Board 400: The Evolution of the IMPACTS Mentoring Model: Expanding the Scope to Broaden Success in the Engineering Professoriate

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Project Background

The Increasing Minority Presence within Academia through Continuous Training at Scale (IMPACTS) mentoring program brings together Georgia Institute of Technology, the University of Colorado Colorado Springs, the American Society for Engineering Education, and T-STEM External Evaluation to develop, implement, study, and evaluate an evolving mentoring model in engineering academia. The IMPACTS mentoring program is sponsored by a National Science Foundation (NSF) Broadening Participation in Engineering Track 3 award (#22-17745) and builds on the success of two prior NSF awards. The program was originally intended to be an innovative strategy to complement prevailing approaches that support career mentorship opportunities for engineering faculty of color while boosting the career longevity of emeriti faculty who served as mentors. Historically, mentees have been recruited through the Academic and Research Leadership Network, a database of minority STEM faculty, as well as the National Society of Black Engineers, the Society of Professional Hispanic Engineers, and the American Indian Science and Engineering Society. To create the mentoring matches, names of emeriti faculty are solicited from mentees, and then the program administrators contact the emeriti faculty and orient them to the program's goals. The primary goal of the mentoring program was to match emeriti faculty mentors with faculty of color mentees as they navigated the university promotion and tenure processes and established a greater professional presence in their field. Distinct from other mentoring models, this program moved beyond career development to include professional networking and advocacy by renowned emeriti faculty positioned to provide these resources and who had the flexibility, time, and desire to mentor faculty of color.

New Mentoring Model

The current iteration of the IMPACTS mentoring program will expand its scope by including white women engineering faculty as mentees per NSF funding requirements. This new model will be implemented by establishing an Inclusive Mentoring Hub. Despite efforts to diversify engineering academia for decades, the engineering professoriate remains predominantly white and male (ASEE, 2023). The intent of this new model is for the Inclusive Mentoring Hub to disrupt this demographic reality. With the evolution of the mentoring model expanding to white women, this ASEE NSF Grantee Poster aims to report insights on this evolution with a subset of past IMPACTS participants. This research is sponsored by an NSF Broadening Participation in Engineering Track 3 award (#22-17745).

Brief Literature Review

While many industries have made strides to diversify over the past 50 years, engineering academia remains nearly 80% white males (Tran et al., 2020), with only 19.6% identifying as female, 2.5% as Black, 3.9% as Hispanic, and less than 1% as Indigenous (ASEE, 2023). Mentoring has been heralded as the solution to offset the demographic inertia in engineering academia. Faculty from underrepresented backgrounds receive many benefits from successful mentoring: enhanced advancement opportunities; expanded professional networks; and a greater

understanding of the norms, power dynamics, and expected performance metrics in academia (Buzzanell et al., 2015; Randel et al., 2021; Villanueva et al., 2019; Zambrana et al., 2015). Mentoring also helps mentees navigate the complex workload of a professor that often is different for faculty of color and white women, particularly as it relates to the disproportionate service requests they receive compared to their white male counterparts (O'Meara, 2016; Zambrana et al., 2017). Mentoring also can counteract feelings of isolation and marginalization and serve to address racial/ethnic and gendered discriminatory experiences in the academy (Blood et al., 2012; Buzzanell et al., 2015; Kelly & Winkle-Wagner, 2017; McCullough, 2020; Tran et al., 2020; Van Helden et al., 2023; Zambrana et al., 2015, 2017).

Methodology

Research Design. This research employed an instrumental case study design (Stake, 1995) to explore how prior IMPACTS participants view the evolution of this mentoring model. Case studies focus on developing an in-depth description, analysis, and understanding of a unique experience or phenomenon (Creswell & Poth, 2018). More specifically, instrumental case studies allow researchers to uncover a specific problem or concern from the participants' perspectives, which others may interpret as unimportant (Stake, 1995). The research question guiding this study was: How do past IMPACTS mentoring program participants view the evolution of the IMPACTS mentoring model to include white women as mentees?

Participants. Prior IMPACTS mentoring program participants were invited to contribute to this study. Participants included three mentees and five mentors, for a total of eight participants. The three mentees all identified as Black men. All were employed at doctoral-granting universities with very high research activity (commonly referred to as Research 1 institutions); one was an Assistant Professor, one an Associate Professor, and one a Full Professor. One of the mentors identified as a white woman, one as a South Asian man, and three as white men. All retired from Research 1 higher education institutions, primarily representing engineering disciplines, while one was in urban geography.

Data Collection. Per Institutional Review Board approval, all participants were provided with a consent form detailing the purpose of the study, interview procedures, and safeguards to protect anonymity and confidentiality. Interviews averaged 45 minutes in length and were conducted one-on-one through Zoom, with a single researcher conducting all interviews. An interview protocol was designed to explore the ways in which the IMPACTS mentoring program was evolving through a third round of funding from NSF, as well as considerations of which the project team must be mindful as the Inclusive Mentoring Hub is developed, implemented, studied, and evaluated. The protocol purposefully embedded opportunities for building rapport and probing for deeper insights. After each interview, the recordings were transcribed through Zoom and permanently deleted once reviewed and cleaned for errors and identifying information.

Reflexivity and Positionality. Prior to data collection, the research team engaged in the process of reflexivity by individually and collectively considering experiences, beliefs, values, and assumptions on how the inclusion of white women as mentees could affect the IMPACTS mentoring program. Reflexivity is integral in qualitative research because it forces the

consideration and exposure of researcher bias through analytical reflection and dialogue (Watt, 2007). The team agreed that expanding the mentoring model was valuable, although they expressed concern about the effect on peer relationships among the mentees when white women were included. Per the guidance of Lincoln and Guba (1985), the positionality of the research team must be clarified, as it directly influences the administration of the study, as well as the principal findings and interpretations. The team includes a demographically diverse group of men and women who hold professor, administrator, and graduate student roles in various higher education institutions with disciplinary homes of educational leadership and engineering. All are involved in the administration, study, or evaluation of the IMPACTS mentoring program and strongly believe in the value and career advancement potential of quality mentorship in academia. The practices of reflexivity and positionality were purposely embedded in the study's methodology to emphasize the participants' points of view rather than that of the researchers.

Data Analysis. Silverman's (2019) thematic content analysis method was utilized to explore the interview transcripts related to the ways in which past IMPACTS mentoring program participants viewed the evolution of the IMPACTS mentoring model. This technique followed an inductive approach to search for themes related to the research question. Using this method, the researchers coded the transcripts individually and then collectively refined the codes by clustering them into initial patterns by combining like codes and eliminating duplicative codes. In vivo codes—the participants' own words—were used. The initial patterns in the data were refined into themes by grouping associated codes and synthesizing the patterns, which allowed for the development of more precise themes viewed as representative of the totality of the data. This process resulted in three themes: (1) a great need exists for the mentorship of women faculty in male-dominated disciplinary fields; (2) including white women as mentees may overshadow the mentoring needs of faculty of color; and (3) the mentoring needs of women of color may be marginalized with the inclusion of white women.

Trustworthiness. Multiple trustworthiness strategies were employed to ensure credibility, transferability, dependability, and confirmability of the findings and interpretations (Lincoln & Guba, 1985). In order to address credibility, Silverman's (2019) thematic content analysis method was diligently followed. To achieve transferability, participant direct quotes were included in the findings to support readers' determination of study applicability outside the study context. Reflexivity and a positionality statement bolstered the study's dependability, as the research team was transparent about their association with the IMPACTS mentoring program. Finally, confirmability occurred by involving multiple researchers in the data analysis process and holistically evaluating the themes, findings, and interpretations.

Limitations. As in all research inquiries, this study has several limitations. First, the research team did not conduct member checks, which could have provided more complex and nuanced insights into the research question. While the study exposed researcher bias through reflexivity and positionality, its potential to influence the findings and interpretations cannot be guaranteed due to their closeness to the IMPACTS mentoring program. Also, all participants are past program participants, which may limit the transferability of the insights and experiences to others in different contexts.

Findings

Theme 1. Both mentees and mentors discussed the great need for the mentorship of women in male-dominated disciplinary fields such as engineering. One of the mentees shared, "In STEM, depending on the discipline, there are a lot of disparities around gender lines. Some departments may only have one or two women, so they face a lot of the same challenges about bias that people of color face, so I think it's important to include them." Similarly, a mentor commented on underrepresentation: "When I first started, there were maybe three in the whole nation. We are definitely not near parity, but the numbers have grown quite a bit. Nonetheless, they are in the minority, and having reassurance from a mentor can probably help them a lot." In fact, all the mentors discussed including white women as mentees as an "improvement" of the IMPACTS mentoring model. One stated, "Women, whatever the color of their skin is, have special issues from, you know, just keeping the family to having babies and stuff, you know, where that kind of interferes in their career path."

Theme 2. While all agreed that white women need and deserve mentorship in the engineering professoriate, mentees voiced concerns about their inclusion potentially overshadowing the mentoring needs of faculty of color. One mentee indicated, "I think women have real concerns in male-dominated STEM disciplines, but I caution prioritizing their needs or taking away from those that exist for underrepresented minorities." Another mentee simply stated, "It dilutes what you were doing before." A mentee also shared, "Universities and departments can sort of get away with, like checking the diversity box by saying they've increased the number of women, but minority numbers are bad." He went on to say that including white women may decrease participation from faculty of color: "I do think some people will choose not to participate if they know white women will be included and that the program will not be focused exclusively on us."

Theme 3. Interestingly, while mentors believed "it certainly wouldn't hurt anyone to include [white women] in the program too," mentees shared particular concern that the mentoring needs of women of color would be marginalized with the inclusion of white women. One mentee shared, "It can create a different environment and experience for Black women. Their voices can end up being the most marginalized because their numbers are even smaller than Black men in STEM." Another openly wondered, "What will this change mean for [women of color's] experience since they will now have to share space?" He went on to say, "It may not feel like a nurturing space anymore and just reflect our larger environment, which is not very safe or nurturing. As it currently runs, the program allowed us to kind of escape from our realities and not feel like we were alone." Another mentee shared, "White women are underrepresented, but there is a separation, they set themselves out to be very different. They look out for other white faculty and do not necessarily help faculty of color, nor women of color specifically."

Implications and Conclusions

The purpose of this instrumental case study (Stake, 1995) was to explore the ways in which prior IMPACTS participants view the evolution of this mentoring model to now include white women. The findings indicate that while including white women in the IMPACTS mentoring program potentially broadens the success and impact of this evolving model, it may negatively affect the mentoring experience of faculty of color, particularly women of color. Program administrators

must be mindful of this potential and purposefully embed opportunities for faculty of color to continue developing strong peer relationships among themselves and with the white women mentees. These findings suggest that separate programming may be warranted to ensure the needs of faculty of color, specifically women of color, are not eclipsed. While the literature is clear that mentoring benefits faculty of color and white women (Buzzanell et al., 2015; O'Meara, 2016; Randel et al., 2021; Villanueva et al., 2019), it is essential to note that mentoring needs can be quite different across these groups. Being conscious of these mentoring dynamics in the IMPACTS mentoring program is critical to ensure that all benefit from the mentoring opportunities afforded by this program.

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