An Undergraduate Research Conference as Counterspace for Students of Color in STEM

Erin Doran and Paul Hengesteg, Iowa State University

July 2020

IINSPIRE-LSAMP Research Brief

Funding Information

This material is based upon work supported by the National Science Foundation (NSF) under award HRD-1619654. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the NSF.

Abstract

The purpose of this study is to look at an undergraduate research conference and how it provides a counterspace to support the emerging STEM identity of minoritized students. Previous research has described the importance of counterspaces for students from minoritized backgrounds in STEM (Lane, 2016; Ong, Smith, & Ko, 2018; Solórzano, Ceja, & Yosso, 2000). Using observations and student interviews, this study explores how this conference space disrupted the whiteness of students' campus-based experiences in order to provide professional development and to retain them in STEM majors through empowerment and undergraduate research experiences.

Purpose of this Study

There is a well-documented problem of recruiting and retaining racially minoritized students into majors in science, technology, engineering, and mathematics (STEM) in postsecondary education (Museus, Palmer, Davis, & Maramba, 2011). These spaces embody "oppressive and culturally biased meritocratic structures, campus cultures based on White European individualistic values, marginalizing predominantly White campus cultures, and racial prejudice and discrimination" (Museus, Palmer, Davis, & Maramba, 2011, p. 25). In order to close these gaps in representation, institutions have incorporated a number of different strategies, including curricular changes to improve diversity (Busch-Vishniac & Jarosz, 2004; Paguyo, Atadero, Rambo-Hernandez, & Francis, 2015), focusing on pre-college preparation (May & Chubin, 2003), and interventions for students while they are enrolled in college like the National Science Foundation (NSF) program Louis Stokes Alliances for Minority Participation [LSAMP] (Crisp & Nora, 2012; Liptow, Chen, Parent, Duerr, & Henson, 2016).

The purpose of this study is to look at an undergraduate research conference run by the IINSPIRE-LSAMP alliance and how it provides a counterspace to support the emerging STEM identity of minoritized students. Funded by the National Science Foundation's LSAMP program, this alliance is "a Midwest STEM partnership for innovation in research and education. The alliance is committed to broadening the participation of underrepresented minorities in STEM education in the Midwest" ("Welcome," 2019). A cornerstone of the alliance's program is in promoting undergraduate research experiences to students who are STEM majors within the alliance's 16 participating colleges through Iowa, Illinois, and Nebraska. Utilizing a case study approach with interviews and observations, this study addresses the question: How does an off-campus undergraduate research conference create a counterspace for minoritized college students who major in STEM?

Theoretical Framework

This study conceptualizes the undergraduate research conference as a "counterspace" for the students participating in it. As explained by Solórzano, Ceja, and Yosso (2000), counterspaces "serve as sites where deficit notions of people of color can be challenged and where a positive collegiate racial climate can be established and maintained" (p. 70). As further described, counterspaces "allow African American students to foster their own learning and to nuture a supportive environment wherein their experiences are validated and viewed as important knowledge" (Solórzano, Ceja, & Yosso, 2000, p. 70). Lane (2016) used this idea to analyze undergraduate research experiences for Black students in STEM, writing that these spaces enabled these students to take a break from microaggressions on their campus classrooms and

labs and to bring their whole selves to an educational space. Other research by Ong, Smith, and Ko (2018) demonstrate that creating and engaging in these counterspaces is important marginalized students in STEM (in this study's case, Women of Color specifically).

Methods

Case studies analyze a real-life event, context, or phenomenon (the "case") within a bounded system (Yin, 2009), and here the bounded system is an off-campus conference for STEM students who attend a college within the IINSPIRE-LSAMP alliance. Case studies call for the collection and analysis of multiple data sources which are described below (Hays & Singh, 2012). The two-day conference took place in February 2020 in Cedar Falls, Iowa on the University of Northern Iowa campus. Two researchers on the qualitative research team (the authors of this proposal) attended the conference as observers.

Data Sources

There are 2 main data sources for this study: interviews with students and observations from the conference. Both types of data were collected by both researchers. Students were identified by their badges and were asked to participate in the study through opportunistic sampling—that is, we tried to minimize our interference with their conference experience, so we deliberately tried to interview students during scheduled breaks or when they were not attending sessions. Over a 2-day period, we conducted 10 interviews with students that took an average of 45 minutes each. A semi-structured interview protocol was used to guide the interviews, and the interviews were audio-recorded so they could be transcribed later using transcription software. We also immersed ourselves in the programming of the conference by attending plenary sessions, sitting at tables with students during meal times, and in attending the conference poster session where students presented their research projects. In all, we estimated that we completed about 30 hours of observation and observed both formal and informal interactions. An observation protocol was used to help provide some guidance on the way field notes were taken. For each observation, the researchers also wrote a reflective memo immediately after their observation was complete to provide more context or thoughts on what they just observed.

Data Analysis

Due to COVID-19 pandemic, the ability for the researchers to meet in person to formalize and execute the analysis process has been hindered. The emergent findings presented here are based on an exchange of memos that the researchers developed to help make sense of the data for this proposal. The data will be analyzed more systematically in the Fall 2020 semester, likely using software, and the writing of the findings will commence shortly thereafter. The paper will be completed ahead of the April AERA conference.

Emergent Results

Out of the first round of analysis, the following preliminary themes have emerged. First, the conference creates a powerful counterspace where minoritized students can feel, albeit temporarily, that they are not minoritized. Second, the alliance and its programming, specifically the conference, create a space for empowerment and professional development that is tailored to the experiences of minoritized students. Finally, we observed that while this counterspace is important to students' development as STEM majors (and ultimately STEM professionals), it is not a perfect space. We observed moments of misogyny in particular that could have negative consequences for female students and their futures in STEM.

Building a Space for Solidarity

Perhaps one of the richest moments where we observed solidarity was in seeing students from Nebraska and Iowa institutions talk about their cultural backgrounds and the lack of food choices that reflect their backgrounds in their college communities. During a break in between sessions on Friday afternoon, a group of Black and African students (about 8 total) gathered in the common area where they pushed together tables and chairs to talk as a group. A number of the students disclosed that they were from African countries whose families had immigrated to cities like Dallas and Houston and who had accepted scholarships to attend their predominantly white campuses in rural, Midwestern towns. These students shared stories about the restaurants they go to in their adopted hometowns, the struggle to find restaurants and grocery stores that sold the products they need to make the food from home they craved, and how different the regional food of the Midwest was from Texas or from their home countries.

Providing Empowerment and Professional Development

The researchers observed a 2-hour long poster session where most of the students attending the conference presented on their undergraduate research experiences that included lab and/or field work, depending on the student's respective field. Throughout the session, students were encouraged to talk to everyone who walked by, including conference staff, other students, and the faculty chaperones from other campuses. Aside from the professional development exercise of having students orally present their projects, the poster session allowed for space where students were the experts on their particular projects and were there to answer questions about the research at virtually every step of its development and execution. We observed that the room where the poster session was animated throughout the 2-hour period, and when students ventured off for the appetizers provided by the conference, they tended to continue talking about their projects or related subjects (e.g., classes they were taking on their home campuses, their next steps professionally for internships or jobs, and so forth).

Moments of Disempowerment

On Saturday morning, one of the researchers sat down at a table with 7 other students discussing their post-graduation plans. A female Asian student talked about how she had already applied to graduate programs in mathematics, and while she was waiting for decision letters from several other universities, she had more or less decided where she wanted to attend. A Black male student started effectively "man-splaining" why her actions were wrong—that is, he began offering his thoughts on her graduate school plans, how she should decide where to go, and why her plan was not the right step in a way that was belligerent. The female student tried to explain herself for several minutes, but as the male student kept talking over her, she stopped trying to explain herself and sat further back in her chair. These 2 students were from different institutions, so it is unclear if they knew each other before this interaction or if this was the first time they had ever spoken.

The same researcher who took notes on this interaction conducted an interview with the female student after this happened. When asked about it, the student ("Ariel") explained that it was not much different than interactions she had with male students on her campus. She talked about the thick skin that she developed and that she learned to cope with misogyny through her faith and the people she attended church with.

Discussion

Previous research has described the importance of counterspaces for students from minoritized backgrounds in STEM (Lane, 2016; Ong, Smith, & Ko, 2018; Solórzano, Ceja, & Yosso, 2000). Based on the observations of the LSAMP research conference, we found that this space in many ways constituted a counterspace for student participants. It disrupted the normal routine of campus-based life where these student researchers often find themselves surrounded by whiteness. Similar to Carter (2007), this study found that this counterspace allowed for bonding time among students and a place where their identities were affirmed. Something that appears to be less discussed in the literature is how counterspaces are not perfect and can still perpetuate other forms of oppression—in this case, misogyny. While the content of the research conference positively empowered students in relation to their racial and ethnic identities, it could incorporate and affirm other parts of the participants' identities. For instance, affinity groups within the conference could be formed to provide content and space specifically for female students, trans and non-binary students, and students who hold identities (e.g., LBGTQ+ identities). Further, while also talking about the disparities of racially and ethnically minoritized students in STEM fields, it could also be worthwhile to explicitly discuss the added burden of being female in STEM and encourage male students to engage in empowerment, not sexism.

Scholarly Significance

In line with the 2021 AERA conference theme, we argue that this study challenges us to think critically about efforts to broaden participation of minoritized populations in areas like STEM. This research conference where we collected data provided a break from the predominantly White spaces where these minoritized students pursue their education. In short, it was a place where White participants (typically their faculty mentors, LSAMP program coordinators and managers) were actually in the minority themselves. The space aimed to be empowering, yet it was possible for students to feel marginalization along other parts of their identities through interpersonal interactions. Therefore, we see this presentation as a way to highlight the efforts of the LSAMP program but to also take responsibility for what it can do better in promoting equity and inclusion efforts for minoritized undergraduate students in STEM fields throughout the Midwest.

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