Building Partnerships Between Research Universities and Tribal Colleges

A ND EPSCoR Model

Nurturing American Tribal Undergraduate Research and Education (NATURE)

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North Dakota EPSCoR
ND Collaboration

- National Science Foundation
- State of North Dakota
- Two ND Research Universities
- Five Tribal Colleges
- Reservation High Schools
Collaboration
ND Universities and Tribal Colleges

- Turtle Mountain Community College, Belcourt
- Fort Berthold Community College, New Town
- Cankdeska Cikana Community College (Little Hoop), Fort Totten
- United Tribes Technical College, Bismarck
- Sitting Bull College, Fort Yates

Grand Forks
UND
Fargo
NDSU
NATIVE AMERICAN STUDENT PATHWAYS

PATHWAYS
- General Population
- Skilled Population
- Professional Population

APPROACH
- Facilitate Entry
- Facilitate Transfer
- NURTURE RETAIN SUPPORT COMPLETE

ACTIVITIES
- HS summer camps
- Sunday academy
- Mentoring Culture
- Summer camp
- Course development
- Culture Mentoring/Scholarship
- Co-op Undergraduate Research Experience Scholarship

High School
- Tribal Community College
- Four Year Universities
- Graduate School

B
A
C
Tribal College Participation

- NATURE is the product of a collaboration that started in 1998 between the ND Tribal Colleges and the North Dakota State University College of Engineering.

- Dr. Laurel Vermillion, President, Sitting Bull College who was one of its founders, is a member of the ND EPSCoR Advisory committee.
North Dakota EPSCoR

- Became a NATURE partner in 2000.
- Funded NATURE in 2004.
Goals of NATURE

- Attracting North Dakota Native American high school students into STEM disciplines
- Increasing retention rate of ND Native American students in STEM programs at high school and college levels by incorporating culture into STEM
- Building research capacity in tribal colleges that will benefit students, faculty, programs, and community
- Building a STEM pathway for American Indian students that incorporates Native Knowledge.
NATURE Pathway Activities

- Sunday Academy
- High School Summer Camps at Tribal Colleges
- Tribal College Summer Camp at Universities
- Tribal College Research
NATURE Annual Objectives

- Sunday Academy: 125 American Indian high school students
- High School Summer Camps: 125 American Indian high school students
- Tribal College Summer Camp at NDSU: 15 American Indian tribal college students
- 20 American Indian Tribal Colleges students conducting research
American Indian Culture
Tribal Culture

American Indian culture will form the foundation on which knowledge is built.

- Karen Swisher-

*Next Steps: Research and Practice to Advance Indian Education*
Education and Culture

“[It] is culture that provides the tools for organizing and understanding our worlds in communicable ways.”

- Jerome Bruner-
  The Culture of Education
Culture Teachers Develop Sunday Academy Units
SUNDAY

ACADEMY
Sunday Academy Curriculum

- Curriculum developed by Collaboration Teams
- North Dakota STEM Standards Based
- Culture infused
Sunday Academy

- Objective: 125 High School Students at 5 Tribal Colleges in ND
- Seven Sunday Academies are offered each academic year
- Year 1: 92 HS Student @ 4 Tribal Colleges
Sunday Academy
Summer camps for high school and middle school students at tribal colleges

Sunday Academy for high school students
TRIBAL HIGH SCHOOL SUMMER CAMPS AT TRIBAL COLLEGES
Summer Camp

- The Objective: 125 High School Students @ 5 Tribal Colleges in ND

Year 1:

141 Tribal High School Students @
5 Tribal Colleges in ND
High School Summer Camp

- Curriculum is developed by the teaching staff
- Curriculum is ND Standards-based.
- 10-day Summer Camp
- Culture is infused
CULTURE

Native Science continually deals in systems of relationships and their application to the life of the community.

-Gregory Cajete-

*Native Science: Natural Laws of Interdependence*
Summer Camps for High School Students
UNIVERSITY SUMMER CAMPS

1. Tribal College Student Track
2. NATURE Teaching Staff Track
Tribal College Student Camp at Universities: 2 Weeks

- **Week 1:** Students visit STEM labs at the two universities (University of ND and North Dakota State University). Students meet successful American Indian engineers who are in workforce.

- **Week 2:** Student select a lab at either university where they participate in research.
Tribal College Student Camp at the two ND Research Universities

- **Objective:** 15 Tribal College Students from the 5 ND Tribal Colleges

- **Year 1:** 13 Tribal College Students from 3 ND Tribal Colleges
Summer Camp at the Universities
Tribal College Student Track
Summer Camp at the Universities
Instructor and Teacher Track
Collaboration in Action

- Week 1. Developing TCC summer camp lesson plans and hands-on activities.

- Week 2. Developing Sunday Academy lesson plans and hands-on activities
RESEARCH
North Dakota EPSCoR and the North Dakota Tribal Colleges envision that a research partnership will evolve where the universities assist the tribal colleges and the tribal colleges assist the universities. The state has a model for the nation that should be shared.
Research Team

- NATURE research happens at the tribal colleges

- Each Research Team consists of...
  - 1 or 2 Tribal College Students
  - 1 Tribal College Faculty Member
  - 1 University Researcher
Tribal College
Student Research

- Objective: 20 Tribal College Students
  10 Tribal College Faculty
  10 University Professors

2009: 18 Tribal College Students
  10 Tribal College Faculty
  10 University Professors
41 tribal college students have conducted research

12 Tribal college faculty mentored student research

22 University research professors mentored research teams
Traditional Knowledge

“Every act, element, plant, animal, and natural process is considered to have a moving spirit with which humans continually communicate.

-Dr. Gregory Cajete-

Native Science: Natural Laws of Interdependence (2000)
Building Research Capacity

Though discovery research is desirable and could be the first choice, research methodology and skills are the primary focus.
NATURE Research Initiative

The “R” in NATURE

- Having students participate in research projects has been shown to improve retention of undergraduate students in STEM

- Involvement in research and instruction using research projects helps faculty to engage students in the STEM learning process

- Engaging tribal college faculty in research activities is an important part of building research capacity at tribal colleges
Sustainability
Expected NATURE Outcomes

1. Impact on students
2. Impact on TCC faculty
3. Impact on HS teachers
4. Impact on Univ. faculty
Academic Impact

- High School Teachers apply learning strategies to high school classrooms
- Tribal culture is built into every teaching unit
- Tribal College Faculty learn to use new labs and conduct research
- University Professors learn about American Indian culture
- Students retained in STEM
Anticipated Outcomes

- In ten years...

  ...the Tribal Colleges and ND Universities will advance culturally infused research on TCC campuses as partners

  ...Tribal Colleges will expand their research initiatives on their campuses

  ...significant movement of American Indian students along the STEM educational pathway will result leading to their graduation with STEM degrees
Reservation Impact

- Successful students will become role models for future generations
- Tribes will be able to fill STEM jobs on the reservation with tribal members
- Tribes will be able to study their STEM issues utilizing tribal college researchers
- Families will have role models
So What?
So What?

- Tribal College and High School Student surveys show interest in STEM careers is improving

TMCC: 31 AS majors in 1998
187 AS majors in 2008
Sally from TMCC earned a double major: Mathematics/civil Engineering

Jon from FBCC is enrolled in a MS Program in Transportation Engineering

James and Charles are juniors majoring in civil engineering at NDSU

Robert earned a PhD in Physical Therapy
So What?

- **Don** is at Montana State University enrolled in MS in Environmental Science.
- **Karla** and **Nell** are juniors at an out-of-state university majoring in science.
- **Shirley** earned a bachelor’s degree in Secondary Science and is teaching at a high school on the Turtle Mountain Reservation.
So What?

- **Albert** won a $15,000 scholarship at an Intel International Science Fair. He is a junior in Civil Engineering.
- **Don, Sam and Linus** are college seniors majoring in High School Science Teacher Education.
- **Allen and William** are college seniors majoring in Environmental Science.
So What?

- **Joe** is teaching science at a reservation middle school

- Eleven Sunday Academy students participated in 2009 National American Indian Science Fair
So What?

- **Virgil** and **Linus** are college seniors majoring in High School Science Teacher Education.

- **Allen** and **Wally** are college seniors majoring in Environmental Science

- **Nat** earned a bachelor’s degree in clinical lab science
How We Addressed Barriers

- NATURE purposely addressed, supported, and incorporated the American Indian culture of participants in all teaching units

- NATURE purposely provided stipends for everyone
How We Addressed Barriers

- NATURE brought university engineers and other STEM faculty to the Tribal Colleges where they met with parents, faculty, and high school teachers. This demonstrated University commitment and brought status for parents and students who wanted a worthwhile experience.
Who Supports NATURE

- National Science Foundation
  Experimental Program to Stimulate Competitive Research – EPSCoR
  $500,000 per year for NATURE

- North Dakota State University
  Research Infrastructure Improvement
  Award #0814442
Who Supports Nature?

- North Dakota Legislature!

- North Dakota is one of the states with a budget surplus, so we have enjoyed support from our legislators.
PARTNERSHIP

To build our vision will require many partners including Funding Agencies. Initiatives such as NATURE require resources. But, the investment will reap rewards when Tribal College graduates enter the workforce in STEM careers.
MIIGWECH (Thank You)

http://www.ndsu.edu/epscor/NATURE/index.html