

WIP Engaging Every Student: Understanding Faculty Perceptions of Access, Diversity, Equity, and Inclusion in a 2 Year Professional Development Series

Dr. Pheather R Harris, University of California, Irvine

Dr. Harris has worked in postsecondary education for over two decades in various capacities. She began her career at Santa Monica College as a counseling aid at the Extended Opportunities Programs and Services office prior to her role as an Assistant Director of Admissions at the University of Southern California. She then moved to Cambridge, MA to pursue her Master's Degree in Higher Education, with a focus on Risk and Prevention, and began working at Tenacity, a non-profit organization focused on social-emotional learning and literacy development for middle school youth, as a Prevention Specialist. Dr. Harris formally moved to the east coast when she began her work at the Gates Millennium Scholars Program as a Senior Program Manager – managing the Academic Empowerment Program across partner organizations: the United Negro College Fund, The Asian Pacific Islander American Scholarship Fund, The Hispanic Scholarship Fund, and the American Indian Graduate Center Scholars. Dr. Harris received her Bachelor of Arts degree in Communication from the University of Southern California, a Master of Arts degree in Education from Harvard University, and a Doctorate in Higher Education Administration from The George Washington University. She is also an NSF IASPIRE Fellow and the Principal Investigator on a nearly \$3-million dollar grant aimed at advancing access, diversity, equity, and inclusion in STEM. Her research interest includes exploring the relationship between faculty mentor engagement and minoritized student STEM persistence. She is a critical methodologist who uses both post positivism and postmodernism to guide her inquiries.

Dr. Tayloria N.G. Adams, University of California, Irvine

Dr. Tayloria N.G. Adams is an Assistant Professor in the Department of Chemical and Biomolecular Engineering at the University of California, Irvine (UCI). Her research group integrates electrokinetic techniques with microfluidic platforms to investigate the heterogeneity of human mesenchymal stem cells and prostate cancer cells. She holds patents for her discoveries and has received prestigious fellowships, including the NSF Postdoctoral Fellowship and the UCI Chancellor's ADVANCE Postdoctoral Fellowship. Dr. Adams has been recognized with numerous honors, including the Faculty Innovation in Teaching–Early Career Award from UCI's School of Engineering, the NSF CAREER Award, the University of California Cancer Research Coordinating Committee Award, and the Chao Family Comprehensive Cancer Center Pilot Award funded by the Anti-Cancer Challenge. Her research interests also encompass culturally responsive teaching. Dr. Adams is committed to advancing inclusive excellence by creating pathways that promote the representation and success of minoritized students and women in STEM. She is dedicated to fostering an academic environment where students feel empowered, supported, and equipped to thrive in their academic and professional journeys.

Dr. Star Lee, University of California, Irvine

Dr. Star Lee is an Assistant Professor of Teaching in the Developmental and Cell Biology Department at the University of California, Irvine. Her science education research focuses on creating inclusive STEM learning environments for students. She is particularly interested in investigating the effectiveness of teaching professional development programs for STEM graduate students and faculty, and receives support from the National Science Foundation.

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Abstract

This work in progress (WIP) describes a grant funded by the National Science Foundation to examine how a 2-year access, diversity, equity, and inclusion professional development series impacts inclusive pedagogical practices by faculty, both tenured and non-tenured, at a Hispanic Serving Institution, and at a community college. Faculty play a key role in cultivating cultures of inclusion in STEM, and must be provided with information, resources, and technological tools that advance equity and inclusion from a student-centered perspective. The aims of the series are to provide faculty with nine 3-hour sessions that explore access, diversity, equity, and inclusion (year one,) and classroom observations, and workshop co-facilitation (year two). This WIP is focused on a research question that investigates the impact of year one. Faculty that completed the first year of the professional development series were invited to participate in a 90-minute qualitative interview focused on answering the following research question, “*What is the impact of participation in the professional development series on faculty conceptions of diversity and inclusion in the classroom?*” 15 faculty, across 6 STEM disciplines, and two cohorts, were interviewed over the span of two years to discuss, a) their lived experience, b) the professional development curriculum, c) its impact on their pedagogical practices and, d) recommended programmatic enhancements. The anticipated research results will show that faculty professional development, focused on inclusion, creates more opportunities for meaningful engagement in STEM between faculty and minoritized students, cultivates a culture of inclusion, and gives faculty practical application and tools that ensures their curriculum is inclusive; thereby, increasing undergraduate degree completion. This project is significant because there is a need to diversify the professoriate, and the STEM workforce in general, which begins with increasing persistence and retention rates of minoritized students through inclusive academic environments. Minoritized students, as defined in this work, are Latinx and Black students. Faculty play a key role in establishing positive academic cultures through intentional and focused efforts. The WIP session presenters prefer seats in rows lecture style and will present a PowerPoint presentation.

Introduction

Science, technology, engineering, and mathematics (STEM) degree completion disparities continue to persist between minoritized and non-minoritized undergraduate students at US postsecondary institutions [1], [2], [3]. Minoritized, as defined in this work, are African American and Latino/a undergraduate students in STEM. A diversified STEM workforce is essential to maintaining competitiveness on the global stage, enhancing the production of innovative solutions that address challenges faced by the country, and addressing national security concerns [2]. Interventions aimed at retaining Latino/a and African American students in STEM, by dismantling barriers that preclude them from receiving their undergraduate degrees, must be nuanced and intentional. The STEM culture, which often includes stereotype threat [1], and microaggressions [4], is identified in research as an example of an environmental factor that negatively impacts the retention and persistence of minoritized students. Given the pervasive nature of the issue, and ongoing efforts to combat racism and anti-blackness in higher education, this NSF funded program

is designed to eradicate factors that produce (or reinforce) exclusionary environments through faculty professional development.

This NSF funded initiative is both an institute, and research project, that takes place at a Hispanic Serving 4-year Institution and Community College along the Pacific Coast. It is a two-year professional development series (PDS) specifically designed for faculty in STEM (holding varying seniority and academic responsibilities) that teach, mentor, and/or conduct research with undergraduate students. Year one of the program comprises 9 sessions that provide the foundation for the program through three-hour meetings that take place over the span of nine months (during the fall, winter and spring terms). The sessions explore degree completion disparities through quantitative and qualitative data. As part of the research arm of the grant, faculty are interviewed to answer the following question: How does faculty participation in the PDS lead to increased implementation of evidence-based inclusive teaching? For this research question (there are three questions associated with this project in total) 90-minute interviews take place midway through the program to inform researchers about the lived experiences of the participants and the impact the program has had on their understanding of inclusive pedagogical practices. Faculty were recruited for the program by the deans of their schools. Recruitment practices were identified by each school which included applications provided to faculty for the opportunity, and direct nominations from school leadership. Participants that were confirmed for the opportunity were provided with Academic Enrichment Funding to participate.

Epistemological and Conceptual Frameworks

The epistemological frameworks that ground this analysis are both postmodernism and post positivism. Postmodernists posit reality is constructed through the identities and groups to which one belongs and argue that it "...is almost entirely the product of our subjective experience and negotiated meaning with other people..." [5]; whereas post positivist consider probability through research that employs mixed methods to a gain deeper and richer understanding about the phenomenon under investigation [5].

The conceptual framework that informs this work are Astin's [6] input, environment, output framework focusing on what can be done, environmentally, to positively impact academic outcomes; Schlossberg's [7] marginality and mattering, which provides faculty with information that ensures that students are not placed in the margins during their academic experience; Bourdieu's [8] theories on social and cultural capital amplify the importance of the exchanging of professional and academic information towards the unlocking of access to resources and rewards; Dweck's [9] implicit theories provide a roadmap on how to access growth versus fixed mindsets, which influences persistence and retention for minoritized students; and Harper's [10] anti-deficit framework help faculty examine how they can reframe STEM degree completion disparities from a deficit lens to a strengths based lens.

Research Design

The analysis for this research project is in the very early stages. We are still conducting qualitative research interviews at this time. This study will use thematic analysis to identify prominent themes that emerge from the qualitative data and structuring the analysis by those themes [11]. There will

be consideration with concern for intercoder reliability, veracity, and validity, when the interviews are coded and analyzed. Further, quantitative data collected from the surveys will deepen the analysis about the impact of the PDS.

Study participants

The study was conducted in 2021-present and based at a large public university with a Carnegie basic classification of Doctoral University: Highest Research Activity. Participants for the study were faculty at an HSI 4-year research university or community college who completed the PDS. The research team that leads this effort will begin transcribing the qualitative interviews during the 2024-2025 academic year, specifically for the faculty that participated in Cohorts 1 and 2. Cohort 3, taking place at a community college, is in the middle of year one, and has not yet been interviewed.

Data Collection

Surveys

To gauge programmatic impact, faculty in the PDS completed 3 surveys at the beginning, middle, and end of the first year. The 4th survey is deployed during year 2 of each cohort to gauge longitudinal impact. Cohort 1 and 2 faculty (n=24) were from a range of STEM disciplines, including computer science, health sciences, astronomy & astrophysics, life sciences, engineering, chemistry, and mathematics. Faculty were distributed across different stages of their career: assistant professors (n=8), associate professors (n=9), professors (n=5), and lecturers (n=2). Survey questions focused on assessing faculty motivation, teaching beliefs, teaching practices, and teaching reform in supporting minoritized students in their STEM. The data collected from the surveys will be synthesized to provide more context about the impact of the PDS on faculty participants.

Interviews

A subset of Cohort 1 and 2 faculty participants (n=15) were interviewed to validate survey responses and provide additional insight into their experience in the PDS. Interviews were semi structured, and questions focused on assessing a) their lived experience, b) the professional development curriculum, c) its impact on their pedagogical practices and, d) recommended programmatic enhancements. Lived experience questions focused on their exposure to people of different backgrounds in their communities and education as well as support in their STEM journey. Professional development questions asked about their training in supporting minoritized students. Pedagogical practices questions assess their practices in engaging, mentoring, and supporting minoritized students. Lastly, programmatic questions gauged major takeaways from the PDS and their future plans of implementation of inclusive practices. Interviews occurred at the end of the first year of the PDS. Interviews were conducted on Zoom and audio recorded. Recordings were transcribed and transcriptions were analyzed.

Data Analysis

Survey analysis

Survey data collection and analysis is ongoing. Cohort 1 (n=12) has completed all 4 surveys. Cohort 2 (n=12) has completed 3 surveys. Cohort 3 (n=12) has completed 1 survey. Once all three cohorts have completed all 4 surveys, survey questions will be analyzed. For items on a Likert scale, Cronbach's alpha will be calculated to determine internal consistency. For short answer questions, survey responses will be coded using inductive coding to identify recurring themes. Analyzing both quantitative and qualitative responses will strengthen the findings from the survey.

Interview analysis

The research team independently read through 3 interviews from faculty participants to identify possible themes. Interview analysis is in progress and inductive and deductive coding will be used to develop a codebook. Each code will be defined together as a group and the researchers will meet regularly to compare and revise codes until finalizing a codebook.

Preliminary Findings

Survey

Initial review of surveys indicate the impact of the PDS program on pedagogical practices. Faculty report having 1) thought of different ways to develop a culturally responsive classroom and curriculum for future class and 2) having a better understanding of how to apply an anti-racist approach to curriculum and teaching. Participation in the PDS program has a positive impact in faculty feeling more comfortable in discussing culturally inclusive curricula with colleagues and discussing STEM relevance to students' social and cultural lived experiences.

Interview

Faculty participants were interviewed to explore their lived experiences, the impact of the PDS program on their pedagogical practices, and their engagement with minoritized students in STEM. Here we provide illustrative quotes that capture the influence of the PDS and supports the anticipated research results, showing that fostering inclusive pedagogies, meaningful faculty-student engagement, and cultivating a culture of inclusion addresses disparities in undergraduate STEM degree completion.

PDS participants consistently highlighted the program's role in increasing awareness of minoritized student experiences and encouraged reflective teaching practices. One participant noted in response to the question *to what extent, if any, do you take into consideration the backgrounds and experiences of students in your classroom, as part of your teaching practice?* "...[B]eing part of the [PDS] brought that to the forefront. [I]f I'm being perfectly honest it's not something that I, myself, even considered, the backgrounds of certain students, before starting the PDS. I think my approach was always, I am going to be accessible, a resource for you if you, come tell me. But I never investigated, or I never thought about perhaps, how their lived experiences are

influencing...their performance in the classroom or outside the classroom in skill[ed] settings. [S]o, if I'm being frank, it was not at the forefront before...coming and learning within this program.” This reflection illustrates how the PDS promotes intentional consideration and understanding of students’ diverse needs and challenges.

Faculty also described how the PDS equipped them with practical tools to create/implement inclusive classroom practices, many of which they had not considered before participating in PDS. For instance, one participant shared, “I did include a positionality statement and...a slide about me at the beginning of my class that I taught in the spring. [A]nd so that...was something I didn't even know about and would never have done before doing the [PDS].” Reflecting on the impact of this change, the faculty participant noted, “...[T]here’s the...act of putting that [positionality] slide in my first lecture and talking to the students about it. But then there’s also that reminder to myself that I don’t know exactly what my students are experiencing or what they experienced before they came into my classroom.” Another participant emphasized the importance of incorporating positionality into their syllabus, stating, “The new part will be the syllabus and, you know, a statement of positionality. That’s something that I really would like to implement, but I haven't had a chance yet to do it because I was not teaching”. These examples illustrate how PDS provided participants with actionable strategies to foster inclusivity in their classrooms, from embedding positionality statements to creating opportunities for dialogue and reflection. These tools align with the PDS’s goal of encouraging faculty to design pedagogical practices that acknowledge and support the diverse experiences of their students.

The PDS’s emphasis on self-reflection also resonated with participants. For some, the program highlighted how their upbringing and personal experiences shaped their perspectives as educators. One faculty member remarked, “...I’m more a product of my upbringing than I realized... there were several sessions on that, which I thought were, well not on that specifically, but that was sort of woven into different sessions.” While another participant noted that the PDS emphasized “...how little I know, still.” These sentiments, along with discussions about positionality, underscore the importance of reflection in the program. Together, these reflections illustrate how the PDS encourages faculty to examine themselves and their practices critically, fostering personal growth alongside professional development.

Finally, optimism was expressed for applying what was learned in the PDS to foster broader cultural change. One participant shared, “I think the [PDS] has made me more intentional about some of the things that I need to do within the classroom. I’m hoping that once we get this instituted within our department and share with other colleagues, it will be intentional for everyone. It’ll be at the forefront for everyone. And then we would actually begin to see the changes that we desire to see.” This reflects the PDS’s ability to inspire intentional practices and cultivate a culture of inclusion across institutional contexts.

These quotes represent a snapshot of the PDS’ program’s influence on faculty professional development and meaningful student engagement. A more systematic analysis of all interviews will further explore these impacts.

Future Work

Moving forward, survey responses from all four faculty surveys across Cohorts 1, 2, and 3 will be systematically coded and analyzed to identify recurring themes in faculty experiences within the PDS program. Additionally, faculty demographics will be collected beyond discipline and rank to provide deeper context for our findings and enhance the interpretability of results. These analyses will contribute to a broader understanding of how faculty engage with inclusive pedagogical practices, offering valuable insights into the long-term impact of the PDS program.

Conclusion

Interventions that address diversifying the US STEM workforce must include interrogating environmental factors that create exclusionary academic environments in postsecondary education. Faculty play an important role in advancing an inclusive culture both inside and outside of their classrooms. This PDS provides a potential framework that contextualizes the experiences of minoritized students in STEM, how faculty can address barriers that preclude students from persisting in their STEM degree classrooms, and tools that aid in pedagogical enhancements focused on inclusion. Programs such as these strengthen STEM degree pathways by allowing students to fully participate in their studies without the burden of experiencing racism and anti-blackness.

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