Improving University Postdoctoral Affairs Offices: Viewpoints from Engineering Postdoctoral Scholars of Color

Dr. Sylvia L. Mendez, University of Colorado, Colorado Springs

Dr. Sylvia Mendez is a Professor and Chair of the Department of Leadership, Research, and Foundations at the University of Colorado Colorado Springs. She earned a PhD in Educational Leadership and Policy Studies from the University of Kansas, a MS in Student Affairs in Higher Education from Colorado State University, and a BA in Economics from Washington State University. She is engaged in several National Science Foundation-sponsored collaborative research projects focused on broadening participation in STEM academia. Dr. Mendez's research centers on the creation of optimal higher education policies and practices that advance faculty careers and student success, as well as the schooling experiences of Mexican-descent youth in the mid-20th century.

Jennifer Tygret

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Abstract

An instrumental case study (Stake, 1995) explores the perceptions and opinions of engineering postdoctoral scholars of color about ways to improve university postdoctoral affairs offices to better support them personally and professionally. Ten participant interviews were analyzed deductively (Stake, 1995) using cultural marginality (Choi, 2001) as a conceptual framework. Data analysis findings revealed three themes to which postdoctoral affairs offices must be more attentive in the personal and professional journey of postdoctoral scholars of color: (1) prepare them for the transient nature of their positions, (2) smooth their unique work challenges, and (3) address workplace isolation and invisibility. The findings of this study could be useful to postdoctoral affairs offices and postdoctoral advisors in advocating for the needs and priorities of this population. By prioritizing and addressing their concerns, such offices can create a more productive and satisfying postdoctoral experience, leading to a smoother transition into academia, industry, or government employment.

Introduction

This instrumental case study (Stake, 1995) explores the perspectives of engineering postdoctoral scholars of color. The study aims to identify areas where university postdoctoral affairs offices can be improved to better support these scholars personally and professionally. Ten engineering postdoctoral scholars of color from three higher education institutions were interviewed for this study. The interviews were analyzed deductively (Stake, 1995) using cultural marginality (Choi, 2001) as a conceptual framework. Awareness of the institutional support needs of engineering postdoctoral scholars of color may be instructive to postdoctoral affairs offices and postdoctoral advisors. Greater advocacy for this population may result in a more productive and satisfied postdoctoral experience and a smoother transition into academia, industry, or government employment. This research is sponsored by the National Science Foundation (NSF) Alliances for Graduate Education and the Professoriate (AGEP; award #1821008).

Literature Review

A career in the professoriate is the single most desired career option for science, technology, engineering, and mathematics (STEM) postdoctoral scholars (van der Weijden et al., 2016; Yadav et al., 2020); therefore, it is logical to assume the ascent into the professoriate follows a postdoctoral appointment. However, only 16% of engineering postdoctoral scholars secure a tenure-track faculty position after their appointment (Andalib et al., 2018). This may be a result of postdoctoral appointments tending to be unstructured and the quality of the experience depending heavily on the postdoctoral advisor (Åkerlind, 2005). The appointment duration also varies widely and is temporary (Powell, 2015). On average, postdoctoral appointments last four to five years, and most postdoctoral scholars secure their first permanent position when they are around 40 years old (Proudfoot & Hoffer, 2016). These factors can make it difficult for postdoctoral scholars to achieve their career aspirations, particularly if their goal is to enter the professoriate.

The relationship between postdoctoral scholars and their advisors can lead to disparities in training because the supervisor is mainly responsible for individual experiences, workplace culture, and overall job satisfaction (Burt, 2019; Clement et al., 2020; Pyhältö, 2018; Scaffidi & Berman, 2011; Van Benthem et al., 2020; van der Weijden et al., 2016; Yadav et al., 2020). Postdoctoral scholars are exposed to high levels of stress due to significant scholarly output expectations, limited supervisory support, and low institutional oversight (Burke et al., 2019; Leshner, 2012; Small, 2012). To support the career advancement, wellness, and mentorship of postdoctoral scholars, institutions must enact policies and practices that ensure effective postdoctoral care, notably when advisor guidance and expectations are lacking (Ålund et al., 2020). Unfortunately, instances of negative postdoctoral scholar-advisor relationships permeate the literature (Burt, 2019; Van Benthem et al., 2020). As supervisors are directly responsible for much of the satisfaction derived from a postdoctoral scholar's appointment, the academy must consider the role of the institution in properly supporting postdoctoral scholar development and career advancement (Pyhältö, 2018; Scaffidi & Berman, 2011; Van Benthem et al., 2020; Yadav et al., 2020).

Postdoctoral affairs offices play a crucial role in providing the structures and resources postdoctoral scholars need to be successful in the evolving landscape of academic research and development (Brint, 1994). Davis (2009) highlights the importance of initiatives to enhance the postdoctoral experience, including postdoctoral offices and advocacy by postdoctoral organizations. Efforts include offering supplemental funding, increased salaries and benefits, and structured oversight of the postdoctoral advisor-advisee relationship. Relatedly, Martinez et al. (2016) provide empirical evidence of the effectiveness of programs like the NSF's International Research Fellowship Program (IRFP) in promoting international research collaborations among early-career scientists and engineers. This study underscores the role of external funding and institutional support, often facilitated through postdoctoral affairs offices and postdoctoral associations. By addressing disparities in engagement and utilization of these offices and associations, institutions can better support the career development and success of engineering postdoctoral scholars from underrepresented backgrounds (Davis, 2009).

The National Postdoctoral Association (NPA, 2023) created a toolkit for postdoctoral affairs offices with guidance on effective policies and programs, but the extent to which it is being used is unclear. The literature shows a lack of universal orientation programs that prepare postdoctoral scholars for their work responsibilities (Burke et al., 2019; Cutright et al., 2018). Burke et al. (2019) noted that a successful postdoctoral experience depends on whether a student has been provided with appropriate resources and support during their doctoral education and postdoctoral appointment. A lack of resources and support can be even more acute for postdoctoral scholars of color. For example, postdoctoral women of color report encountering discrimination more frequently than their White peers (Burke et al., 2019; Jach & Gloeckner, 2020). Proudfoot and Hoffer (2016) argued that a comprehensive strategy is needed to properly support, inspire, and equip postdoctoral scholars for success. Moreover, to increase the number of postdoctoral scholars of color who continue into the professoriate or other permanent positions in academia, they need policies, programs, and resources that include professional skills in writing and public speaking, as well as opportunities to build a community and social network (Gordon et al., 2015).

Conceptual Framework

Cultural marginality (Choi, 2001) was selected as the conceptual framework to explore the perceptions and views of engineering postdoctoral scholars of color on how university postdoctoral affairs offices can better support them personally and professionally. Cultural marginality comprises four dimensions—passive betweenness, forging new relationships, emotional conflict and struggle, and anxious-hopeful promise. Passive betweenness refers to the experience of living in two different worlds in which one does not belong to either. Forging new relationships is about the need to form new relationships despite the desire to hold on to previous ones. Emotional conflict and struggle include identity confusion and worry. Finally, anxious-hopeful promise involves feelings of uncertainty and optimism in changing circumstances. The conceptual framework of cultural marginality was used to guide the data analysis process and the implications of this study.

Methodology

Research Design. An instrumental case study design (Stake, 1995) was employed to explore the viewpoints of engineering postdoctoral scholars of color on ways to improve university postdoctoral affairs offices to better support them both personally and professionally. Cultural marginality (Choi, 2001) served as the conceptual framework guiding this study. The research question guiding this study was: What are the perceptions and views of engineering postdoctoral scholars of color on how university postdoctoral affairs offices can better support them personally and professionally?

Participants. A total of 10 postdoctoral scholars of color were recruited and interviewed for this study. All participants were invited based on their involvement in an AGEP Postdoctoral Engineering Alliance, which focuses on the career development needs of engineering postdoctoral scholars of color who plan to move into tenure-track faculty positions. All participants are from one of three higher education institutions located in the southern United States. One of the institutions is a Historically Black College or University (HBCU) classified as a doctoral university with high research activity (R2). Another is a predominately White institution (PWI) classified as a public doctoral university with very high research activity (R1). The final institution is a private R1 and a PWI. The sample comprises five women and five men, all of whom self-identified as Black or Latinx. They hail from various engineering disciplines such as aerospace, agriculture, biomedical, chemical, and mechanical. Pseudonyms were used to protect their identity; the pseudonyms are not linked to their higher education institution, race/ethnicity, or engineering sub-discipline. This was done to limit identification, as only a few Black and Latinx engineering postdoctoral scholars are employed at these institutions.

Data Collection. After completing the Institutional Review Board approval process, each postdoctoral scholar was emailed and provided with an informed consent form detailing the study and interview procedures. The postdoctoral scholars were informed that their participation in the interview process aimed to learn about their postdoctoral experience and identify ways to improve it. The interviews were conducted one-on-one via web conferencing and lasted approximately one hour. Participants were compensated with $50 for their time. The interview questions covered topics such as their satisfaction with their postdoctoral experience, their

engagement with the institutional postdoctoral affairs office, changes that could be made at the institution level to better support postdoctoral scholars, as well as those that could be made within the postdoctoral affairs office to better support postdoctoral scholars of color. The questions were carefully worded, asked in a specific order, and included probing questions to seek clarification and meaning. After the completion of each interview, the web conferencing platform rendered a transcription. All recordings were permanently deleted once transcriptions were reviewed and cleaned for errors and identifying information.

Reflexivity and Positionality. Throughout the study, the research team practiced individual and collective reflexivity (Patton, 2015) by reflecting on, setting aside, and discussing experiences, values, and beliefs related to the way in which university postdoctoral affairs offices can better support engineering postdoctoral scholars of color both personally and professionally. Reflexivity is a crucial aspect of qualitative research, as it helps researchers to acknowledge their biases and how those biases might impact their analysis and interpretation of data. To that end, Lincoln and Guba (1985) contended that researchers must disclose their positionality so readers know the unique perspectives they bring to the study. The research team included a diverse group of women and men with academic backgrounds in educational leadership and sociology. All are engaged in engineering education research, with a particular focus on increasing diversity in the engineering professoriate and expanding success in STEM academia and the broader STEM workforce. Additionally, all are involved in the study or evaluation of the AGEP Postdoctoral Engineering Alliance.

Data Analysis. Researchers used Stake's (1995) four-step deductive data analysis process to analyze the interviews. The process consists of direct interpretation, categorical aggregation, pattern recognition, and naturalistic generalizations. The cultural marginality conceptual framework (Choi, 2001) was utilized to create a deductive coding protocol based on its four dimensions: passive betweenness, forging new relationships, emotional conflict and struggle, and anxious-hopeful promise. The first step involved using the coding protocol to independently interpret the interview data, identifying the cultural marginality dimensions present in the data. In the second step, categorical aggregation was accomplished by collectively reviewing the nuanced codes identified in step one and categorizing them into preliminary themes. In the third step, the researchers refined the grouping of associated data and developed more precise codes by establishing fuse codes and reconceptualizing the preliminary themes. This process resulted in three themes regarding the ways in which postdoctoral affairs offices must be more attentive in the personal and professional journey of postdoctoral scholars of color: (1) prepare them for the transient nature of their positions, (2) smooth their unique work challenges, and (3) address workplace isolation and invisibility. In the last step, the researchers evaluated the themes to ensure their naturalistic generalization, applicability to other contexts, and representativeness of the totality of the data.

Trustworthiness. The research findings were established to be trustworthy by using multiple verification strategies (Lincoln & Guba, 1985). To ensure transferability, thick, rich descriptions with participant quotations were included (Creswell & Poth, 2017). Credibility was achieved by using interview triangulation and identifying the occurrence of saturation before the conclusion of the interviews, as no additional themes were gleaned after the fifth interview (Creswell & Poth, 2017). Safeguarding the consistency of the process and product was ensured by using

Stake's (1995) deductive data analysis approach, which ensured credibility and dependability. The dependability of the findings was further bolstered by the engagement of reflexivity (Patton, 2015) and positionality (Lincoln & Guba, 1985), as well as employing multiple feedback loops in the data analysis process.

Limitations. As with all research inquiries, this study has a few limitations. First, all postdoctoral scholars who participated in the study were part of the AGEP Postdoctoral Engineering Alliance, which means their viewpoints and experiences may not be transferable to others in different programs and contexts. While the study exposed researcher bias through reflexivity and positionality, its potential to influence the findings and interpretations cannot be guaranteed. Relatedly, none of the researchers have held engineering postdoctoral positions, so this study was primarily approached from an outsider perspective.

Findings

Theme 1: Prepare Postdoctoral Scholars for the Transient Nature of their Positions. All participants spoke of the great need for postdoctoral affairs offices to prepare postdoctoral scholars for the transient nature of their positions. Negative feelings mounted when intentional attention was not given to postdoctoral appointments being temporary. Joaquin said, "I don't know how you can make a postdoc feel not in limbo because that's kind of like by design…by nature, you're like a temp employee." Savannah mentioned that due to the transient appointment structure, postdoctoral scholars often feel they and their position are in jeopardy: "If you're a postdoc at an institution, you're the most vulnerable person at that institution." These expressions of vulnerability were palpable and clearly affected the way in which the participants approached their postdoctoral work. Orientation programs that outline their responsibilities and benefits could alleviate these feelings, yet none of the participants knew whether one was offered at their institution. Haakim said, "We are good at orientating postdocs to a new lab, like we would graduate students, we forget that they're not young students. Usually, they are employees, and they need to know how to do certain things [e.g., access benefits, establish primary care, seek research funding]."

Additionally, all the postdoctoral scholars indicated that due to the temporary position of a postdoctoral scholar, they would benefit from career planning and development opportunities centralized in a postdoctoral affairs office. Martin shared, "Postdocs should have like a sort of base level of responsibilities, but on top of that, I think they should be augmented with the aspirations and career goals of the postdoc. It should benefit both the department, the advisor research-wise, but also the person who is doing the postdoc because it's all too common or too easy for the postdoc to just be like a research horse, right?" With career planning, nearly all the postdoctoral scholars indicated only entering the professoriate job market was discussed. Aisha noted, "It's important to let postdocs know as early as possible the different career options that exist." Moreover, more support was needed for those firmly planning to enter the academic job market. Carlos mentioned, "[having] faculty from other institutions, from other departments, were looking at my job market statements and things like that will be helpful." Likewise, Evalyn shared the need for more support around her diversity statements: "I was never confident about it, so that made me feel unsure about even entering the job market." Several participants mentioned formalizing an individual development plan [IDP] or career goal-setting activities

would greatly benefit postdoctoral scholars. Tamika warned these activities "need to be individualized, every person will need something different."

Theme 2: Smooth Postdoctoral Scholar Unique Work Challenges. All the participants spoke of experiencing unique work challenges they could not navigate alone and wished postdoctoral affairs offices were attentive to their tribulations. One challenge that arose in each of the interviews was the amount of stress the postdoctoral scholars experienced. Miranda simply stated, "It was stressful at times, and I struggled to manage it well." Similarly, Aisha spoke of stress: "I don't like that feeling that I need to be doing something every single moment. It's stressful, and I'm not sure exactly if there's a way to like rectify it…they throw around balance a lot, but academia as a whole is not always suited to a conducive work-life balance." Savannah shared she was expected to work every day and at all hours of the day: "The expectation of working around the clock, like I'd be on call until midnight, and then if my boss was in a different country, I'd be at a meeting at 7:30 in the morning." When Carlos discussed the stress he was enduring, he talked about the need for crisis management and having dedicated counselors to support postdoctoral scholars: "There's an assumption that people are moving along the pathway well, but there needs to be some sort of crisis management team…a dedicated counselor, mental health advisor is needed specifically for postdocs."

While the majority of the postdoctoral scholars were overall satisfied with their postdoctoral experience and the advanced training they were receiving, despite the stress, a few struggled. Savannah shared, "There needs to be more open and honest conversations about whether or not a postdoc is really working out. Like, a lot of times academics are very nonconfrontational, and they don't want to be caught saying the wrong thing…if something is not working out, then professors need to be held accountable." Brian shared that his main struggle has been receiving proactive communication: "I've had guidance, and people have been great mentors to me whenever I asked for help. But it's been up to me to ask for guidance…[IDPs] should happen no matter what, like a requirement. Like you can't work in a lab until we talk about that." Similarly, Tamika discussed a desire to have "consistent feedback or just actual feedback." To ensure all parties are "on the same page," Carlos suggested, "there needs to be at least a monthly or bi-monthly meeting [with the postdoctoral advisor], where we get on the same page about the postdoc's interests, and how their current projects are feeding into that interest." These suggestions were offered under the guise that a postdoctoral affairs office could address these work challenges.

Theme 3: Address Postdoctoral Scholar Workplace Isolation and Invisibility. Finally, the last theme was specific to the way in which the postdoctoral scholars of color felt their "minority status" contributed to them feeling isolated and invisible. As they thought this was a natural byproduct of being in a disciplinary field dominated by White individuals, they placed the onerous on the institution, and particularly postdoctoral affairs offices, to address these issues. Savannah shared, "To be the only US citizen that was a minority in my lab or in my surroundings is really, really difficult…I didn't share an identity with a lot of people, I didn't have that emotional support." While most participants noted feeling isolated since so few of their colleagues shared similar racial/ethnic backgrounds, some used that as a motivation to persevere. Joaquin said, "Representation matters a lot. Sometimes you don't go for something because no one looks like you…and I want to be that example." To contend with this reality, all the

participants discussed the importance of developing a community of postdoctoral scholars of color. Miranda indicated, “If you could see and grow with a cohort together, and we’re all going to these positions together. I think it would make it more appealing because it wouldn’t be just trying to break barriers, we’re doing it as a group.” Haakim also shared that he would have felt less isolated if he had had access to more social events with other postdoctoral scholars of color. He said, “Having more contact with other postdocs. I think that’s the biggest difference between that and graduate school is a sense of isolation…I really wanted to have a community of postdocs outside of my department.” Martin revealed he had a richer postdoctoral experience once he developed a “cohort experience” with his department's instructional, research, and clinical faculty who shared a similar cultural background with him.

To address feelings of invisibility, the participants believed postdoctoral affairs offices needed to ensure they reach out to all postdoctoral scholars. Some noted that their institution had a problem identifying them as postdoctoral scholars. Evalyn said, “Postdocs aren’t visible, they don’t even all receive the communications designed for them.” Others suggested that more recognition opportunities and support for postdoctoral scholars, particularly postdoctoral scholars of color, were warranted. Tamika shared, “There is no like postdoc travel funds or any kind of scholarships for postdocs in general.” Miranda shared travel and research funding for postdoctoral scholars of color is even more critical than the average postdoctoral scholar because they need “discretionary funding that should come from the institution to kind of grow into independent scientists…postdoctoral scholars of color need to be getting the right publications and recognition because departments might feel like they are taking a chance on a young Black or Brown academic if they don’t have those kinds of accolades.”

Discussion

This instrumental case study (Stake, 1995) sheds light on the recommendations offered by engineering postdoctoral scholars of color on the ways in which university postdoctoral affairs offices can be improved to better support them personally and professionally through the conceptual framework of cultural marginality (Choi, 2001). Three themes were identified in the 10 interviews: (1) prepare postdoctoral scholars for the transient nature of their positions, (2) smooth their unique work challenges, and (3) address workplace isolation and invisibility. Regarding the framework, passive betweenness related to theme one, emotional conflict and struggles connected with theme two, and forging new relationships and anxious-hopeful promise were associated with theme three. Thus, cultural marginality was a helpful tool for considering, organizing, and communicating ideas about improving postdoctoral affairs offices.

When postdoctoral scholars experience strong postdoctoral advisement, the role of the postdoctoral affairs office clearly can be insular, but if advisement is missing or weak, greater institutional support is needed (Ålund et al., 2020; Davis, 2009; Pyhältö, 2018; Scaffidi & Berman, 2011; Van Benthem et al., 2020; Yadav et al., 2020). At a minimum, postdoctoral affairs offices providing orientation programs, travel awards, and recognition opportunities can offset some of their challenges, as noted in the literature (Burke et al., 2019; Cutright et al., 2018; Davis, 2009; Proudfoot & Hoffer, 2016). The unique contribution of this study is sharing the perspectives and opinions of engineering postdoctoral scholars of color, as there is little research highlighting their engagement, experiences, and needs regarding postdoctoral affairs offices.

Programs like NSF's IRFP are promising in this regard and point to successful resources and structures that support the career development and success of engineering postdoctoral scholars of color (Martinez et al., 2016).

Implications. An essential consideration relates to how higher education institutions, specifically postdoctoral affairs offices, can better support the personal and professional aspirations and needs of engineering postdoctoral scholars of color. The inability to properly and adequately support them may be vital to understanding the persistently low numbers of faculty of color in engineering academe—only 2.5% of engineering faculty identify as Black, 3.9% identify as Hispanic, and less than 1% as Indigenous (American Society of Engineering Education [ASEE], 2023). Institutional and individualized support is needed to offset the transient nature of postdoctoral positions; this can occur through orientation programs and career planning opportunities. Additionally, postdoctoral affairs offices can help to eliminate work challenges resulting from poor advisement and high-stress work environments. The participants' suggestions included mental health support and the facilitation of postdoctoral scholar-advisor meetings. Moreover, institutions can address isolation and invisibility by offering targeted programming and financial inducements to postdoctoral scholars. Creating intentional communities of postdoctoral scholars of color can address these concerns and take the onerous from scholars to create them independently.

Future Research. A fruitful area for future research involves continuing to study the role of cultural marginality (Choi, 2001) in the experience of engineering postdoctoral scholars of color. Identifying the value of postdoctoral affairs offices that provide wrap-around services and support to postdoctoral scholars and advisors is crucial, considering the pathway to the professoriate from postdoctoral appointment is relatively low. Also, triangulating these findings with postdoctoral affairs office directors could lend more support to how institutions must take more ownership and care of postdoctoral scholars in general and postdoctoral scholars of color specifically.

Conclusion

Using an instrumental case study design (Stake, 1995), this research explored the perceptions and opinions of engineering postdoctoral scholars of color about ways to improve university postdoctoral affairs offices to better support them personally and professionally. The findings suggest that systematic changes to the postdoctoral training environment may be needed. To rely solely on postdoctoral advisors to provide quality care is risky. Therefore, investing in the infrastructure and personnel of postdoctoral affairs offices may be a wise decision and could potentially influence the pathway from postdoctoral scholar to tenure-track faculty member in engineering academia for postdoctoral scholars of color. It is clear that additional structures and resources would ease feelings of being transient, smooth unique work challenges, and address isolation and invisibility. The question is whether the academy has the will and commitment.

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