

The Effect of Department Culture on Student Success for Women of Color in STEM Graduate Degree Programs



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Purpose of the Study

The purpose of the study is to examine the effect of department culture on student success for women of color in Science, Technology, Engineering, and Math (STEM) graduate degree programs at the ten campuses of the University of California system using a quantitative survey.

Statement of the Problem

In the United States today, only a handful of underrepresented minority women make it through the academic pipeline and enter graduate school in the sciences. For example, less than 1% of currently enrolled graduate students are Native American/Alaska Native women.

The National Science Foundation defines underrepresented minority groups as Black/African American, Hispanic/Latino, and American Indian/Alaskan Native/ Native Hawaiian/Pacific Islanders.

Women of color in science, technology, engineering, and math (STEM) graduate programs face multiple barriers to successful completion including racism, stereotype threat, a chilly climate, and a lack of sense of belonging. Students at multiple campuses reported experiencing social stigma associated with being a racial minority in science (Hurtado, 2010).

Graduate programs are not always successful in fostering a supportive environment where female students from underrepresented groups feel welcome (Ong, Wright, Espinosa, & Orfield, 2011). Students perform better when the campus culture is engaging and provides a space for students to feel welcome and included (Museus, 2017).

Theoretical Framework

The theoretical framework for the study is **intersectionality**, which is an appropriate lens for viewing the subjects of the study and their lived experiences. Individuals experience multiple identities simultaneously which become a single identity that is greater than the sum of the distinct parts. The theory situates identity in the larger culture and the power structures that perpetuate inequality. As a critical theory, it seeks social justice through its examination of the structures of power, privilege, and oppression.

Context of the Problem and Key Literature

Diversity is important in higher education institutions as it can foster an environment where there is an opportunity for cross-cultural interaction. Currently there are very few underrepresented minority students in graduate programs in STEM fields in the United States. The National Science Foundation reported the percentage of master's degrees awarded in 2014 was 14%, and doctoral degrees 8%.

Students often face unfriendly, or **chilly climates**, with discrimination and microaggressions being common experiences (Figueroa, 2016).

Racism continues to be an issue faced by minority students in the US (Moses, 1999; Ong, et. al. 2011; Figueroa, 2016). Students who face discrimination and racism in their graduate programs are less likely to complete the degree compared to those who do not (Figueroa, 2016).

Faculty representation - When undergraduate students do not see anyone of color on the faculty, they are less likely to continue on to a graduate degree (Ong, et al., 2011; Hurlock, 2014). If students do not complete a graduate degree they cannot obtain a position as a professor, and so the lack of diversity is perpetuated.

Kuh and Whitt (1988) define **campus culture** as, "persistent patterns of norms, values, practices, beliefs, and assumptions that shape the behavior of individuals and groups in a college or university and provide a frame of reference within which to interpret the meaning of events and actions on and off the campus" (p. 29).

A more diverse student body has a positive effect on campus culture (Ong, et al 2011; Museus, 2017). When students have a **sense of belonging** they are more likely to complete their degree and contribute to the campus community. A sense of belonging is the feeling that one belongs and is accepted, and is an important positive predictor of persistence for college students.

An important concept that emerged from the literature is that of **safe spaces** (Settles, Connor, & Yap, 2016; Ong, et.al 2017). If the broader community has a chilly climate then a safe space (or counterspace) can provide a supportive environment for students.

Methods, Procedures, and Type of Analysis

The study participants will be master's and doctoral level students in STEM programs at the ten University of California campuses (pending IRB approval).

The data collection tool is an existing survey titled *The Science and Engineering Graduate Student Experience Survey* developed by Dr. Elizabeth Litzler, Director of the Center for Evaluation & Research for STEM Equity at the University of Washington.

The data will be analyzed using a series of T-tests to make comparisons based on gender, ethnicity, and the intersection of the two: looking specifically at URM female students. T-tests will also be performed to determine differences between campuses, between similar departments on different campuses, and between science and engineering departments. The t-test is appropriate because the study is investigating the difference between two population averages.

Relevance to Higher Education

The study could help inform our understanding of the culture and climate in STEM graduate programs and how their effect on student success for women of color. The information can be used by departments to make positive changes to improve students' chances of successfully navigating and completing a graduate degree.

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