TRibal Earth Science & Technology Education Program

TRESTE

Jacci Bloom
NASA Academy - MSFC
MS Technology Management Student
South Dakota School of Mines & Technology
jbloom@hills.net

Maury Estes
Principal Investigator
VP 61 Earth Science
Universities Space Research Association
maury.estes@msfc.nasa.gov
NASA-funded team of Universities Space Research Association (USRA) Earth System Science Program and 9 tribal institutions of higher learning.


**USRA -**

An organization that provides a mechanism through which universities can cooperate effectively with one another, with the government, and with other organizations to further space science and technology, and to promote education in these areas.

**NativeView -**

Partnering of Sinte Gleska University, USGS-EROS Data Center and industry to integrate earth science data and related technologies into Indian Country. Geospatial data accessibility project. Strives to merge western geo-science and empirical Native American knowledge.
Tribal Colleges & Universities (TCU) -
Schools owned and run by tribes
Located on or near reservations
1st tribally controlled college was Diné (Navajo) College in 1968
Primarily 2-yr institutions
Served students from over 250 tribal nations
Established to serve needs of their own Native communities - preserving, enhancing and promoting their tribal language and culture and integrating their tribe-specific worldview.
Address cultural and spiritual health of their students
Instruction is delivered in culturally sensitive ways
Curriculum often highlight examples and case studies that are drawn from Native customs
Offer services such as counseling, day care and high school equivalency preparation
Double as cultural and community centers
**TRESTE Partner TCUs**

Blackfeet Community College, Browning, MT on Blackfeet Indian Reservation first established by Blackfeet Tribal Business Council - 1974

Fond du Lac Tribal and Community College, Cloquet, MN - chartered as a tribal college by Fond du Lac Reservation - 1987; Ojibwe/Chippewa or Anishinaabe

Little Priest Tribal College, Winnebago, NE; chartered by the Winnebago Tribe of Nebraska - 1996. Final words of last great Winnebago warrior leader Little Priest, "There is nothing more I can do for you, be strong, and educate my children."

Oglala Lakota College, Pine Ridge, SD: chartered - 1971 by Oglala Lakota Tribal Council

Sinte Gleska University, Mission, SD: Sicangu Lakota Leader Spotted Tail, Rosebud Lakota Tribe granted charter - 1971

Fort Berthold Community College, New Town, ND; founded 1973 tribally chartered by Three Affiliated Tribes (Mandan, Hidatsa, and Arikara nations) of Fort Berthold Reservation

Sitting Bull College, Fort Yates, ND; On 1973, -Standing Rock Lakota Tribal Council granted charter

Turtle Mountain Community College, Belcourt, ND; Turtle Mountain Band of Chippewa - 1972

Culturally relevant education existed among American Indian societies for centuries before European contact. Essential characteristics of this successful education were that it was holistic, relevant, participatory …

- Dr. Robert G. Martin (Cherokee)

Dr. Robert G. Martin (Cherokee), president of Tohono O’odham Community College and former president of other Indian ed institutes. Article written 1994.
Rather than looking at science from a distant abstract position, indigenous people understand the world in terms of how self relates to others including both the animate and inanimate parts of the world.

- Vine Deloria, Jr. (Lakota)

Vine Deloria, Jr. (Lakota), scholar, historian, political scientist, activist and author,
Custer Died For Your Sins: an Indian Manifesto
Red Earth, White Lies: Native Americans and the Myth of Scientific Fact

No word for science in Native cultures...
Why TRESTE?

NASA is experiencing a shortage of STEM-trained individuals to choose from for their workforce.

Aging workforce

**NASA Education Strategic Plan - education strategic outcomes**

1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals

2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students and faculty.

3: Build strategic partnerships between STEM education providers that promote STEM literacy and awareness of NASA’s mission

Identified where there are underrepresented and underserved populations – Native Americans
Goal -
Promote the use of NASA Earth science data and products in the classroom thereby helping faculty inspire undergraduate students to careers in Earth system science, the physical sciences, and related fields of science and engineering.

Objectives -
• Integrate earth system science (ESS) concepts into the TCU curriculum.
• Incorporate geospatial data into TCU core science courses.
• Introduce PBL into teaching ESS concepts.
• Implement ESS outreach activities on reservations.

Goal-
Line between western science and Native American knowledge needs to be blurred
By adding and/or enhance the STEM curriculum into TCUs, hope is to create further interest in science and encourage Native students onto 4-yr/graduate programs
Help give Native students the skills to better compete for higher paying jobs
Engage Native American community in NASA’s mission
Program Status To Date -

- Training to participating TCU faculty in Earth system science concepts, GIS and remote sensing
- Establishing a library of curriculum development materials, case studies and resources from partners on the project
- Developing curriculum that will increase science and technology in the classroom and use PBL and spatial thinking in the classroom

http://space.hsv.usra.edu/TRESTE
How I Spent My NASA Academy Internship –

- Attended TRESTE 2006 Workshop in Bismarck, ND
- Wrote a program faculty evaluation
- Created project poster
- Formatted an online faculty evaluation form that will be accessible from the TRESTE program website
- Created a database where evaluation data will be stored
Evaluation –

TRESTE evaluation is designed to capture data and accomplishments that can be compared against NASA education strategic outcomes. TCU faculty will provide data regarding curricula changes, class enrollments, student impacts, use of geospatial data, etc.
Example of Evaluation Questions -

How many existing courses/labs were modified to incorporate ESS concepts?

What is the student enrollment in these modified courses/labs?

List any new majors, minors or area of concentration which have been implemented as a result of your institution’s participation in TRESTE.

How are you using geospatial datasets to enhance the TCU curriculum?

How are you using PBL in existing/new course/lab?

Describe ESS outreach programs given, information presented, estimated # of attendees and who was the target audience.

other TCU faculty and staff members,
K-12 students and/or teachers,
tribal government,
other reservation community members, etc
What I learned?

TRESTE language
Academia language
ESS concepts and language

Geographic information system (GIS) is a collection of hardware, software and geographic data for capturing, managing, analyzing and displaying all forms of geographically referenced information;

image processing, Landsat data, MODIS land products
PHP, MySQL, MSAccess
References:
Bly, Brad. “Tribal Colleges can be a key to Native Entrepreneurship.” Community Dividend Issue No. 1 (2005), http://www.minneapolisfed.org/pubs/cd/05-1/colleges.cfm

• 505 federally recognized tribes and 365 state-recognized tribes in US.
• 252 languages are spoken among various tribes.
• Unemployment rates of 45% - 80% have afflicted many reservations (National Center for Education Statistics, 1998).
• 1990 Indian Health Services Census statistics, "31% lived below poverty level in contrast to 13% for all races in U.S."
• Population of American Indians and Alaska Natives "is younger than nation as a whole 11% more of Indian population is at or near college age." (Tribal College Journal of American Indian Higher Education, 1991).
• age range of American Indian population is: about 36% are under age of 18, approximately 12% are between 18-24 yrs of age (National Center for Education Statistics, 1998).
Questions?