for

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[78] Crain. Students have little "choice" as to where they'll attend school on remote reserves, but Band policy occasionally plays a role in determining where the child attends school. A Band may not pay for the transportation of a reserve-based student to attend a public school, thus taking away this option from most parents. However, if the Band is able to receive additional funding from the public sector in order to send students to such locales, that policy might have the effect of draining students from the Band-run facility. The community usually determines what "values of education" should be passed on to their children, and Chief and Council will draft legislation to assure that the wishes of their Band membership is respected.

[79] Nesdoly. Factors influencing parental choice of schools include the ability of the child to maintain school friendships, the educational successes of other family members, the availability of certain extra-curricular activities, student-to-teacher ratios, whether students receive attention for specific needs (such as First Nations language instruction), or the presence of resource materials and technological tools.

[80] Saskatchewan School Boards Association, **Tax Situation Must Be Addressed** (Regina SK: SSBA, September 7, 1999) [http://saskschoolboards.ca/].

[81] Canadian Taxpayers' Federation, ***"Why teachers should not be allowed to strike"***, **Let's Talk Taxes** (Calgary AB: CTF, June 8, 2004), [http://www.taxpayer.com/main/news.php?news_id=723].

such dissenters.

The problem of providing an appropriate education for First Nations students, as we have already seen, is not that this is a federal responsibility, but that it is a responsibility that must be carried out by many layers of government: federal, provincial and municipal or district. Moreover, budgetary cutbacks do not just affect Aboriginal schools; they alter the financial realities of every administrator charged with allocating these smaller funding grants. In order to minimize any potential deleterious effects upon the school's functioning, officials are thus forced to look for "loopholes" in the budgetary process that would allow for the infusion of more funding, often just to keep the school operating, Their "weapon of choice" in this fight is usually the ability of school staff to categorize certain students as "special needs", and receive additional monies for doing so.

The public sector has been shown to have a particular bias towards placing First Nations students in such programmes.[82] Were the students for whom the funds were to be allocated actually provided help for their academic difficulties, this might not be such a problem; however, the minimalist amounts earmarked by provincial governments to treat such difficulties are usually redirected towards preserving the *status quo* programmes at the school or maintaining core staff. As a result, special counsellors, teachers or even teacher aides trained in dealing with First Nations students and their unique academic issues are seldom hired, with the result that "special needs" issues within First Nations

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[82] British Columbia Ministry of Education, "***Students with Special Needs – How Are We Doing?***", **Special Education Home Page** (Victoria BC: BCEd, April 2006), [http://www.bced.gov.bc.ca/specialed/performance.pdf.] Just over 12% of students receiving "special needs" funding (particularly in Language Arts) are of First Nations ancestry – more than three times their overall population proportion. In 2004, leaders from one of the communities in which this researcher taught severely criticized these figures as excessive, racist and unrepresentative of the potential of Native students.

student populations just gets worse.[83] [84] [85]

The central problem, of course, is that Aboriginal students, like any minority, are isolated from their own cultural influences within the public sector. Even though there is legislation in most provinces across Canada to provide First Nations curriculum studies, there are generally no culturally-based programmes to be found within the average public school – regardless of the number of Aboriginal students enrolled at that institution. This reality is further exacerbated by the fact that there are few First Nations role models within the teaching or support staff of the public sector, or, if Aboriginals do hold positions, Native students usually perceive them as having little influence over the school's policy, or how students are disciplined and educated.

It is also an unfortunate reality that many non-Aboriginal teachers have no understanding of the culturally ingrained responses coming from their First Nations students. As an example, the unwillingness of an Aboriginal student to make formal eye contact is seen as a sign of respect for an authority figure (therefore, showing respect for the teacher). To the typical non-Aboriginal teacher, however, this gesture is more likely to be perceived as a sign of impudence, and hence treated as a "behavioural" problem.[86]

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[83] Ibid.

[84] Wagner.

[85] LaFlamme. First Nations students are then left to deal with counsellors who have no understanding of the economic, social or health-related realities of First Nations existence, whether on or off reserve. Because so many Aboriginal parents are reluctant to deal with the school system, overworked counsellors often make decisions affecting student placement based upon school-generated and often-erroneous information.

[86] Sarah Anala, **"Serving the Inuit Offender"**, **CSC Forum** (Ottawa ON: Correctional Services Canada, September, 2002), Volume 14, Number 3, p. 3.

Non-Aboriginal staff also has difficulty in relating to certain observed behavioural patterns in First Nations students with their roots in social maladjustment (sexual harassment, bullying, lack of attendance, failure to perform up to expectations, skipping certain classes, vandalism or dropping out, as examples). In such circumstances, the student's behavioural concerns are more likely to be ignored, or the student referred to budgetary constrained counsellors who cannot respond to the immediacy of the difficulty. As a result, these problems fester, until it is too late for the situation to be handled by conventional disciplinary methods or school policies.

The unwillingness by non-Native teachers to intervene in Aboriginal student behavioural issues is also hampered by current "politically correct" notions that Native suffering from residential school abuse is a "burden to bear" for European culture having inflicted colonialist abuse upon First Nations, and therefore, a topic approached with the utmost sensitivity. Invariably, this cautious approach usually ends up becoming "no mention of the topic was made", and the child's suffering continues. In addition, non-Aboriginal teachers also suffer from a fear of being labelled "racist", in that many behaviours are so stereotypical as to suggest racial profiling is being used to categorize the actions of the child. Students, in turn, interpret any failure to act as a weakness to be exploited; therefore, when a teacher or administrator finally makes a conscientious decision to treat such issues without regard to colour of skin, that very act may be construed or labelled racist in intent.[87]

Lastly, even among the more educationally inclined of First Nations students, cultural issues involving adjustment, particularly shyness, inhibit their participation in

[87] Nesdoly.

normal classroom discussion. Even in classes in which the majority of students are of First Nations background, non-Aboriginal students will invariably answer most questions posed to the class at large. Should an Aboriginal student have answers, he or she will often deny having such knowledge, "acting up" to the point where the teacher will simply give up and ask a non-Aboriginal student to reply, instead.[88]

The conclusion to the problem of dealing with culturally framing the First Nations educational experience is one not just of constraint, but measured concern. One cannot fund schools to deal with cultural disenfranchisement simply out of guilt; there is a limit to the generosity of the human spirit when there is no instrument that might positively measure the result of such action. Obviously, however, there is a necessity for the creation of such Aboriginal-managed institutions, if for no other reason than there has to be some structure in place that will handle the problem of recovering First Nations' lost cultural inheritances. The Band-run schools must fulfil that task. By the same token, there must become a realization in the public sector that it has a responsibility to provide dynamic resolution to issues of disenfranchisement, even if it requires additional resources in the form of counsellors and teacher aides in the classroom.

One cannot reasonably expect an immediate pedagogical adjustment within the school to the First Nations educational crisis, either; teacher adjustment will be gradual, and will occur only if the funds are found to create an awareness of the problems facing First Nations students within the public sector. There is also some urgency in minimizing the deleterious effects of this issue, so that they do not end up overwhelming or ghettoizing the school population.

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[88] Anala, pp. 1, 3-4.

In short, both curriculum adjustment and specialized counselling needs require judicious funding incentive. Whether or not governments want to travel that financial road remains, for the moment, a serious question.

XI) DISPLACED FIRST NATIONS YOUTH

In concluding this segment of literature review, we note with some concern that the carrying-out of the government's residential school policy has created social conditions within First Nations' populations that have impeded the ability of this population to attain any meaningful status in the conventional economy of Canada, and reap whatever benefits one might expect from reaching this plateau. Having lost any touchstone to their identities, increasingly disenfranchised Aboriginal youth are now rejecting their own history and cultural practices. Instead, they are choosing to embrace the Afro-American notion of historical displacement, failing to recognize that they are not just a displaced people, but also dispossessed.

In embracing this foreign analogy, these children seek kinship, comfort and guidance, and find themselves placing their now loyalty in gang memberships.[89] [90] [91] In

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[89] Omid Ghoreishi, "***Hobbema Violence Offers Glimpse into Aboriginal Realities***", **The Epoch Times** (New York NY: Epoch Times International, November 24, 2005), [http://en.epochtimes.com/news/5-11-24/34944.html]. Richard Woodman links social despair with residential school fall-out, suggesting that an "attraction to like minds" within these youth becomes the sales pitch of urban Native gangs.

[90] Lloyd Dolha, "***Aboriginal Gangs in Prairie Provinces in 'Crisis Proportions'***", **First Nations Drum** (Toronto ON: First Nations Drum, Fall 2003), [http://www.firstnationsdrum.com/Fall2003/CrimeGangs.htm].

[91] James Garbarino, **Lost Boys: Why our Sons Turn Violent and How We can Save Them** (New York NY: Anchor Books, 2000), Chapters 1 – 3. The craving of lifestyle symbols drives youth towards gangs, in order to attain status and "wealth" – a common theme on reserves and in Native urban ghettoes.

this alternative world, only one's immediate circle is considered to be your "friend". Here, the colour of one's skin is reinforced by the territoriality of that group and its determination to disempower its own people through exploitation and abuse of their collective influence on the streets. [92] [93]

Drugs and alcohol provide another way "out" for youth dissatisfied with their own existence. For others, survival becomes a question of making choices: whether to steal, because you need money to live and have no job skills, or whether it's better to simply walk a street at night and sell your body to a total stranger whose only goal is to exploit your social condition, humiliate you and make himself, as the exploiter of your condition, feel superior and in control of you. [94] [95]

Family members of these youth, we have seen, endured similar lifestyles when they tried to escape the influence of the residential schools. ***The Legacy of Hope Foundation*** has specifically pointed out that, until the government provides proper

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[92] Robert Gordon, "***Youth Gang Involvement in the Canadian Context***", **National Forum on Youth Gangs** (Ottawa ON: Solicitor General – Canada, December 1999), [http://www.cantraining.org/BTC/docs/CanadianReferences/National%20Forum%20on%20Youth%20Gangs%201999.doc].

[93] Jonathon Gatehouse, "***Canada's Worst Neighbourhood***", **Macleans** (Toronto ON: Rogers Publishing Limited, January 17, 2007), [http://www.macleans.ca/article.jsp?content=20070115_139375_139375]. The article is about Regina's North Central; it could as easily be Saskatoon's Pleasant Hill or Winnipeg's inner core.

[94] Youth Speakers, **Interview: Combating the Spread of Crystal Meth**, Ken MacDougall, Interviewer (Muskoday SK: November, 2005). No matter how "good" their home life might be or supportive their teachers, few Aboriginal youth will risk the alienation of their peers to "conform" and be "cool". Potentially strong youth role models would rather join gangs, drink or use drugs, than lose friends.

[95] Joe Parker, "***How Prostitution Works***", **Prostitution Research and Education** (San Francisco CA: PRE, August 1998), [http://www.prostitutionresearch.com/how_prostitution_works/000012.html].

counselling and support services to the original residential school victims, such conditions will continue to exist in First Nations communities, creating difficulties for future generations of youth. Yet, even in communities where resources do exist to help tackle the problems of displaced youth, Aboriginal leaders still prefer rhetoric to concrete planning and, in the process, frustrate their own people with their seeming obliviousness to the need for immediate intervention and action.[96]

Without counselling and intervention, the victims of the past experience of residential school abuse can teach the current generation nothing but their suffering. In this exchange, the touchstones with tradition, necessary to the survival of cultural beliefs, are lost for good. Thus, we have assimilated another body, but lost a soul to ignorance and neglect.

While the Assembly of First Nations is slowly making progress in negotiating a government commitment to addressing social and educational concerns, even this slow progress runs the risk of falling under the budgetary axe of political expediency.[97] With an excessive drop-out trend continuing for Native students, the prospect for future

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[96] CBC News, **Convicted Saskatoon cops ask for sentencing circle** (Saskatoon SK: CBC Radio, October 31, 2001), [http://www.cbc.ca/canada/story/2001/10/30/sask_police_011030.html]. Aboriginals living in urban communities often complain that they are denied access to federally funded services, because they live in the cities. As well, First Nations' leadership have also accused their leaders of using inner city Aboriginal poverty issues as leverage in a larger game of politics. Federation of Saskatchewan Indian Nations (FSIN) Chief Lawrence Joseph is often quoted by the Saskatchewan media for his colourful oratory on police "discrimination" (as he is, in this story), yet FSIN has no substantive night presence in west-end Saskatoon, where Native prostitution and gang activities flourish.

[97] **Richard Marcus, "*Canadian Politics: Kelowna Accord on Life Support*", Leap in the Dark** (Kingston ON: www.epicindia.com, March 8, 2006).
[http://blogs.epicindia.com/leapinthedark/2006/03/canadian_politics_the_kelowna.html].

generations of Aboriginals attaining control over their own affairs will most likely end up mirroring their own parents' failure to graduate with even a high school accreditation. Without that minimum education being attained, the possibility of attaining managerial potential, at both the personal and employment level, make economic emancipation seem a remote possibility, at best.[98]

[98] Ron MacKay and Lawrence Myles, "***A Major Challenge for the Educational System: Aboriginal Retention and Dropout***", **First Nations Education in Canada: The Circle Unfolds**. Marie Battiste and Jean Barman, Editors (Vancouver BC: UBC Press, 1995), p. 158-160.

Chapter III

PLACING FIRST NATION MATHEMATICAL ACHIEVEMENT INTO ITS CURRENT PEDAGOGICAL PERSPECTIVE

It has been shown that federal decision-making processes have proven to be disastrous in formulating an educational policy for First Nations. However, at this point in our history, only minor progress is being made in producing the pedagogical means to insure the intellectual emancipation of Aboriginal people.

Some would argue that the causes for this delay are, in large part, rooted in the fact that our curriculum has become corrupted by the economic demands of a nation grown used to a wasteful and meaningless standard of living. Still others would suggest that our educational agenda is being set by the need to create a workforce geared more towards controlling our position within the global economy, thus ignoring the intellectual needs of the individual. That dominance is expected to be maintained through the utilization of technology and distribution of information, as opposed to making available goods and services which are readily accessible to our nation's entire population.[99] [100] In

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[99] Emmanuel Forestier, Jeremy Grace and Charles Kenny, **Can information and communication technologies be pro-poor?** (Washington DC: World Bank, 2002), [http://www.digitale-chancen.de/transfer/downloads/MD468.pdf]. The World Bank's believes that economic success is in direct proportion to the utilization of technology by the state; thus, if a nation wishes to increase its natural wealth, it must invest in information networks, while making them reasonably accessible in its schools.

[100] Heather Menzies, ***"Learning Communities and the Information Highway"***, **Journal of Distance Education** (Ottawa ON: CADE, 1994), [http://cade.athabascau.ca/vol9.1/menzies.html]. Menzies believes corporate interests create an artificial dependency of the curriculum upon the use of technology, but gives short shrift to pedagogical research funding, a platform that eventually demystifies these tools.

these contexts, providing a means of educational emancipation for First Nations people plays only a secondary and marginal part on the government's socio-economic agenda.

In support of these contentions, educational historians look no further than to the era between 1965 and 2005. In this time frame, at least three economic imprints were placed upon the nation's educational agenda in the form of so-called "reform":

- ***The easing of academic restrictions in the mid-1960s, to allow for the opportunity of more high school graduates to attend post-secondary institutions***: This reform was made for the purposes of providing industry with a more "knowledge-equipped" workforce.[101] Implementation of this reform, in turn, was accompanied by the introduction of new curriculum taking a different approach towards the teaching and understanding of mathematics, blithely referred to as "the new math", and eased university entrance restrictions on the need for mathematics as an entrance requirement, or even as a major credit towards high school matriculation.[102]
- ***The 1980's obsession with increased budgetary deficits being accumulated by all governments:*** This stage saw governments pin-pointing educational costs as being one of two "out of control" tax burdens. Their response to public and industry pressure was to cut back educational funding, lay off hundreds of teachers, increase class sizes, and assign senior teachers that couldn't be dismissed for "redundancy" to instruct classes "out of scope" with their subject training.
- ***Lastly, the current stage, beginning in the mid-1990's, where in response to the "concerns" of industry as to the quality of mathematical and literacy skills demonstrated by high school graduates***: In this stage, governments again revised the mathematics curriculum, and reasserted their right to determine the measure of academic achievement necessary for potential graduates to attain. They also introduced the notion of minimum "standards" of education by grade equivalence,

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[101] Thomas O'Shea, **The Canadian Mathematics Curriculum from New Math to the NCTM Standards** (Burnaby BC: Simon Fraser University, 2003), pp. 4 - 12, [http://www.math.ca/Events/CSMF2003/panel/oshea.pdf].

[102] Ibid. Most teachers failed to respect the new curriculum, or displayed so much "textbook dependence" in its delivery, it was only a matter of time before the entire curriculum "experiment" had to be revised.

based upon achievement levels attained by students in the "First World" economic nations. At the same time, legislative changes to various educational acts were made to insure that there would be teacher compliance with the intent of the new state-mandated educational curriculum, and repercussions to their ability to teach, should they be found by newly created teacher "colleges" to not performing to such expectations. [103]

Not a single one of these innovations can be seen to have been constructed with the "inclusion" of First Nations educational needs in mind, much less involved some form of consultation with Aboriginals in the reshaping of curriculum requirements.[104]

We have encountered precious little in the way of research that focuses upon the actual "mathematical learning potential" of Aboriginal students, or articles that try to define the precepts necessary to enhance that learning curve. Limited discussion on the topic too often tends to drift into the realm of politically correct dogma, stressing a sensitization to student feelings of isolationism within the education process, as opposed to trying to find ways to improve the overall performance of the students, themselves. Therefore, the purpose of this chapter is to isolate conditions that could adversely affect

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[103] James B. Hunt, Jr., Chairman, **Summary 1997: Mathematics and Science Achievement for the 21st Century** (Washington DC: National Education Goals Panel, 1997), pp. 7 – 46, [http://govinfo.library.unt.edu/negp/Reports/97summ.pdf]. Hunt stresses the "need" for the United States (and Canada) to test student capabilities, and "align all components of the education system with the standards" of nations that exceed the United States in results measurement.

[104] Nesdoly. Several articles cited in the Bibliography (***Kohn***, the ***British Columbia Teachers Federation***, the ***British Columbia Ministry of Education***, ***Cassel***, ***Doucet***, ***Hunt***, the ***Waterloo Chronicle*** and ***Glanfield***, in particular) focus upon this "standards" debate, and particularly the wars of attrition waged between the teachers' unions and the governments of Ontario and British Columbia. All of their arguments boil down to one thing: who has the right to control the educational agenda implemented in schools. However, from a First Nations perspective, the prospect of having market-ready professionals – Aboriginal or otherwise - with subject competence, available to their schools, is still the priority, therefore, debating educational "standards" at this point would be a meaningless exercise for Band-run schools..

the enhancement of Aboriginal student achievement, and map a possible course of pedagogical implementation that might minimize the influence of these factors.

I) SETTING "STANDARDS" AND TESTING

Analyses taken by various "arms length" research groups have shown that today's so-called crisis of mathematical learning – the academic revelation this is fuelling governments' desire to re-introduce so-called academic standards for high school graduates - is economically-based,[105] and has virtually nothing to do with the ability of students to become interested in, or master, the curriculum's expectations.[106] [107]

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[105] Roberto Rodriguez Gomez and Mike Sosteric, "***Higher Education in Transition: An Agenda for Discussion***", **Electronic Journal of Sociology (1999)** (St. Albert AB: Athabasca University - CAAP, 1999), [http://www.sociology.org/content/vol004.002/rodriguez.html]. The authors trace the parallel paths of educational and economic reform in Latin America, as recommended – and funded by – organizations such as the International Development Bank (predecessors of the World Bank), courses of actions which were also followed in Canada (particularly in Ontario).

[106] Hunt. Fewer teachers were being hired to teach in their main undergraduate discipline, and significant numbers have little training in either mathematics or science. An increase in the rate of violence against teachers, as well as students using drugs and alcohol earlier in life, suggests teachers are losing control of the learning environment. This suggests that the political will to impose educational standards might be merited; however, missing from the NEGP's discussion paper is a much-needed debate as to what effect government cutbacks have had in reducing attainment levels reached by these same students, or how citizen "tax revolts" and teacher lay-offs have created the need for such re-introduction.

[107] Florence Glanfield, **Western Canada Regional Perspective on Mathematics Education: Prepared for the National Forum about Mathematics Education for the Canadian Mathematical Society** (Saskatoon SK: University of Saskatchewan, 2003), pp. 3, 4, [http://www.math.ca/Events/CSMF2003/panel/WestReport.pdf]. Minimal criteria exercised by universities for entrance into mathematics-related teaching careers contribute to many of the problems that are now surfacing in the classroom. Criticism is also reserved for administrators who coerce minimally qualified individuals to undertake this task, by suggesting that "anyone" can teach the subject by staying a lesson ahead of the class.

Testing of potential high school graduates for subject competence has been part of the school system's expectations for decades, so one would expect that the re-introduction of educational "values" in the form provincial testing mechanisms – in any province - would have minimal effect upon teacher duties or classroom expectations.[108] However, First Nations have become conditioned to not writing such examinations, aren't encouraged by their teachers to take subjects requiring these tests be taken upon completion of studies, and are more inclined to drop out should such "obstructions" between school subject selection and provincial expectations for graduation be placed in their academic paths.[109] [110]

Rebelling to some artificially contrived "standard" may, on the surface, appear to be little more than an "academic insurgence" instigated by First Nations students; conversely, some critics would have us believe that this "action" merely demonstrates a psychologically inward "realization" by these pupils of their incapacity to learn to such

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[108] John FitzGerald, "***Examine This***", **New Improved Head** (Toronto ON: Actual Analysis, August 16, 2006), [http://www.newimprovedhead.com/exams.htm]. FitzGerald argues that the phasing out of provincial examinations removed the one intellectual factor that cut across the "class" lines of traditional learning beliefs, and allowed the myth that schools catering to the upper classes were doing a "better job" to be debunked. After Ontario abolished Grade 13 final examinations in the late 1960's, the number of Ontario Scholarships (final course average of 80% or higher) went from 3% to 30% of total population, indicating a pattern of teachers "padding" marks for their students. As this trend continued, government significantly decreased the monetary value of the scholarship. In the past, students from so-called "poorer school" districts could expect their final examination efforts to be graded on a par with the children attending elite or private schools, but today's university entrance requirements now allow registrars to weight an academic average according to a school's perceived ability to "adequately educate" its students.

[109] The First Nations Educational Council of School District No, 73, **Aboriginal Education: Improving School Success for First Nations Students** (Victoria BC: BCEd, 2006), [http://www.bced.gov.bc.ca/abed/readings/iss/toc.htm].

[110] Nesdoly.

levels of expectation. However, neither rationale for student resistance to taking such examinations measures up to the scrutiny of the traditional Aboriginal learning model. If children demonstrating the most resistance towards the learning of science and mathematics have parents and grandparents who were abused while attending residential schools, there would be no encouragement to succeed coming from these sources. Parental subject reinforcement would thus be incomplete, or marginal, at best. Moreover, few of the materials being examined in written form are currently taught by tying their relevance to life expectation or even the reason as to how, or why, these "facts" were discovered in the first place – the traditional method by which Elders introduced knowledge when instructing their own young. Lastly, with a long tradition of oral history providing a touchstone to the past, the perceived "unwillingness" of Aboriginal students to write comprehensive tests could just lie in the fact that this practice is still an unfamiliar tool in the Native educational tradition; if such is the case, students could merely practice that technique until they have demonstrated success – as did their ancestors - and incorporate such expectation for eventual achievement into current and updated cultural procedure.[111]

In any case, our poor expectations for Aboriginal mathematical and scientific achievement is most likely extremely pessimistic, premature – and totally wrong.

II) THE LEARNING OF SCIENCE AND MATHEMATICS

Government's insistence upon re-introducing "standards" and the profession's

[111] Brenda T. LaFrance, "***Culturally Negotiated Education in First Nation Communities: Empowering Ourselves for Future Generations***", **Aboriginal Education: Fulfilling the Promise**, Marlene Brant Castellano, Lynne Davis, and Louise Lahache, Editors (Vancouver BC: UBC Press, 2001), p. 108.

resisting such practice serve only to cloud over the answer to the question as to how to define the literate citizen, or who shall be defined as having attained such status. In this case, however, literacy is only being defined in the measure of the spoken and written word; and best portraying the "values" society has to offer at the time of reaching this plateau. As a seeming afterthought, the "mastery" of current mathematical and scientific curriculum objectives is merged into this subjective definition, to provide us with society's version of the "successful candidate" for graduation.

Aboriginal learners, however, find themselves being rigorously excluded from the graduation process. This is due in some measure to the fact that they are still fighting a school structure which discriminates against providing First Nations students with an appropriate learning environment for the study of mathematics. Hampton notes:

> ***Many Native students report being counselled against mathematics because it has been perceived as too difficult for them or as unnecessary to their future (Green, 1978). In this increasingly technological society, mathematics has become the 'critical filter' that often prevents Natives from obtaining careers in high-income fields (Sells, 1980).***[112]

This "critical filter" discrimination has, he notes, profound economic implications for First Nations people:

> ***If Native nations are to have engineers, managers, business people, natural resource specialists, and all the other experts we need to meet non-Indians on equal terms, then we must have educational leadership that makes mathematics, science and computers accessible to our students.***[113]

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[112] Eber Hampton, "***Towards a Redefinition of Indian Education***", **First Nations Education in Canada: The Circle Unfolds**, Marie Battiste and Jean Barman, Editors (Vancouver BC: UBC Press, 1995), p. 7.

[113] Ibid, p. 6, 7.

Rather than examining their own role as instructors, Hampton points to the fact that many teachers merely "observe" Aboriginal students "failing" mathematics and science courses. With this data in place, they then draw the transitory but racist conclusion that all such students will have difficulty in these settings, prompting the negative counselling towards enrolling in such programmes.

By paying more attention as to how Native students "think", Hampton suggests that teachers might devise a more critical pedagogical approach that utilizes the influence that language and culture play in formulating linear thinking patterns and mathematical learning potential:

> ***...ways of thinking are language-based as well as culture-based. Pinxton, van Dooren and Harvey (1983)...show a possible relationship between Navajo language and the teaching of mathematics...In Navajo, for example, it is relatively easier to speak of centres than boundaries. Dynamic shapes are more commonly dealt with order and position seems more salient than number...***[114]

By exploiting certain of these features of language and culture, he believes, perhaps Aboriginal students could develop a stronger connection with some mathematical ideas.

Covington suggests that students respond to learning environments based upon a "self-worth theory of achievement motivation":

> ***If we believe that success in school is the key to academic self-esteem, then those students who fail in a competitive classroom structure...will probably develop low academic self-esteem.*** [115]

To reduce the risk of developing negative self-perception from such academic "failure",

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[114] Ibid.

[115] Karen Manheim Teel and Andrea Dubruin-Parecki, **Making School Count: Promoting Urban Student Motivation and Success** (London: Routledge – Falmer, 2001), p. 19.

Covington advocates for the elimination of traditional testing methods, urging teachers to develop and utilize a grading system that embraces non-competitiveness and effort applied by the student as measurements of learning attainment. In the mathematical curriculum, however, Covington's approach finds itself "at odds" with the reality of the mathematical learning process.

Every new concept to be learned in mathematics is built upon an understanding of previous theories taught. These previously learned lessons are often revisited, so as to provide an applied knowledge to new ideas. Therefore, it is essential that students fully understand previous concepts before proceeding to the next phase of curriculum. Thus, empirical measure is a "fact of life" for the mathematics teacher; this is not just some "competition" to the determine whether one "knows or does not know" the topic according to curriculum criteria; the bar on the mathematics high jump merely has an elevation point on the crossbar that must be reached, before one continues the contest.

"Failure" of a mathematical task is an acceptable learning response. Aboriginal learning tradition shows:

> ***...First Nations ancestors used intense and extended observation to study science and mathematics...a high degree of respect for the individual ...enabled the child to observe until he/she felt confident to undertake the task independently...Once the task was successfully completed, it was repeated and lauded in public. Learners cooperated and assisted each other in achieving their goals. The concept of failure was not introduced to the learner; rather, it was accepted that learning was a lifelong process and that knowledge acquisition continued until death. Such knowledge brought with it an obligation to share it and pass it on.*** [116]

[116] LaFrance.

There is evidence to suggest that Aboriginal resistance to formalized testing procedures should more accurately be perceived as the student expressing a "fear of success".[117] Until European settlers came to Canada, there was no need for First Nations children to be tested for their mathematical understanding beyond its application in spiritual thought and expressed by Mother Earth[118] or utilized through commerce.[119] In our newly revised and properly mandated classroom settings, however, few teachers are prepared to provide a relationship between the materials taught and an application to life; the roteness with which mathematical fact is now being taught might even be seen by Aboriginal students as an incomplete task, lacking any focus or purpose for its existence.

Beggs has also observed patterns of behaviour demonstrated by teachers when first introduced to Aboriginal students, which may simply exacerbate the problem of later "testing" these same children. Typically, an instructor will enter a new community, and be immediately bombarded with stories highlighting the "unsatisfactory teaching skills" of his or her predecessor. Usually, this interpretive history will be provided by a teacher's aide or administrator. Even if the teacher doesn't start his or her tenure in this manner, the

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[117] Don Beggs, **Telephone Interview: Former Educational Consultant to Vancouver Island West School District 84**, Ken MacDougall, Interviewer (Gold River, BC: July 2006).

[118] Department of National Defence - Canada, **"Native Spirituality"**, **Religions in Canada** (Ottawa ON: Directorate of Military Gender Integration and Employment Equity, September 2004), [http://www.forces.gc.ca/hr/religions/engraph/religions23_e.asp]. The medicine wheel, with its relationship to the Circle of Life embraced by most Canadian Aboriginal cultures, is a potent Native mathematical symbol integrating life, Mother Earth and the Creator.

[119] Ibid. The potlatch ceremony was also a commercial endeavour. Organizers of such feasts would borrow from family and friends in order to present for the ceremony, and interest was paid on that debt, to insure that those preparing for the feast not only understood its social value, but worth and sacrifice, as well.

first task usually undertaken in class by this person is to test whether full value was given to the previous year's curriculum. When students fail this review, the conclusion invariably reached, regardless of possible avenues of explanation available for exploration, is that topics of prior curriculum expectation must be re-taught.[120]

The more insidious side effect invariably coming from such assessment is this: seeing these Native students academically struggling, the (usually) non-Aboriginal teacher may decide to take the "politically correct" instructional approach to solving the problem by embracing the historical guilt of society's treatment of First Nations, and "tread lightly" in setting student expectations, thus creating a standard of race-based testing procedures. [121]

LaFrance's evaluative model would suggest that a simple communication between student and teacher, in private, may be sufficient to stimulate the student to understand what is expected of him or her in the educational exchange. Since Aboriginal

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[120] Beggs. The high rates of failure observed by Beggs may well just be as a result of the relative "newness" of the instructor. Were such results found to exist in larger, less remote schools, it is likely that consulting staff would be called upon to advise a plan of action; however, in Aboriginal schools, in particular, the prevailing mindset of teachers familiar with the students is often allowed to dictate the remedial course of action, without examination of external factors influencing that result – such as home life, social setting, or the relative frequency of survivors within the community of the residential school experience.

[121] Ibid. By eliminating or shortening instruction in newer topics, the teacher damages mathematical understanding in later studies, where this principle is used as the basis of enhanced theory. This invariably produces a later struggle within the classroom where the student, having failed to grasp a new concept due to a lack of foundation, forces the teacher to make one of three choices: fail that student, put the child in remedial programmes (which ultimately lead to being labelled as "special needs") or give in to social pressures within the school (fear of being perceived as a poor teacher by administrators, parents complaining about their child's lack of progress, or the classic "the child should be allowed to move up with his or her peers, to avoid social stigma"), inflate marks, and have the student "moved up", to become a "problem" to the colleague in the next room or down the hall in the following academic year.

children respect the concept of wisdom emanating from an Elder or parent, by playing the role of teacher as Elder and making that connection with the student, this could possibly elicit a child's more positive response to understanding process, thus building the necessary desire to achieve to the level of the teacher's expectations. However, most instructors, fearing resistance by that student to the subject (a non-Aboriginal expectation of reaction to failure), avoid such discussion, seeing it as being potentially "confrontational", as opposed to having instructive value or in keeping with traditional methods of learning by First Nations people.

III) THE DROP-OUT PROBLEM

The conflict between having those who "have knowledge" in mathematics and science (mostly non-Aboriginals) and the need to create role models for Native students who will in turn impart such wisdom to a new generation of students in the community, is a delicate balancing act. Multiple studies suggest that First Nations children's mathematical learning paths are on a par with so-called "normal" population samples up to, and even beyond, the Grade 6 level. However, an increased drop-out rate for Native children as they progress through high school soon causes that rate to plummet. Notwithstanding this damning statistic, if a child maintains an involvement in organized extra-curricular activities to the completion of high school, performance levels of Aboriginal students are still on a par with the rest of the population.[122] Furthermore, these

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[122] Charity Bonneau, Brian Ee, and Jason Lauzon, "***First Nations Learners and Extracurricular Activities: Barriers And Bridges To Participation***", **Educational Insights,10(1)**, (Vancouver BC: University of British Columbia, 2006), [http://www.ccfi.educ.ubc.ca/publication/insights/v10n01/articles/bonneau.html]. Deterioration of "performance levels" appear linked to two factors: peer pressure and cautious sensitization by non-Native teachers to First Nations issues and history.

rates improve further when there is a stable family home environment, a situation in which few First Nations students find themselves.

There is much literature available to suggest that parental withdrawal from a child's life is often fuelled by shame over a family member's treatment received while attending residential schools at that same age level. There is also supporting evidence given that the patterned rates of drop-out closely mirror those of the family member. However, identifying the problem and developing a healing solution derived from First Nations traditions still remains an elusive commodity.

IV) EMPOWERMENT: ENABLING TOOL OR ENABLING EXCUSE FOR FAILURE?

A body of principally Aboriginal thought believes that, by teaching a student to be empowered through study of their peoples' past experiences and the role in which seemingly systemic Euro-centric cultural genocide played in that history, may spur First Nations students to greater success in education:

> ***...it is only when (Aboriginal people) get to university that they have a chance to be exposed to their history and culture and to the impact of colonialism. Learning about who they are, and how they came to be where they are today as a result of colonialism, is a liberating and empowering experience...high schools should be doing for many Aboriginal students what certain university courses do for a few. This is a process of de-colonization, by which Aboriginal students come to know and to value themselves as Aboriginal people.***[123]

This exposure to historical reality is often seen as being the sole key to unlocking the vast

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[123] Jim Silver, Kathy Mallett, Janice Greene and Freeman Simard, "***Aboriginal Education in Winnipeg Inner City High Schools***", **Canadian Centre for Policy Alternatives – Manitoba** (Winnipeg MB: Canadian Centre for Policy Alternatives, December 2002), [http://www.policyalternatives.ca/index.cfm?act=news&call=450&do=article&pA=BB736455].

potential of First Nations students' intellect. For them, the solution to lost learning progress is simple: if First Nations students can only achieve an awareness of the historical damages inflicted upon their people by European colonialization, then conflicts found within the learning process would simply disappear.

LaFrance, on the other hand, has suggested that Aboriginals, if properly taught mathematics and science (meaning, by paying reasonable attention to the traditions of First Nations teaching and learning patterns), students will not only learn these materials, but feel an obligation to pass on this knowledge to their children. If this simple process were followed and reinforced by teachers on a regular basis, it alone could dramatically reduce the problem of academic underachievement by Native populations.

It is only reasonable that First Nations students must understand their roots, particularly with regard to its influence upon intellectual growth and development. However, it is definitely a leap of faith to suggest that the "discovery" of these origins will, somehow, immediately correct the historical wrong turns made by their ancestors and colonizing governments more than two centuries ago. This very emphasis placed by empowerment theorists upon their racial bond also tends to refocus Native thinking upon only one of many factors contributing to their economic and social displacement – racism, particularly as practiced by the Canadian government, and now presumably manifesting itself in non-Aboriginal society. This tends to dull the learning appetite for other subject matter, making it more of an impediment to academic success, as opposed to actually travelling the full scholarly pathway, and dealing with crossroads of difficulty in life as they are encountered in the classroom.

As a result, mathematics teachers interested only in finding the proper balance of

instructional techniques to be used with First Nations children are currently stranded in the trenches between a side reinforcing its "case" in the propaganda campaign of past historical excess, and an "enemy" (the non-Aboriginal population controlling the school's agenda) immersing itself in the battle fatigues of politically correct dogma of guilt and self-worth that has no relevance to teaching the curriculum. Fuzessy further underscores this point:

> ***Cummins posits a model that... highlights the essential role of educational structures and the teacher in providing opportunities for the empowerment or the disabling of minority students...it is students of difference who face the biggest challenge in obtaining academic success in our present educational and social systems. Decades-old studies have demonstrated the educational and social bias in favour of the dominant and / or mainstream North American ideology...This realization is not new, yet despite concerted efforts to the contrary many school failures for Aboriginal students persist.***[124]

Fuzessy's conclusion should have become obvious some time ago, even if they fail to totally acknowledge the decimation that the residential school experience imposed upon First Nations culture and learning practices. Curriculum content is the educational prerogative of the ruling classes. For First Nations students to succeed, they must not only accept the hierarchy of learning objectives within these documents, but ascend this class structure by both mastering, and if necessary, manipulating the "system" to accept them as equals. Only through demonstrated accomplishment and a rebuilding of the intellectual elite to which the Elders ascended, and by embracing their cultural reverence in obtaining this gift of knowledge, can this ever be accomplished.

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[124] Christopher Fuzessy, ***"An Investigation of Teachers' Role Definitions in Nunavik"***, **Canadian Journal of Native Education** (Ann Arbor MI: Proquest Educational Journals, 2003), Vol. 27, No. 2, pp. 195 – 197.

It should not be necessary to train Aboriginal teachers who base their classroom goals exclusively upon re-indoctrination principles; the subject that must be taught then becomes secondary in the political process.[125] As well, one does not wish to see non-Aboriginal teachers tiptoe around the historic nature of the First Nations - Euro-Canadian educational conflict, yet make no adjustment to their own pedagogical tools when crossing this same cultural boundary; they are merely inflicting more damage upon their students, and further delaying economic emancipation for Aboriginal populations.

V) CONSTRUCTING "CULTURALLY RELEVANT" CURRICULUM

There is no question that the learning potential provided by printed materials is significantly enhanced when the textbooks draw on a readers' experiences. For instance, in mathematics, we as Canadian teaching citizenry would find the utilization of American texts, with their emphasis upon the Imperial system of measurement, lacking credibility for their application to the Canadian context. Therefore, it is only reasonable that First Nations educators should demand, among other things, the inclusion of their own history and contribution to the Canadian identity be taught in the daily classroom social studies experiences of all Canadian children, not just to those of First Nations ancestry.

However, when it comes to the spheres of mathematics and science, we seem to not want to include Aboriginal tradition. We erroneously assume that there exists a correlation between the poor performance of Aboriginal students in these subjects and the

[125] Hesch, p. 183. With courses in history or Social Studies, Hesch's empowerment strategy might have pedagogical implications; however, teachers aren't in a position to "renounce" what the educational system has already provided – band-administered or otherwise, because, as Crain and Highway have both noted, First Nations bands can't "go it alone" economically, so it's up to the schools to provide the "new" tools for success with the existing curriculum.

relatively minimalist influence of First Nations achievements having been passed down by their Elders, by way of their traditional learning patterns. Thus the debate ensues; is there no "tradition" of mathematical or scientific learning, or have we just not been diligent enough in finding its influences?

Aikenhead and Huntley believe the problem lies within the realm of a scientific curriculum laced with the colonial influences of Western achievement, to the exclusion of First Nations accomplishment:

> ***...the disparity between home and school environments is so great that some Native American students experience a kind of culture shock which significantly affects their attitudes toward school (Cajette, 1986, p. 201)...to transmit a Western scientific world view to these students amount to cultural assimilation and tends to marginalize and even oppress many students...How can Aboriginal students gain access to a Western scientific way of knowing without losing something valuable from their own cultural ways of knowing?***[126]

These researchers seem to miss two points. First, there is precious little to "distinguish" between the so-called Westernized "scientific method" and the discovery processes of Aboriginal societies. First Nations teachings always embraced the notions of experimentation and exploration of fact within Nature. These are the very tenets of true "scientific discovery" as employed by European scientists. Moreover, subscribing to the theories of cultural repression conveniently enables non-Aboriginal society to ignore the vast contributions made by the Navajo, Inca, Mayan or Cherokee made to our understanding of architecture, social order or astronomy, as but few examples. Further, it does not allow us to fully appreciate the value and contribution to medical knowledge

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[126] Glen Aikenhead and Bente Huntley, ***Teachers' Views on Aboriginal Students Learning Western and Aboriginal Science***, **Canadian Journal of Native Education 23(2)**, Ann Arbor MI: Proquest Educational Journals, 1999), pp. 159 – 160, [http://www.usask.ca/education/people/aikenhead/cjne.pdf].

given to us in the healing routines of Canadian-based tribes, our understanding of the Earth's structure and climate as passed down through oral history of these people, nor of their sensitivity to Nature's balances that is contained in their environmental practices and religious beliefs. Therefore, for Aikenhead and Huntley to even posit such differentiation is to denigrate the very accomplishments of the people they are most trying to assist in their learning tasks.

If we embark upon a process that ties Aboriginal teaching practices to the traditional manner in which First Nations people learned (an educational process that relies heavily upon introspection and problem solving capability), this might allow Aboriginal students to more fully understand the materials being taught. This, in turn, could enable these same children to not only better appreciate their culture, but empower them to seek a future role as Elder and teacher. However, as the curriculum is still controlled by a well-educated ruling class, this can only be accomplished by compromise, gradual ascension to these ranks, and the recognition of the role that the knowledge-givers – regardless of race – must bring to this process of understanding and revitalization of Native intellectualism and cultural rebirth.

VI) So - What Have We Learned to this Point in the Discussion?

Canadian-based research has already begun on developing mathematical curricula for First Nations schools. LaFrance, in her evaluation of the Ahkwesahsne Mohawk special curriculum, paints a foundation for its successful implementation:

> ***...the promotion of science and mathematics knowledge must be culturally relevant in order to spark interest and enthusiasm among First Nations youth. The overall goal was to promote self-confidence and self-esteem...by***

introducing and reinforcing Aboriginal contributions to the fields of health, science and technology and, thus, demonstrating the historical and current importance of science and math in First Nations cultures.[127]

In basing the teaching of mathematics and science in a cultural setting, this mollifies the activist voices of the empowerment movement, while simultaneously allowing graduates of this programme to interact on an equal footing with the Eurocentric culture that has become the Canadian mosaic. At this point, having developed a confidence in the ability to master the subject on one's own terms, it is then possible to foresee a time where the more abstract and contemporary learning of modern discovery become equally mastered by this more urbane Aboriginal scholar, thus allowing for the rebuilding of the intelligentsia of First Nations people, and a return to the dominance of the Elders is the transmission of this knowledge to their people.

The danger is seen here, not in the designing of the curriculum, but obtaining teachers capable of disseminating its knowledge to its fullest potential. There is much that has to be done to not only revitalize traditional tenets, but reconstruct their processes, both in their teaching application by Elders and appreciation by students now enrolled in the conventional school system. To date, however, governments have shown some reluctance to the continuation of this task, much less to its funding.[128] [129]

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[127] LaFrance, p. 105.

[128] Ibid, pp. 105 – 108. The Ontario government went from enthusiastic support for the Mohawk curriculum in its formative stages to outright indifference once materials were ready for classroom distribution.

[129] Barry Montour, **Interview: Director of Education, Ahkwesahsne Mohawk Board of Education**, Ken MacDougall, Interviewer (Cornwall, ON: August, 2006). Montour worked as a developer and teacher on the Mohawk initiative. The research was destroyed in a fire, and with this loss, interest waned in its implementation, a waste of both time and unearthing of Aboriginal mathematical potential.

The outcome of research based upon establishing such a curriculum will be incremental, and slow in developing. Its fundamental objective, however, will be to assure that Native students achieve success by understanding the foundations of mathematics, through cultural interpretation. Once this goal has been reached, their evolutionary utilization into other subject areas will occur in a natural pattern.

In other words, the abilities of the First Nations child to master mathematics and science must be restored, or the traditions and processes that enabled Aboriginal people to teach their children will disappear into the assimilative wasteland most feared by Native scholars.

Chapter IV

CASE STUDIES AND ANALYSIS

This chapter examines the mathematical performance of two groups of Native students in two different educational systems; the public sector and a fully Band-administered operation. This collection of students came from two teaching assignments undertaken by this researcher in rural, isolated communities of British Columbia, starting in the Spring of 2003 and concluding in June, 2004. Both schools followed the curriculum published by the British Columbia Ministry of Education, but determined what levels of instruction were provided by grade, and levels of achievement expected by students upon completion of that grade level. This differentiation of offerings, however, did not extend into areas covered by the mathematics curriculum.[130] [131]

The comparative group against which First Nations student performance was measured also came from a teaching assignment undertaken by the author, during the Fall and Winter periods of 2002 and 2003. This sample consisted of an initial group of 49

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[130] British Columbia College of Teachers, **Information on First Nations Language Authorities**. (Vancouver BC: BCCT, 2005), [http://www.bcct.ca/documents/app_first_nations.pdf]. The Band-run school had its own regional Language Authority, while the public sector school did not.

[131] First Nations Educational Steering Committee, **First Nation Education Jurisdiction: An Overview of the Agreements** (Vancouver BC: First Nations Educational Steering Committee, June 2006), [http://www.fnesc.ca/jurisdiction/RevJun06Overview%20of%20Jurisdiction%20Agreements%20Jan%2006.DOC]. First Nations course offerings usually utilize a standard format that allows for the growth of a culture-based curriculum to have uniform development in the local languages, on a grade-by-grade progression. The FNESC merely acts as an advisory agent, to assure that the "intention" of the grade's curriculum is respected.

students studying Grade 9 mathematics at an inner city school under the administration of the English Montreal School Board (EMSB), in west-end Montreal.

As to the nature of the materials covered, students in Grades 8 (the second First Nations school, only) and 9 were introduced to the study of spatial and geometric concepts, as well as algebraic and problem-solving techniques on a theoretical level, over a three week period. Evaluation of progress was made using a series of standard tests extracted from CD's provided by the ***Banque d'instruments de mesure*** **(BIM)**, a Quebec-based consortium that provides testing materials for many subject areas, including mathematics, and marries its materials to curriculum by grade levels, as administered by the Ministry of Education, Quebec.

The Quebec-based materials were chosen to establish measurement standards for three reasons. First, the curriculum in both British Columbia and Quebec at the Grade 8 and 9 levels are reasonably close in their final expectations of students, thus allowing for an extraction of certain similar test items for all classes. These results could then be compared with the testing performed by the author with students in the Montreal school.

The BIM-based questions are professionally field graded for their ability to test conceptual, applied, or problem-solving capabilities of students. They provide a diverse format of multiple-choice, short answer, or extended answer questions, and rate each item on the generated test based by degree of difficulty.[132]

Due to the flexibility of the BIM format, it was a relatively simple matter for this researcher to approximately conform to testing standards loosely defined by curriculum consultants across Canada, wherein the general make-up of such tests should include

[132] Please see ***Appendices II -I V*** for full details.

40% of questions being asked to be conceptually-based, 35%-40% as being applications-based, and the final 20% -25% challenging students to utilize their problem-solving abilities. Whatever bias that could be brought to bear upon the tests could then be appropriately adjusted for margins of error using BIM-based parameters, as opposed to personal factors that might have clouded this instructor's expectation in first having to get to know these students before measuring understanding of this mathematics unit.

In this chapter, we will first describe each of the schools in terms of its students and the social factors which affect students' learning. We will then look at the mathematical materials covered in the three schools and discuss the approach taken in delivering the curriculum. Finally, we will examine the results of the testing and compare the performances of students from each group.

I) Defining the Research Model's Sociological Parameters

In order to "measure" First Nations' student abilities to overcome the secondary effects of residential school abuse, a comparative model was required that specifically identified social factors one could expect in the classroom. By then trying to understand the conditions which contributed to the emergence of these behaviours, a strategy could be developed whereby appropriate counselling or remediation could be provided to the student – if such services were available to the teacher, or if this teacher had the requisite skills to handle the problem externally from the classroom environment.

By following this approach, it was much easier to judge the overall teaching effectiveness of the applied pedagogy, isolate behaviours not related to the learning of mathematics from social factors, and thus allow research to concentrate on fine-tuning

the instructional skill set. This also allowed for an ability to gauge instruction effectiveness within the different politically charged environments of the public and Band sectors.

The ***Legacy of Hope Foundation***'s web site (http://www.legacyofhope.ca/Who.aspx) provided the list of behaviours one could expect to originate with residential school abuse, and exhibited in classroom behavioural patterns. An abridged list may be found in ***Appendix I***. A variety of strategies was employed to deal with each issue of concern on this list, including personal intervention on behalf of the student, personal counselling (and, where required, safe haven and meals), counselling provided by Elders of the community, social workers, other students (usually, but not always, peers or a student whom had been afflicted in a similar matter, in the past), fellow members of staff, and, on occasion, law enforcement officials.

The greatest impediments to maintaining a focused strategy was that, in trying to deal with each issue by its "categorization", the student's reaction to an applied therapy would often require an "on the fly" adjustment of methodology. Responses to applied therapies could be as varied as the list of conditions afflicting the community through residential school practices. Adjustment to classroom behavioural conditions was a constant concern, and serious loopholes in regulations provided to schools for dealing with specific behaviours (especially those of a sexually-based nature, as required by either provincial or federal government regulations) were often found to be more of a deterrent to having the condition dealt with by local officials, as opposed to having immediate action taken on the matter. In particular, concerns expressed to a teacher in confidence by a student, and requiring the attention of school or community officials,

would often be challenged by administrators when reported by a teacher or would necessitate the commencement of bureaucratic procedures requiring frivolous paperwork, procedures which either undermined or seriously damaged the confidentiality factor that the student so earnestly desired. Furthermore, each new occurrence of a similar problem invariably generated a different variable for consideration, when encountered during instructional periods. In all of these circumstances, classroom pedagogy had to be adjusted accordingly to reflect a control, or at least an acknowledgement, of the behavioural condition's existence.

II) Applying the Literature Review Results to the Case Study

Our literary reviews have shown us that First Nations cultures perceive "failure" as merely a learning test, versus the European-Canadian notion that it is an instrument of oppression in the educational process. We also have seen that the teaching profession, along with First Nations governments, continue to be locked into ideological struggles with governments in seeking to "control the outcome" of student learning and achievement. Lastly, whatever research is being done in an effort to find a solution to the First Nations mathematics deficit is, at the moment, being pushed off its course by an "empowerment" movement focusing too narrowly upon Canada's lingering history of cultural genocide, as opposed to trying to return Aboriginal people to their historic traditions of learning.

We have been shown that First Nations have, in the past, created with their own dynamic, oral structures for the passage of knowledge from one generation to the next. These methods have used the power and creativeness of abstract thought, and the process of introspection, in order to master complex subjects. These types of sophisticated methodologies are seldom found in the rote learning environments of today's conventional classrooms. Instead of recognizing these points, however, we, as a society, have deigned to classify Aboriginal students as being of "special

academic need", and lacking a capacity to master our subject's challenges.

As a teacher, we have to disassociate ourselves from the theoretical rhetoric of research debate, and concentrate upon the "problem" of teaching mathematics to First Nations students. There must be a realization that, regardless of intention or learning objective, the "measure" of a teacher's effectiveness in an Aboriginal environment is in the successful application of that learning to their life experience, not to the teaching of the idea or concept itself. This in turn promotes with its success stimulation within the student to tackle new ideas and extend their value beyond the curriculum's expectations.

To assist these processes in coming to fruition, we must therefore reflect upon the wisdom of current literature, marrying our classroom pedagogical philosophies towards resolving the two fundamental issues first identified in this research:

1. **Healing the cultural and social dysfunction resulting from governmental attempts to force First Nations students to attend residential schools, a policy relying heavily upon a perceived need to assimilate Aboriginal populations into the Eurocentric culture now dominating Canadian values, and**
2. **Simultaneously returning the classroom learning model into one of introspection, reflection and interactive dialogue – not just student-to-student, but involving teachers, community members and the Elders.**

Classroom issues having their origins in residential schools are already identified by First Nations communities. The behavioural items that teachers most often encounter, and the general manner by which they may be handled in an educational environment, include:

1. **Chronic absence or lateness by a child, or students frequently taken from the community for "family visits", "shopping" or medical treatment.** Often, these behaviours result from parental indifference or neglect, family contempt for school values, in general, or abuse, and can only be adjusted through constant monitoring, parent-teacher discussion, or Elder intervention.
2. **Children showing up for class poorly dressed, sleepy, unkempt and dirty, and almost always pale and hungry.** Parental neglect is almost always a factor in such circumstances, and can often be rectified or made less of a problem through Elder

intervention and parent training or parent addiction counselling, school breakfast programmes, and/or the teacher becoming "*in loco parentis*", at least during school hours, to such children.

3. **Finally, students behaving inappropriately, either by bullying others, indulging in narcotics and/or alcohol, displaying contempt for the rights of other students to not be subjected to such behaviours (particularly those of a sexual nature), being sexually aggressive or prone to states of solitude and isolation from others, even friends.** Such behaviours are almost always the result of abuse, whether at home or elsewhere, and should be dealt with by counsellors or Elders immediately upon identification (with the teacher as active observer and participant in remedial processes), as they may lead to further problems, including the possibility of the child attempting suicide.[133]

These behaviours were to be duly recorded for their occurrence and frequency of repetition. It was extremely important to the outcome of this research to have strategies in place for dealing with their occurrence, even if these measures could not be tested in advance.[134]

Additional caution was taken with regard to insuring that the classroom relationship between this instructor and his students did not affect instruction of materials, or predispose

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[133] During the course of conducting this research, interventions were conducted with the assistance and co-operation of certain teaching staff and counsellors, Chief and Council, Elders and members of the Band who had special interest in education and health; even so, the number of persons denying the existence of certain behaviours, and refusing to involve themselves in therapeutic measures was still significant.

[134] Tom Lyons, "***Stolen Nation", Southern Manitoba First Nations Repatriation Program*** (Winnipeg MB: Virtual Circle Media, 2000), [http://www.wrcfs.org/repat/stolennation.htm]. While Lyons' article only addresses the issue of adoption of Aboriginal children by non-Natives, its relevance to this research is reflected in the fact that many First Nations perceive this practice as an extension of the purpose of residential schools - to assimilate Aboriginal people into the Westernized and European populations. Adopted children demonstrated behaviours similar to those found in students suffering from the effects of residential school abuse; moreover, many of these children often ended up in intervention due to initial behavioural observations made at school, usually by teachers with little or no training in counselling such students. Compounding this ambivalence, some behaviour is so painful to observe that teachers can often be "convinced" by other staff, or through administrative intimidation, to "believe" that the problem does not even exist, and therefore, extra counselling services are unwarranted in the schools.

anyone to expectations of success or failure; these steps included the following:

1. **There was to be no pre-conceived assumption as to the learning capability of any student based solely upon school classification of intellectual potential, unless specific learning issues were noted during classroom observation and presentation of materials; rather, it would be presumed that, if a child were in a specific grade, they would be able to perform, intellectually, at that grade level, and according to the expectations of provincial curriculum;**
2. **Issues of discipline and behaviour, homework completion, the taking of notes, or performance on tests and examinations were to be dealt with in an appropriate, culturally sensitive manner, involve parents and the extended family of the child, and unless specifically determined to be originating from issues identified with residential school fall-out, treated as "normal school expectations";**
3. **While attempting to apply, wherever possible, a "culturally sensitive" approach to presentation of materials, emphasis was to be placed upon student intellectual processes of introspection, insight, guided discovery, and the application of problem solving techniques formulated by Georges Polya;** [135] [136]
4. **Finally, the message to be consistently reinforced to students, parents and extended family was that of their obligation to make up the intellectual deficit within First Nations circles of mathematically and scientifically enriched Elders and teachers, so as to regain their status as equals in the evolutionary processes that constituted the needs of the trans-global economy, and the economic requirements of the future.**

These modified adjustments to pedagogical implementation were seen as constituting only an adjustment to teacher "attitude", as opposed to requiring a radical restructuring of curriculum; moreover, they were changes to instructional technique that could be undertaken by the teacher alone, should there no consensus within teaching staff to either adopt or extend this approach beyond the mathematics classroom.

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[135] Peter Alfred, G. Polya, How to Solve It (Provo UT: University of Utah, Department of Education, August 16, 1996), [http://www.math.utah.edu/~pa/math/polya.html].

[136] George Polya, How To Solve It (Princeton NJ: Princeton University Press, 1957).

As to "justifying" this approach to materials presentation to administrative personnel, it can readily be shown that **anything** that interferes with the natural instructional process of the classroom, or causes the teacher to deviate from a pathway for accomplishment of task is an issue to be addressed in some pedagogical context, particularly In First Nations communities. This adjustment can therefore be classified as a cultural imperative, not a deviation from normal pedagogical application, used in order to root out the behavioural abnormalities that remain behind as a result of the past history of the residential school abuse.

When distilled for its intent, all this study was attempting to show was that there could be found nothing "wrong" with the average First Nations' student's abilities to successfully absorb course materials, nor of their capacity to survive, economically speaking, within the Canadian mosaic, when they were required to utilize that knowledge as a "life skill".

III) Establishment of a Comparative Study Group

In the Fall of 2002, while auditing classes at Concordia University, the author was afforded the opportunity to substitute teach at a school administered by the English Montreal School Board (EMSB). The assignment provided the occasion to instruct students in Grades 9 mathematics (Secondary III [QC], Mathematics 314).

The school's population base came from an extended region of the city, with students travelling from near the boundaries of the Sir George Williams campus of downtown Montreal to the poorer areas of La Salle, Lachine, Cote-St.-Luc and Notre Dame-de-Grace. Ethnicity of the school was mixed; many of the students (and parents) came from Caribbean nations, while other large immigrant populations included students of Sri Lankan, East Indian or Pakistani descent.

a) Establishing a Population Demographic Definition for the Study

The school could be categorized as "inner city"; many of the traits germane to this classification manifested themselves in the student population, including the number of single parents, unemployment rates of adults, median income differentials for

families, individuals living below the poverty line, extreme racial differentiation from the city's normal population, and gang or juvenile crime activity.[137] [138] Despite this school having an exclusively non-Aboriginal population, many of these behavioural conditions were of the kind cited by the ***Legacy of Hope Foundation*** as germane to identifying the lingering effects of residential school abuse in First Nations students. During interviews with students, teachers, counsellors and parents, it was found that:

1. **There were few "white" students attending the school, and more than half of the children attending had not been born in Canada.**
2. **Only about one in 25 attending students were dropped off by their parents at the school; the rest came by Montreal public transit, from residences in some of the poorer working-class areas of west-end Montreal itself.**
3. **70 per cent of the school's population was considered "special needs", and were either not expected to graduate, or would eventually be transferred to "alternative" schools in Montreal. The school was also receiving extra funding for these students through government programmes.**
4. **Absenteeism ran to an average of seven students per class, either through extreme lateness or non-attendance. Some seldom attended classes at all.**
5. **Although the school classified many students as "underachieving", their overall attitudes were usually geared towards cooperation with teachers, while involving the classroom in periodic debate upon social issues.**
6. **More than two-thirds of students had already experimented with sex, drugs and / or alcohol. Some had juvenile records for dealing or street crime. Almost half had been suspended at one time or another in their school lives, or had been told to "transfer" to another school.**
7. **Many of the female students "acted out", and were extremely aggressive, suggesting that they had been victims of sexual assaults or predation.**
8. **Almost a quarter of male students admitted to having been beaten by adults, or bullied by older students.**

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[137] Michael E. Porter, State of the Inner City Economies: New Learning (Washington DC: Economic Development Administration, Department of Commerce, November 15, 2005), pp. 2 – 8, [http://www.isc.hbs.edu/pdf/ICEF_2005.11.15.pdf].

[138] Jean Anyon, "***Race, Social Class and Educational Reform in an Inner City School***", Teachers College Record 97 (1) (New York NY: Teachers College, Columbia University, 1995), pp. 69 – 94.

9. **More than 20 per cent of the males admitted to being in "gangs".**
10. **Fights broke out on a regular basis, particularly with students in the Secondary I and II streams. Some of these individuals had either been diagnosed as having FAS or Attention-Deficit Disorder. Skirmishes usually started with racial slurs between predominantly black students whose parents had emigrated from Caribbean nations, or students of Sri Lankan heritage, usually over "manhood" issues (who was, who wasn't a "man").**
11. **Male students frequently harassed or inappropriately handled female students, often in front of teachers, to get a "response".**
12. **When a sexual assault was reported, there did not appear to be any coherent school policy to deal with such attacks, even when witnessed by teachers.**
13. **More than half of the students lived in single-family situations with the mother as the household "head". Most of these mothers were holding down a poorly paying position in the workplace, or were on social assistance. Many of these same women were also living with, or dating, abusive males with chronic alcohol or drug habits.**
14. **Many of the students expressed "contempt" for either their home life, or their families, or both, and had at one time within the last two or three years, either ran away from home, lived away from home, or moved in with relatives or friends, because they couldn't stand the conditions under which they were currently living.**
15. **Attempts made to deal with student issues were often curtailed by administrative reluctance to accept the nature of reported behaviours. Experienced counselling services were inadequate and not usually available for immediate crisis intervention, as would also be the case when teaching in the First Nations community where the school was under public control.**
16. **Finally, although most considered it to be important that they complete their high school education, less than half of the students believed that this would ever happen.**

Teacher morale was low, with more than a quarter of staff on stress leave.

Academic expectation of the population was low; and had been for years. [139]

b) CLASSROOM SUBJECTS FOR THE TEST GROUP

Two classes of Grade 9 (Secondary III) students were assigned. One class held 26 pupils, and the second 23. Three students would drop out before the subject test was administered to the class.

The first class was a morning session, in Period I. The earlier class had a predominance of female students, while the second, an afternoon class following lunch hour, had a better balance of males to females. Conditions and specific notes as to the understanding of behavioural issues arising from this study include the following points:

1. Students suggested that previous teachers had "played favourites" with female students, and that they had been marked "easier" than the males. One father of a female student came to school specifically to talk about his child's decreased performance, and stated that his daughter found classes "harder" than the previous teacher's – a theme repeatedly heard during parent-teacher interviews later in the term. Virtually all complaints came from parents of female children.
2. Work habits for the students ranged from the fastidious to the non-existent. On average, only 64% of the total students would pass in assignments, and of these, almost half were incomplete. By far the majority of incomplete assignments came from females, while the males simply would not pass in work, unless it was completed, or unless the author specifically came to them on an individual basis and asked for the work they'd finished to that point.
3. Parental involvement in school academic work for male and female students was extremely poor, although extra-curricular sporting events were well attended.
4. During scheduled parent-teacher pedagogical days, the majority of parents of female students wanted to know how to help their child at home, while the parents of male students were more concerned about "behavioural" issues, and wanting to be called if their child "acted up in class." Almost all of the parents of the male students indicated that their children had talked about their class at

[139] Quebec Ministry of Education, **Results on the June 2003 Uniform Ministry Examinations and Graduation Rates**, (Quebec QC: Government of Quebec, Minister of Education, 2004), [http://www.mels.gouv.qc.ca/sanction/epreuv2003/Exam2003.pdf]. The school ranked in the lowest 10 percentile for the school year 2002 / 2003, in all subjects combined.

home, usually in a favourable manner; almost the exact opposite occurred with parents of female students.

IV) GOALS OF THE CURRICULUM

The Mathematics 314 syllabus followed for this study may be found on the Quebec Ministry of Education's web site. Its recommended instruction time is approximately 200 minutes per week (four periods). The curriculum's objectives are ambitious, in terms of the skill sets a student is supposed to acquire:

> ***To help students acquire the knowledge and skills targeted by this program, it is important to design learning situations that call upon their powers of observation and dexterity and that involve manipulation, exploration, construction and simulations. Through these activities, the students analyze hypotheses, actively look for solutions, discuss their approaches, analyze concepts or theories from their own point of view while taking into account other points of view, actively question the meaning and consequences of the procedures they use and relate the knowledge they have acquired to their own experience. These situations encourage the students to reflect, act, react and establish links with what they have already learned.*** [140]

V) THE ROLE OF PROBLEM-SOLVING IN UNDERSTANDING COURSE OBJECTIVES

Wherever possible, the provincial guidelines encourage teachers to seek answers on their own through resource utilization, whether it is with teacher-assisted guiding of principles, or eliciting innovative solutions which the students conjure up themselves. The idea is to turn the student into what can be best described as a "critical thinker", one who can view the principle conceptually, apply it to a basic situation, or utilize that

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[140] Quebec Ministry of Education, **Curriculum – Mathematics 314 Secondary School**, (Quebec QC: Government of Quebec, Minister of Education, 2002), [www.mels.gouv.qc.ca/dfgj/dp/programmes_etudes/secondaire/pdf/mata**314**.pdf], p. 9.

information in conjunction with other ideas, so as to create solutions for situations which may not even look to have common thread with the concept involved:

> ***Problem solving is an essential teaching and learning tool in several general education programs...and is an integral part of any mathematical activity. Problem solving is not a separate theme, but rather a process that should be applied throughout the program and that provides a suitable context for learning concepts and acquiring skills. Problem solving is both a basic skill that students should develop and an effective teaching approach that promotes the development of mathematical knowledge, thinking skills, socio-affective attitudes and problem-solving strategies.***[141]

By utilizing problem-solving technique in all facets of instruction, the curriculum's creators believe that the teacher can then guide the student along a pathway to a solution set, simply by asking questions relating to the task. Their pedagogical rationalization states:

> ***... problems provide an opportunity to:***
>
> - ***apply and integrate mathematical knowledge (e.g. concepts, properties, algorithms, techniques, procedures);***
> - ***develop intellectual skills (e.g. organizing, structuring, abstracting, analyzing, synthesizing, estimating, generalizing, deducing, justifying);***
> - ***develop positive attitudes (e.g. becoming aware of one's potential, respecting the opinions of others, and being imaginative and creative as well as rigorous and precise);***
> - ***use different problem-solving strategies (e.g. looking for patterns, representing a problem by means of a figure or a graph, constructing a table, referring to a known model, using a formula, formulating an equation, working backwards).***[142]

The approach encourages philosophical reflection that, were students to extend

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[141] Ibid, p. 10.

[142] Ibid, p. 11.

such thought processes to life sequences and events, would provide further opportunity for introspection and an appreciation of the process of self-understanding.

VI) Approach Taken In The Presentation of Materials

A conscientious decision was made by this teacher to utilize an instructional methodology that focused upon describing mathematics, as opposed to providing manipulative exercises. It was generally found that students at this age had not been provided with any instruction in the appreciation of mathematical history, conception, supposition, or cultural significance resulting in its application; therefore, wherever possible, theory formed the basis of most classroom discussion. The purpose in following this instructional path was to try and fill in the gaps of instructional neglect that allowed this condition to exist.

This approach was disconcerting to many students, who simply looked upon mathematics activities as the "providing of answers" to set questions. They had become conditioned to solving exercises through a series of orderly sequences and patterned responses that teachers had shown them on the blackboard, and / or were intimately detailed in an "authorized' textbook coming from the Department of Education.

While the language of the curriculum might suggest that its purpose is to promote problem-solving techniques, administrative staff in many schools in the EMSB interpret this to mean that it should only be done in the "approved" fashion outlined in the "approved" textbook (***Breton et al***, **Mathematics Carrousel**).[143] This situation appears to

[143] Quebec Ministry of Education, **Textbooks Approved for Secondary Students (Regular Stream)**, (Quebec QC: Government of Quebec, Minister of Education, 2002), [http://www.mels.gouv.qc.ca/bamd/pedagogi/p0068a.htm].

be consistent with the observations of Glanfield, cited earlier in this paper.

There are also serious flaws in how ***Breton et al*** introduce topics. The textbook follows a philosophy which might loosely describe as a "process of discovery", yet seldom makes specific reference, even in the historical examples, as to how the principles came to the attention of mathematicians in the first place. It also does not provide a justification for a concept even being introduced, or included, at a particular stage within the textbook, beyond that which might have been previously mandated by the Ministry of Education itself in its curriculum guidelines.

VII) TEACHING STRATEGIES AND CURRICULUM OBJECTIVES TO BE TESTED

The objectives of the material are grounded in geometry, its relationship to naturally formed phenomena as a process of description and discovery, and of the mathematical capability to manipulate these formations of nature to create or describe still other visual occurrences.[144] Curriculum designers include its study for its ability to progress the student through observations of patterns to its extension into the abstract:

> ***Geometry helps us represent and describe our world... to develop their perception of space in the world around them...(Students) first learn to recognize shapes and then analyze the different properties of these shapes ...it is essential to continue developing the students' spatial sense, which is a mental skill that makes it possible to create and manipulate the images of object... The goal is to improve the students' perception of two- and three- dimensional space, of the objects in that space and of the qualitative and quantitative aspects of their own representations.*** [145]

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[144] The curriculum's objectives may be found in ***Appendix V***.

[145] Quebec Ministry of Education, **Curriculum – Mathematics 314 Secondary School**, p. 28.

When introducing this unit, the choice of materials chosen for the study was governed by its opportunity to elicit descriptive responses to natural occurrences of mathematical phenomena. This, in turn, allowed the student to obtain a sense of "placement" for the materials within the cognitive thinking process, as opposed to having materials rotely described and defined. It also allowed for a more process-directed problem-solving technique to be utilized in the discovery of the principles of descriptive narrative for the mathematical concepts involved.

Unfortunately, extending this understanding beyond the conceptual level and into application or problem-solving potential of the material was restricted by the paucity of questions available for review in the ***BIM*** database; this, in turn, often necessitated the citing of examples taken from life experience, and not normally viewed as standard mathematical materials.[146] This deviation from normal mathematical example pleased students, who used their introduction to branch off into life-related concepts of materials.

The principal points of the curriculum were reviewed in essentially the same order by all classes. This was due in large measure to the fact that fundamental subject weakness was consistent throughout all three schools, and it became almost mandatory to review many skills of which one would normally expect to find students having a ready understanding at these grade levels. Thus, the introduction of materials, and teaching strategies employed, followed the order found in the next sub-sections.

a) Foundation Skills

When the test group classes started and when questions were asked as to "why" students were performing certain functions involving fractions, decimals, or solving

[146] This could include the concentric growth circles in a tree trunk, "perspective" creating a sense of depth within a drawing, or describing crystalline shapes found on the playgrounds;. Geometry was determined by description, while theoretical extension (e.g.: triangle braces on bridges) showed its utilization.

for the value of a single variable, justification of an answer was usually predicated upon a rote routine previous teachers had taught them. For example, in the case of solving for a variable, it was "what you do to one side of an equation, you have to do to the other." As long as the theoretical nature of an "=" sign being a "balance" (dynamic or otherwise), this explanation was accepted. Other problems included:

1) A basic test of metric concepts indicated a weak knowledge of prefixes and positioning, relative to the base unit. The higher Latin prefixes were first introduced, showing their relationship to the power of 10 (exponents), or multiples of this number. This was then extended to places beyond the decimal location (< 0). This introduced fractions as multiples of 1/10, and extending exponents into negative values. A table was then formulated, similar to what follows:

"k"	→	kilo	→	1 000	→	10^3	
"h"	→	hecto	→	100	→	10^2	
"da"	→	deka	→	10	→	10^1	
"base"	→		→	1	→	10^0	(meter, gram, etc.)
"d"	→	deci	→	1 / 10	→	10^{-1}	
"c"	→	centi	→	1 / 100	→	10^{-2}	
"m"	→	milli	→	1 / 1000	→	10^{-3}	

Lastly, a simple memory aid, taught to graduate students by former M.T.M. student Robert Lam, was introduced to show students how the prefixes were ordered; it went:

ketchup **h**as **da**maged my **d**elicious **c**hocolate **m**ilk

where the first letter(s) of the words gave the order of metric symbolization.

2) Even after the metric review, there was still some confusion as to how the number "1" related to the exponent "0". To clarify this issue, a discussion of how computers "talked" to one another was begun. The idea of a light "switch" introduced the Base 2 system and the ASCII set representation, and the idea of exponent as a power of the base number appeared to thus be better understood. Many were then able to make the transference to the Base 5, Base 7 and even Base 16 thereafter.

3) When it came to the idea of numbers representing something, most students could relate to the notion of

Natural numbers { 1, 2, 3, ...}, $\mathbb{N}$

Whole numbers { 0, 1, 2, 3, ...}, $\mathbb{N}_0$ and

Integers {...-3, -2, -1, 0, 1, 2, 3, ...}, $\mathbb{Z}$ (Where negative values were first introduced)

At this point, students could easily see that each position on an arbitrary number line was represented by one, and only one element, in each of the above three sets. However, it took a considerable length of time to convince them that rational numbers ($\mathbb{Q}$) or fractions (including 1 / 2, which was the most disputed), could be represented as a "repeating decimal", as follows,

1 / 2 = 0. 50000.....

Many considered this representation to be a "trick", and that it was a teacher's way of trying to "confuse" them. However, when the transition was made to more obvious repeating numbers (such as **1 / 3**), the muttering eventually went away, particularly when students encountered more extensive patterns of repetition of the decimal, such as might occur in **3 / 7**.

This confusion resurfaced when it came time to convert a repeating back into a fraction. This is usually done by taking a sequence of repeating numbers, multiplying that number by a power of ten associated with the length of the repeating decimal (e.g.: repeating decimal of **0. 914523914523**..., use $\mathbf{10^6}$ as the multiple), so that the decimal components align, and subtracting the larger number from the smaller. If, for instance, we utilize "X" to denote the value of the fraction, we get:

1 X = 1.76837683... (1)

The length of the repetend is four places, so we multiply by 10^4:

10 000 X = 17683.76837683... (2)

Subtract Equation (1) from Equation (2) gives us:

9 999 X = 17682 (3)

So that the fraction is 17 682 / 9 999

The resultant fraction might be reduced further, but the intention of the exercise was to illustrate the process of obtaining a fraction from the repeating number. The odd "dissenter" in the class wanted to know if this method worked for every repeating

decimal, say, somewhere in the order of 300 positions; when told that he had to take notes if such an example was demonstrated on the board, the response was usually a quiet laugh, followed by a "Never mind,", and going back to work.

Students became less shocked when the idea was introduced that each and every fraction now having an infinite number of representations, such as:

1 / 2 = 3 / 6 = -7 / -14 = 8 297 / 16 594 = etc..

For some reason, this concept didn't seem to bother them. When, however, when irrational numbers were introduced ($\mathbb{Q}'$), many students insisted that ***pi*** (π) was a fraction, with a value of 22 / 7, or a decimal value of 3.14. This "math myth" took some time to dispel. Students were much more inclined to believe in the "existence" of irrational numbers when shown how to locate one such object between two fractions, or how to create their own "irrational", simply by playing with the concept of infinity. [147]

4) The last topic to be introduced was the idea of representing points on a Cartesian plane. Some elemental work had to be performed in showing "how" or "why" these points can be mapped to a plane in the first place. This process was often far harder for students to understand than the actual plotting of a graph or figure. For instance, the idea of an "independent variable" projecting a domain of a function, while a "dependant variable" forming the range, to the average child, just doesn't make any sense, until it's viewed from the perspective of "control". The elements in the domain do the controlling, while the elements of the range are the items under control.[148]

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[147] The following example was used to illustrate the principle of an irrational number: Take any two numbers, say { 1, 2}. Make them into a decimal by starting out with just the two items, say "0.12". Now, double the first; you get 0.1211. Now double the second; you get 0.121122. Triple, quadruple and progress in this increase, and you obtain an easily constructed irrational, that being 0.12112211122211112222211111....Fairly quickly, students start to see that they can do multiple increases or stagger the number, so long as the pattern is consistent for its inconsistency.

[148] A female student, believing she was being "funny", said, "You mean, like when my old man gets drunk and starts beating my mom?" She correctly identified the "domain" and "range" in this "relation"; however, too many teachers might not appreciate this "renaissance view" that mathematics is "one and part" of all we observe in Nature, including our own periodically warped social and behavioural functioning.

After that, the differentiation between a function (one element of the domain to only one element in the range) and a simple relation (one or more elements of the domain going to one, or more, elements in the range) became trivial.

It was also difficult for the students to relate the marked units on the axes ($\mathbb{X}$ – axis as the domain; $\mathbb{Y}$ – axis as the range) in different denominations. For instance, if the markings on the $\mathbb{X}$ – axis each represented two units (or half a unit, for that matter), they also wanted to mark the $\mathbb{Y}$ – axis in the same fashion. This became problematic when they were performing simple plots on vector-based applications (e.g.: *velocity / time* curves). Again, once past the convention of "having" to see both axes from the same perspective, the plotting then became relatively trivial.

When it came time to set the unit test, none of these areas of difficulty were specifically singled out in any test item; however, special care in the marking phase was taken to insure that understanding of the key points in the unit were not being undermined by these difficulties, and that, if indeed they had influenced the production of a final answer, they were later reviewed on an individual basis with the affected students.

b) Using Mathematical Descriptors to Convey Worldly Perspectives

When students described objects, shapes such as elliptical, conic, pyramidic or circular required little teacher correction. Terminology that did need a more thorough explanation included the concepts of a "perimeter" (often, students wanted to include the "space" inside the perimeter in their answers, confusing this with the concept of "area", even at this grade level), area and volume.

The classes would start out by defining terminology of description, such as:

a) Axis of symmetry – line about which an object can be split or rotated, so that what is on one side of the line is identical to the other
b) Prism – a many-sided solid object in which ends are identical polygons, top and bottom are parallelograms
c) Right prism –all sides of the prism are also right angled rectangles
d) Pyramid – solid with a square base and sides are triangles meeting at a point
e) Apothem – perpendicular (right angle) height of a triangle or pyramid
f) Isosceles – a triangle in which two sides are of equal length
g) Cone – a solid with a circular base, tapering to a point; when viewed from the side, looks like a triangle

h) Cylinder – solid with equal-sized circular bases and sides of uniform height

i) Perimeter – length around the outside of an object

j) Area – surface enclosed by three or more sided objects, in a flat surface

k) Volume – space occupied by an object

The idea of a "prism", an object which students perceived as being "triangular" and capable of refracting light beams, was difficult to use as a descriptor for an object whose "bases" were rectangular; it was far easier to take a light prism – an object with depth, as well - and show them that, for every "side" of the prism, there was a corresponding "rectangular surface" to the object. This better assisted them to see multiple-sided objects beyond three sides as also being prismatic in shape.

Next, objects were described in terms of the sides enclosing their area or volume:

a) quadrilateral – four sides

b) pentagonal – five sides

c) hexagonal – six sides

d) Octagonal – eight sides (Question: what's a seven-sided object called?)

e) dodecahedral – twelve sides

f) decahedral – ten sides

Students had little difficulty in utilizing these descriptors, particularly when the word (e.g.: penta, hexa, octa) had a cultish and wizard-like application in current series or movies (e.g.: ***Harry Potter***, ***Buffy the Vampire Slayer***, or ***Dungeons and Dragons***).

The last descriptors to be introduced referenced shape, arc and direction of an arc's indentation relative to the user:

a) concave objects – curvature is "into" the object, as in a cave shape

b) convex objects – curvature is "towards" the viewer

Conceptually, students could relate to these basic notions of curvature.

It was found, accidentally, that to try and interfere with the student choosing the exact words to describe a geometrical shape, if terms were "suggested" by this teacher, the whole class would cease responding, for fear that the teacher was looking for specific terms taught in previous years, and since forgotten from lack of usage.

Under normal circumstances, the requirements of this curriculum would also have necessitated the introduction – and understanding - of such concepts as surface area measurement, volume measurements and their appropriate unit extension into two and three dimensions, all within the metric system. However, it was felt that their inclusion would have distracted from the theoretical thought processes this research

was attempting to measure with these materials; as a result, only surface area measurement and volume concepts for rectangular objects (squares, cubes and prisms) were introduced at this point.[149]

c) Viewing 3-Dimensional Objects in Two Dimensions

Once comfortable with "describing" an object, the students were then asked to represent various three-dimensional shapes in two dimensions. Most started their sketching with either artistically created shapes showing contour and shading, or merely drawing rough approximations, often with contour, with little attention paid to depth perception. Almost universally, the concept of depth was neither to scale nor accurate, from the perspective of the vision of the object as seen before them.

The students were allowed to see that it was "correct" or at least acceptable, to draw an oblique perspective of an object, as this was what was usually "seen" in real life. Attention could then be directed towards addressing the features of the object, when standing before a particular "face" of the subject matter. The student would then be required to examine what could be seen from that "view" only, and put it to paper.

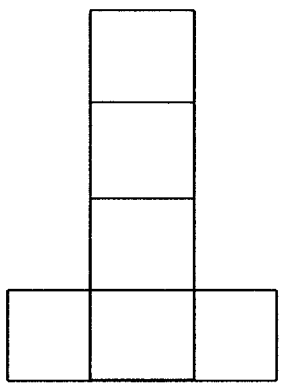

Figure 1: "Net" View of Cube in Two Dimensions

Constructing an object required a student to first "deconstruct" the structure; this usually took the form of the object's "net", a view of a three dimensional object, dissected so that it can be seen in only two dimensions.[150]

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[149] ***Appendices II*** test questions are broken down as follows. Questions 3, 5, and 10 deal with conceptual and applied descriptive technique. Question 16 visualizes in three dimensions, while 15 and 17 integrate area and volume concepts in the construction of an object. Question 18 requires a deconstruction and analysis of shapes contributing to the formation of a larger form.

[150] Question 2 of the sample examination (***Appendix II***) tests student understanding of a "net".

It was not uncommon for students to relate their tasks directly to the discipline of drafting of blueprints; however, the classroom objects were considerably less detailed, and could start out as something like the following item:[151]

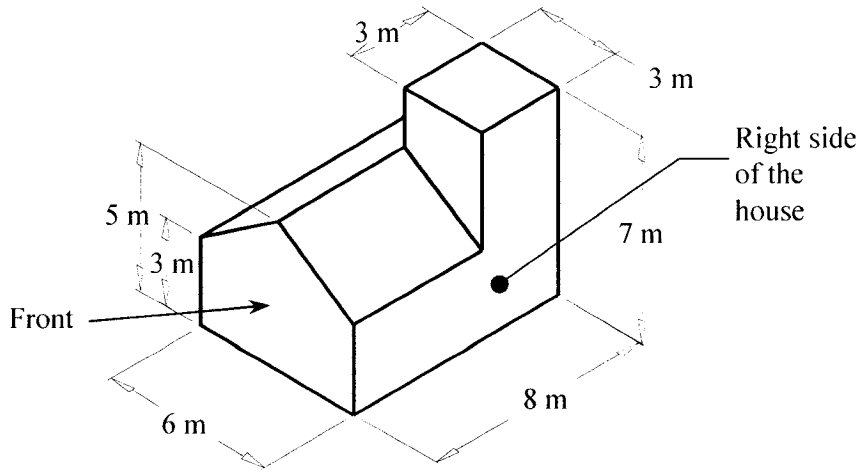

Figure 2: Oblique Scaled Rendering of House in Three Dimensions

The concepts of "scale" and proportion were introduced, with examples given, not only to reduce the object to workable proportions, but to emphasize with the student the fact that the object's "perspective" must also be realistic and exact. Students would be required to "view" the item from a particular perch or position, and then re-create what they were seeing in some linear, two-dimensional fashion. They would then scale a grid, and get this type of result:

i) **Front View**

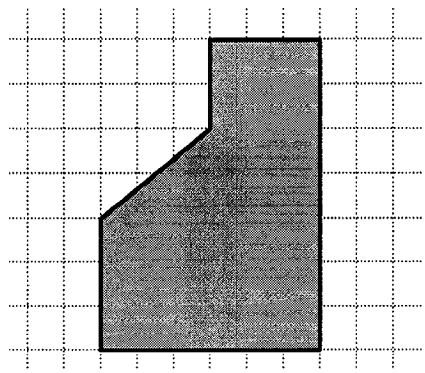

Figure 3: View as Seen from Front of House, Figure 2

[151] Société GRICS, "***Mathematics 568-314***", **BIM CD** (Montreal QC: Société GRICS, 2005), Item E0588.

A similar approach was utilized from other perspectives, such as:

ii) **Top View**

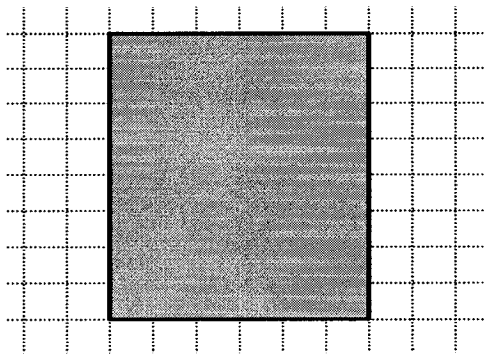

Figure 4: View as Seen from Top Side of House, Figure 2

iii) **Right Side View**

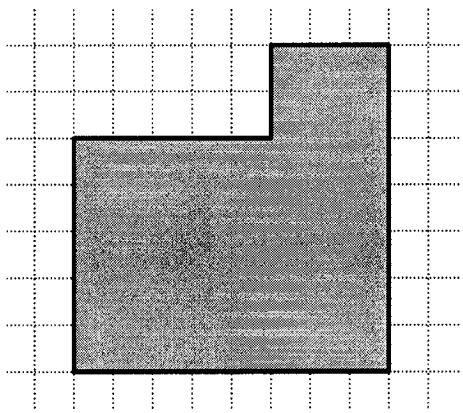

Figure 5: View as Seen from Right Side of House, Figure 2

iv) **Left Side View**

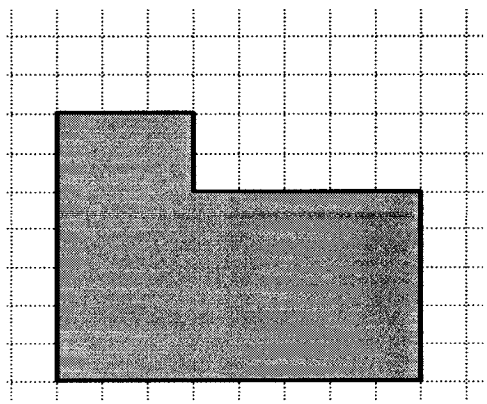

Figure 6: View as Seen from Left Side of House, Figure 2

Similar exercises were constructed utilizing cubes stacked in various dimensions and shapes, so as to increase facility in viewing technique.

Once completed, students were given drawing tasks of a similar nature, utilizing buildings found around the school area and at home. These were then collected and analyzed by all students, with the person producing the perspectives then being required to grade their individual work, according to the criteria demanded by the majority of the class.[152]

d) Conveying the Intention of Transformative Processes [153]

A wide range of concepts are integrated into the idea of relating transformational manipulations to algebraic functions, understanding function and graphical mapping, inverse processes, composite operations, and extending the domain and range of an object by transformation.

The process of explaining transformative functions, and relating their application to a geometrical context, bear some explanation and differentiation from the algebraic connotation. In this sense, the students had to observe that the process itself referred to functional "manipulation" of a geometrical figure, and not necessarily to the ordered pairs mapped onto a Cartesian plane, which formed the components of the figure itself.

In the algebraic sense, any ordered pair, (x, y) in relation to a second ordered pair (x_1, y_1), where $x = x_1$, is not considered a function, but a relation only.

In the geometrical sense, the transformative functions are considered operations that, by and of themselves, produce a singular result that is unique, and separate from, the original figure. As such, this may be considered as a "one – to – one" mapping, but not necessarily a "function"; you are just taking a set of points, and "moving" then to another, separate place, as defined by the transformative function. No two points in the geometrical figure could then ever be "sent" to the same position.

The following descriptions and relationships to algebraic functions were provided to the classes, so as to complete the investigation of this particular unit.

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[152] Questions 4, 6 and 13 of the unit test (***Appendix II***) use view construction in their solutions.

[153] The remaining seven questions (1, 7, 8, 9, 11, 12 and14) of the unit test (***Appendix II***) test student knowledge of transformations, combined with various algebraic operations.

i) Reflections (function $\mathbb{S}$)[154]

A reflection is started by obtaining a figure, and then considering any straight line in the form of

$$y = a\,x + k,$$

where: a = the slope of the line, and

k = part of the ordered pair $(0, k)$, denoting the **Y** – intercept of the line

or any linear derivative, whether having infinite slope, or zero slope.[155]

This straight line is then considered to be the "axis of rotation" of the figure. By then taking this line and, relative to the figure, drawing perpendicular lines to distinct position in the geometrical figure, one constructs another geometrical figure on the opposite side of the given reflective line, as follows:

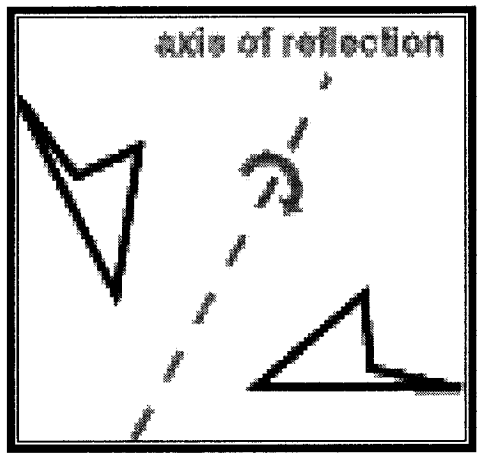

Figure 7: Constructing a Geometric Reflection

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[154] Leila Williams, Eran Mukamel and Don Hyatt, Coaches, "***Totally Tessellated: An Introduction to Tessellations***", **ThinkQuest** (Redwood Shores CA: Oracle Education Foundation, 1998), [http://library.thinkquest.org/16661/glossary.html].

[155] This research defined a linear graph using $y = a\,x + k$,
as opposed to the more familiar, textbook form of $y = m\,x + b$
When conic shapes and trigonometric functions are introduced, the constant "a" is referred to as a "steepness coefficient", while "h" denotes a "horizontal shift coefficient" and "k" denotes a "vertical shift coefficient".

ii) Translations (function *t*) [156]

This function involves the simple moving of a shape to a different position, without altering its orientation, and therefore appearance, as follows:

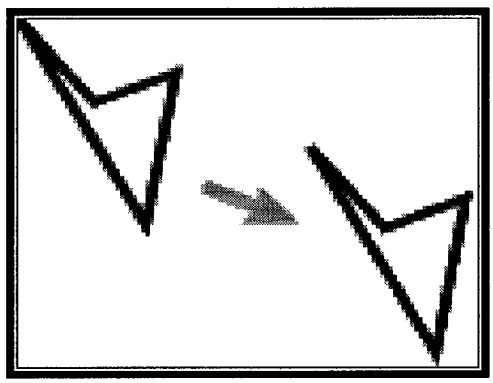

Figure 8: Producing a Translation on an Object

iii) Composite Functions (symbol o)

A "composite" consists of performing a consecutive number of transformative operations upon a variable or geometrical shape. To illustrate this scenario, we can refer to the notion of a "glide reflection", wherein a reflection and a translation are performed upon a geometrical shape. It doesn't matter which operation is first performed, as (for this example, at least) the result will still be the same. However, in utilizing composite notation, we can have either:

$$s \circ t \qquad (1)$$

or

$$t \circ s \qquad (2)$$

In Equation (1), the translation is performed first, whereas in Equation (2), the reflection is the first operation performed.

Here, again, we run counter to normal European cultural habits, in that we have a tendency to read from "left to right", whereas, in a composite function "world", the function on the right is first performed.

[156] Williams *et al.*

iv) Rotations (function $\mathcal{P}$) [157]

A rotation is a transformation performed by rotating an object about a fixed point, called the "centre of rotation" *(x, y)*, at a specified angle β, which can either be counter-clockwise (positive) or clockwise (negative), as follows:

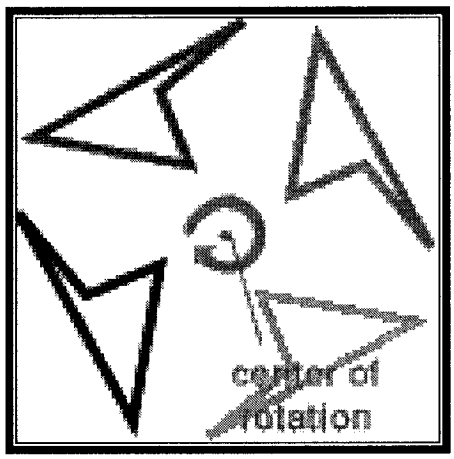

Figure 9: Constructing a Geometrical Rotation upon an Object

Rotations can be explained exactly "as is", from any textbook, as students never seem to have difficulty with its principles, save for the clockwise versus counter-clockwise differentiation of its angular measure.

In the Montreal-based test class, there were all forms of "weird" applications mentioned, from dancing to kite flying, and the one which seemed to get the most "giggles", that being "Crack the Whip", the skaters' line game. A significant number of velocity and "gravitational" aspects were also considered, with one student even asking whether the "string" keeping the moon in orbit, or even the Earth around the Sun, was, in fact, gravity. All of these were spontaneous observations made by the students, without teacher suggestion.

v) Dilatations

A dilatation is an expansion or contraction (resizing) of a geometrical object, without changing the ratio of sides of the object's view, relative to a fixed position, O. The following diagram illustrates such a process being performed:

[157] Ibid.

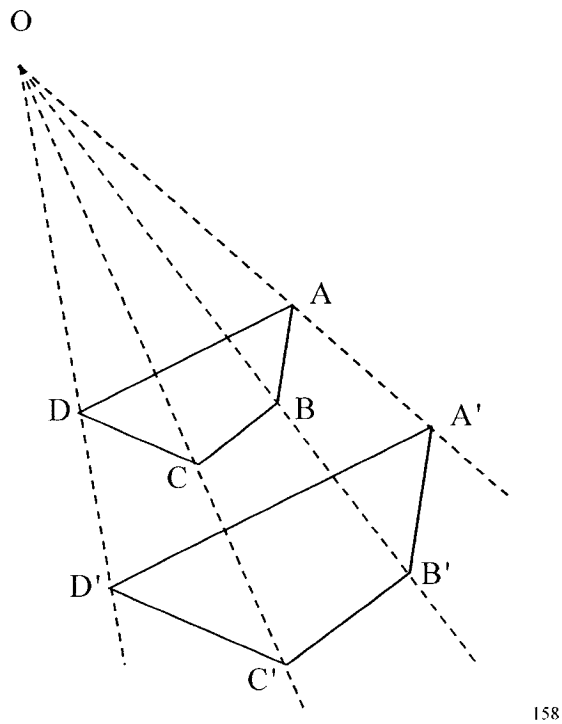

Figure 10: Constructing a Dilatation upon an Object

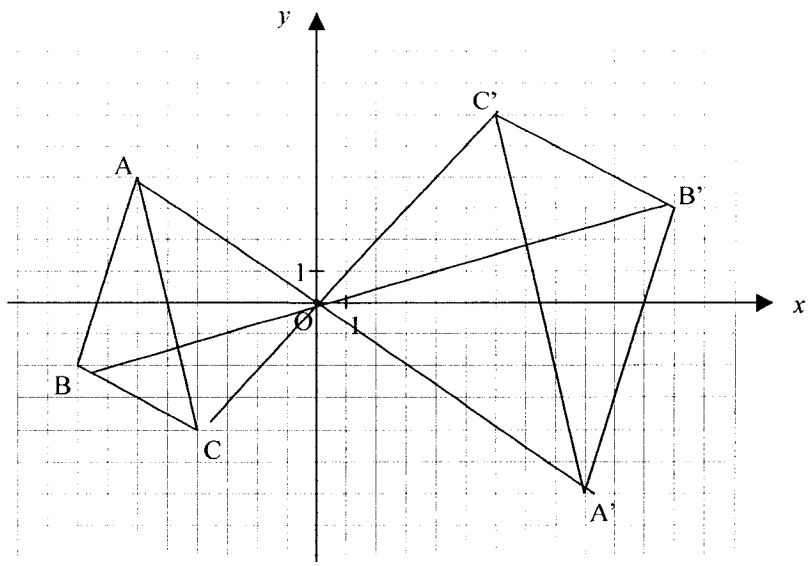

Figure 11: An Inverse, or "Negative" Dilatation upon an Object

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[158] Société GRICS, "*Mathematics 568-216*", Banque d'instruments de mesure - CD (Montreal QC: Société GRICS, 2005), Item E0383. Note that this concept is taken from a Grade 8 (Secondary II) example.

In Figure 10, the scaling of the object ABCD is in the ratio of **3: 2**, or **1.5**. It is important to relate this type of construction to the notion of artistic parallax construction, wherein an artist can relate objects of similar size and construction to each other, so as to denote increasing distance with respect to the horizon.

If we extend the lines of any vertex through the position O, we are also able to generate so-called "inverse" images, wherein the object appears to be "standing on its head", in a fashion similar to what one might expect to find in the creation of a "mirage" (an optical phenomenon very commonly found on the Prairies), as in Figure 11.

In Figure 11, we were required to find the dilatation ratio. Since the object is "negative", the ratio is "negative", as well. We can then compare the lengths of the images,

Say **B(-8, -2)** and **B^1(12, 3)**,

to determine this value at **– 3 / 2**.[159]

The students found it extremely important that the geometrical process could be related to occurrences within nature; this not only allowed them to maintain focus, but enabled them to formulate their own relationship between theory and application to everyday activity.

vi) Inverse functions (f^{-1}) [160]

The idea of an object having an "inverse" value is not a geometric, but rather an algebraic principle, with the ability to be more reasonably – and visually – explained using the principles of mapping a geometric object to a Cartesian plane; as such, it was included in this section. The theory is straightforward; for every Cartesian point on the object, (x, y), its inverse is represented as the ordered pair (x_1, y_1), where

$$x_1 = y \quad \text{and}$$

$$y_1 = x$$

Therefore, we can represent a sample figure, using this principle, in the following

[159] Ibid, Item E0037.

[160] Williams *et al.*

manner:

Given figure ABC, with coordinates A (9, -6), B (12, 3) and C (6, 6),

its inverse figure $A^{-1}B^{-1}C^{-1}$ would have coordinates as follows:

A^{-1} (-6, 9), B^{-1} (3, 12), C^{-1} (6, 6).

e) The Role of Problem Solving in the Instructional Process

The notion of trying to examine how problems should be solved individually, without reference to previous experiences, or even teaching problem solving as an "exercise" seems extreme. There is little credence to be placed in providing students with a "list" containing problem solving principles, as all this does is give the student an excuse to "memorize" the techniques, and if they "fail", blame the process – or the teacher - as opposed to encouraging them to try something "different".

Sample problems were introduced "in group", with the teacher directing the solution process in the beginning stages only. It was important that problems from outside the text be incorporated, so the actual resolution could be seen to derive specifically from student-generated effort. This then allowed the "method" for finding a solution to be followed again and again, whether in proving theorems or problems gleaned from real life. Most importantly, every student eventually saw that there were many ways at arriving at a solution, a discovery that went a long way towards teaching the children respect for their individuality and intellect.

The following problem was one such example used in this process:

A small boy takes a pile of 4 cm – sided wooden cubes to create an increasingly larger cube. Starting with one cube, he paints all of the outside faces, then glues a second cube to each face, filling in the corners as necessary to create the second, larger cube. He does not paint its outer surface. This process is again repeated, but this time, the outer edges are again painted. This work proceeds, alternating layers of painting, until the boy has used all of his 729 small blocks.

This problem requires the child to construct a "model" block, or at least draw its construction. Problems could also be generated so that a student would have to "take it apart", so as to find the number of blocks that have no paint on them, or with any

number from one to six surfaces painted, or a myriad of other possibilities, such as in the following example:

125 small cubes are combined to form a single cube. Two opposite ends are then painted, and their corresponding edges as well. Finally, the middle row is also painted. How many of the squares have the following number of edges painted?

a)	*Zero*	*d)*	*Three*
b)	*One*	*e)*	*Four*
c)	*Two*	*f)*	*Five or more*

The overall objective is to be able to extend the problem into something meaningful and tangible, manipulative – and manageable by the student's intellectual capabilities.

Once again, the point of the teaching of this exercise was to demonstrate that, in solving a problem, there are alternative processes to be utilized, including construction or de-construction of the process, in order to arrive at a result.

This "looking for other options" approach can also lend itself to the solving of simple equations or trigonometric exercises; as an example. For instance, too often we see our society, accustomed to reading from "left to right", trying to solve mathematical problems in the same fashion. In mathematics, it is intuitively understood that an "equal" sign means the left side of an equation can become the right; however, the right side can also be placed on the left, for the same reason. Therefore, for a student to start a "solution" to a problem by examining the right side, first, does not constitute an error in strategy, but merely an "adaptation" to a life experiences. [161]

In similar fashion, when projecting a "view", the perception of the object is restricted to the "position" in which the student has been placed while observing. However, what happens when the student "sees" nothing at all? For instance, Question 16 on the unit test (***Appendix II***) draws a group of blocks with letters inscribed, and we are asked to find how the letters on the block are dispersed (presumably, by using a cube's "net"); is this problem made "more" difficult by simply describing what we

[161] The most "common" illustration of how a perspective might change is in trying to understand the Distributive Law, where ***a (b + c) = (a * b) + (a * c).*** If we read from left to right, we are "expanding" the expression, while by reading right to left, we are "factoring".

are seeing, as in the following adaptation of a formerly used ***BIM***-based question:

> ***Five "alphabet cubes" are placed side by side, so that, from an oblique view, you can see the tops, fronts, and the right side of the cube on the right. The six letters on the cubes' sides are A, G, I, N, S and T. The letters on the front of the five cubes, from left to right, are I, G, T, S and A. On the right side face is the letter I, lying on its side. On the top, from left to right, are, in order, a sideways S, an upside-down A, a sideways S, a properly placed G, and an N, written as though someone had written it on the block when standing on the left side, and looking towards the right. If we know that the I and the T are on opposite sides of the cube, what are the letters on the REVERSE side of the line of cubes, and what word do they spell? (ANSWER: "SAINT")***

As teachers, we know that students have the most difficulty with "word" problems; therefore, the intention in providing this alternative form of instruction should be to assist students in seeing "words" in mathematics as more than variables, and also tools of intuitive understanding.

Many more lessons can be taken from Polya, and applied to the classroom process of teaching students to think intuitively. In these three jurisdictions, the most satisfying result in providing difficult examples for the students to try, was to watch a student react with joy when told that "guessing" was one of many acceptable methods in trying to provide an answer, and that there was always more than one way to arrive at an acceptable solution.

VIII) Comparing the Montreal and First Nations School Conditions

In preparing this study, the choice of teaching locations was entirely accidental. What seems now to be a rather bizarre occurrence is that the behavioural patterns of the students attending each of the three schools were not dissimilar in nature, a point noted in the introduction to this chapter. However, it is not entirely surprising to witness this phenomenon; much of the literature suggests that the loss of cultural touchstones undergone by immigrant populations when transplanted into urban communities, trigger similar patterns of dislocation and behavioural maladjustment, as has been observed in

the individuals victimized by the residential school experience. It would therefore stand to reason that, as with the children of First Nations, these influences are then either passed down to, or taken out on, the students who attended these three schools, and resulted in the display of similar behaviours.

The teaching responses to behavioural abnormalities found in the Montreal school would later be used to develop a working model of remedial practices, shared with parents and Elders, and refined to accommodate cultural expectations in the delivery of classroom materials, so as to be able to continue to teach "beyond" the point of influence of these disruptive experiences.

IX) ASSESSING STUDENT RESPONSES TO THE MATERIALS UNDER REVIEW

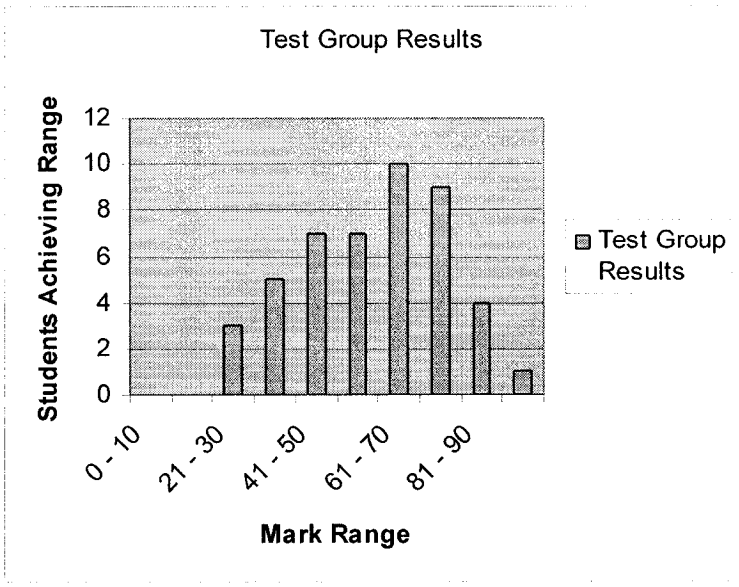

Figure 12: Distribution of Marks - Montreal Test Group

The unit test (See ***Appendix II***) was administered on a Monday. Those students who were absent on the test day were removed from class in the first period that they returned to school, and wrote the examination under supervision in the Library. Once all

students had completed the required task, the results were compiled and analyzed.

Distribution of test scores of the Montreal- based students is graphed in Figure 12.

The overall average for the test by both classes, combined, was 60.02%, with a variation in marks of ±17.65%. The pattern of distribution of marks is what might be expected in a "normal" Canadian classroom.

By Quebec standards, the anticipated "pass" mark for Secondary III should be 60%, so 22 students, or a total of 47.83% of the total student population "failed" this unit.

When placed within the perspective of the overall achievement levels of Montreal-based students, in particular, and judging by past years' results from the school, this result is consistent within the given population.[162]

From the perspective of the "teacher", it is difficult to understand why such a high percentage would not have done well, as the materials appeared to be readily assimilated by the majority of the class. Observations of particular note included the following:

1. More than 60% of the failing students were female; some even claimed that the materials hadn't even been presented in class.
2. As to the overall failure rate by attendance, all had missed more than a quarter of all classes, and the majority had a 40% or greater absentee or late rate.
3. Ironically, a female student with the highest absentee rate in either class scored in the 80-percentile range.
4. All of but one of the males who failed the test had been classified as "special needs" by the school board.
5. 65% of the females who failed the test were classified as "special needs", while the remaining individuals had originally been introduced in the classroom as being of "above average mathematical ability".
6. Only one male admitting to involvement in "gangs" failed.

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[162] Mathematics Coordinating Committee, **An Analysis of the Results of the Summative Examination for Mathematics 314 – June 2002** (Montreal, QC: English Montreal School Board, Mathematics Coordinating Committee, 2003).

7. A male "special needs" student with a difficulty in relating both to classmates and authority figures such as teachers, scored in the 60-percentile range.
8. All but one of the students who did not pass the test lived in single parent homes, with the parent (mother) receiving social assistance.
9. Finally, of the female students who "acted out" in some sexual fashion or were overly sexually aggressive, none passed the test.

These observations support the views of researchers who study the academic problems associated with inner city schools.[163]

These scores cannot effectively be analyzed from the perspective of association of patterns of adverse behaviour with results, as there was no concrete attempt made to isolate students within this population from the sociological, environmental and emotional factors that could adversely influence their mathematical potential.

X) INSIGHTS INTO THE PERSONA OF BAND-EDUCATED STUDENTS

This researcher accepted the second position to teach full-time at a Band-administered school in the interior of British Columbia, starting in February, 2003. Tremendous support and assistance with classroom issues was provided by the school's Principal, Librarian, Home-School Coordinator and Nurse. The only pre-instructional advice given by everyone was to "involve the students as much as possible."

As the previous teacher had resigned in mid-term, this teacher's assumption was that the students would not only be unruly in class, but uncooperative and unwilling to work in completing the curriculum's assignments. Instead, the classes held groups of individuals who, although quiet almost to the extreme, spent the bulk of time engaged in the work provided. They almost never broached opinions on the subject matter, but when

[163] Silver et al.

questioned for the purposes of determining their "understanding", invariably provided answers to suggest that they were, in fact, following along, and did grasp the concepts being covered in the materials.

There were few problems with discipline. When a student did "act up", it usually took only a conversation in private outside the classroom to elicit a reason for the display, and a return to "normal" social behaviour. Although absenteeism was a major concern, even when students missed several days of classes (which occurred regularly with most of the students), they almost always picked up materials from where they had previously left off, often working outside the class to obtain information they'd missed.

Staff cooperation extended to maintenance and support staff, most of whom were Aboriginal, knew the students by "reputation". They were singularly amused whenever the students actually performed the tasks requested of them outside the classroom. Both students and support staff treated this teacher's presence in their community as a "resource", to either be exploited for new knowledge, or as a provider of new skills.

Often, students would stay after school hours, talking about their personal lives, playing basketball, or catching up on relevant work assigned in class. For the most part, this cooperation and involvement was almost exclusively voluntary.

XI) PERSPECTIVES ON EDUCATION: THE STUDENT POINT OF VIEW

Only three members of the Grade Nine Band-located class attended classes on a daily basis. As far as providing continuity of instruction, this was problematic; however, it never seemed to get to the point where this behaviour interfered with the students' ability to learn.

Most of the students to be reasonably bright and articulate, were often absorbed in their own life's problems, prone to be flippant in their speech, and totally unafraid to make personal observations on classroom behaviours (teacher or student), often in rather hilarious and sarcastic fashion. They were equally unmerciful towards each other, but it never seemed to create any personal animosity.

Many pupils, however, questioned the type of education that they were being provided at the school, as did their parents. There were comments made to the effect that the Band-administered school did not have the "standards" of educational achievement that the local publicly-administered high school allegedly maintained.[164]

As for the social issues lying beneath the surface, and relating to previous family experiences while attending residential schools, mitigating factors would ultimately influence the students, in one way or another, to "act out" their problems. These included, among other things:

1. Only a few of the students had what might be referred to as full "parental support" for their school endeavours.
2. Some of the female students had "boyfriends" who had, for various reasons, been asked to leave school; however, they would often come around during school hours to disrupt classes and encourage the young women to leave – which they often did.
3. Several students already "had problems" with alcohol and, on occasion, drugs (marijuana, which was in large supply, locally); still others were already sexually active, and had been so, on average, for two or more years.
4. Some of the students occasionally lived away from home, as their parent(s) had problems with alcohol or drugs.
5. Over half of the students lived with only one of their parents, usually their mother.
6. With some students, there was literally no supervision over their activities after class,

[164] Nesdoly. Many reserve-based students still went to the public institution because their parents felt they'd get a "better education" there.

or on weekends, when the parents would simply "travel" to outlying communities to "party", leaving the children to fend for themselves for days at a time.

7. At least one student had issues of personal identity, and despite having many friends within the community, often simply left home for days at a time, to visit friends and relatives in other parts of British Columbia where she felt more "in place".
8. Finally, there were parents of these children who, influenced by organizations such as the ***Warriors' Society***, displayed extreme contempt for any subject matter which did not relate back to traditional lifestyles of the Band's people, and allowed or encouraged their children to freely express such opinion in school.

This community had many survivors from the residential school experience, including parents and grandparents of some of the children in the Grade 9 class. Thus, the behaviours displayed by students were not unexpected, and could be dealt with in school, due to small class sizes and the presence on staff of three Aboriginal teachers, a nurse and librarian (all from the local Band) able to positively influence such behaviour.

What made the presence of local personnel in roles of authority most effective, however, was to see the manner in which students that did develop problems in school being called to task. Their behaviours were not condoned, but often their misadventures were turned into humorous stories the students could tell upon themselves.

On occasion, and dependent upon the severity of a problem, Elders also became involved, and issues "talked out", so that the students became aware of how their actions had adversely affected, not just themselves, but the community. After such sessions, the school seldom had to intervene with its own form of disciplinary action.

There were some imperfections in the application of this system, due to the presence in school of certain members of staff having either children or grandchildren in attendance; however, it nonetheless promoted a strong and effective healing environment.

XII) TEACHING THE MATERIALS TO THE BAND STUDENTS

The order in which materials were presented to this class closely followed that of the Montreal test group. When instruction was first started, it was not uncommon for a student to simply blurt out, "I've never seen this stuff before." It was anticipated that their preliminary understanding of basic principles, including the handling of number systems and mathematical laws, would be weak, and additional time had to be scheduled to handle this problem. More time was taken for review with this group than with the students in Montreal, due to time constraints placed upon length of instruction by the Montreal school board.

Quebec's curriculum layout, teaching time lines and depth of coverage are more rigidly monitored by provincial authorities than in schools classified as "Independent" in British Columbia. Moreover, the English Montreal School Board employs a full-time Mathematics consultant who not only monitors course progress at each school, but who is made available to mathematics teachers to assist in curriculum delivery and pedagogical application. No such service existed at the Band school, and other teachers had to be approached to determine the extent of which fundamental theories and principles of mathematics had been stressed in previous grades.

As for the materials, the students, when they attended, handled the principles easily, often with their own brand of humour interjected for class entertainment.[165]

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[165] First Nations students usually display a "different" sense of humour towards teachers. For instance, this teacher freely admits that his handwriting is only moderately legible, but classroom materials are still provided by notes on the chalkboard. There were white-boards in all classes, and a spray bottle of cleaning solution would normally be kept handy, to be used whenever the erasers were dirty or someone "accidentally" wet them. After the spray bottle "disappeared" for the hundredth or so time, this teacher finally "wised up" to the prank, and locked the bottle in his desk.

XIII) TESTING BAND-EDUCATED STUDENTS AND ANALYZING THE RESULTS

The test was administered on a Monday morning; students who deliberately missed the class that day were later "rounded up" and required to answer the questions under the supervision of the Librarian. Their results for this class were as follows:

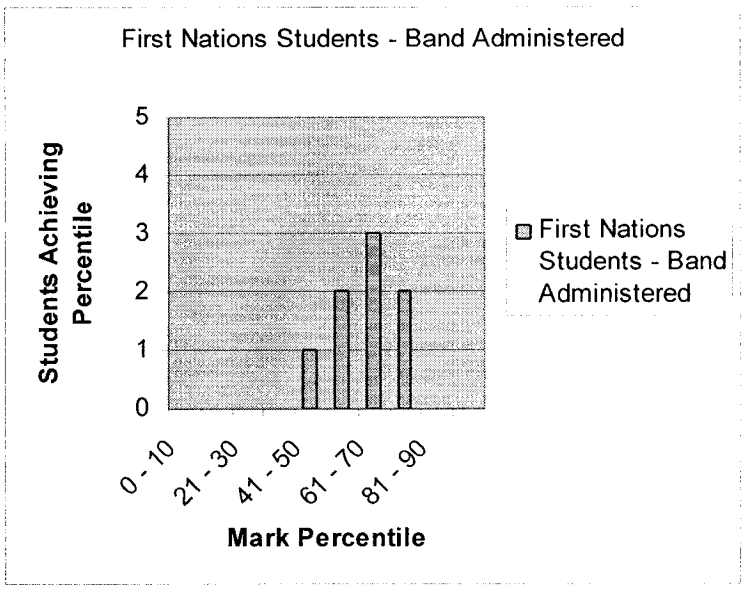

Figure 13: Distribution of Marks - Band-Students

Class average for the test scores was 63.88% with a ±11.61% mark deviation. By British Columbia standards, only one student of the eight "failed"; this being the student who spent a large proportion of time "visiting" outside the community. Although the sample size is small, the results appear to be normal to what one might anticipate with a larger-size group.

The marks were disappointingly low, especially given that the majority of the class had appeared to thoroughly understand the module. However, it was later determined that students had collectively decided beforehand that they'd pass in their tests long before the time allowed for its writing was to end. Ironically, the student leading this "protest" had all of the questions done correctly, up to when it was decided

that the "rebellion" should be staged. She also obtained the highest score on the test. The students who wrote their test in the Library also fared better, as the Librarian would not let them leave without first having completed or attempted all of the questions.

When comparing percentages of students attaining a mark range with the Montreal test group, the results also demonstrated some interesting characteristics, as follows:

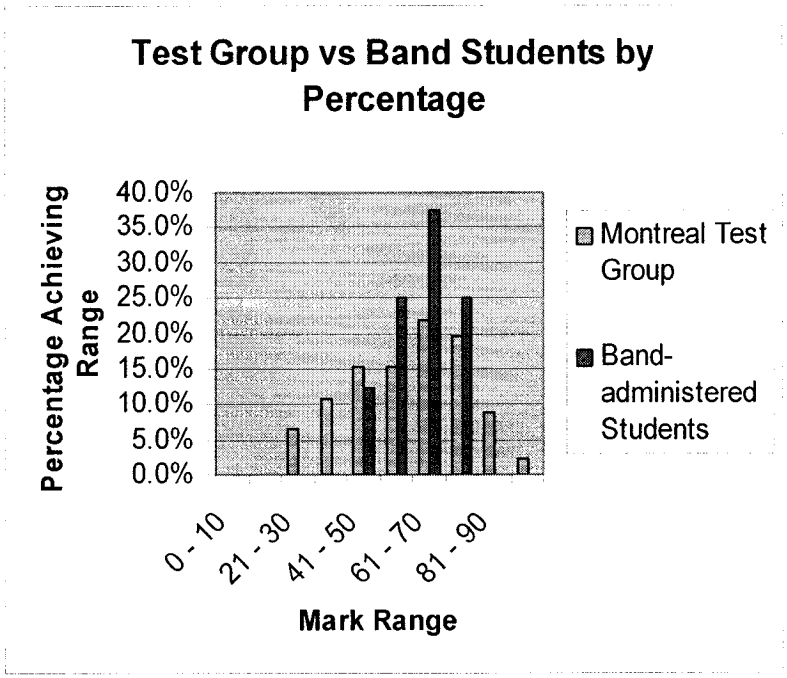

Figure 14: Comparing Montreal and Band Students by Percentage

The distribution range demonstrates a considerably greater understanding of the principles involved by the Band-administered students than the Montreal test group, even though the materials at first appeared to be "foreign" to these students. It also suggests that the levels of understanding of mathematical principles within this group were extremely sound. This is in stark contrast to the "doom and gloom" scenario painted by Hampton and others when examining the success rates in mathematics for Aboriginal

students, and citing teacher prejudice mitigating against such expectations.

It would be interesting to consider what the data might have suggested, had the majority of the students simply taken the time to complete the entire test, and had worked to their own particular levels of mathematical competence.

XIV) THOUGHTS ON THE EDUCATIONAL PROCESS IN BAND-RUN SCHOOLS

This school was fortunate, in that it had a group of teachers, Aboriginal and non-Aboriginal, who worked well as a team, cooperated with one another in all activities, stressed educational principles for education's sake, and with but one exception, were insulated from political interference and Band-related politics.

There was a high degree of community involvement by the Elders, resources were well-managed and applied to items of need within the school, and while there had been no particular plan to forage ahead with a curriculum divorced from the British Columbia mainstream, action was being taken to insure that the academic criteria expected by the province was ultimately achieved by the students. This latter process was actively encouraged by the ***First Nations Educational Steering Committee***.

At the time of writing this thesis, all but one of the eight students observed during this study received either their Dogwood diploma, or its equivalent, in the Spring of 2006. Almost half of the students, by graduation, had children of their own. This list of graduates included, ironically, students whom towards the end of their Grade Nine year had involved themselves in a comedy of community misdeeds that included the driving of a stolen pick-up truck through the front window of the local liquor store (twice), setting a deserted reserve house on fire in order to distract police attention from their

intention to rob the liquor store, and helping themselves to a few plants in a locally hidden "grow op" contracted to a Vancouver gang chapter. These students were subsequently "required" to "take some school time off" to atone for their misdeeds.

XV) THE REALITIES OF ONE FIRST NATIONS SCHOOL UNDER PUBLIC CONTROL

Following the five month tenure at a First Nations, Band-run school, this researcher was hired to teach at a publicly administered venue on Vancouver Island. All but one of the students attending this school was of First Nations descent.

In the previous year, the school had employed five teachers; one retired, two transferred to other schools in the district, one moved on to teach in the interior of British Columbia, and the fourth had been placed on stress leave. The only persons to remain from the staff were the administrative officer, locally based Teaching Assistants and support staff.[166]

Due to a decline in enrolment, the individuals who eventually comprised the school's teaching staff consisted of four persons, only one of whom was familiar with the local customs, traditions and expected behaviour of the students. This teacher, as it turned out, had more classroom experience than the entire new teaching staff, combined.

Board-owned teacherages, which were rented to staff, consisted of converted

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[166] A search of the ***Education Canada Network*** employment site (http://educationcanada.com/) will reveal that, while massive turnovers of staff may ring "alarm bells" with a teacher seeking employment, it is not an uncommon occurrence in First Nations schools. However, in 2003, the British Columbia government had increased classroom sizes and imposed harsh budgetary restrictions upon school boards, which led to massive teacher lay-offs. Despite this bleak picture, the entire teaching staff still chose to leave the community; however, as there were so many unemployed teachers, the Board had little problem in finding new staff to replace them.

house trailers, separated from the main Band residences. A short boat ride was required in order to reach the main community's general store and post office. If someone needed an item not carried by the local store, it could be ordered and shipped in from outlying communities, or staff could just travel by water taxi and automobile (a four hour journey, usually) and purchase it themselves in a larger urban environment.

The school consisted of four small portable classrooms, a main building housing administrative offices, staff lounge and home economics room, a laboratory, a small and poorly equipped library, and two classrooms for the elementary pupils. A small, detached gymnasium stood adjacent the school, and behind it was a standard-sized football / soccer / baseball field used for most outdoor activities, including community events.

When the school year started, the student washrooms in the main building were having the stall walls reinstalled; they'd been taken down the previous year due to "student difficulties" and "socializing issues". During that period, washroom supplies also had to be signed for at the office. Proposals had been submitted to the district office to have cameras installed around the school to monitor student activities, for reasons of "security" and "safety".

XVI) Teaching Conditions in the Public Sector School

Mathematics instruction was expected to be provided in one daily class over an 80 minute period, housing all grade levels of students (Grades 8 through 12). The teaching conditions included the following influences:

1. One of the two "teaching assistants" assigned to this class had "no knowledge whatsoever" as to the subject of mathematics. Both assistants were non-Aboriginal.
2. Student records were locked in the Principal's office. Obtaining these files required

seeking permission from the administrative officer to do so, and providing reasons for wanting to view their contents.

3. It was common practice for classroom discussions to be "listened in" upon by the Principal, using the public address system or by standing outside classroom doors. The Teaching Assistants regularly took notes of all materials taught in the classroom, and submitted these documents to the Principal for comment – all without the teacher being made aware of this process occurring.
4. Despite school policy which dictated how students were to be disciplined in the event they were found to be under the influence of drugs or alcohol during school hours, the student could not only expect to be expelled, but the teacher reporting the incident could also expect to have his or her "reasons" for reporting such infractions questioned by the administrative officer.
5. In an area of Canada in which the damages due to parental and grandparent attendance at residential schools was at its most severe, Christian missionary "zeal" still dominated the moral influence at the school and in the community. Two non-Aboriginal Teaching Assistants and the Principal referred to themselves as "born again". A fundamentalist "healing centre" was located just outside the community, and during the summer it was a common occurrence for missionary school boats to moor in the harbour and run Bible camps for local Aboriginal children.
6. The non-Aboriginal Teaching Assistants, despite having no formal training in mathematics education, questioned every facet of instruction, including the non-usage of textbooks, materials presented by grade level, and resource materials left in the classroom which came from this teacher's personal library.
7. Despite Tribal Council members demanding that their children receive a proper education as mandated by the Minister of Education, there was regular classroom resistance offered by some teachers and teaching assistants to this researcher's intended goal of "teaching the curriculum and beyond".
8. It was continually argued that the students "weren't capable" of handling the materials at their grade level, and that it was the "moral responsibility" of teachers to resist the intended goals of the Ministry, particularly with regard to preparing students to write provincial examinations.
9. In its first sixteen years of existence, the school had a sordid record of accomplishment. Most of the graduating students were required to upgrade their course standings (usually, Mathematics, Science and English) before proceeding to a post-secondary institution.

During this same period, only one student had completed a university education;

10. There were no records of any graduating student ever having written a Mathematics or Science Grade 12 Dogwood examination administered by the province, and of those students who wrote an English subject examination, it was always in Communications. The percentage of students writing even this one test was still extremely low.[167]
11. When it was required that the author be away from class, carefully prepared lesson plans were never followed, unless it involved doing research using computers and the Internet. Often, pages upon pages of "review sheets" stressing fundamentals more relevant to elementary grade levels than the ones in which the students were supposed to be placed were passed in by students, with an expectation that the author would mark this work.
12. The Aboriginal staff, mostly administrative assistants, part-time teaching assistants, or volunteers, were often treated with general contempt and scorn by non-Aboriginal administrative personnel, and their rights as employees were often violated, in spite of being part of a union bargaining group (CUPE).[168].
13. The Band, when notified of problems at the school and the need for action, responded positively; however, these actions didn't necessarily sit very well with some members of the school staff, or even some students. When, for instance, a newly-elected Chief and the Home School Coordinator put on a bullying and sexual harassment workshop for students, at least one non-Aboriginal teacher openly criticized the presenters (all of whom

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[167] British Columbia Ministry of Education, **Grade 12 Exam Results 2000 / 2001 – 2004 / 2005: Full Year School Summary Report**. (Victoria BC: BCEd, 2006), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr12/08484041.pdf].

[168] The racial discrimination endured by support staff was relentless. In the first case, the administrative assistant, who was at the time also the Band chief, would regularly have letters of grievance filed against her for missing work, due to her having to attend business meetings related to Band administration. When a teacher was forced to resign due to health reasons, the First Nations Teaching Assistant who temporarily replaced her was never paid teacher-related wages, despite provision for such action being mandated by contract. In a third case, an extremely effective Aboriginal Teaching Assistant had her hours severely curtailed when one of the non-Aboriginal Teaching Assistants complained in a staff meeting that "students say she acts too much like their mothers." Lastly, despite there not being a local Language Authority, the Band-hired Language Instructor was regularly seconded from her classroom duties to run errands of "urgency" to the village, was always required to be "supervised" by a "duly qualified" British Columbia teacher, and was constantly criticized by the administrative officer during staff meetings.

were members of the Band), calling one male in particular "harping" and "misogynistic".

14. Lastly, when policy violations came up during staff meetings, they were often dismissed as being a "problem" for the teacher bringing the issue up – usually this teacher.[169].

There were many complaints emanating from the community relating to the manner in which the school was being run. The previous year, parents had withheld their children from class in protest, or moved their children to other communities, rather than sending them to the school. Enrolment for the current term had thus fallen to around fifty students, depriving the school of the fifth teacher available during the previous year.

XVII) Documenting the Existence of Residential Schooling Fall-Out

Administrative issues weren't the only concern within the classroom. Here, the ravages of passed-down residential school abuse at times overwhelmed the teacher's ability to conduct classes in any orderly fashion. The list of behavioural issues included:

1. Evidence of sexual abuse, exploitation and incest were to be found in even the elementary grade levels. An intermediate student regularly "acted out" her frustration with being "hit upon" by boys, while a senior female student had allegedly been forced to provide sexual favours for male students at the school on a regular basis.
2. A victim of incest was sexually aggressive to even teachers, and in one three-day period, completely covered a few of the younger females in the school with "love bite" marks, or "hickies", about the face, neck, eyes and breast areas.
3. Senior female students had allegedly been sexually molested, yet staff would not address the issue of whether there should be an intervention undertaken, the incidents investigated by the school, or even whether special policy should be written and implemented, should the alleged abuser end up in the same class as the victim.

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[169] Students were not allowed to have portable CD players in class, as they detracted from students paying attention to materials being presented in class. School policy required such equipment to be confiscated, and returned at day's end. However, a non-Aboriginal Teaching Assistant claimed that these instruments were "beneficial" in Art classes, so the problems continued during classes in mathematics and science, where students refused to put away these units, and often walked out in "protest" of policy enforcement.

4. Several junior high school males reported witnessing a sexual assault by a senior male student upon one of their classmates. The RCMP were never called to investigate, despite the incident being reported by this teacher under school policy guidelines.
5. A junior high school student had already been returned to the village after having run away to Vancouver to live on the street.
6. A life of prostitution was actively discussed by other females.
7. Older males regularly fondled female students during break periods, often trying to provoke teacher reaction.
8. Two female students gave birth towards the end of the school year, Males regularly bragged about not using contraceptives or protection during sexual activities.
9. A student, allegedly diagnosed with FAS, wandered around the school, walked into any classroom at will, and disrupted activities going on in that class, without repercussion.
10. Several of the male students, especially younger ones, openly displayed a propensity towards violent behaviours. Many admitted to being abused at home, or having abused and bullied others in their immediate family. Intervention or remedial action taken by the school was extremely rare, and to individually intervene was to invite criticism from either administrative personnel or some non-Aboriginal staff.
11. Many female students also had issues relating to anger management, often lashing out in class. When intercession was initiated, it was often discovered that the classroom behaviour was either as a result of negative behaviour from individuals in the home, or problems due to sibling rivalry, choice of friends, or a poor choice in lifestyle by members of the family. Students usually expressed an appreciation for having taken an interest in their problems, but non-Aboriginal Teaching Assistants would often complain that this teacher's manner with the students was "verbally abusive".
12. There were issues of student depression which bordered on the contemplation of committing suicide. In the previous year, a female student had hung herself. [170] When the author successfully intervened in an incident where a friend of that student was contemplating "joining" her friend, it was subsequently reported to the Board office that the author was "counselling students without valid British Columbia credentials".
13. Student-to-student confrontational issues abounded. Some of these problems related to drug and alcohol abuse (even though the community was supposed to be "dry"), while

[170] British Columbia Ministry of Public Safety and Solicitor General, **"Case File 2002-130-0003"**, **Judgement of Inquiry** (Gold River BC: Coroner's Office, Gold River, 2002).

other issues stemmed from "leadership" confrontations between male students, where sexual "prowess" (even in fourteen and fifteen year old males), respect for First Nations tradition or group domination became a point of contention.

14. A male student was referred to an Elder for counselling by the author when he threatened an older female student for, as it turned out, making his younger brother "smoke a joint".
15. When similar counselling was proposed for a senior female student extolling the virtues of providing sex for monetary reward, the student's mother refused to allow such intervention to take place, even though such action had been recommended by the Chief.
16. Lastly, parental influence and support was minimal. Many students lived with grandparents or aunts and uncles, as opposed to their own families. Fathers, in the majority of cases, were non-existent, uninvolved, or abusive. Some parents, when it was suggested that they attend school meetings to deal with issues relating to their children, would simply reply that the problem was "of the school's making", thus leaving the teacher ultimately responsible for finding a resolution to the behavioural condition.

It soon became obvious that there were two facets of the school's behavioural problems that required analysis and special consideration. First, there were the fairly obvious student issues that related in one form or another to conditions passed on from past residential school abuse of the adult population. Equally damaging to the children, however, were the opinions expressed in private by non-Aboriginal staff, many of which showed extreme contempt for the ability of First Nations students, on any level, to actually "learn" anything beyond the most elemental of skills, and function normally within a traditional (European model) school environment: As a corollary to this observation, any task proposed by this teacher in the classroom that challenged students to think beyond a level of simple rote understanding often met with fierce resistance. The following observations demonstrate these trends:

1. Most of the First Nations students were classified as "special needs", some without any criteria-based rationale evident by classroom learning behaviours, at least from the perspective of teacher observation.

2. In the younger high school classes, students always deferred to the non-Aboriginal student to answer questions. When this researcher insisted upon a particular student answering a question, a non-Aboriginal Teaching Assistants would often accuse him of "picking on" the Aboriginal student, or "ignoring" the non-Aboriginal student.[171]
3. It soon became evident that by far the majority of the senior students had little or no mathematical knowledge at even the most elementary of levels, and had just been "pushed ahead", without relevance to the needs of the curriculum. Almost all of the appropriate answers to questions in class came from Grade 8 and 9 students, at least six of whom the author considered to be gifted or have strong academic potential. [172]
4. Academic "intimidation" and peer pressure techniques were often foisted upon younger students, to keep them from contributing to the class discussion.[173]
5. As the school year progressed, attendance issues became a serious concern with senior students. It was not uncommon for only three or four senior students to regularly attend Mathematics, Science or Technology classes, with the remainder either only showing up for Physical Education. This group would stand outside the classroom window, taunting the students who were in class. Invariably, there would be no administrator in the school to deal with the problem, by requiring these students to either return to class, or determine why they had even been allowed to leave their classrooms in the first place.
6. A non-Aboriginal teacher, upon seeing the research being done by junior high school

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[171] Usually, the Aboriginal student correctly answered the question; it just took some time for the response to be forthcoming. The racial bias of the Teaching Assistants, however, was too obvious to actually believe having had occurred. There was no understanding demonstrated by these individuals that First Nations culture taught the student to defer to an Elder, or if a child behaved inappropriately, they were still "responsible" for learning, as it would be their future "duty" to pass such knowledge to their own children.

[172] It was impossible not to expose Grade 8 and 9 students to Grades 10, 11 and 12 materials, due to class scheduling; nonetheless, criticism by non-Aboriginal support staff in support of the older students begged the question, "If the older students weren't understanding introduced concepts, why were in that grade?"

[173] At the start of the year, a female Grade 8 student often answered questions correctly – and often for work intended for the senior students. She would sometimes have the answer before the question had even been fully asked. After class, however, she was regularly berated by senior female students, as well as some of the senior males. She soon stopped contributing to discussion, at one point even refusing to write a classroom quiz. It took a considerable amount of "one on one" discussion to get her back contributing, and isolated from the senior students who were trying to intimidate her into being "uncooperative" in class.

students on social justice issues assigned by this researcher, publicly criticized the work as either being "too hard" or "above the heads" of the students - even though the students and community leaders had given input to its inception, either through classroom presentations or guidance and cooperation in the implementation of the projects.

7. Many students challenged the "need" for an education, or for the reasons as to why they were required to complete certain work. When it was pointed out that many job opportunities were being farmed outside the community at great cost to the Band (monies lost from social services programmes and housing funds, as examples), this researcher was accused by a non-Aboriginal Teaching Assistant of being "racist" and "anti-White".
8. School routines, including having a timetable which did not provide sufficient subject choices to allow students to qualify for a Dogwood diploma upon graduation (thus, requiring them to either upgrade, or give up on their educational pursuits), were established with no input from staff, nor justification as to their academic purpose.
9. Administrative roadblocks were often put up in order to stifle discussion on the implementation of a local First Nations Language Authority, so that relevant First Nations curriculum could be taught at the school.
10. A Parent Advisory Committee, required by British Columbia law, was never established at the school. Regular meetings between teaching staff and the Band Council were discouraged or postponed. The lack of community input resulted in academic and social problems that existed at the school never being brought to the Band's attention, except through rumour or when a child found himself afoul of existing policies, and was either expelled or sent home for a certain period of time.
11. Lastly, although it was obvious that a Counsellor specializing in First Nations issues (one trained in understanding the influence of residential school problems upon student populations, in particular) was urgently needed as a permanent member of staff; the importance of that person's role within the school was continuously ignored by administrative personnel.

The "barrenness" of school life for the academic year, including the will of staff and administrators to address issues of concern to the community, could be best summarized by the educational results displayed by graduates of that year. One student qualified for such status; his only meaningful Grade 12 credit - Physical Education.

XVIII) Teaching Aboriginal Students in the Public School Setting

At the start of the year, teaching concepts to a group of students over a five-grade spread was difficult, but manageable. However, as subject materials became more "intense" in approach and the weakness of student knowledge (at the senior levels, in particular) became increasingly evident, most students experiencing such difficulty decided that they would "act out" in one form or another so as to disrupt the overall classes' progression through the curriculum. This then became their way out of not doing the requisite work necessary to address academic shortfall. As this form of behaviour had been anticipated, remedial action had been planned well in advance:

- The "wandering" student was required to remain seated in class and take notes and, if he persisted in his behaviour, his parents were called to deal with him.
- Students who showed up for class under the influence of a narcotic (usually marijuana) or alcohol were taken outside the classroom and, with a friend present, told to either deal with the problem themselves, or seek Elder counselling. Follow-up was usually arranged by the student.
- If there were recurring absenteeism issues, the Home School Coordinator was asked to talk to the person.
- In the morning, if a student was absent, the name of that student was given to the Administrative Assistant to be called at home, awakened and told to get to classes; if the problem persisted, their parents were brought in to assist resolving the issue.
- If there were social or emotional issues involved, the Band's Chief or the Home School Coordinator were asked for guidance and to follow up with treatment.

In the meantime, curriculum guidelines as to the length of time that should be spent on a subject area were followed with reasonable rigidity, and meaningful work was expected from all students.

The Grade 8 and 9 students' behaviour was typical for students of this age. Males resorted to the standard boyish pranks, talking out of turn, wrestling with or "yipping" at

each other in competitions, while the females, for the most part, confined their enthusiasms to jibes over clothes or make-up, or "territorial" competition for the attention of one male or another. When things got out of hand, students were sent to do laps around the football field, or sprints up and down the hill behind the portable classrooms. The females knew enough to bring the smart comments to conclusion just before they were sent out for some "exercise"; when, however, they did have to go, a male in the class usually ran with them, often encouraging the young female so that she would complete the required laps. This form of constructive punishment seemed to work well, particularly with the males, and especially after they found themselves buzzing from having eaten too much candy or drinking too much pop over recess or noon hours. Some even asked to be sent to do laps, not just to "take a break" from class, but to enable them to better concentrate on classroom work when they returned.[174]

Student realignment in grade level and expectation continued normally; however, some drop-out issues continued to surface throughout the academic year:

- One of the male students ended up reverting back to a Grade 7 class.
- Another male, dissatisfied with his home life and wanting to go out and find work, missed more than half the year's work.
- A female student missed more than a third of her classes due to "home problems" relating to her brother and his "girlfriend".
- Another female student simply "dropped out" without reason being given;
- A third female student eventually left the community to go live with her father, after

[174] This form of behavioural "restitution" could never be tried in a non-Aboriginal school setting or larger school, where regulations pertaining to teacher "control" of the classroom are dogmatically enforced. Teachers were expected to either "deal with" disciplinary issues in the classroom, or send the student to the principal for further punishment. None of these tactics have any relevance to First Nations students who normally live for outdoor activity, and could use considerably more physical education in their curriculum, especially given the high rates of student obesity, poor diet and diabetes found in Aboriginal populations.

recurring problems of sibling rivalry and a lack of attention from her mother forced her to make a choice between academic success or continued family bickering.

The younger students were resilient, and for the most part, ignored the taunts and pressures of the older ones. When in class, they'd answer questions, occasionally after being asked more than once, but their responses were succinct, articulate and keenly observant, despite their seemingly outward resistance to the materials being taught. Senior students asked the same types of disruptive questions as did the Montreal test group; ironically, the younger group usually ended up answering them, much to the seniors' displeasure.

It took considerably longer to complete the materials needed to be covered in order to administer the unit test, but again, most of this delay was as a result of the older students either seeking a "clearer" explanation, or putting more effort into trying to disrupt the class, instead of trying to understand the materials.

Many of the younger students were also an anomaly in that, while surrounded by the staggering behavioural factors emanating from the older children (many of which related back to the after-effects of the residential school experience), they were extremely supportive of each other. There was no wavering of this support based upon gender lines; when one of them had problems, the rest tried, in earnest, to assist them through the issue. This younger group was only occasionally disruptive, often staying after school to work, talk or play basketball.

The stronger students, academically speaking, usually had two-parents living at home, or were influenced by strong-willed and "dominant" mother role models.[175]

[175] The strongest student, academically speaking, varied in both of these characteristics. Her mother was neither supportive nor cooperative with school staff. The child was also a victim of sexual abuse.

The peripherally-performing children, on the other hand, came from dysfunctional families, with a second parent being either a step-parent or non-existent in the community. These non-participatory parents usually lived in satellite Native villages throughout Vancouver Island, worked in the forestry or fishing industries of the province, or pursued a lifestyle mired in alcoholism, drug usage and / or personal depression.

A few of the children lived either with non-parental relatives or grandmothers. In these latter two groups, there was ample evidence displayed by these student of behaviours relating to residential school fall-out, but even they seemed protected from its effects by the strength of character of the stronger group of students who bonded together to protect one another.

Eventually, the class would extend its personal relationship with this teacher to periods of extended conversations relating to personal problems associated with identity, social agendae, issues from home or school that affected their ability to perform academically, or their personal aspirations.

XIX) The Results of the Third Test

As with the previous groups, this test was given on a Monday morning. Three students wrote later in the week. Class average for the test scores was 65.56%, with a variation of ±11.26%. Although the sample group is again extremely small, results appear to be what would be expected from a "normal" test group (Figure 15).

These results were not scaled to reflect the fact that the majority of these students were in Grade 8. In Quebec, some of the topics to be tested are introduced in Grade 7. It was expected that there would be some academic "shortfall" in the results posted by the

younger children, due to this curriculum "reinforcement" not being present in British Columbia. However, no degradation was found; making the group results seem all the more impressive:

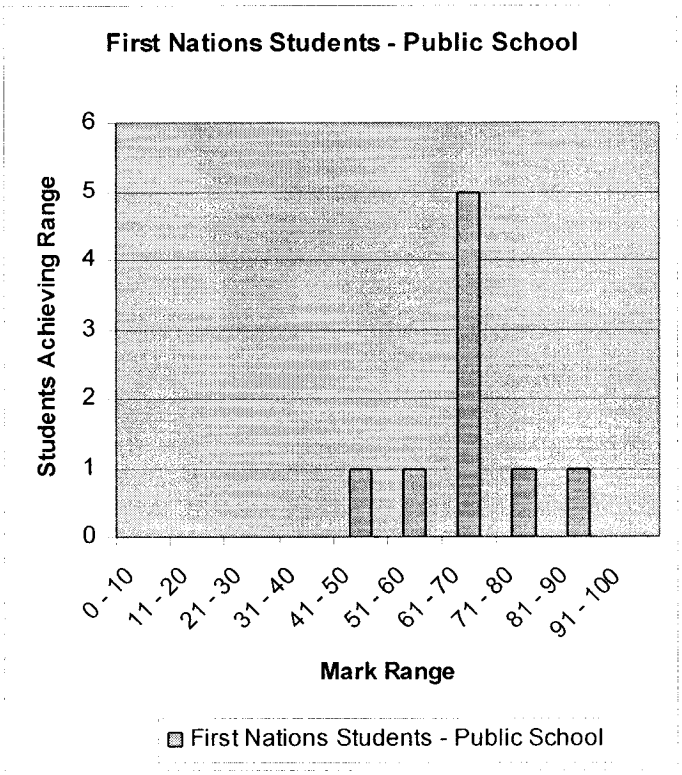

Figure 15: Mark Distribution of Public Sector Students

As with the first Aboriginal study group, only one student failed by British Columbia standards: the young male who missed more than half of his classes. The borderline "failure" grade, when measured by Quebec standards, was recorded by the female student having difficulties at home with her brother and his girlfriend.

There was no teacher expectation that the marks would be either "high" or "low". Similar behaviour to that displayed by some of the Band school participants in taking the test (wherein a student would get "bored" of writing, and prematurely pass in the exam) was expected, but did not occur. By Montreal standards, one could also have expected

three or four students to post marks below the 60-percentile range; this, too, did not occur. Two of the three Grade 9 students fared reasonably well on the test, but female Grade 8 students exceeded the mark posted by the lone non-Aboriginal child, who was expected by both students and other staff members to fare the best, overall.[176]

The comparison of results with the Montreal test group was also impressive, in that there were no extreme levels of mark distribution. All of the students, it seemed, had potential to handle the materials with success.

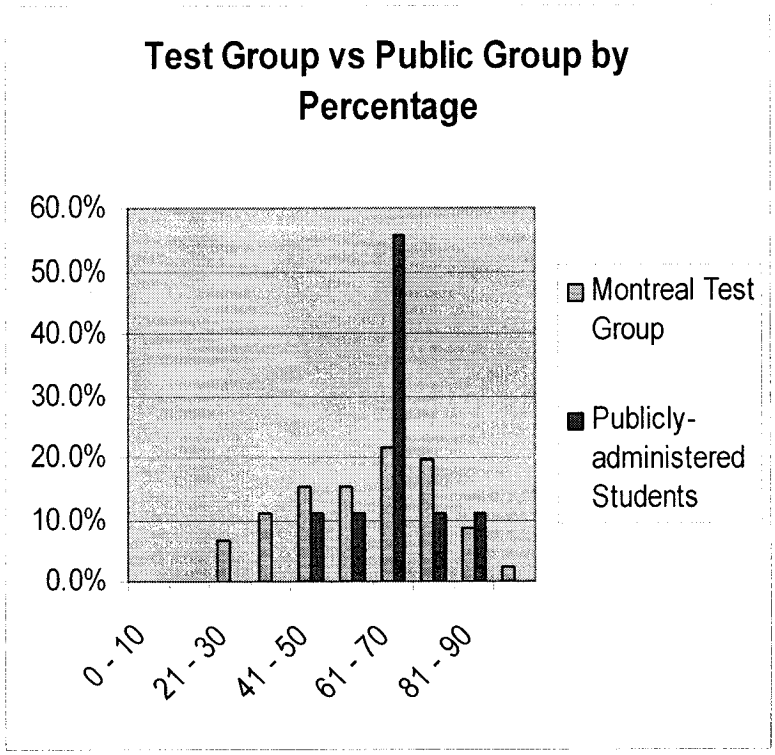

Figure 16: Montreal versus Public Sector Students by Percentage

As for comparing this population against the students from the Band-run school, the following graph illustrates the fact that the results are, statistically speaking, reasonably close in measurement, including in the percentages of students passing, and

[176] The non-Aboriginal student's mark is not included in these statistics.

approximation of high and low marks:

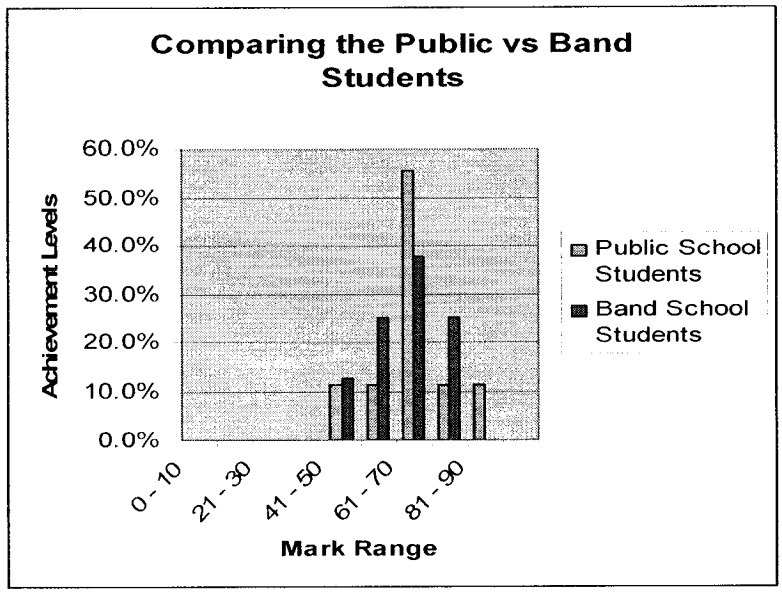

Figure 17: Percentage Comparison - Band-and Public Sector Students

The First Nations group averaged 64.76%, with an overall deviation of ±11.09%.

XX) COMPARING FIRST NATIONS RESULTS TO THE TEST GROUP

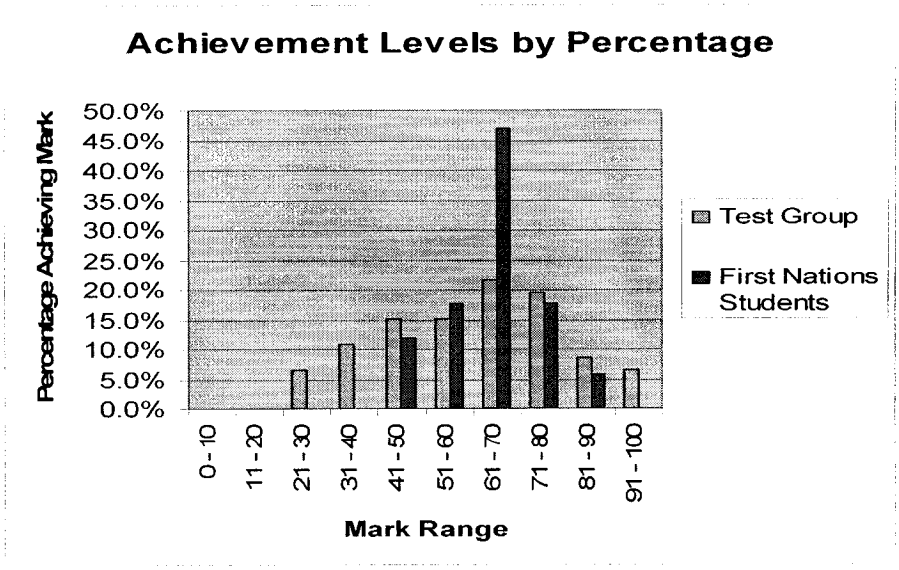

Figure 18: Percentage Comparisons – Montreal vs Native Students

The final statistical measurement taken during the conducting of this research compared the combined First Nations classes with the Montreal test group. The results, by percentage of total population writing, suggest a better-than-average expectation of success being obtained by Aboriginal students, as is indicated in Figure 18.

XXI) EPILOGUE: FIRST NATIONS PERFORMANCE ON PROVINCIAL EXAMINATIONS

The literature reviews suggest that First Nations students not only avoid taking provincially set examinations, but fare poorly in their results. This statistic is, as well, a cause of great concern with the ***First Nations Educational Steering Committee***. As a test of this trend continuing within the populations participation in this research project, a two-year follow-up was initiated by this researcher, in order to determine how the two British Columbia schools would fare once their students had to start writing such tests in Grades 10 and 11.

At the Band-run school, it was difficult to assess overall student performance, as provincial examination marks were "masked" so as to prevent examination of final result. One can tell, despite this handicap, that marks given on the provincial component are generally lower than the teacher-posted ratings. However, this trend has no statistical value, as this pattern is prevalent over the entire province, for virtually all independent and public schools.

The only points of interest for the Band-run school are, first, that more of its students wrote provincial examinations in 2006,[177] while all of the students who

[177] British Columbia Ministry of Education, **GRADE 12 EXAM RESULTS: 2001/2002 2005/2006: Full-Year Summary Report Province – Independent Schools Only**, (Victoria BC: BCEd, 2007), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr12/indep.pdf].

participated in this research project have since graduated – including the two students who had their studies curtailed due to intervention by the courts.

In 2006, approximately 64,500 students enrolled in British Columbia high schools were eligible to write Grade 12 provincials. Of this number, approximately 4,600 were Aboriginal. 472 of the First Nations students wrote one of the mathematics examinations, or just over 10% of their numbers; this compares with 37% of the total population writing at least one Grade 12 segment.[178] This is not a particularly good showing, in terms of participation rates; however, part of this differential may be due to Aboriginal students only taking mathematics classes up to Grade 11, in which case, some analysis of these numbers should be undertaken in the near future, in an effort to determine whether or not the trend towards "mathematics aversion" continues.

The 2006 results for the Grade 10 provincial examinations, however, provide a far more optimistic environment of result potential. Here, there were approximately 56,000 students eligible to write, of which about 5,600 were of Aboriginal descent. Of these numbers, 88% of the total eligible students wrote one of the three mathematics stream examinations (***Applications of Mathematics***, ***Essentials of Mathematics*** and ***Principles of Mathematics***), while for First Nations students, this number stood at 3,552, or approximately 64% of the total of Native students eligible.[179]

Again, these comparisons are still not "great", but there is hope for improvement

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[178] British Columbia Ministry of Education, **GRADE 12 EXAM RESULTS: 2001/2002 2005/2006: Full-Year Summary Report Province – Public and Independent Schools Combined**, (Victoria BC: BCEd, 2007), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr12/prov.pdf].

[179] British Columbia Ministry of Education, **GRADE 10 EXAM RESULTS: 2004/2005 2005/2006: Full-Year Summary Report Province – Public and Independent Schools Combined**, (Victoria BC: BCEd, 2007), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr10/prov.pdf], pp. 5 – 10.

when one considers the "Pass / Fail" ratios of the general population versus the First Nations population. Of the 406 students writing the ***Applications of Mathematics*** component, 76% of students passed (compared with 84% for the general population), 81% of the 1,537 writers passed the ***Essentials of Mathematics*** test (versus 86%, overall), and 75% of the 1,609 students writing ***Principles of Mathematics*** passed, as opposed to 89% of the general population writings.[180]

Even though failure rates may be higher than the general population, and marks lower,[181] overall, the trend shows that there are more First Nations students now willing to write the academic stream component, ***Principles of Mathematics***. These are the ranks of the student population that will have to be encouraged to succeed, and move into the teaching profession, so as to assist their people in building up both the mathematical and scientific expertise in these communities.

In the independent system, only 3.6% of its base of students is of Aboriginal descent. Native student course participation rates are also skewed, in that 13% wrote the ***Applications*** stream (versus 7.3% of First Nations students, Grade 10, province-wide), while 20% wrote each of the ***Essentials*** and ***Principles*** components (compared with 28%, overall). [182] [183] Equally problematic is the fact that, although this was only the second year in which students were required to write such tests, with the exception of the

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[180] Ibid, pp. 9 – 12.

[181] Ibid.

[182] Ibid.

[183] British Columbia Ministry of Education, **GRADE 10 EXAM RESULTS: 2004/2005 2005/2006: Full-Year Summary Report Province –Independent Schools Only** (Victoria BC: BCEd, 2007), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr10/prov.pdf].

Essentials of Mathematics stream, Aboriginal test performance in the independent schools is decreasing, a trend which is not evident in the public sector.[184] This is a trend that should be monitored in following years, so as to key in on specific problems relating to teaching mathematics in these schools, and assist in the reversing of the trend.

This situation may reflect the fact that independent schools catering to First Nations populations do not have sufficient mathematically or scientifically trained staff to carry forward this task.[185] That assessment is based upon the failure of any independent school in British Columbia to have an Aboriginal student write the scientific offerings such as Physics (and, to a lesser extent, Chemistry), while seemingly pushing these students towards offerings in Biology or Forestry (which does nor require writing a provincial examination to pass).[186] This result also stands in stark contrast for the Grade 10 results, where only 44% of Aboriginal students wrote the Science examination, as compared with 61% across the province. However, given the fact that 44% of the Native students still failed Science, no one has any "bragging rights" to carry forward from producing such results.

As for the performance of students enrolled at the publicly-administered school, it has been previously noted that the school's results over the previous sixteen years were

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[184] Ibid.

[185] Nesdoly.

[186] British Columbia Ministry of Education, **GRADE 12 EXAM RESULTS: 2001/2002 2005/2006: Full-Year Summary Report Province – Independent Schools Only**, [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr12/indep.pdf]. The most worrisome component of this report is the fact that many of the First Nations participation rates – and results – are "masked", suggesting that there might be some embarrassment in these statistics, and that the ***First Nations Educational Steering Committee*** still has a major task on hand in raising standards in Band schools.

dismal, with the students' results – when an effort was made to write these examinations – almost always ending in failure or students finding themselves in need of upgrading.

In the 2004 / 2005 academic year, pupils from the research group's Grade 9 class wrote their first-ever provincial examinations, under the new Ministry of Education requirements for Grade 10. Interestingly enough, these students did not write the lesser scaled examinations designed for general or practical application, but sat for ***Principles of Mathematics***. Going into this test, class averages exceeded 70%, but dropped slightly to 64% after the provincial results were weighted in, with one student failing overall.[187] When compared with the full district performance, however, these results surpassed all other schools in this jurisdiction, including those with significantly lower percentages of First Nations students, and allegedly "less troubled" in their student populations.[188]

The results of the 2005 / 2006 examinations, however, were neither as successful nor as academically strenuous. All of the students in the original Grade 8 stream – including the students who were the leaders in academic success during the research period – were downgraded to write the second tier mathematics stream, ***Essentials of Mathematics***. Equally disappointing was the fact that only two of the five students

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[187] British Columbia Ministry of Education, **Grade 10 Exam Results 2004 / 2005: Full Year Summary Report** (Victoria BC: BCEd, 2006), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr10/08484041.pdf].

[188] British Columbia Ministry of Education, **Grade 10 Exam Results 2004 / 2005: Full Year Summary Report – District 084** (Victoria BC: BCEd, 2006), [http://www.bced.gov.bc.ca/reports/pdfs/exams_gr10/084.pdf]. Other schools in the district had students writing the less difficult streams, with equally poor results. 60% of students from this school did not bother to write any provincial mathematics exam, but over 60% of writers across the district failed. Course averages for the district was also higher than at this school, whereas the combined mark for the district was four percentage points lower than at the test school.

eligible to write at this stage chose to do so – a statistic repeated in the writing of the Science examination.[189] This participation rate returned the school to its traditionally low levels of academic attainment, as demonstrated in the sixteen years prior to 2003.

[189] Ibid.

CONCLUSIONS

With Easter rolling around, things were getting a little hectic, and I was actually looking forward to the break. Having decided to "push the envelope", so to speak, I'd convinced the kids in all of my classes that it'd be in their best interests to finish up the curriculum by, or shortly after, the break; now, having set my exams to mirror as closely as possible to the finals, all I had to do was administer the little beauties, mark them, and disappear for a few days – to Toronto, no less, where my mother had promised the entire family a feast of turkey, ham, the usual assortment of desserts and, of course, cabbage rolls. My mouth began watering at the very thought of them.

"Snap!" The finger popping sounded real enough, but I still wasn't certain whether it was part of the dream sequence, foretelling a future of serious weight problems, or one of my students, jarring me back into the real world. It was the latter...

"What do you want, James," I asked gruffly, looking at the clock and realizing that I'd already been in class too long. The young Cree was alone, for once, and his look of bemusement told me that he knew that I wasn't looking forward to a social visit, much less a dissertation of events as they unfolded after basketball practice. With that, he got right to the point.

"I just talked to my uncle," he started to say, "and he wants me to come home at Easter and work the trap lines with him."

"So, what's that got to do with me?" I asked, knowing what was coming next.

He hesitated for a second, then plunged into his request. "Well, since we're pretty well finished for the year, I was wondering if I could write the final at Easter, so I'd get a full credit for the year."

It took me less than a second to process his request, but just so he'd think that I'd had to think about it for a while, I kept him waiting for the answer. There was no question that I was going to allow him to do this, but I didn't want him to get the impression that, just because he was floating through class with a high 90's average, I was going to ignore the months of recurring interruptions where I was constantly breaking up side conversations between him and the closest female, him filling the air with mild jokes the entire class could hear, just so they could laugh and disrupt my progress through another "meaningful" lesson in mathematics.

"If it means two months of peace in class, no problem," I finally answered. "Just make certain that you make the same arrangements with the rest of your teachers, so that I'm not left having to explain this to the office." By "the office", of course, I meant our august principal, a man long past his Peter Principle, but who'd been elevated to the throne through the sudden removal of the previous occupant for overzealousness in the performance of his duties

I knew that my colleagues would go along with this proposal; so I started assembling a "final" for him to take almost the moment he left the room. I also knew what would happen when James wrote the exam – he'd kill it.

I should have also expected the obvious when I walked into the boss's lair with my final mark...

"You want me to assign him a 98% as a FINAL," he stammered, feigning a deep disdain for the flaunting of provincial regulation. I could already taste the invective speech he was about to deliver; still, I was duty-bound to listen to the bitter end. Patiently, I explained that this kid could teach the class; he was "finished", as they say, his work for the year; keeping him around for another nine weeks wasn't going to "make him stay", no matter how coercive school regulation and dogma might be on this point, Moreover, to not pass him would be a serious waste of a strong academic mind.

None of this reasoned logic seemed to get through. "No," he said, "this won't do. You'll have to change the mark to reflect his lack of attendance, as well as the 'other' factors in his behaviour."

I paused. The next statement out of my mouth would probably make me insubordinate, but out it came, nonetheless. "That's your department," I answered, "and within your authority to change. As his classroom teacher, that's the mark I think he deserves, and that's the mark he'll get, even if you won't accept it until the end of June." With that, I stood up, and started to leave.

I anticipated being told to sit down again; instead, there was nothing impeding my scurried exit, verbal or otherwise. Continuing my hasty exit, I wondered whether I should be relieved or not; my only thought process for the moment consisted of circumstance and conflicting cultures: would this dialectical dance have ever occurred had it been the child of a white, English mill manager asking for the same dispensation, but with more exotic ports of call in mind. [190]

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[190] Ken MacDougall, **"Excuse me, God; but..."**, **Some You Remember - Even Those You Forgot** (Unpublished: June 2007).

ASSESSING FIRST NATIONS STUDENTS' POTENTIAL FROM THE STUDY

The results of this investigation show that it is extremely difficult to ignore the influence that social conditions, and conditioning, place upon the teaching of subject matter to Aboriginal students – whether in mathematics, literature or history. Specifically, this study found the following points of great relevance in helping to understand just how "misdirected" and politically motivated some of the conclusions expressed in previously reviewed literature may have been:

1. Problems allegedly identified in First Nations students understanding mathematical principles (and therefore supposedly not being able to achieve at the same levels as non-Aboriginals with a more "culturally sensitive" appreciation of the mathematical curriculum's agenda), may exist in some school settings, but such findings are hardly the result of First Nations students being incapable of handling the mathematical materials.
2. More specifically, the research shows that First Nations mathematical students, even under the most adverse of circumstances, relate reasonably better to the mathematical curriculum, and have at least no lesser an ability to retain knowledge within its domain, than any student that could be found in any troubled inner city school in Canada.
3. Band-administered schools are demonstrating a greater ability to monitor and control student behaviours than are public sector schools (due, in large part, to the availability of adult counselling services and personnel made readily available to school authorities); however, both systems are failing miserably in their abilities to encourage students to attend school on a regular basis.
4. "Group bonding" of academically talented First Nations students, with the view of providing strength and appreciation of learning through numbers, appears to be a naturally sought-after phenomena by such students, especially when their teachers are prepared to shelter them from the more abusive aspects of a school's "peer pressures".
5. Empowerment in First Nations students, particularly in mathematics, and by its extension, science, might be more productively found through utilizing the traditional practices of patience, perseverance and struggle, and a re-stressing by

the Elders of the need for these future parents to be nurturer, provider, and teacher to their own, and future generations.

6. Lastly, First Nations communities might benefit from taking a more active role in the enforcement of academic rigor within the classroom, insuring that teachers communicate the full measure of the curriculum's intent, apply knowledge across the full expectation of measured application, and follow this up with meaningful explanation of learning intent and objectives to educational facilitators within the community, so that parents might, through traditional ways, reinforce this knowledge to their children, thus make the concept of "difficulty" irrelevant and the "success or failure" of their children more a community-based burden, as opposed to one borne by teachers, alone.

Precious few of these outcomes were expected, and certainly more study and follow-up should be conducted, particularly when these results may appear to be at odds with previous findings. However, the principal supposition, namely, that First Nations students should <u>not</u> be having difficulties with mathematical education beyond what might normally be expected within our population, seems now to be a logical conclusion to reach.

I) MYTHS 101: DEBUNKING ABORIGINAL - INNER CITY SCHOOL COMPARISONS

The literature review reveals huge disparities between the educational results for First Nations students versus traditional, non-Aboriginal institutions, none of which are particularly favourable towards Canada's indigenous populations. Whether the study focuses upon Native populations in urban centres,[191] or examines conditions at Band schools, the concept of the so-called "educational ghetto" – the impoverished inner city school, rife with its myriad social ills – is ultimately levelled at institutions where larger-

[191] Silver *et al.*

than-average populations of First Nations students congregate.

It has been argued that Aboriginals have no concept of achieving advancement in class status, that their heavy reliance upon government funding and social safety nets inures them to their existing plight, and that, without direction or initiative, their condition will not change for the foreseeable future.[192] .The political reality, however, is this: Aboriginal students – and their parents - want to be "part of the system" as much as anyone else.

The educational reality is, however, is this: residential school experiences and behaviours inherited and learned from the abuses incurred in that system provide a myriad of sociological, environmental and emotional issues resulting in behavioural disorders unparalleled for their ferocity in defeating the human spirit. Therefore, each educational setting into which a First Nations student is placed brings with it its own rules for survival, few of which have their basis in the normalcy of social order.

It is therefore not unreasonable to expect these students to manifest behavioural problems normally observed in the chaotic confines of crowded inner city schools. Since governments have failed to provide adequate funding to counsel students with the most disruptive tendencies, these young Aboriginals will eventually become branded as "special needs", thus confining them to receive only the most pitiful of educational opportunities offered in the intellectual wastelands that now become their classes. Thus, the comparison of academic environments – the urban jungle versus the savagery of First Nations lifestyles – is blindly accepted. The results of this research illustrate some

[192] Crain. Many of these arguments have been advanced by governments unwilling to continue funding specific programmes deemed as "failures", when the failure most likely existed as a result of inadequate planning or funding period limitations that made such initiatives little more than "stop-gap" measures.

distinct anomalies between the two educational environments.

The behavioural tendencies of students from the Montreal test group and those of First Nations ancestry show disturbingly similar patterns. However, when one examines the academic achievement levels by comparison,[193] we find that, although receiving little in the way of support beyond that offered in the classroom, the levels of subject understanding displayed by the First Nations groups exceeded those of the Montreal test group by a considerable margin. This suggests that these students have a culturally learned and distinct way of internalizing their personal problems when provided the opportunity to perform meaningful analysis of subject materials in the classroom, a trait that was more easily subjugated by peer pressure in the Montreal group.[194]

There is no question that performance levels by First Nations students is less than ideal, but it still seems as though Aboriginal students are working through their difficulties in a far better fashion than inner city schools appear to be coping. In the Montreal system, as an example, the Grade 9 (Secondary III) failure rate for all schools hovers in the neighbourhood of 51%, with the French language sector performing only marginally better, at around 48%.[195].

Is this a fair rebuttal of the conceptualized mythology of First Nations students, which posits the belief that such students are generally incapable of "survival" in the

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[193] Please refer to Figure 18, ***Achievement Levels by Percentage: Test Group / First Nations Students***.

[194] Crain. This trend is even more remarkable, when one considers the extreme levels of ridicule and harassment provided by senior students in the public school to the younger students. It also, in some small part, partially explains the unwillingness of many First Nations survivors of residential school abuse to even talk about their experiences in these institutions – a point made by many researchers and writers focusing upon this subject.

[195] Mathematics Coordinating Committee.

mathematics classroom, without the assistance of some "special needs" programme or "culturally sensitive" curriculum? Do First Nations schools really deserve to be stigmatized by their ongoing comparisons to inner city schools? The results of this research suggest "yes" for the behavioural component, and a definite "no" for the academic portion. Bluntly stated:

> ***Aboriginal students appear to fare better, academically, than those from an "inner city" school in a typical urban Canadian environment; moreover, they do so with less resources, worse attendance, far graver social conditions, a higher percentage of children being labelled as "special needs", and far more parental indifference than even this typically described "socially disadvantaged" urban school could muster.***

II) CHANGING THE TEACHER PERSPECTIVE THROUGH METHODOLOGY

There is a distinct possibility that the positive results scored by the Aboriginal study group might be anomalous. Nonetheless, it seems obvious that the most significant impediments to First Nations students having a better understanding of mathematics are intrinsically tied to after effects of the residential school experience, and the seemingly jaded views of both teachers and administrators who classify these students as "special needs", and therefore unworthy of receiving proper and complete academic instruction.

It could be argued that, until such time when the ravages of the residential school experience subside, we're just wasting our own time, intellectually speaking, in trying to introduce full and meaningful curriculum reform for First Nations students – much less successfully integrating its contents into the classroom. The dilemma this brings back for discussion again lies in the results of this study: Is it the curriculum, and its contents, that require the "reform", or is it the actual methodology utilized in the classroom that will

yield the most favourable results for these students?

Earlier in our discussions, LaFrance had suggested a curriculum design that married traditional Aboriginal values of mathematics application with the expectations of society, so as to foster both a respect for, and pride in, knowing and understanding the concepts of mathematical thought. While such an instrument may be an "ideal" in the evolutionary process of securing First Nations mastery of the subject, in the current classroom settings it would seem far more reasonable to suggest that we may be able to obtain a better "success" rate for such students by simply embracing only one key factor central to LaFrance's design of this material, that being the principle of reciprocal respect demonstrated between teacher and student, and phasing other aspects of this reform process into the classroom on a pedagogical timetable having previously undergone rigorous testing and examination in its own right.

When we examine the factors that influenced overall success or failure of the First Nations students observed in these case studies, it is fairly obvious that most carried personal "baggage" into the classroom, generally acquired through a passed-down association to someone who attended residential schools, or through friendship with members of the families of these individuals. These factors, in turn, influenced student learning potential, usually in a negative manner. Yet, each of these seventeen Aboriginal students in the study seemed capable on a purely intellectual level of handling the mathematical materials associated with the Grade 9 curriculum and the module under study, even if they weren't "officially" at that grade level. What this therefore suggests is that teachers must become more proactive in developing teaching mechanisms that marginalize behavioural modes, while assisting First Nations students to meet the general

expectations the system places upon all students, regardless of cultural origin.

To succeed in this task, we must first understand its immensity and order, as was pointed out in our literature review:

> ***The affirmation of the cultural and linguistic identity of students is a significant educational issue in the diverse framework of North American society, which gains importance with the realization that it is students of difference who face the biggest challenge in obtaining academic success...central to the Cummins model (is) that educators cannot collaborate in the creation of power...unless they themselves are active participants...Therefore, Cummins (1996a) suggests that empowering education should be an interactive process between teachers and learners... (There are) four institutional characteristics of schools where the interplay between the role of educators and the educational structures in which they teach can encourage opportunities for the empowerment or disabling of minority students through their educational experiences...(a) "Cultural / Linguistic Incorporation"; (b) "Community Participation"; (c) "Pedagogy"; and (d) "Assessment." Nel (1993) suggests that a fifth element should be included in Cummins' model: (e) minority students should be made familiar with mainstream culture and school practices. As such, students will be better equipped to handle the demands of the mainstream culture in the classroom.***[196]

Cross-cultural educational training, in its most basic form, is having the teacher use intellectual wherewithal to actually "translate" the matter within the curriculum into the local dialect of the learner; thus, to accomplish the goal of the first expectation is, naturally, for the teacher to make every concerted effort to understand the nuances of local tradition upon learning patterns – even if this is only a "hit and miss" objective before the orientation process to the culture is complete.

The second point, however, is much more difficult for a non-Aboriginal educator

[196] Fuzessy, pp. 195 – 197.

or administrator to swallow, that being to even "allow" the local "community" to "participate". What that should mean is that:

i. The school is open and accessible to the community.
ii. Visitors are free to come into the classroom and hear what's going on or participate in the discussion.
iii. The Teacher Aides should preferably be community members with a reasonable knowledge of subject matter, or be willing to learn with the class (as opposed to always being "photocopier specialists" or performers of menial tasks in the classroom that teachers try to avoid doing, whenever possible).
iv. Regular meetings should take place between Chief and Council, the Educational Authority, and administrators and teachers within the school.
v. Wherever possible, community role models in the subject areas should be allowed to either conduct the lesson, or assist in its preparation.
vi. Effort must be expended to band academically talented students together, teaching them to be free and independent in their thought processes, and their achievements acknowledged with reverence and respect, so that these students can be used as future "role models", in the absence of a qualified adult population, and aid in the development of a positive attitude towards educational goals in other students.
vii. Finally, that school disciplinary or counselling issues should be coordinated with community Elders, and wherever possible, action taken on such matters be consistent with traditional practice, such as the "sentencing circle", restitution procedures or counselling for reconciliation purposes.

All of the aforementioned practices are ideals to be placed on the value and worth of the educational process of students; few of them, however, are within the control of the classroom teacher, unless there is unanimity in their inclusion by staff, or the administrator is committed to the process. Any teacher who believes that they can accomplish these tasks on their own is merely looking for Utopia in Dante's Hell.

The last three items in Fuzossy's list, pedagogy, assessment and heightening awareness of cultural expectations of the educational agenda, can be tackled as issues

only if one recognizes the complete limitations of the power invested within the teacher by the educational system. Where we have the most influence is within the classroom itself. We are pedagogically trained, but this bareness of educational preparation does not necessarily have to translate to our restricting our practices in the classroom to the rote expectations envisioned by our methods professors. On this issue, we must be prepared to react to the expectations of the class, not of ourselves as the instructor, and be proactive in our choices of deliverance of materials and subject matter.

In assessing the student, we must recognize that this process has to be coordinated with the expectations of the curriculum, and that to deny such linkage is to deny our students the existence of progression within the learning cycle. Knowledge, once accumulated, may not then be disposed of as "irrelevant" or of having any future value.

Here, then, the notions of traditional educational delivery may be more appropriately tied to the assessment proceeding by directly relating to the cultural expectations of First Nations groups, wherein it is "understood" that the child shall, in himself, eventually become the teacher of his own offspring. This process could then be observed, respected by, and even administered in conjunction with the teacher, by a community member intimately involved in the educational process of the school itself. Ideally, too, this individual should have been given the opportunity to contribute to the process, thus bringing a cultural touchstone to the proceedings through these observations and consultations.

The latter item, that being to provide awareness to the student of the cultural expectations of the educational agenda, is by far the most difficult item to address. The notion that student empowerment and historical awareness of one's own heredity creates

a cultural "awareness," is a sketchy proposition, at best. The very term "empowerment" suggests imagery reminiscent of the era of the Black Panthers, wherein such power came from the purpose and intent of the clenched fist used by the group as its universal icon – a symbol of defiance, certainly, but conveying with it a note of resistance to the learning process that, in the current environment of Aboriginal classrooms, is already too prevalent. It is in this latter confrontational context that the Winnipeg task force took its stance on its application to their school system, as a way of dealing with the needs of urban First Nations students;[197] however, it is an approach that the facts of this study do not appear to support as a way of implementing reform in the First Nations mathematics or science classrooms.

Few teachers are prepared to accept that there is a cultural and societal agenda to the materials that they bring to their classes; quite frankly, they "just want to teach". The politics of the curriculum are, then, a matter for individual interpretation and, as such, depending upon the philosophical approach and emphasis one gives to its application, may cause additional problems not just within the classroom and the community, but the colleagues with whom one must share teaching duties. [198]

For this cross-cultural pedagogical readiness training to succeed, a single teacher cannot implement the practice alone; this must be a collaborative approach, its intention and philosophical purpose boldly stated in school policies, and its plan of action reasonably enforced through action within the classroom setting. Its intent, after all, is to

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[197] Silver ***et al.***

[198] Aikenhead and Huntley, p. 162. This study concluded that teachers could not, or did not perceive "science" as anything other than a field of study, with little or no intention to culturally oppress students, and therefore was bereft of any political intent – even though the authors disagreed with this assessment.

provide the student with an understanding of the expectations of the curriculum, and to provide the teacher with the tools necessary for that student to attain those goals.

III) Applying the Historical Lesson to Mathematical Pedagogy

We are now left to ponder the merits of the process of mathematical education of First Nations students, and the political, societal and historical influences placed upon the dissemination of that knowledge.

The historical result of governments' First Nation educational policies, and their implementation, was not only a disaster looking for a place to happen, but a social experiment finding its appropriate place to wreak educational havoc. Filled with cultural insensitivity, religious intolerance and an intellectual arrogance based primarily upon concepts of racial superiority, the educational system in Canada has so far failed in its mission to Aboriginal peoples.

Whether through deliberate obfuscation or political manipulation, there is still an unwillingness to assign responsibility for the failure of past First Nations educational policy back upon the administrators who perpetuated the system. There has been a grudging admission of past mistakes made by the federal government, addressed towards ancestors of specific First Nations; however, as for blanket confession and expression of shame, such words are but distant hope for the future.[199]

Even today, when a possible approach to the teaching of mathematics to First Nations children is first broached, governments still tend to balk at the prospect of

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[199] David Wiwchar, **"Canada apologizes for residential school system"**, **Windspeaker** (Edmonton AB: January, 2001), [http://www.ammsa.com/windspeaker/WINDNEWSJAN2001.html].

implementing their own innovations for repair. When, for instance, a culturally significant, freshly developed mathematics and science curriculum was proposed for the Ahkwesahsne Mohawk Nation (Grades 7 through 9), the government of Ontario was wildly supportive of the idea. As a consequence, the project was duly funded, the philosophical approach established, the materials collected, and the curriculum formed. When, however, the project was finally deemed ready for classroom implementation, the funding to carry this project forward was never forthcoming.[200]

First Nations educational issues must continue to be analyzed from a constructively applied reading of our sordid history, and solutions arrived at based upon finding closure, instead of each "side" in this historical drama continuing to point fingers of blame for the failure of such policy, while simultaneously denying responsibility of action and purpose of the policy itself.

Residential school abuse is, after all, a legacy of our collective Canadian heritage. The result of litigation proceedings, and of their resultant payments to the victims of the carnage wrought by these institutions, isn't really a statement of what we've learned from history, but what illness we had, and what were its symptoms. As for the remuneration itself, while the victims may appreciate it, this is analogous to giving aspirin to treat a viral condition - the medication does nothing to allow the victim to heal, nor does it prevent the illness from spreading to those whom they love.

Our attempts at minimizing the behavioural by-products of the residential school generations are even more restricted by the paucity of pedagogically-based insights into the solutions. Scholars who have studied the issues prefer to express their own

[200] LaFrance, p. 105-106.

experiential concerns, as opposed to addressing closure to the issues themselves. What they in turn elicit is rage, manifesting itself as "empowerment", when it is only the voice of a frustrated population trying to find its way in our society.

The lessons of empowerment, versus the desire to survive, have to find common footing. Aboriginal peoples cannot continue to "live" on the rhetoric of past sins, and past transgressions, of an imperialistic race fuelling their progress in society. One can perceive the devastation wrought by the residential school experiences of previous ancestries, but their children must now live within a world of fake needs, technological innovations, and the luxuries of cellular phones, ***i*Pod**s, **MP-3** players and **MTV.** To stall their educational progress in its quest to differentiate "want" from "need", and to rail only at the lack of understanding placed in educating First Nations people, means that the next generation will not only be able to discern fact from fiction, but, more importantly, never have a place within our economy that allows them to have some meaningful method of surviving through opportunities provided by that society, or contribute towards its evolution.

Only meaningful educational reform, an increased emphasis on cross-cultural pedagogical training, and an awakening within the teaching profession to come to grips with its own role to play in this transformation, will assure reformist construction and educational success. For this ever to happen, considerably more attention must be paid to a student's <u>continuing</u> need for knowledge and enrichment, whether Aboriginal or otherwise.

Missing from this lesson of life's reality is this economic truism: No one is telling the fledgling student apprentice that, in order to go from his current state of blissful ignorance to one of competent journeyman, he must embrace experience and upgrading

as a life-long commitment to perfecting his craft. This moral is not just a lesson of economics, but of life itself. The Elders of First Nations communities understood the principles of evolution and the need to survive, and their ancestors did not stand still in their own education while life passed them by. Perhaps this is a lesson educators now trying to study the problem in earnest could learn.

In conclusion, we can see no validity in accessing the capabilities of an Aboriginal student as being varied from other cultures, whether in mathematics or any subject. We can, however, give credence to, and actively practice, the techniques that will bring forward the potential of these students, by relating materials and classroom practice to the cultural touchstones of the students' community. Moreover, in order to best assess our results objectively, we must be more willing – and vigilant – in our efforts to criticize our own classroom pedagogy, gearing our approaches to subject materials through the tenets rooted in anti-racial behaviour and cultural integration, as opposed to promoting dogmatic and standardized text-based approaches that may, unintentionally, project an assimilationist mentality.

These are our responsibilities as teachers to the needs of First Nations students, and indeed, to all students of a cultural heritage different from our own.

APPENDIX I:

Monitored Conditions:

Expected Behaviours in the Classroom

Formulated by the Residential School Experience

The ***Legacy of Hope Foundation*** is a Canadian-based organization "whose purpose is to educate and create awareness and understanding about the legacy of residential schools and the effects and intergenerational impacts on First Nations, Inuit and Métis peoples and to continue to support the ongoing healing processes" required for these identified groups to take their rightful place in society.[201]

The list of behavioural patterns to follow was gleaned from the Foundation's web site (http://www.wherearethechildren.ca/en/impacts.html), and constitutes the basic concerns that were to be anticipated while conducting this research. With the assistance of Don Beggs, former Consultant to the Vancouver Island West School District 84, these traits were then edited to reflect the interpretations that a teacher, in observing such actions emanating from a student, could bring to bear upon the problem. This initial analysis then allowed the author the opportunity to plan appropriate reactions and focus of treatment, without violating the child's or parents' rights, not to mention written policies requiring teachers to follow certain procedures in reporting such behaviours, and bringing such matters to the attention of the appropriate authorities.

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[201] The Legacy of Hope Foundation, **Legacy of Hope: Who Are We? - Mandate** (Ottawa ON: The Legacy of Hope Foundation, 2005), [http://www.legacyofhope.ca/Who.aspx].

Some of the issues cited by the Foundation have, for the purposes of clarification and relationship to actual classroom experience, been combined for their need for categorization; while others might have been modified, edited or deleted.

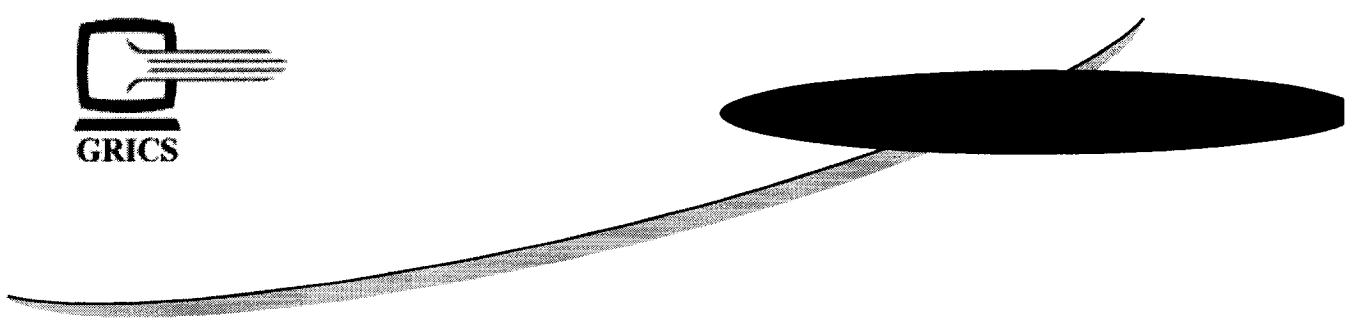
The list follows:

- **Students suffering from alcohol and drug abuse, Fetal Alcohol Syndrome (FAS) and Fetal Alcohol Effect (FAE).**
- **Students whom are victims of sexual abuse, physical abuse, psychological and emotional abuse, and have low self-esteem.**
- **Students coming from dysfunctional families and already having had difficulties formulating and maintaining interpersonal relationships.**
- **Students whose parents don't have "parenting skills", as the children already suffer from emotional coldness, rigidity within their personalities, neglect, have poor communications skills, and may already have been abandoned or "intervened" upon by Band social workers, and may now be living with extended families, such as grandparents or aunts and uncles.**
- **Students who are thinking about suicide, may have tried – or will try – to commit suicide, and may even have formed "suicide pacts" with other students.**
- **A teen pregnancy rate that greatly exceeds the national average.**
- **Students who are chronically depressed, or are always exhibiting feelings of rage or anger (possibly from having been the victim of abuse).**
- **Students with eating disorders (and having no concept of the value of food and nutrition) or sleeping disorders (often created by extenuating factors within the household, including partying and the constant watching of television to all hours, without supervision or awareness of the need for programmed sleeping routines).**
- **Students who are chronically and physically ill, due to spiritual and emotional trauma, or lingering upon issues of unresolved grief and loss.**
- **Lastly, students who actually fear personal growth, transformation and healing.**

APPENDIX II:

Sample Test:

Spatial Concepts Module



Spatial Geometry and Description

Mathematics, Grade 9

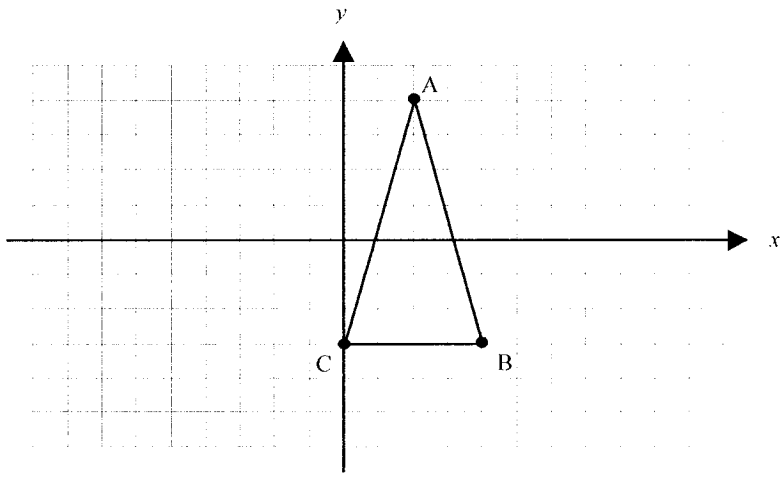
Understanding Shape

Question Booklet

Youth Sector General Education

For questions 1 to 9, blacken the appropriate space on the computerized answer sheet.

1 Given triangle ABC with coordinates A(2, 4), B(4, -3) and C(0, -3). /4



If the composition of transformations s o t was performed according to the following definitions:

$t : (x, y) \mapsto (x + 3, y - 2)$
$s : (x, y) \mapsto (-x, y)$

which of the following will be the coordinates of the resulting triangle A"B"C"?

A) A"(1, 2), B"(-1, 1) and C"(3, 1)

B) A"(1, 2), B"(-1, -5) and C"(3, -5)

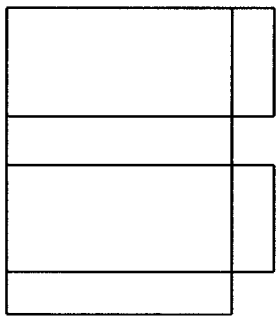
C) A"(-5, 2), B"(-1, 5) and C"(-3, 5)

D) A"(-5, 2), B"(-7, 5) and C"(-3, 5)

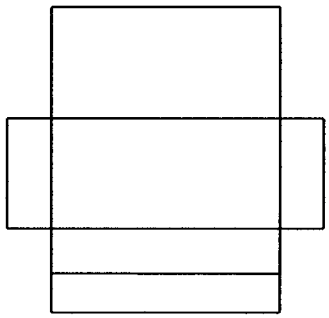
E) A"(-5, 2), B"(-7, -5) and C"(-3, -5)

2 Which of the following is the net of a right prism with a rectangular base? /4

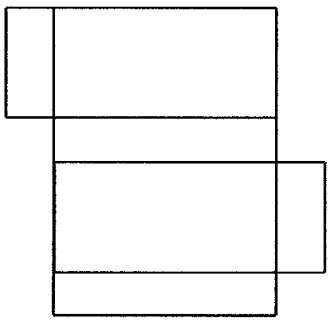
A)



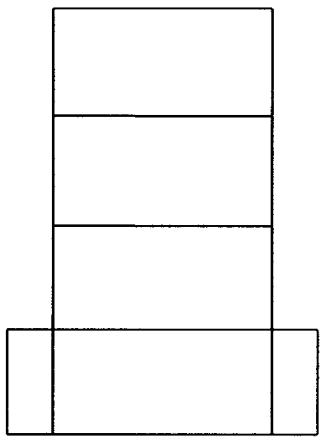
C)



B)



D)



3 A right triangle is rotated 360° in space. The axis of rotation is one of the legs of the right angle. /4

Which solid results from this rotation?

A) A cone

B) A cylinder

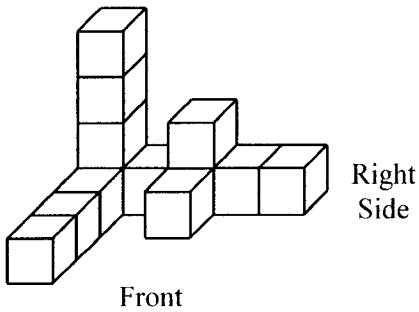
C) A prism with a triangular base

D) A solid consisting of two cones whose bases are coincident

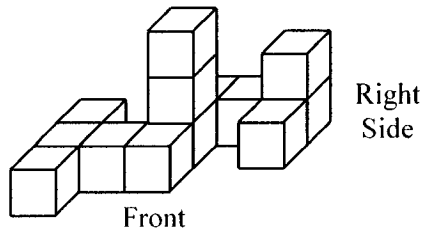
4 Which of the solids illustrated below matches the following description? /4

- The right-side view shows 7 cubes.
- The second layer consists of 2 cubes.
- The top view shows 9 cubes.

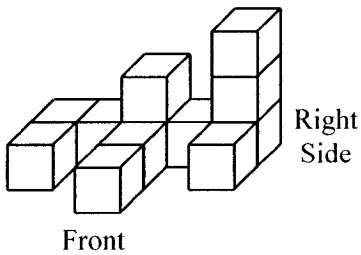
A)



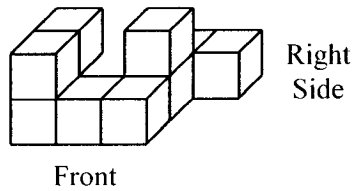
C)



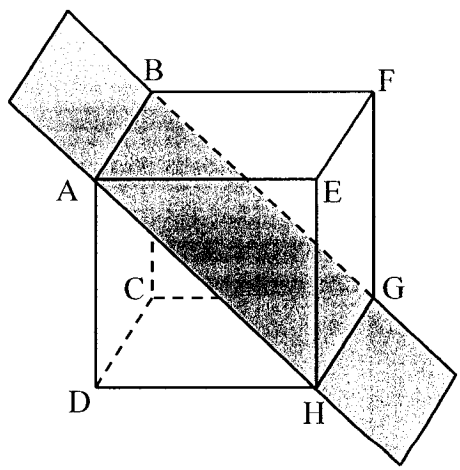
B)



D)



5 The cube represented in the figure below is cut through vertices A, B, G and H. /4



What is the name of the two solids generated by this cut?

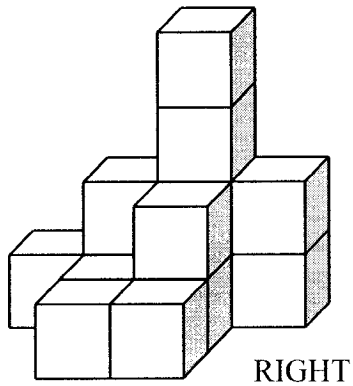
A) Rectangular prisms

B) Triangular prisms

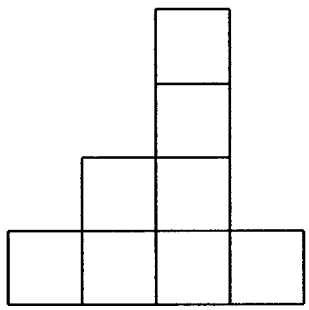
C) Rectangular pyramids

D) Triangular pyramids

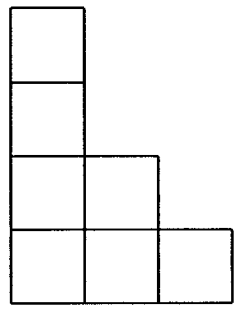
6 Which of the following views represents the solid below? /4



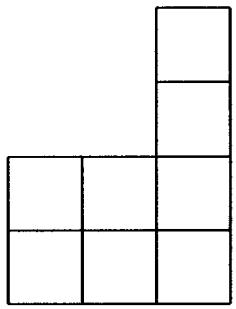
A) Front view



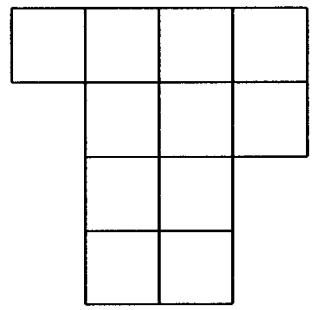
C) Left-side view



B) Right-side view



D) Top view



7 Only one of the following is FALSE. Which one? /4

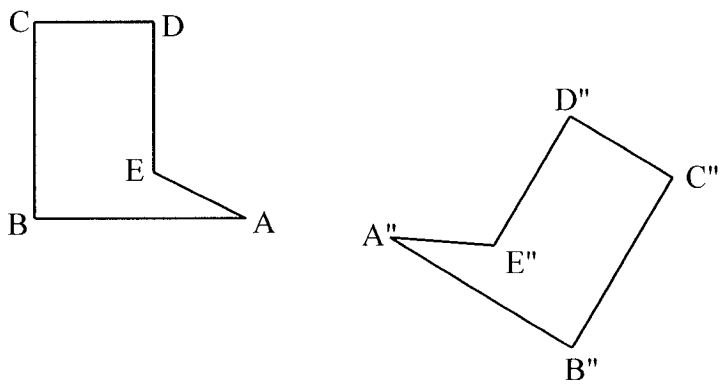
A) The centre of a dilatation is a fixed point.

B) Dilatations always preserve lengths of the sides.

C) Dilatations always preserve the measures of angles.

D) Dilatations preserve parallelism.

8 Image A"B"C"D"E" is the result of a composition of transformations. /4



Which transformation is equivalent to this composition of transformations?

A) Rotation

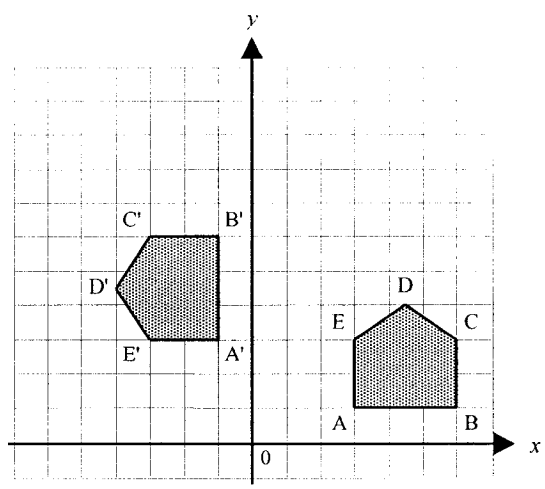
B) Glide reflection

C) Translation

D) Reflection

9 A garden shed, lifted off the ground by a tornado, underwent a rotation. /4

The following graph represents this situation.



The garden shed, designated by polygon ABCDE, underwent a 90° rotation centred at the origin. The image obtained is figure A'B'C'D'E'. Which rule defines the inverse of this transformation?

A) $r^{-1} : (x, y) \rightarrow (-x, y)$

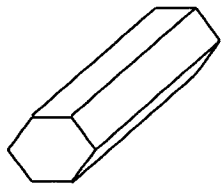
B) $r^{-1} : (x, y) \rightarrow (-x, -y)$

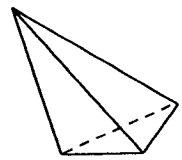
C) $r^{-1} : (x, y) \rightarrow (y, -x)$

D) $r^{-1} : (x, y) \rightarrow (-y, x)$

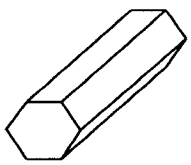
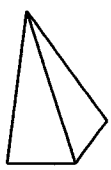
10 Classify the 3 solids shown below in the chart provided in your answer booklet. /4

A) B) C)





Classify the figures by selecting one characteristic from each column heading. Write your answers in the appropriate space next to each figure.

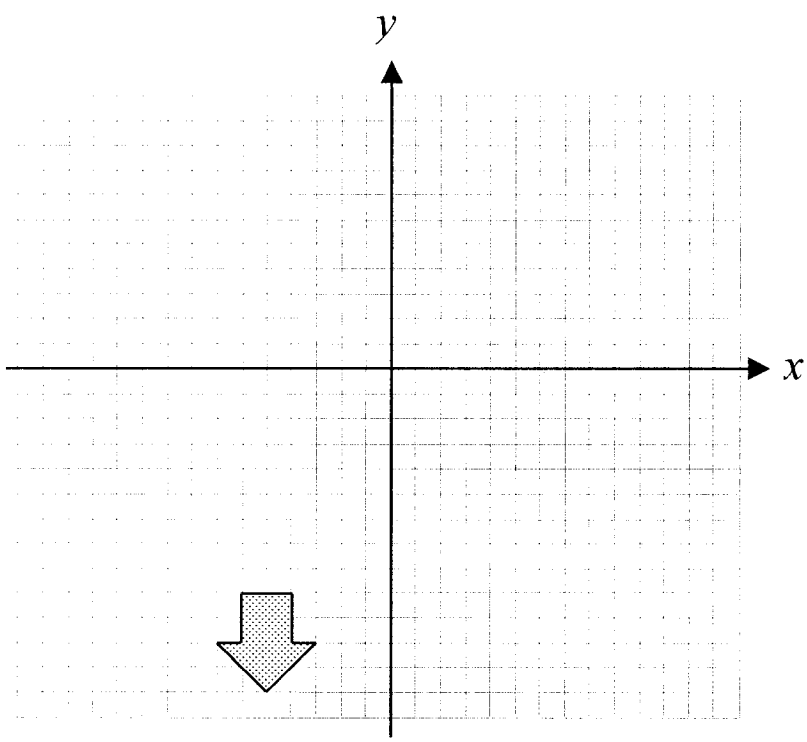
	Right or Oblique	**Circular, triangular, rectangular, pentagonal, hexagonal, or etc.**	**Prism , Pyramid, Cone, or Cylinder**
A) 	example Right		
B) 			
C) 			

11 Draw the image of the figure in the answer booklet under the composition of transformations $r \circ t$. /4

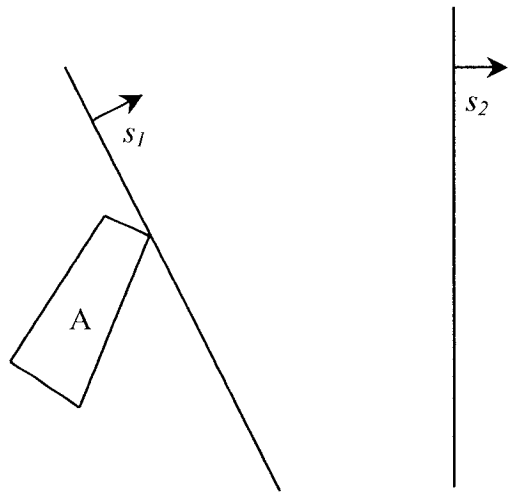
Translation t is defined as: $(x, y) \rightarrow (x + 2, y + 4)$.
Rotation r is 90° counter-clockwise about the origin.

$r \circ t$

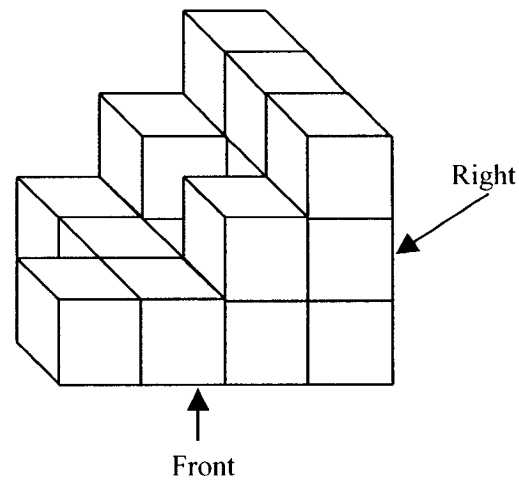
Translation t is defined as: $(x, y) \rightarrow (x + 2, y + 4)$.
Rotation r is 90° counter-clockwise about the origin.



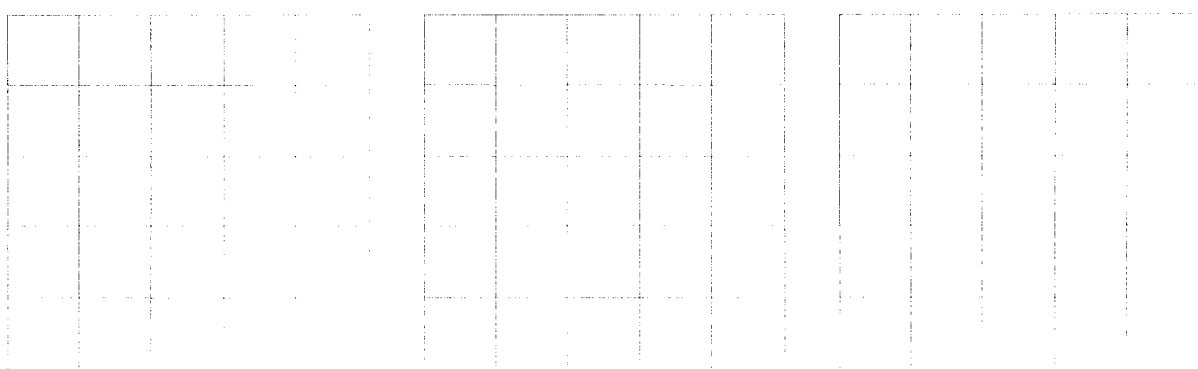
12 In your Answer Booklet, draw the image of trapezoid A under reflection s_1, followed by reflection s_2. /4



13 Given the stack of blocks on the right. /4

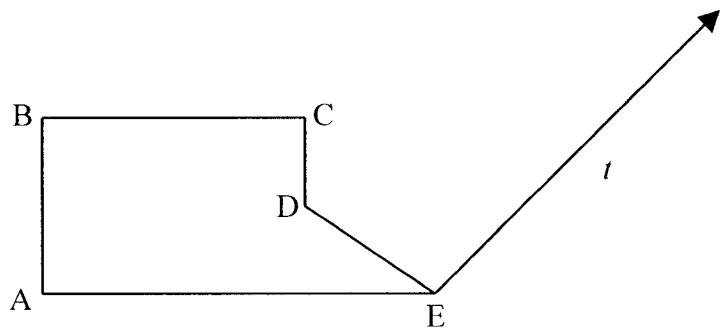


Draw the top, the front, and the right view of this stack of cubes.



Top Front Right

14 In your answer booklet, construct the solid generated under translation t of polygon ABCDE. /4
Draw the edges of the solid either in a continuous line or a dotted line.



15 The total area of a large cube is 1350 cm^2. /5

This large cube is made of small identical cubes.

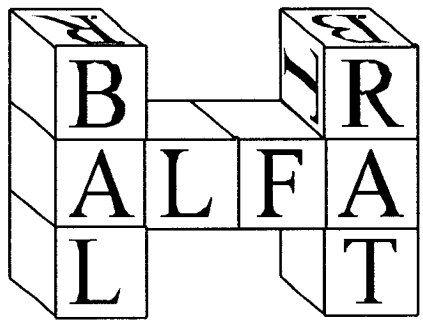
There are 25 small cubes in one layer of the large cube.

What is the measure of an edge of one small cube?

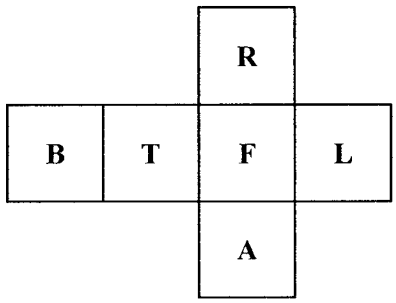
Show all your work.

Answer The measure of an edge of a small cube is _____ cm.

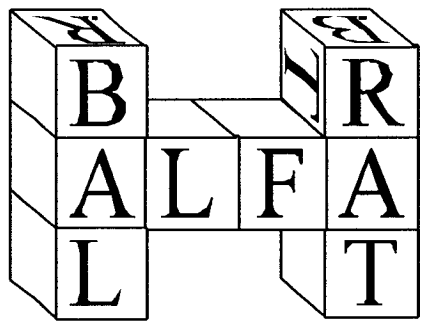
16 The following solid is made up of 8 identical cubes. However, 6 of the faces are blank. /4



Each cube can be put together with the pattern below:



Write the letter that should appear on each of the 6 blank faces, keeping in mind the orientation of the letters.



17 A large cube is made up of several identical small cubes. The total area of the large cube is 3456 cm. The volume of a small cube is 27 cm^3. /5

How many small cubes were used to form the large cube? Show all your work.

Answer: The large cube is made up of _____ small cubes.

18 125 identical small cubes were put together to form one large cube. One surface of this large cube was painted. When the paint dried, the large cube was taken apart. /5

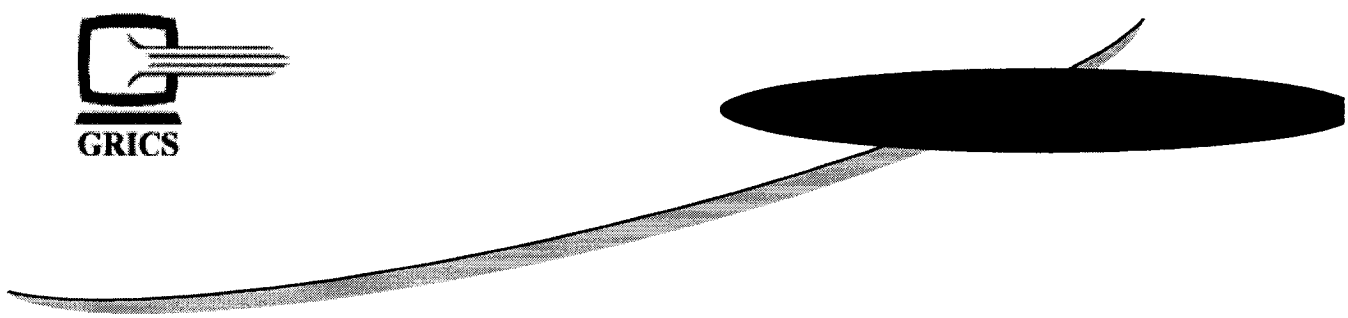
How many of the small cubes have no paint on them at all? Show your work.

Result : _____ small cubes
V

APPENDIX III:

Answer Key for Sample Test:

Spatial Concepts Module



Spatial Geometry and Description

Mathematics, Grade 9

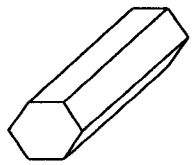
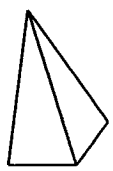
Understanding Shape

Answer Key

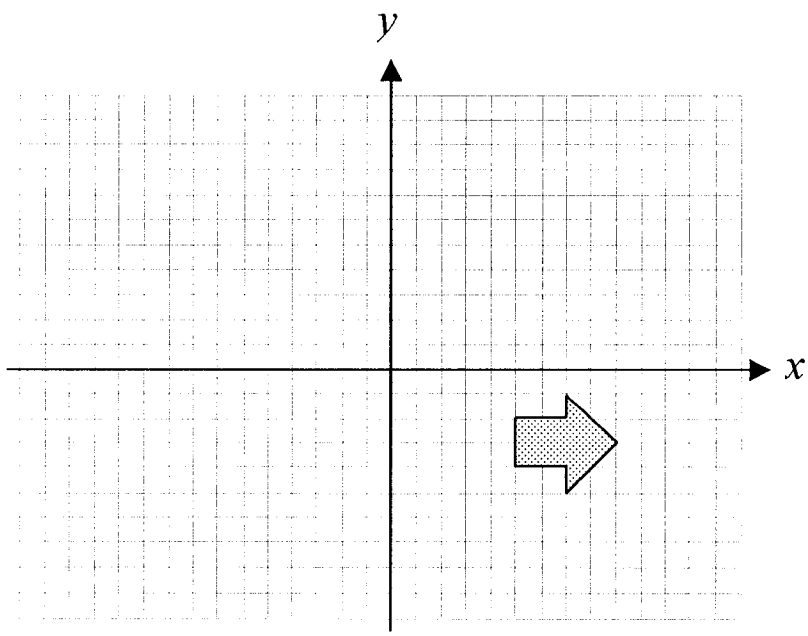
Youth Sector General Education

CORRECTION KEY

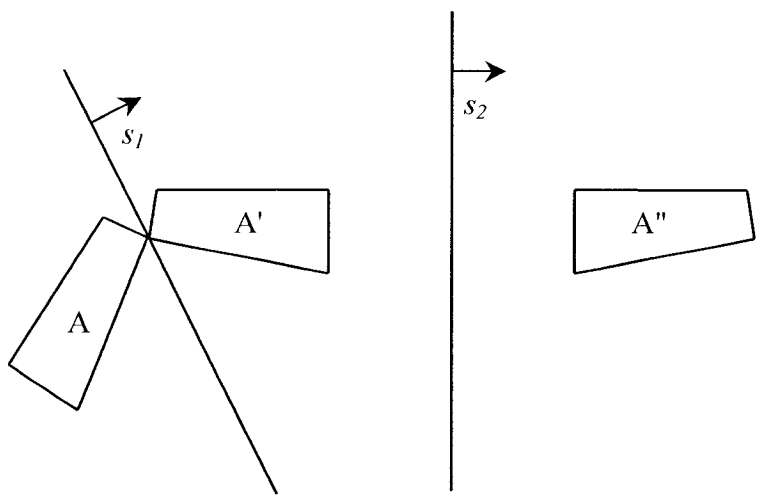
1	E	/4
2	B	/4
3	A	/4
4	A	/4
5	B	/4
6	C	/4
7	B	/4
8	B	/4
9	C	/4
10	Example of an appropriate solution	/4

A)		*Ex: Right*	Hexagon	Prism
B)		Right	Circular	Cylinder
C)		Oblique	Triangular	Pyramid

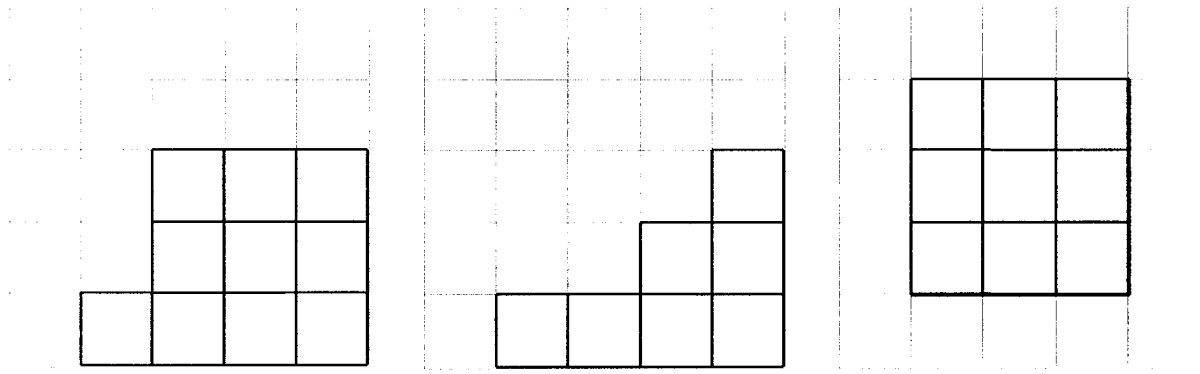
11 /4



12 /4

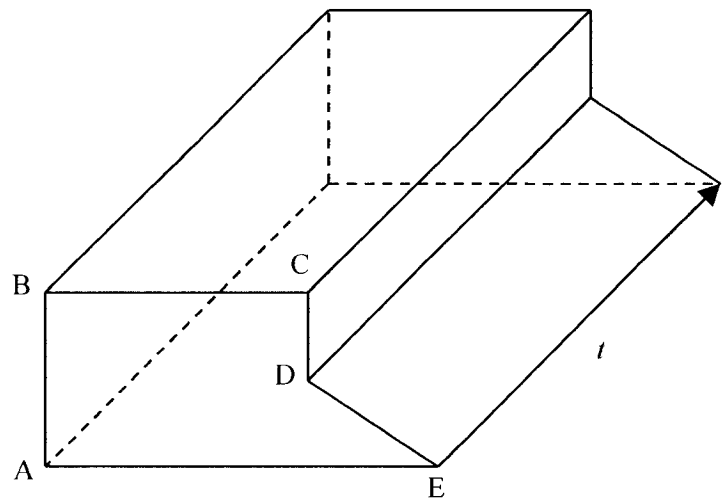


13 /4



Accept all rotations of the top view.

14 /4



15 /5

Example of an appropriate method

Area of one face of large cube

$1350 \div 6 = 225$

Area of one face of small cube

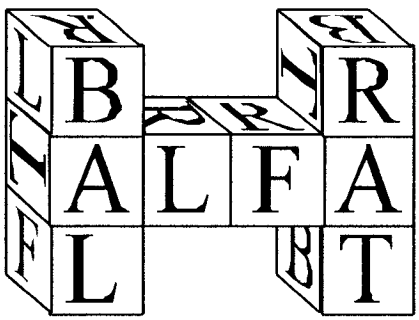
$225 \div 25 = 9$

Measure of one edge of a small cube

$\sqrt{9} = 3$

Answer The measure of one edge of a small cube is 3 cm.

16 /4



Note : The orientation of each letter must be correct.

17 /5

Example of an appropriate solution

Measure of one side of the large cube

$A_t = 6c^2$

$3456 = 6c^2$

$c^2 = 576$

$c = 24$

Measure of one side of the small cube

$V = c^3$

$27 = c^3$

$c = 3$

Number of small cubes on one side of the large cube

$24 \div 3 = 8$

Number of small cubes in the large cube

$8^3 = 512$

Answer The large cube is made up of 512 small cubes.

18 /5

Work : (example)

Dimensions of large cube

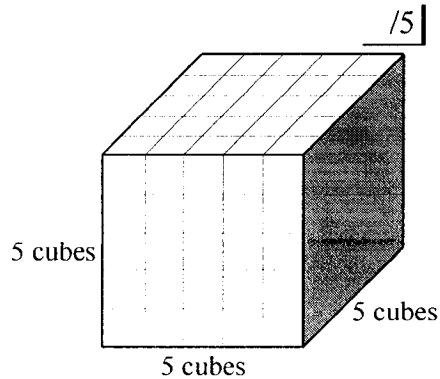
$\sqrt[3]{125} = 5$

Number of small cubes in one surface or face

$5 \times 5 = 25$

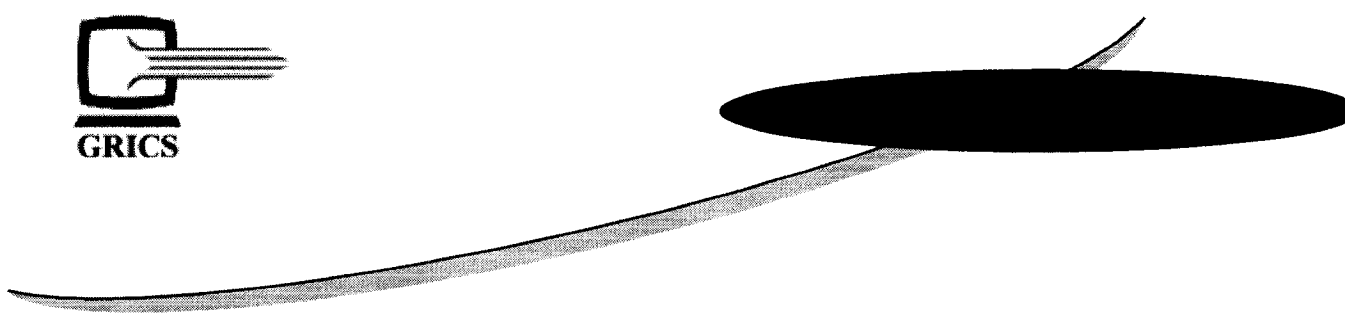
Number of small cubes with no trace of paint

$125 - 25 = 100$



APPENDIX IV:

Evaluation Key and Legend For Sample Test: Spatial Concepts Module



Spatial Geometry and Description

Mathematics, Grade 9

Understanding Shape

Evaluation Key and Legend

Youth Sector General Education

CONTENTS

Spatial Geometry and Description
Understanding Shape

Question	Item	Objective*	S	T	D	Ind. d	Ind. F	Ind. 1	Ind. 2	Dimension
1	0082	GEO.01.01	A	M	M	0.00	0.00	0.00		
2	0277	GEO.02	C	M	E	0.00	0.00	0.00		
3	0275	GEO.03.01	C	M	E	0.00	0.00	0.00		
4	0280	GEO.02.03	A	M	M	0.00	0.00	0.00		
5	0540	GEO.03.05	C	M	M	0.00	0.00	0.00		
6	0202	GEO.02.01	C	M	E	0.00	0.00	0.00		
7	0106	GEO.01.04	C	M	E	0.00	0.00	0.00		
8	0458	GEO.01.03	C	M	M	0.00	0.00	0.00		
9	0237	GEO.01.02	C	M	M	0.00	0.00	0.00		
10	2019	GEO.03.04	C	C	E	0.00	0.00	0.00		
11	0247	GEO.01	A	C	M	0.00	0.00	0.00		
12	0118	GEO.01.01	A	C	M	0.00	0.00	0.00		
13	0468	GEO.02.02	A	C	M	0.00	0.00	0.00		
14	0322	GEO.03.02	A	C	M	0.00	0.00	0.00		
15	0476	GEO.03	P	E	M	0.00	0.00	0.00		
16	0248	GEO.02	A	C	M	0.00	0.00	0.00		
17	0557	GEO.03	P	E	D	0.00	0.00	0.00		
18	0122	GEO.02	P	E	M	0.00	0.00	0.00		

*** NOTE: Objective Refers to text used in Quebec**

Legend

S : Skills
- A : Applications
- C : Concepts
- P : Problem solving

T : Types of items
- T : Evaluative task
- C : Short-constructed answer
- A : Association
- E : Extended answer
- I : Illustration or text
- M : Multiple-choice answer

D : Levels of difficulty
- E : Easy
- M : Medium
- D : Difficult

Ind. 1 : Indice 1
Ind. 2 : Indice 2
Dimension : Dimension

APPENDIX V:

Curriculum Objectives

of the

Research Study's Geometry Module

Generalized objectives in the study of Geometry in Grade 9 include its relationship to worldly phenomena described either by a geometrical shape, or in its manipulation. Specific topics of discussion and objectives of the Quebec Ministry's curriculum include the following:

1) To solve problems involving isometries or dilatations

- to use knowledge of composite transformations to solve problems
- to assimilate the concept of an inverse transformation
- to analyze transformations and identify the one that is equivalent
- to use the correct terminology to state these properties
- to construct images under a composite of transformations.
- to describe the inverse of different transformations of the plane
- to state the main properties of different transformations

2) To solve problems involving three-dimensional objects

- to perceive three-dimensional objects and represent them in different ways
- given a set of cubes, give a verbal description of what they see, draw sketches of the front, side and top views or describe the various layers of a given object
- to construct three-dimensional objects on the basis of descriptions or two-dimensional representations
- to describe three-dimensional objects, using words or drawings.
- to represent three-dimensional objects in two dimensions.
- to build a three-dimensional object from a description or a drawing

3) To solve problems involving solids

- to create solids through rotations or translations of plane figures or by splitting a cube into sections
- to analyze the elements of solids (e.g. edges, sides, slant heights (apothems), etc.) and use these elements to classify solids
- to deduce a measure in a solid they have already created
- -to generate a cone, sphere or cylinder by rotating a figure 360° about an axis
- to generate a prism by translating a polygon
- to represent solids in two or three dimensions
- to classify solids
- to split a cube into sections to obtain a solid with one triangular or quadrilateral face
- to deduce the measure of a segment from a definition or property
- to justify an assertion used in solving a problem involving solids [202]

[202] Quebec Ministry of Education, **Curriculum – Mathematics 314 Secondary School**, pp. 29 – 34.

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