

## **Board 194: Advancing Access, Diversity, Equity, and Inclusion in STEM for Minoritized Students Through Faculty Professional Development**

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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.

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# **Advancing Access, Diversity, Equity, and Inclusion in STEM for Minoritized Students through Faculty Professional Development**

## **Abstract**

The research associated with this project is made possible by a National Science Foundation grant. Minoritized students (MS) (defined in this work as African American and Latinx) often experience increased instances of exclusionary academic environments compared to their non-minoritized counterparts [1]. As a result, MS are more likely than their peers to attrit from their STEM majors. Faculty play a significant role in the development of either a positive or negative academic culture. For this reason, there is a need to bring meaningful faculty engagement into the classroom to address the challenge of STEM degree completion disparities between MS and non-MS students. To directly address STEM faculty's perception of access, diversity, equity, and inclusion, this project examines the impact of participation in a two-year professional development series on faculty conceptions of diversity and inclusion in the classroom to strengthen MS undergraduate degree completion.

To assess faculty perceptions before, during, and after the first year of the professional development series (PDS), we deployed Likert Surveys, while also soliciting their responses to open ended questions, about the PDS which is focused on enhancing their understanding of inclusion and equity. The PDS is supported by STEM school deans, academic personnel, the leadership overseeing undergraduate education, and diversity, equity, and inclusion; underscoring the importance of institutional commitment to providing STEM faculty with meaningful ways to strengthen their understanding of access, diversity, equity, and inclusion towards enhancing their pedagogy and academic practices.

Preliminary findings from this research demonstrates that STEM faculty often are not confident about having conversations with colleagues about anti-racist and culturally inclusive curricula. Further, they desire more developmental experiences whereby they can learn more about access, diversity, equity, and inclusion issues, and expressed discomfort having conversations with students about STEM inequity and how it is relevant or related to their social and cultural lived experiences.

Findings from this work have significant implications for policy and practice at higher education institutions, particularly related to STEM disciplines. Specifically, with increasing student diversity in STEM, faculty must have access to tools, resources, and strategies that aim to enhance their pedagogy. Postsecondary institutions must support efforts that are focused on creating an inclusive culture for STEM faculty that seek to strengthen their pedagogy to reach more students. The preliminary findings from this study shows that STEM faculty are able to develop an enhanced understanding of the STEM culture and practices that contextualize degree completion disparities between MS and non-MS students. Moreover, faculty are able to employ an intervention that advances access and equity for MS in STEM. Given this work requires a nuanced approach, institutional policies must provide faculty in STEM with opportunities that allow them to access information to further understand the ways in which they influence the academic outcomes of MS.

## **KEYWORDS**

Diversity, Equity, Inclusion, STEM, minoritized-students

## **Introduction**

Diversifying the STEM workforce is of the utmost concern for industry leaders, academia, government agencies, and the medical field since diversification helps to create inclusive environments that lead to enhanced innovative, productive, and collaborative solutions that address challenges facing the country, and world, in STEM [2]. Diversifying the workforce requires that postsecondary institutions examine degree completion disparities, as a result of exclusionary academic environments, between minoritized and non-minoritized students [3,4]. Minoritized students (MS), as defined in the work, identify as having African American or Latinx racial / ethnic backgrounds. Pervasive research continues to reveal that MS students are more likely than their counterparts to attrit from STEM majors [5].

Faculty play an important role in cultivating an inclusive academic culture both inside and outside of the classroom [6]. To strengthen inclusive environments in STEM, faculty must be afforded the opportunity to participate in professional development that: a) contextualizes the experiences of MS in STEM, b) provides them data (both qualitative and quantitative) about degree completion disparities, c) shares resources, and activities that helps to unpack their perceptions of access, diversity, equity, and inclusion; d) and provides tools to examine their epistemological leanings and the associated implications therein. Towards that end, this project builds on these recommendations for faculty and examines the impact of participating in a two-year professional development series (PDS) towards advancing inclusion in STEM and strengthening MS undergraduate degree completion. The activity takes place at an R1, Minority Serving Institution, with 12 STEM faculty per cohort (two total) from areas of expertise that span across 6 STEM schools: Engineering; Information and Computer Science; Biological Sciences, Physical Sciences, Public Health; and Pharmaceutical Sciences.

To assess faculty perceptions before, during, and after the first year of the professional development series (PDS), we conducted qualitative interviews with seven STEM faculty focused on enhancing their understanding of inclusion and equity and deployed Likert Surveys to all 12 of the participants. In an effort to ensure that faculty participants received the support they needed to engage in the experience, STEM school deans, academic personnel, leadership overseeing undergraduate education, and diversity, equity, and inclusion participated in various components of the program to demonstrate their ongoing commitment towards institutional transformation. It is important to have gained campus leadership buy-in on this work to address any potential obstacles that might impede on the progress of the project [7].

## **Research Methods**

Likert surveys (with open-ended questions) were administered at the start of the program to understand participant motivation for engaging in the experience, at the halfway point to gain feedback on their journey in the program, and at the end of the project to examine whether faculty perceptions of access, diversity, equity, and inclusion changed throughout their time in the project. There will be a final survey deployed at the end of year two to assess whether what

faculty learned in the project ultimately impacted degree completion for MS. This paper is focused on the feedback from Cohort 1's survey responses at the end of their first year in the program.

## **Preliminary Findings**

While Cohort 1 participants are no longer attending PDS sessions that are focused on advancing their understanding of MS in STEM, they are in year 2 of the experience which entails deploying what they have learned in their classrooms, and participating in classroom observations. The preliminary findings noted below are from the surveys that were distributed their first year in the PDS (beginning, middle, and end). There were three areas from the surveys that showed growth during their time in the PDS. Seven out of twelve respondents (58% response rate) completed the surveys in their entirety. Concerning question #3, it is important to note that the approach of the PDS is to provide faculty with resources, knowledge, and opportunities to embody inclusive behavior, rather than focus on explicit conversations with students about the topic.

The preliminary findings are shared below.

Q1: I am confident about having conversations with colleagues about anti-racist and culturally inclusive STEM curricula.

- In survey #1, 14% of respondents reported they are confident in having conversations with colleagues about anti-racist and culturally inclusive STEM curricula. By survey #3, 43% of respondents reported they are confident in having anti-racist and culturally inclusive conversations with colleagues.

Q2: I want to have more development experiences whereby they can learn more about access, diversity, equity, and inclusion issues.

- In survey #1, 86% of respondents reported they want to learn more about access, diversity, equity, and inclusion issues and how it impacts their teaching of minoritized students. This percentage remained consistent up until the end of the professional development experience.

Q3: I feel comfortable having conversations with students about STEM inequity and how STEM is relevant to their social and cultural lived experiences.

- In survey #1, 14% of the respondents reported that they were comfortable having conversations with students about STEM inequity and how it relates to students' lives. By survey #3, 43% of respondents reported feeling comfortable with having these kinds of conversations with students.

In addition to synthesizing the data that has been collected via Likert Scales and open-ended questions, faculty from Cohort 1 were also interviewed, individually, in an effort for the researchers to gain a more comprehensive and in depth understanding about their experience within the PDS. That data is still being transcribed and synthesized in an effort to identify

emergent themes. That information will be disseminated once it is complete. Quantitative and qualitative data is also being collected from Cohort 2 to strengthen this analysis and its associated recommendations.

## **Conclusion**

Quantitative findings from this work have significant implications for policy and practice at higher education institutions, particularly related to STEM disciplines. With concern for increasing student diversity in STEM, faculty must have access to tools, resources, and strategies that aim to enhance their pedagogy. Postsecondary institutions must support faculty efforts that are focused on creating inclusive academic cultures to strengthen their pedagogy and reach more students in the learning process. The preliminary findings from this study also reveal that STEM faculty are able to develop an enhanced understanding of the STEM culture and practices that contextualize degree completion disparities between MS and non-MS students. With that, they are able to employ an intervention that aims to advance access and equity for MS in STEM. Lastly, given this work requires a nuanced approach, institutional policies must also provide opportunities where faculty in STEM can access information to understand the ways in which they influence the academic outcomes of MS.

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