LGBT+ in STEM: The Transgender Experience

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Abstract: It has been widely reported that youth are more accepting of LGBT+ identities, and an increasing number of colleges and universities allow students to use gender-neutral pronouns. Yet, *research* on how inclusive STEM educational cultures are of sexual identity and gender fluidity is *meager*. In this poster, we present interview results on the lived experiences of transgender undergraduates in physics, mathematics, and computer science at institutions that have achieved inclusion by gender and race.

According to a Human Rights Campaign survey, 75 percent of LGBT+ youth report that most of their peers have no problem with their LGBT+ identity, yet 4 in 10 say the community in which they live is not accepting (HRC, 2012). Yet research in LGBT+ experiences across Science, Technology, Engineering, and Mathematics (STEM) disciplines describes of the *lack* of belonging (The American Physical Society (APS), 2016; Stout and Wright, 2016); which also characterizes the experience of women of color in these fields (Johnson et al, 2017; Leslie et al, 2015; Moss-Racusin et al, 2012; Ong, Smith, and Ko, 2017). In this poster, we explore the experiences undergraduate trans students have in physics, mathematics and computer science, and whether institutions that are more inclusive for women of color in these disciplines are also inclusive for trans students.

Theoretical framework

To frame our research, we apply Patricia Hill Collins' Domains of Power, comprising the interpersonal, the cultural, the disciplinary and the cultural (Collins, 2009). In comparison to one co-author's previous writing on science identity for women of color in STEM (Carlone and Johnson, 2007; Johnson et al, 2011), Collins' model frames these experiences as setting features rather than internal individual experiences (Johnson, in preparation).

In the **interpersonal domain**, where power is expressed between individuals, transgender physicists feel exclusion and isolation, as well as pressures to perform heteronormativity (APS, 2016). This aligns with findings for women of color whose interactions with peers and professors were characterized, "regardless of their actual abilities as measured by exam performances, grade point averages, and research mentor evaluations, … perceived nearly consistent messages--with some rare exceptions--that because they lack the standard appearance of a scientist, they also lack the intellectual competence associated with such an appearance" (Ong, 2005). This struggle with whether their bodies fit in STEM, and resultant performative impacts, is common to the experiences of women of color and trans students.

In the **cultural domain**, "where a group's values are conveyed (or contested)," power determines what it means to be a good scientist. Such beliefs lead to differential outcomes for job applicants who vary only by their identities (Moss-Racusin et al, 2012), with decisions interpreted as individual choices rather than cultural influences. Such beliefs are reified into rules and policy in the **disciplinary domain**, or when power is distributed via large social structures, like state and federal law, or the unintended consequences of clashing practices in the **structural domain**, we see "uneven", "lacking", or "discriminatory" policies, including those involving health care and bathroom access (Ackerman et al, 2012).

When analysed from this framework, the failure of these marginalized students to thrive rests not on lack of interest or ability, but on the need to face extra obstacles above and beyond the challenges all students face due to the difficulties of the science itself.

Data and methods

The research featured in this poster is part of a project entitled ***Centering Women of Color in STEM: Identifying and Scaling Up What Helps Women of Color Thrive*** (CWCS), which explores physics, mathematics and computer science educational settings to find the features that allow all kinds of students to thrive and learn, despite how profoundly non-representative these disciplines are for most women of color. Our interdisciplinary team is made up of a physicist, an anthropologist, 2 physics undergraduates, and a chemistry undergraduate.

CWCS applies the broad definition of gender articulated by the Athena SWAN criteria, which includes a consideration of transgender identity. To identify what the departments under study do to create environments in which women of color thrive, we are conducting case studies that comprise student and staff interviews, observations of classrooms, and ethnographic field notes (e.g., community spaces, meetings, conferences, collaborative spaces). In additional to making a specific appeal to trans students in each department we are studying, we are working to build relationships with the campus organizations that support trans students. Our goal is to create as full a picture of the trans experience in context as possible.

Interviews are semi-structured, open-ended, hourlong, audio-recorded and transcribed. Participants were asked a broad set of questions about their academic background and interests, a challenging time and how they overcame it, factors that promote their success, advice for institutions, and advice for people like themselves. CWCS uses narrative analysis for coding and analysis, combining systematic methods and multiple researchers, to triangulate our understandings of the lived experiences of transgender students.

Findings

At ICLS 2018, we will present findings from our interviews with transgender undergraduates at three very different institutions (a small liberal arts college, a large research university, and an enormous open-enrollment university), whose commonality is that they have created environments in which women of color thrive in physics, mathematics, and computer science.

Our findings will be presented in the actual voices of our interview participants, with the expectations that poster visitors will have the opportunity to consider how they can increase inclusion for transgender STEM students at their home institutions. These conversations will identify ways in which physics, mathematics, and computer science settings can be extended to a wider diversity of learners.

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