



Native Americans in STEM: A Case Study of Mentored Internships

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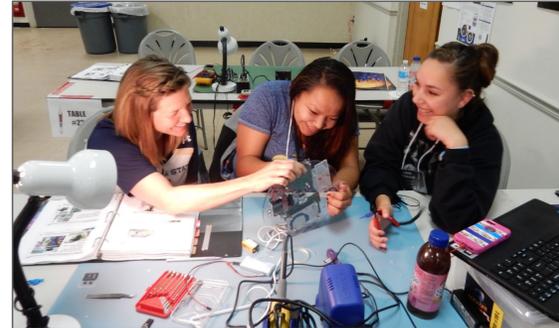


Background

- Native Americans remain significantly underrepresented in STEM fields, and face many barriers in STEM education in traditional university settings
- These barriers include material disadvantages as well as cultural and epistemological differences between culturally traditional Native Americans and western academic structures
- NASA, the National Science Foundation, and others have highlighted the need to increase representation in STEM fields by reducing these barriers
- This research focuses on Native American students using STEM internships to enhance their science (and other) education at a post-secondary level
- In this research, we draw on Tribal Critical Race Theory to analyze STEM internships for Native American students and how they help address the barriers described above
- An assumption of this approach is that creating spaces for Native voices and Indigenous science will help make higher education more equitable
- We explore the following questions:
 - How do opportunities to engage in STEM research affect students' views of themselves in relation to STEM?
 - What effects will engaging in STEM internships in a space dedicated to Native Americans have on students?

Data and Methods

- Comparative case study of 2 undergraduate science internship programs over 3 years: 2012-2015
- Qualitative data taken from detailed yearly reports on the internship programs that followed the Indigenous Evaluation Framework
- NSF-funded (TCUP) science internship program at Chief Dull Knife College and NSF-funded (REU) summer research internship program at the University of Montana
- Interviews conducted with interns and mentors multiple times each year
- Analysis of interview transcripts, annual reports; coded & analyzed for themes
- Analyses of detailed information gathered by assessment teams about participants' perspectives on program experiences, including the meanings they give to their experiences and program outcomes
- Multiple team visits to the programs each year allowed for observation of program activities and participation in research and social gatherings. Internship completion data were provided by program staff and mentors
- Program data coded separately for both programs



“I really like working with [my mentor] cause she's Navajo... [and also] cause I don't get a lot of **exposure to traditional people in academia.**”

“I can totally feel that my **skills [have] improved a lot...** [and] my confidence that I can get into other projects.”

“[This program] has helped build my confidence that **I am a scientist too.**”

Findings

- **Enhancing Skills in STEM**
 - The internship program at CDKC successfully introduced students to science research methods and prepared them for STEM achievement, more intensive research experiences at university internships such as REU, and future educational opportunities
 - In both the CDKC and REU programs, mentors helped their students get excited about STEM and research
 - Both programs increased students' knowledge and capacities within STEM by boosting their confidence, knowledge, and capacities
- **Providing Native American Role Models in STEM**
 - Good relationships between mentors and students benefited the participants of both programs; when mentors had tight-knit relationships with students, they were better able to respond to students' needs
 - Students and mentors built an inclusive community that was augmented by their shared Native American heritage; Native American mentors became special role models for students
- **Empowering Students in their Education**
 - Both programs empowered students to overcome social and psychological barriers/obstacles in education and, more specifically, in STEM
 - Students developed as their mentors challenged them to find answers to their own questions
 - By the conclusion of each program, students felt motivated to seek additional educational opportunities and give back to their communities

Conclusions

- Students gained friendships, skills, and increased confidence to achieve their goals
- Students gained important experience in the internships and were successful in contributing to STEM research projects, especially when they were well-supported
- Culturally inclusive/supportive learning environments help Native American students succeed in STEM fields, and that success is often connected to a desire to solve problems in the students' home communities
- The more participation students have in culturally sustaining programs, the better their skills and preparation for the future will be