Native American Engineering Faculty: Insights into Entry and Persistence

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Science, technology, engineering, and mathematics (STEM) education initiatives in higher education increasingly call for career mentorship opportunities for underrepresented minorities (URM). Researchers (Johnson & Sheppard, 2004; Nelson & Brammer, 2010) note the importance of having faculty to mentor and act as role models for students, often assuming that mentors play a stronger role if they are also from the same cultural background. Native American (NA) faculty members are underrepresented in most fields in colleges and universities, and exceedingly so in engineering. Only 0.2% (N=68) of engineering faculty nationwide identify as Native American (Yoder, 2014). Likewise, NA students are underrepresented in undergraduate (0.6%; N=1853) and graduate (0.1%; N=173) engineering programs. The low percentage in graduate school is of even greater concern as they represent the primary potential pool of new faculty members. Advising and mentorship from those who identify as NA are often considered important components recruiting and retention in STEM fields. For example, Smith and colleagues (2014) found that factors such as communal goal orientation influenced NA engineering students' motivation and academic performance. However, very few studies account for differences in NA identity or provide a nuanced account of successful NA STEM professional experiences (Page-Reeves et al., 2018). This research paper presents findings from an exploratory study aimed at pinpointing the factors that influence NA entry and persistence in engineering faculty positions.

Research Focus and Methods

Our study aimed to identify contextual and individual factors and the linkages that influence NAs' entry and persistence as engineering faculty. We present data from eight faculty interviews (6 men and 2 women; 2 from Western states and 6 from Southern Plains states; 6 tenured faculty and 2 contract/term faculty; mean age was 54; average time as engineering faculty was 18 years). Interview questions included initial and general interest in engineering, followed by questions about entrance and persistence as faculty. The interviews and coding were completed by a multi-disciplinary team (with research backgrounds in career counseling, engineering education, and NAs) using two theoretical lenses: Social Cognitive Career Theory and Bronfenbrenner's Ecological Systems Theory.

Findings

Entry. Self-efficacy and outcome expectations from early experiences seemed to relate to the participants' entry into faculty positions, as did the impact of desiring to work at a particular university, be near family or community, and opportunities to apply for faculty positions. Most

interviewees mentioned faculty or mentors, none of whom were NA, who were excellent teachers or helped to develop the love of research. Some interviewees suggested that "happenstance" was at work in their becoming faculty members (Krumboltz, 2009). They never set out to be faculty members, but loved what they got to do as engineers, had problems they wanted to work on that served NAs or the community, and/or loved teaching and mentoring. None had advised an NA student who went on to become a faculty member.

Persistence. Engagement with professional and academic groups appeared to sustain interest in faculty positions over time, as did the influence of evolving opportunities to provide mentorship to NA students. For some, complex and ever-changing learning experiences (e.g., research with people interested in the same problem and/or teaching) appeared to maintain faculty role interest, as did the ability to foster self-efficacy and interest in students. Participants voiced hesitance to directly encourage students to enter the faculty, preferring to provide learning experiences that increased student self-efficacy and attended to systemic (e.g., financial) demands on students. A few mentioned being able to integrate their values or those learned from their families or ancestors into their teaching or research. Other supports for persistence were having a broader NA community on campus and having NAs students to advise (not necessarily in engineering). Obstacles to persistence for some included tenure and/or promotion decisions, salaries, and being lonely as the only NA faculty on campus.

Importance of Research

The complexity of NA identity, geographic and tribal differences, and the historical context underlying participation in higher education are prominent factors worthy of investigation across all STEM fields concerned with increased NA representation and retention. More work is also needed to explore the influence discipline and institution on NA students' decisions to transition into higher education. For example, despite a large number of NA engineering undergraduates in the OK-LSAMP program, very few transition to graduate school in comparison to students from the life sciences. Given our findings and the small number of current NA engineer faculty, we challenge participants in the audience to critically address the assumption that NA faculty mentors are required to interest and recruit NAs in engineering.

Reference:

Jacobs, S. C., Johnson, S. B., Lee, K., Colston, N., Mason-Chagil, G., & Turner, S. L. (April 2019). Native American engineering faculty: Insights into entry and persistence. Keeping Our Faculty VIII: Recruiting, Retaining, Advancing American Indian Faculty and Faculty of Color (March 31 - April 2, 2019). University of Minnesota, Minneapolis, MN.

Acknowledgements:

This research has generously been funded by a National Science Foundation (NSF) research grant (EEC1743329/1443572). Any opinion, findings, and conclusions or recommendations expressed in this presentation are those of the authors and do not necessarily reflect the views of the NSF.

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