

Exploring the Career Thinking of Native American Engineering Students

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Overview

NSF EAGER Project

Exploring the interests and aspirations for engineering faculty positions

Research Question:

What is the magnitude of the specific personal and contextual barriers and supports that Native American engineering students face as they prepare for their engineering careers?



Are you Native American? Are you 18 or older? Are you an engineering faculty or student?

Invitation to Participate in a Research Study

An Exploratory Study Pinpointing the Factors That Influence Native Americans Interests and Aspirations for Engineering Faculty Positions

If you answered **YES** to these questions, we invite you to take place in the research study. Participants will take part in an online survey, and in a focus group (students) or an individual interview (faculty).

The purpose of the research study is to develop a deeper understanding of the factors influencing Native American or Alaskan Native involvement in the engineering professorate. We hope to provide evidence for best practices for encouraging Native Americans to pursue the engineering professorate and to consider the academy as their professional home.



Participants will receive a \$15 gift card for participation.

Thank you

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Research Context

 According to recent reports (Yoder, 2016), Native Americans (NA) are underrepresented in the field of engineering and at a rate disproportionate to their representation in the population:

NA Engineering Students (0.6%; N=1853)

NA Engineering Faculty (0.2%; N=68)

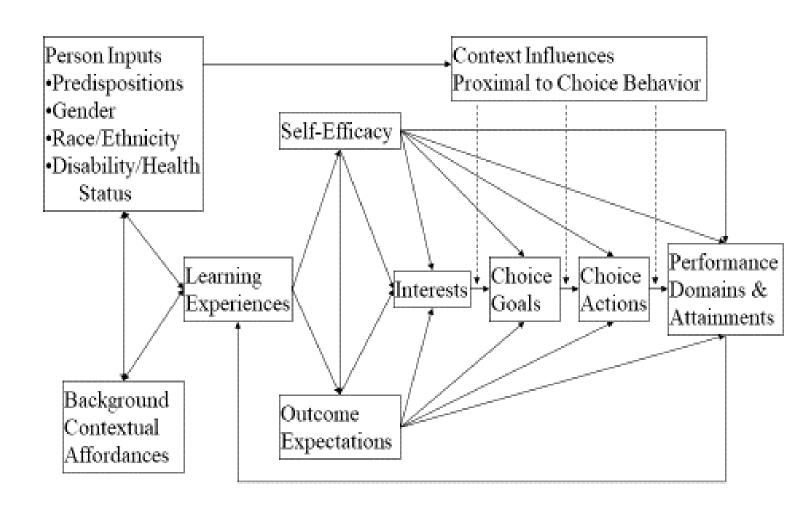
 Very little research about the contributing factors to Native American student success in engineering specifically

Social-cognitive variables

 Career interests, along with self-efficacy and outcome expectations, predict career choice goals

 Efficacy, outcome expectations and goals predict choice actions (such as persistence)

Adapted from Lent, Brown, & Hackett, 1994, 2000



Literature Review

- Fouad and Santana (2017) review of literature on SCCT and underrepresented groups found that SCCT is predictive for pre-college, undergraduate, and graduate college students from underrepresented groups.
- Persistence and Retention in Graduate Education
 - Campus climate
 - Sense of belonging
 - Institutional Support
- Less evidence about the contextual and person factors that interact with and predict the social-cognitive variables of efficacy, outcome expectations, interests, goals, and choice actions among these young people.

Methods

 On-line survey to assess the motivational variables that guide the career thinking and advancement of students preparing to enter the field of engineering.

- Native American Engineering Students (n=23)
 - 25% graduate and 75% undergraduate
 - 65% Male, 30% Female
 - From field of electrical, and chemical, mechanical, aerospace, biomedical, civil, environmental industrial, software engineering

Procedures

- Participants completed an online survey comprised of five self-report instruments:
 - Mapping Vocational Challenges (Lapan & Turner, 2000)
 - Perceptions of Barriers (McWhirter, 1997)
 - Strutured Career Development Inventory (Lapan & Turner, 2006; Turner et al., 2006)
 - Career-Related Parent Support Scale (Turner et al., 2003)
 - Assessment of Campus Climate for Underrepresented Groups (Rankin, 2001)

Received \$15 gift card for participation

Recruitment Settings

Challenges given the small population of Native Americans in engineering degrees

Small regional meetings

Large national convention



Social-cognitive

 Participants were interested in, had efficacy for, had positive outcome expectations for, and were likely to complete their engineering degrees.

Table 1. Social Cognitive Variables, Personal Strengths and Skills,									
and Contextual Supports (Parents), Descriptive Statistics									
	<u>X</u>	<u>SD</u>							
Social-Cognitive Variables									
Engineering Interests	4.43	.85							
Engineering Efficacy	4.14	.86							
Engineering Outcome Expectations	4.79	.43							
Likelihood of Completing Your Engineering Degree	4.91	.30							
Personal Strengths and Skills									
Social (i.e., communication & collaboration) Skills	4.33	.45							
Academic Skills	4.11	.61							
Career Exploration Skills	4.06	.58							
Goal-Setting Skills	3.83	.63							
Contextual Supports – Parents									
Parent Support - Emotional Support	4.29	.88							
Parents' Encouragement to Make Good Grades	4.50	.76							
Parents' Encouragement to Go to Engineering Program	4.07	.99							
Parent Support – Verbal Encouragement	4.20	.75							
Parent Support - Career Role Modeling	3.92	.99							
Parent Support – Instrumental Assistance	3.61	.85							
Contextual Supports Climate									
Cooperative to Uncooperative Climate	3.86	.77							
Friendly to Hostile	3.79	.81							
Equitable to Discriminatory	3.79	.80							
Respectful to Disrespectful	3.71	.83							
Concerned to Indifferent	3.64	.74							
Comfortable to Uncomfortable Climate	3.64	.75							
Enjoyable to Dismal	3.57	1.02							

Personal Strength & Skills

- Confidence in their own communication and collaboration skills (Mean = 4.33, SD = .45)
- Commitment to their academic and career preparation (Mean = 4.11, SD = .61)
- Parents' Emotional Support
- (Mean = 4.29, SD = .88)

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Barriers

 Most challenging barriers are financial and academic, followed by not fitting in and lack of career information

Table 2. Barriers to Engineering Career Development Descriptive Statistics										
Most Challenging		Moderately Challenging				Least Challenging				
	<u>X</u>	SD		<u>X</u>	SD		X	SD		
Financial Barriers	2.31	.96	Not Fitting In	1.98	.76	Talent/Motivation/Interest	1.83	.75		
Not enough money	2.43	.99	I don't fit into my program	2.00	.68	Not interested	1.86	.86		
Expenses greater than income	2.29	.99	Not able to get the job I want	2.00	.88	Lack of talent	1.86	.99		
Must work to make ends meet	2.21	.89	No mentorship	1.93	.73	Lack of motivation	1.79	.58		
Academic Barriers	2.18	.86	Lack of Career Information	1.91	.70	Balancing Work and Family	1.67	.82		
Not prepared academically	2.29	.83	About balancing work/family	2.00	.66	Have a family	1.86	.77		
Not enough engineering theory	2.14	.66	About engineering	1.93	.83	Being married	1.71	.83		
Not confident Enough	2.29	.99	About focusing my career path	1.86	.66	Pressure from Boy/Girlfriend	1.43	.85		
Not smart Enough	2.00	.96	About skills needed for my job	1.86	.66	-				
_						Lack of Parent/Peer Support	1.55	.56		
						Lack of peer support	1.79	.89		
						Others don't think I can do it	1.64	.63		
						Lack of parent support	1.18	.41		

Positive Aspects of Program (5 pt. scale)

• more cooperative than uncooperative (Mean = 3.86, SD = .77)

• more friendly than hostile (Mean = 3.79, SD = .81)

• more equitable than discriminatory (Mean = 3.79, SD = .80)

• more respectful than disrespectful (Mean = 3.71, SD = .83)

Discussion

- consistent with research supporting parent support as salient predictor of self-efficacy beliefs and outcome expectations
- reported high commitment to their degree programs and positive campus climate, but noted barriers to academic preparation and career information.
- exploratory study is limited due to small sample size, A large, multisite, longitudinal investigation would help validate the SCCT for Native Americans, as well as for the engineering domain specifically

Questions?

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