

## CONFERENCE REPORT

# Aboriginal science symposium: enabling Aboriginal student success in post-secondary institutions

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## ABSTRACT

**Context:** Research in the sciences is now beginning to acknowledge what many Aboriginal educators and students have experienced or witnessed in educational curricula, a general dismissal of Indigenous knowledge as being considered scientifically 'worthy'. This is the result of educational institutions', and the systems within which they are placed, failure to teach from broad cultural orientations. Aboriginal persons are under-represented in post-secondary education programs, with a similar disparity in the limited number of Aboriginal persons holding careers in health, science and engineering occupations.

**Issues:** The University of Lethbridge is attempting to increase the number of Aboriginal students who successfully complete programs in a variety of areas. To that end, the Support Program for Aboriginal Nursing Students (SPANS) commenced in Fall 2007 in order to increase the numbers of Aboriginal students who enter and complete the 4 year nursing program. At one time there were as few as 2–3 Aboriginal nursing students across the 4 years of the program. Since SPANS began there are now 34 students of Aboriginal background across all 4 years of the nursing program. This is noteworthy because statistically there are only 1200 Aboriginal Registered Nurses in Canada, a daunting statistic that is alarming low. One of the objectives of SPANS is to enhance the nursing faculty and clinical instructors' understanding of Aboriginal science so that it can be integrated into the current curriculum. With this aim, an Aboriginal Science Symposium was held in May 2009 to bring nursing faculty together with other University faculty and experts in Aboriginal science. The symposium attempted to highlight the links between programs in nursing and health sciences and the need for integration with Aboriginal science. The 3 specific symposium objectives were to:



(1) generate an understanding of traditional scientific knowledge; (2) bridge Aboriginal and Western scientific thought, toward and; (3) understand ways of implementing and raising awareness of how Aboriginal knowledge and understanding of science can be applied to help inform and improve teaching in all educational science settings.

**Lessons learned:** From keynote addresses, panel group discussions, and breakout sessions, participant responses to the symposium objectives coalesced into 4 themes: (1) Aboriginal ways of knowing: informing Western science curricula; (2) Elders and community, enhancing science education; (3) Aboriginal student experience in the science classroom; and (4) strategies and advice to meet the needs of the Aboriginal science student.

**Key words:** Aboriginal, Aboriginal science, Aboriginal ways of knowing, Canada, conference, health sciences students, Indigenous knowledge, symposium.

## Context

While education as a whole is changing to incorporate a variety of cultural perspectives, there remains a distinct disparity between the number of Aboriginal students who graduate from high school and go on to complete post-secondary degrees<sup>1</sup> compared with those of non-Aboriginal background. In this article, Aboriginal refers to First Nations, Inuit and Métis peoples as per the definition and practice commonly used within Canada<sup>2</sup>. This practice is based upon acknowledgement of Aboriginal identity regardless of category into First Nations, Inuit or Métis groups. When the term 'First Nations' is used, it refers specifically to individuals who have been formerly referred to as 'Indian'<sup>2</sup>. In the most recent census (2006) *Statistics Canada*<sup>3</sup> found that 34% of First Nations persons did not complete high school and only 8% have a university degree, 15% lower than non-First Nations persons in Canada. While these numbers are bleak they have increased since 2001 where 6% (26 300) of First Nations persons had obtained a university degree. This statistic is a significant and timely capture of the movement of more First Nations persons entering post-secondary school. Even though it is small relative to that of the non-Aboriginal population, it cannot be underscored and is indicative of the growing evidence in favour of First Nations persons' growing success in university education<sup>4</sup>. This is in the face of another recent census highlighting the burgeoning First Nations population

in Canada. First Nations persons now account for 3.8% (1 172 790) of the total population, an increase from 3.3% in 2001; a growth rate higher than that of the non-Aboriginal population. Ultimately, with a rapidly growing population, it becomes even more important that First Nations persons succeed in both the kindergarten to grade 12 educational system and at post-secondary level. Such success will give First Nations communities the ability to improve and change their social conditions by providing a source of qualified individuals to secure economic and communal sustainability<sup>4</sup>.

The number of First Nations students who do not make it through high school or complete a post-secondary education for a variety of reasons cannot be ignored. For example, Cajete<sup>5</sup> and Aikenhead<sup>6</sup> report that in the sciences in particular, First Nations students lose interest in conventional western ways of teaching science-based discourses because their worldviews clash, resulting in the often-reported student 'disengagement' – often mistaken for a sign that these individuals 'cannot learn'. Research and classroom practice have revealed that First Nations students experience an internal bind as they encounter an epistemological gap between how they interpret the world when transferring traditional knowledge to conventional western science curricula. This cognitive dissonance can be explained as an assimilation reaction to a foreign world view<sup>6</sup>. The Canadian Council on Learning (p3)<sup>7</sup> acknowledges this assimilation reaction and states that this may be responsible for 'the low



Aboriginal participation rates in science and engineering occupations, and post-secondary programs’.

Recent research into the sciences is finally beginning to acknowledge<sup>8</sup> that past climates in educational curricula have been damaging to Aboriginal students, due to the general dismissal of Indigenous knowledge as being not science ‘worthy’ or having ‘scientific’ merit. Science from a Aboriginal perspective must be heard beyond reference to measurement, tests of reliability, theories of predictive value, mathematics, logical empiricism, or the existence of a natural world independent of local and cultural belief systems<sup>5,9,10</sup>. Considering what science means from an Indigenous perspective, we can include the former, but also encompass a science of the resident, of culture, of the participants’ ways of living in their realities – a medium of study that embodies both the body and natural world while also transcending them<sup>5,6,9</sup>. The results of denying the creditability and applicability of Aboriginal knowledge in terms of scientific value<sup>11</sup>:

*...skews the historical record, undermines objectivity in Aboriginal, multicultural, and mainstream education; and seriously restricts approaches to some of our most vexatious and debilitating environmental, science-technology, and socio-economic problems.*

The results of ongoing research suggest that educational institutions do not teach from broad cultural orientations but rather only meekly address Aboriginal and other Indigenous perspectives in their science-based curricula<sup>5</sup>. In the meantime, Aboriginal and non-native students suffer as result of curricula that do not broaden minds, but entrench truth regimes from the perspective of Western epistemologies<sup>10</sup>.

In summary, Aboriginal persons are under-represented in post-secondary education programs, particularly in the science-related programs (ie health-related programs, mathematics, computer science, the natural sciences). Moreover, there is a similar disparity in Aboriginal persons who hold careers in science and engineering occupations<sup>12</sup>

relative to non-Aboriginal persons. Ultimately, this should raise alarm among educators and researchers, because this paucity of evidence along with history is suggestive that Aboriginal participation rates in both post-secondary education and in science and technology occupations ‘are unlikely to improve until strategies can be found to produce successful experiences with classroom science among Aboriginal students’ (p8)<sup>7</sup>.

## Issues

The University of Lethbridge is attempting to increase the number of Aboriginal students who successfully complete programs in a variety of areas. The Support Program for Aboriginal Nursing Students (SPANS) commenced in Fall 2007 in order to increase the number of Aboriginal students who enter and complete the 4 year nursing program. The SPANS program is specifically designed to meet the needs of Aboriginal students and help them succeed in a science-based nursing education curriculum. It is a collaborative initiative of the University of Lethbridge Faculty of Health Sciences, Red Crow Community College, Blood Tribe Department of Health, Aakom-Kiyii Health Services (Piikani Nation), Siksika Health Services and the Blackfoot Confederacy.

While there have been as few as 2–3 Aboriginal nursing students across the 4 years of the program, since SPANS began this has increased to 30 Aboriginal-background students. Formally connecting the current nursing curriculum with Aboriginal science may enhance the students’ experience and success in the program and, therefore, potentially increase the number of Aboriginal registered nurses.

One of the objectives of SPANS is to enhance the understanding of nursing faculty and clinical instructors about Aboriginal science. Therefore, ‘Aboriginal Science Symposium: Innovation Application’ was held 6–8 May 2009 in Lethbridge, Alberta, Canada to bring together



nursing faculty, other faculty from the university, and experts in Aboriginal science. The symposium was not only about nursing or health sciences, but also about Aboriginal science in general. The symposium program included speakers of First Nations and Métis backgrounds who share common barriers to and challenges in securing post-secondary education.

The symposium had 3 objectives: (i) to generate an understanding of traditional scientific knowledge; (ii) to bridge Aboriginal and Western scientific thought; and (iii) to work toward applying this knowledge and understanding to teaching within all educational settings; kindergarten to grade 12 and post-secondary. To achieve these objectives, the symposium program consisted of key-note speakers, panel group discussions, breakout sessions and 2 summative speakers who provided comments to wrap up the event and highlight main points (Table 1). Both morning and afternoon sessions began with a keynote speaker, followed by an open-floor discussion. After this participants were divided among the breakout sessions to discuss themes identified that address the issue of the lack of Aboriginal people in the sciences. Each breakout session was led by a discussant and the results of the various groups were then summarized in the closing session. To set the tone the symposium opened with a traditional processional entry consisting of drumming, singing and a procession of officials with appropriate flags, followed by traditional prayers conducted by an Elder.

A total of 85 participants attended the conference. As well as participants from The University of Lethbridge, others attended from educational institutions and governmental agencies throughout the region (eg Lethbridge College, Red Crow Community College), province (eg Alberta Education, Bow Valley College, Kihew Asinly Education Centre, Mount Royal College, St Paul First Nation School, Saddle Lake Education Authority: Onchaminahos School, Blue Quills First Nations College, Treaty 8 of Alberta, University of Calgary) and country (eg Simon Fraser University, The University of Saskatchewan, the First Nations University of Canada, Lakehead University, Thompson Rivers University). Such widespread professional affiliations allowed for much

discussion as well as rich, diverse perspectives on Aboriginal science education during the breakout sessions and within the whole-group question and answer periods.

## *Key topics addressed*

Arising from keynote addresses, panel group discussions, and breakout sessions, 6 key topics emerged:

1. Living and experiencing Aboriginal science
2. Bridging Western and Aboriginal science
3. Holistic teaching in the classroom
4. Addressing general student concerns as well as the lack of Aboriginal content in the current science curriculum
5. Addressing teacher/professor concerns when applying/teaching Aboriginal ways of knowing
6. Increasing Aboriginal science student enrollment.

## Lessons learned

Participant immersion during the symposium led to a great deal of discussion and debate about why the current science curriculum in the educational setting (kindergarten to grade 12 and post-secondary) is slanted toward teaching Western epistemological models, and what can be done to change this situation. Further issues addressed were the reasons for so few Aboriginal students enrolling in science courses but not completing, and why so few Aboriginal persons choose science-related careers. Discussions from the breakout groups were collected and arranged thematically (Table 2). These perspectives are offered in order to advance awareness toward changing and developing strategies to incorporate greater Aboriginal content into science-based curricula, and address the issues surrounding the low enrollment of Aboriginal students in science, as well as their absence in science-related careers in general.



**Table 1: Keynote speakers**

Speaker	Brief biography
Gregory Cajete, PhD	A Tewa Indian from Santa Clara Pueblo, he is the Director of Native American Studies and an Associate Professor in the Division of Language, Literacy and Sociocultural Studies in the College of Education at the University of New Mexico. New Mexico.
Lee Wilson, PhD	A Métis from Manitoba, Lee is an Assistant Professor of Chemistry in the Department of Chemistry at the University of Saskatchewan, Saskatoon, Saskatchewan, he teaches at the undergraduate and graduate levels and has an extensive research program.
Marie Battiste, PhD	A Mi'kmaq educator from Potlo'tek First Nation of Unama'kik, Nova Scotia, she is a full professor in the College of Education, Director of the Aboriginal Education Research Centre (AERC) at the University of Saskatchewan and Co-Director of the Aboriginal Learning Knowledge Centre, a national project of the Canadian Council on Learning.
Leroy Littlebear, JD	A Blackfoot from the Kainai First Nation, he is the founder of the Native American Studies Department and an alumnus of the University of Lethbridge where in 1971 he was one of the first Aboriginal students to complete a Bachelor of Arts Degree.
Mamoru (Mo) Watanabe, MD, PhD	Professor Emeritus of Medicine and former Dean of the Faculty of Medicine of the University of Calgary.
Madeleine Dion Stout, RN, MA, LLD	Of Cree background, former Director for Native American Department at Carleton University and currently a health consultant.

Several major themes were noted across categories (Table 2). One was the importance of relationships between individuals (ie teacher and student, Elder and community member) as well as between the individual and nature. Relationships signify a particular protocol for action and behavior and can be analyzed to fully understand Aboriginal students' behavior in university programs. The second was the need to integrate holism into the teaching atmosphere so that inter-relationships are acknowledged and the recognition of the intimate interconnection between things (ie courses and content) is achieved. A final theme was the need for perseverance in understanding the complexity and interconnections between things, and in addressing individual and community challenges. Dealing with these challenges may take precedent over mastering course content.

## **Recommendations**

The following recommendations arose from the Symposium:

- Strategizing sessions need to be held within individual faculties to incorporate indigenous

knowledge; nursing has the opportunity to lead the way in this regard.

- Discussions are needed with Aboriginal students in a variety of faculties to gauge what, if any, changes are being made to incorporate Indigenous knowledge into their curriculum.
- Methods should be developed to include Elders in a variety of educational programs across the university.
- Ongoing discussions are needed with other universities engaged in similar initiatives (ie to increase the number of Aboriginal students) to hear about their successes and lessons learned.
- Support programs are needed for Aboriginal students to enable a successful transition to university.
- The identification of mentors is critical to model and encourage possibility for Aboriginal students; a good support community on campus is critical for Aboriginal students.



**Table 2: Critical immersion responses and seeking change**

Theme	Main points
Aboriginal ways of knowing: Informing Western science curricula	<ul style="list-style-type: none"> <li>• Bring Indigenous culture into classroom dialogue with Eurocentric ideologies</li> <li>• Allow for the experience of nature</li> <li>• Observational learning and understanding surroundings</li> <li>• Linking science to everything around us</li> <li>• Visiting is research – acquire/share information</li> <li>• Equality between everything</li> <li>• Space and time is limited in Eurocentric but not in Aboriginal teachings</li> </ul>
Elders and community, enhancing science education	<ul style="list-style-type: none"> <li>• Follow Elder’s direction in order to understand traditional ways</li> <li>• Having Elders available as resources</li> <li>• Elders living what they were taught (ie value: treat people well, they do well)</li> <li>• Big picture view, even responding to issues in dreams, process creates more positive people, both students and Elders</li> <li>• Create relationships with knowledge keepers in community</li> <li>• Linking students and parents together to education</li> </ul>
Aboriginal student experience in the science classroom	<ul style="list-style-type: none"> <li>• Did not know options available for multiple choice exams</li> <li>• Faculty did not inform, advocate dropped out of program</li> <li>• System and culture of university not holistic</li> <li>• Students need a place of ceremony and protocol on campus</li> <li>• Fear of being wrong</li> <li>• Students must encouraged and feel safe enough to bring their knowledge (both cultural and academic) into the classroom</li> </ul>
Strategies and advice to meet the needs of the Aboriginal student	<ul style="list-style-type: none"> <li>• Teach observational skills</li> <li>• Coach students to create own patterns to help them to remember</li> <li>• Encourage perseverance through difficult times</li> <li>• Enthusiastic support</li> <li>• Teachers able to discuss life issues</li> <li>• Clear expectations: due date or zero</li> <li>• Encourage expected behaviours for workplace or school</li> <li>• Explaining connectedness is important</li> <li>• Experiential learning techniques – hands on activities, animations using student’s senses to teach, use their own experiences, values and principles and culture</li> <li>• Teach them from the medicine</li> <li>• Do not impose</li> <li>• Experience, not books – books can be wrong</li> <li>• Must be a relationship between teacher and student</li> <li>• Need to see everything, the whole picture / need it see it, hear it, and feel it, not just read it</li> </ul>

## Conclusions

The symposium confirmed that Western education was deficient in its application of scientific knowledge for all Aboriginal students, including those in the nursing program. Aboriginal ways of knowing were mostly missing from the science education curricula, which consequently offers a non-relevant science perspective for Aboriginal students.

However, the symposium shed light on Aboriginal successes in the scientific community and the field of education.

In moving science education into the future, research efforts are necessary to in order to understand how to bridge the gap between Aboriginal Science and the current Western science education curricula, to address it, and to motivate and sustain Aboriginal student interest in the sciences. For the SPANS program and for the University of Lethbridge at large, much



needs to be done in order to ensure that Aboriginal science is acknowledged and incorporated. Ongoing initiatives such as professional development among nursing faculty and continual discussions about how this can be achieved will be maintained and have been propelled by the success of the symposium.

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