Indigenous Education: Faculty Development to Support Indigenous Student Success

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Undergraduate/Graduate
Est. in 1892
~ 29,000 students
Student to Faculty Ratio = 220 : 1
Bachelor’s to Ph.D.
Extensive Research Facilities
I teach CHM only.

Mission: …We provide student-centered education and foster personal and intellectual growth to prepare students for productive careers, meaningful lives, and responsible citizenship in a global society.

2 Year College
Est. in 1998
~ 150 students
Student to Faculty Ratio = 11 : 1
Associates
No Research Facilities
One Semester Courses: CHM, ESC, PHY, BIO

Mission: The SCTC will create an environment for learning and personal empowerment by providing programs and services that support learners in reaching their personal educational goals, through the framework of Anishinaabe culture and values.
What I do in the classroom is a result of course workshops and educational experiences supported by National PETE and my educational courses.

Networking

Discovering ideas for new ways of teaching

Educational Leadership

Learning Indigenous Culture & Values

New Experiences give rise to new perspectives
Educational System: a primary tool of colonialism; *Boarding schools are a critical factor in why some American Indian parents find it difficult to communicate with public school system administrators and teachers – and even more difficult to trust them.*

At the time reformers believed that assimilation and off-reservation boarding schools were the lesser of two evils. They were a better policy than extermination, getting rid of American Indians by shooting them or starving them to death.

www.kporterfield.com/alcttw/articles/boardingschool.html
Indigenous Educational Changes Due to Colonization

**Education Before Colonization**

- Indigenous Languages
- Knowledge from Elders
- Social Learning
- Listen/Oral Lessons
- Non-Course Based
- Indigenous Values
- Needs-Based Curriculum
- Spiritual Learning
- Community Betterment
- Hands-On Learning
- Experiential Learning
- Reflective
- Family Integrated to Community
- People and Place Oriented
- Use of Stories
- Indigenous Culture & Worldviews

“I must learn about the birds and the rocks and the trees from books instead of daily interaction with them. This is what the White Man says I must do. and I have no choice but to obey.”

“Wen Quon’s Oath” (John Tanner)

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**Education After Colonization**

- English Language
- Classroom Teachers- mostly dominant culture!
- Classical Learning
- Read/Write Lessons
- Course Based
- Eurocentric Values
- Liberal Arts Curriculum
- Early Colonization: Church of England
- Test! Test! and Retest!
- Lots of Memorization
- Eurocentric Culture & Worldviews

“If you eat from the forest, you must protect it, and if you
Drink from the river, you must conserve it.” Saying from Karen People
How can we Decolonize STEM Education?

• Critically analyze EVERY aspect of our educational system
• Incorporate Indigenous values, ways of knowing, and ways of being. (otherwise undermine Aboriginal person’s sense of self-worth and self-identity)
• Value Mother Earth and Indigenous Spirituality
• Incorporate Indigenous Learning Styles
• Respect Elders
• Community Betterment in the Curriculum
• Service Learning Projects
• Indigenous Research Methodologies

Photo from tintadefilipinas.blogspot.com
Scientific needs from an Elder’s Perspective

- Climate Change
- Sustainable Resources
- Sustainable Clean Energy
- Hydraulic Fracturing
Indigenous students favor Holistic Learning: Focus on the Big Picture with Culturally Relevant Topics!

Sustainability: The Water Cycle
Recycle – Reuse
Fresh Water for All!

Balance Between Humans and the Environment

Interconnectedness of Humans with the Land

Photo from www.acs.org and www.yahoo.com
Retrieved 5/21/2012
Indigenous Peoples and Place: Many believe the heart of the world is in their own backyard.


Ojibwe nation holds the traditional knowledge for navigating the Great Lakes, rivers, and the maple and birth woodlands of Minnesota, Ontario, Wisconsin, and Michigan... (Nelson, 2008, p. 12)

Importance of Wild Rice

Limestone Forest in Guam

Dependence on Fishing Industry

The Coral Reef within the Oceans
Indigenous populations tend to be kinesthetic learners!

- Use all senses - sight, touch, taste, smell, hearing
- Enjoy laboratory work
- Field trips and tours
- Prefer examples of principles
- Enjoy real-life examples
- Want applications, hands-on
- Trial and error
- Collections of things - rock types, plants, shells, grasses, case studies...
- Exhibits, samples, photographs...

http://www.vark-learn.com
PETE Workshops: Laboratory Experiences are Important! (Inside and Outside the Classroom)

Allowed me to create Virtual Field Trips for my students.
Kinesthetic learners…

Learn better with case studies and applications to help with principles and abstract concepts.

- Appreciate pictures, graphs and photographs that illustrate an idea!

- Appreciate technology to help with visuals.

- Benefit from virtual field trips.
Community Concern: Fracking

- **Chemistry:** Establish baseline of chemical data for Chippewa River – Research Experience
- **Physics:** Incorporate critical issue of Energy Sources – Students investigate and report.
The Energy Expo Family Event!

- Culturally Relevant
- Visual
- Family Oriented
- Social
- Aural
- Read/Write
- Kinesthetic
Indigenous students tend to be Visual Learners. Visual Study Strategies: Incorporate pictures and relevant material in homework.

PETE has allowed me the opportunity to make homework Practical, Real, and Relevant!

Modified homework problems from the book...

The depth of the Pacific Ocean in the Mariana Trench is 11,035 m.
What is the gauge pressure at this depth?

Stoichiometry Problems with...

H₂S and SO₂ gases react to produce Sulfur, a yellow mineral known to Hawaiians as Kukaepele, the waste of Pele.
Community Concern: **Climate Change**

- Chemistry: pH, Ocean acidification, CO₂ Levels, Data Analysis, Data Presentation

Chart from www.epa.gov
Created culturally relevant research questions and lab experiences:

How does climate change impact the Chippewa River?
What is the current baseline of conditions of the Chippewa River?

- Library
- Weather
- pH
- Density
- Alkalinity
- Hardness
- Dissolved O₂
- CO₂
- Graphing
- Data Analysis
- Pesticides/Herbicides
- Nitrates
- Phosphates
- E. coli

NOTE: River goes through Isabella Indian Reservation
Students are able to share their data with their community.
National PETE provided us networking opportunities with faculty from tribal and Pacific Rim community colleges.
Assessment:

• Improved Attendance
• Improved Grade Point Averages (mostly A’s and B’s)
• Before: very low enrollment
  Now: Wait-list for Chemistry and Physics
• Excellent feedback from students.
• Excellent feedback from PETE participants.
• Awarded 2014-2015 Outstanding Faculty Award at SCTC.
• “You share with us the things we really need to know.” –Student 2015
• “I feel you really care about our culture and our needs.” –Student 2015
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