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The Review of Higher Education, Volume 38, Number 2, Winter 2015, pp. 251-270 (Article)

Published by The Johns Hopkins University Press
DOI: 10.1353/rhe.2015.0004

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The Review of Higher Education
Winter 2015, Volume 38, No. 2, pp. 251–270
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Considering the Interest-Convergence Dilemma in STEM Education

Lorenzo DuBois Baber

In the United States, considerable attention is being given to increasing postsecondary participation in science, technology, engineering, and mathematics (STEM) education.[1] This emphasis reflects concerns from policymakers, economists, and educators about declining rates of STEM degree production among domestic students (Chen, 2013; National Academies 2007; National Science Foundation, 2012). To address this decline, many federal, state, and institutional initiatives focus on developing talent among underrepresented students of color populations. (I use this term

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I thank members of the STEP-UP research team for their assistance with data collection and initial data analysis for this article—William T. Trent, Principal Investigator; Casey George-Jackson, Project Coordinator; Erin L. Castro, Graduate Assistant; Mariana G. Martinez, Graduate Assistant; Blanca Rincon, Graduate Assistant; Kimberly Walker, Graduate Assistant; and Montrischa M. Williams, Graduate Assistant. I am also grateful to the National Science Foundation, Ford Foundation, and Alfred P. Sloan Foundation for generous funding of the STEP-UP project.

[1]For the purposes of this article, "STEM education" refers to the fields of engineering, natural sciences, mathematics, computer sciences, and physical sciences but not social/behavioral sciences.

for African Americans, Latino Americans, and Native Americans—groups whose representation in the pool of postsecondary STEM students is below that of their proportion in the general U.S. population.) Despite enrollment increases in STEM education, the proportion of STEM degrees awarded to underrepresented students of color remains low relative to those awarded to White students. As population trends in the United States continue to shift toward greater ethnoracial diversity, challenging disparities in STEM participation and completion rates is a critical objective, particularly for students of color with talent in STEM.

Early advocates of equal opportunity in STEM fields consistently focused on broadening participation among underrepresented students of color, arguing for inclusive policies as an extension of the civil rights movement (Grady, 1998; Malcolm, 1981, 1990; McBay, 1989; Oakes, 1990; Pearson, 1985). Scholars emphasized historical prejudice, unequal distribution of opportunities for capable students, and isolating environments for underrepresented students enrolled in postsecondary STEM programs. Malcolm (1981) directly challenges meritocratic perspectives promoted in science education by stating: "Science has not been served well by our past prejudice and discrimination; we have lost time, talent, and ideas" (p. 137).

Recent national public policy reports by the National Academies, a group of leading organizations in STEM policy development, continue to promote expanding participation in STEM fields (2007, 2010). However, equity concerns advocated by early scholars are largely absent in the report narratives. Instead, the primary incentive for increasing participation is rooted in concerns for economic prosperity, specifically strengthening the U.S. advantage in science and technology in the face of growing global competitiveness. For example, *Rising above the Gathering Storm* (National Academies, 2007) highlights concerns about the nation's capacity for developing STEM workforce skills and provides recommendations for expanding opportunities in STEM education.

In a follow-up report, *Rising above the Gathering Storm, Revisited: Rapidly Approaching Category 5*, the National Academies (2010) follow a similar suit by focusing on the economic implications of inequalities in the STEM fields. Both of these reports, while emphasizing the need for greater workforce capacity in STEM fields, largely ignore roots of historical underrepresentation and the need to center equity rationales. A separate report by the National Academy of Sciences, *Expanding Underrepresented Minority Participation* (2011) stresses the importance of increasing diversity in STEM but rationalizes this support by expressing concerns about global economic competition. In the report, the role of diversity is cast as a "competitive asset" for increasing national human capital for economic efficiency.

A human capital approach toward addressing diversity issues in STEM is clearly a pragmatic tactic that potentially broadens advocacy for increas-

ing student of color participation. However, national investment based on human capital perspectives also raises concerns about the marginalization of educational equity principles as part of the diversity discourse in STEM education. With only limited inclusion of equity perspectives, an examination of complex structural issues in STEM education tends to give ground to quantifiable goals and outcomes. As scholars note, overlooking systematic transformation allows those in privileged positions to propagate notions of increased access while limiting necessary shifts in normed behaviors and beliefs (Kezar, 2010; Tierney, 1999).

As national policy reports tend to influence institutional practices, a human capital rationale for broadening STEM participation may increasingly influence the development of campus-level programs targeting underrepresented students in STEM. Using qualitative data collected as part of a multiple year, multi-institutional study on the persistence of underrepresented students in STEM, this article presents perspectives of STEM diversity program administrators to examine the influence of human capital perspectives on campus programs. Specifically, I use Derrick Bell's interest-convergence (1980, 2003) concept to analyze institutional STEM diversity efforts. Interest-convergence stresses that social change benefitting traditionally marginalized populations occurs only when it also serves the best interests of the dominant population.

Specifically, this study is guided by the following research questions:

- How do current STEM diversity administrators describe the mission of their programs?
- In what ways do these descriptions reflect tensions between universalist ideology and realities of racial/ethnic inequality in STEM education?
- How does an interest-convergence framework enhance our understanding of normed behaviors that limit equitable opportunities in STEM education?

Review of Literature: Science Education and Universalist Ideology

The successful launch of Sputnik by the Russians in 1957 stimulated an unprecedented U.S. investment in STEM education at a time when educational opportunities, particularly at top research universities, remained unequal due to *de facto* segregation (Anderson, 2006). As a result, few students of color were in a position to take advantage of the renewed emphasis on STEM education, research, and development. By the time civil rights legislation stimulated an emphasis on equitable opportunities, cultural norms and practices in the STEM profession had long been established.

Concurrent with the increasing significance of science during the post-World War II period was the influential work of sociologist Robert Merton and his description of the "ethos" of science (Long & Fox, 1995; Merton,

1996; Pearson, 1985). Merton proposed a set of sociocultural norms, or core principles, that characterize the scientific community. Among these core principles is "universalism." Universalism proposes that knowledge claims transcend political boundaries and are free of subjective elements, including the personal attributes of the scientist. "Objectivity precludes particularism. . . . [U]niversalism is rooted deep in the impersonal characteristic of science" (Merton, 1996, p. 269). Further, Merton argues that universalism demands meritocratic distribution of opportunities, resources, and rewards within the science community: "To restrict scientific careers on grounds other than lack of competence is to prejudice the furtherance of knowledge" (p. 270).

Considerable debate exists about the merit of the Merton's analysis of social norms in science, including universalism as a key element for the production of scientific knowledge and understanding (Coburn & Loving, 2001; Kalleberg, 2007; Pearson, 1985; Siegel, 2002). Proponents situate universalism within the positivist paradigm of scientific practice, setting a sociocultural standard for the communication of thoughts and expressions of knowledge. Further, scholars argue that the science community adheres to meritocratic principles because advancement of knowledge demands objective evaluation. Critics take the position that the science community cannot be isolated from other sociocultural influences that shape our society (Bourdieu & Passeron, 1998; Stanley & Brickhouse, 2001). As such, scholars argue, scientific norms are subjectively grounded in dominant culture (e.g., modern Western science culture), challenging the empirical ideals of scientific practice.

Supporting the interdependent position of science and society, Kardash and Edwards (2012) argue that Merton presented his norms as an ideal of how science *should* operate, not as a reflection of how science *does* operate. Indeed, scientists' behavior often deviates from scientific norms. Several studies have challenged universalist traditions in science by highlighting persistent racial inequalities in degree attainment within STEM fields (Pearson, 1985; Long & Fox, 1995; Rincon & George-Jackson, 2009; Ong, Wright, Espinosa, & Orfield, 2011). At each stage of postsecondary education (bachelor, master's, doctoral), African American and Latino American students have lower levels of participation, persistence, and completion rates than their White peers. Long and Fox (1995) note, "Although a universalistic norm may help to create pressure for resources and rewards to be allocated on the basis of performance, it does not guarantee equal opportunity for women and minorities to acquire the resources that enable performance in science" (p. 61).

Current statistics show that racial disparities in STEM continue to persist. Whites make up nearly three-quarters of all scientist and engineers in the United States (National Science Foundation, 2012). Racial disparities are particularly evident in conservation science (91%), material engineering (89%), earth and ocean science (86%), nuclear engineering (83%), agri-

cultural and food science (82%), and electrical engineering (80%). Beyond statistical observations, researchers have examined the sociocultural experiences of students of color in postsecondary STEM education (Crisp, Nora, & Taggart, 2009; Hurtado, Eagan, Tran, Newman, Chang, & Velasco, 2011; Rincon & George-Jackson, 2009).

In a comprehensive analysis of scholarship related to underrepresented students of color and STEM, Museus, Palmer, Davis, and Maramba (2011) found that experiences are influenced primarily by three sociocultural community characteristics: (a) a positive racial climate; (b) pedagogical strategies that promote socially relevant inquiry and collaboration; and (c) frequent, high-quality interaction with institutional agents such as faculty and advisors.

Despite evidence of racial disparities in STEM education and insights on support systems that promote success among underrepresented students of color, equitable opportunities remain a challenge. Universalist traditions limit acknowledgement of subjective bias in normative practices and beliefs. This perspective is further protected by human capital approaches to STEM diversity initiatives that ignore issues of power, cultural hierarchy, and historical discrimination. An interest-convergence framework can provide a clearer understanding of how embedded norms shape inequalities even in the context of increasing calls for diversity in STEM education.

The Interest-Convergence Framework

Focusing on American history, Derrick Bell (1980, 2003, 2004) observed that, for African Americans, progress toward equality depends on whether such opportunities best serve the interests of affluent White society. The historical advancement of African American interests is a result of being fortuitous beneficiaries of measures directed at furthering aims other than racial equity. Further, Bell states, "Even when interest-convergence results in an effective racial remedy, that remedy will be abrogated at the point that policymakers fear the remedial policy is threatening the superior societal status of Whites, particularly those in the middle and upper classes" (Bell, 2004, p. 69). A legal scholar, Bell compares the position of African Americans in the racial history of the United States to that of a third party who receives incidental benefits from a contract between two other parties. In this model of contract law, if the two contracting parties do not have the third party in mind, the benefits to the third person are indirect and that person has no right of recovery should benefits cease to continue.

Bell provides a policy example of interest-convergence by reframing the 1954 *Brown* decision as an anti-Communist decision. While African Americans had long challenged inequalities supported by the "separate but equal" doctrine established by the 1891 *Plessey* decision, desegregation efforts in the

United States gained significant momentum as a result of two main factors: growing ideological competition from Communist nations, and potential charges of democratic hypocrisy from World War II allies. Bell states:

> The decision in *Brown* to break with the court's long-held position on [segregation] cannot be understood without some consideration of the decision's value to Whites, not simply those concerned about the immortality of racial inequality, but also those Whites in policymaking positions able to see the economic and political advances at home and abroad that would follow abandonment of segregation. (p. 524)

Given that African Americans had challenged segregation for decades with very limited success (Bell, 1980), interest-convergence provides an example of the concept that those with power dictate the pace and structure of social change. While African Americans are seen as benefitting from desegregation policies, the historical tempo of desegregation stalled as Whites debated their sociopolitical costs and gains. As a result, the possibility faltered for holistic changes to the racialized power structure which created the conditions of inequality for African Americans prior to 1954. Interest-convergence is dilemmatic as African Americans benefit from changes; however, motivation, tone, and pace center on White interests that could shift as different priorities surface.

Bell (2003, 2004) cites the 2003 University of Michigan law school admissions case, *Grutter v. Bollinger,* as a contemporary example of interest-convergence. Focusing on Justice O'Conner's majority opinion, Bell notes that it was the argument for diversity in the classroom, not remediation for past and continuing racial barriers, that garnered her support. Diversity as a valuable workforce skill for all students is a principled interest-converging goal but one that can minimize the historical and continuing racial oppression for students of color. Further, Bell notes, Justice O'Conner accepted the diversity rationale as shown by the fact that the Michigan Law School considered other diversity factors besides race that might also benefit nonminority applicants. Therefore, diversity efforts were acceptable as they were not too disruptive to the privileged position of the nonminorities. "Once again," he summarized, "Blacks and Hispanics are the fortuitous beneficiaries of a ruling motivated by other interests that can and will likely change when different priorities assert themselves" (2003, p. 1625).

William Tate and Gloria Ladson-Billings highlight interest-convergence as part of their larger introduction of critical race theory (CRT) for education research (Ladson-Billings, 1998; Ladson-Billings & Tate, 1995; Tate, 1997). CRT centers race and racism in examinations of social structures, practices, and discourse through five main tenets: (a) counter-storytelling, (b) the permanence of racism, (c) Whiteness as property, (d) a critique of liberal-

ism, and (3) interest-convergence. DeCuir and Dixson (2006) argue that educational researchers have primarily focused on counter-storytelling and the permanence of racism when using tenets of CRT for analysis. Interest-convergence has been used to examine policies and practices related to teacher education programs (Milner, 2008); intercollegiate athletics (Castago & Lee, 2007; Donner, 2005; Harper, 2009); the development of historically Black colleges and universities (Gasman & Hilton, 2012); and postsecondary access for Latino immigrant populations (Alemán & Alemán, 2010).

Methods

In extending interest-convergence as an analytical tool to examine normed practices and behaviors in STEM education, my study employs a critical research perspective. Critical research seeks "to illuminate the hidden structures of power deployed in the construction and maintenance of its own power, and the disempowerment of others" (Cannella & Lincoln, 2009, p. 55). Bensimon and Bishop (2012) encourage researchers in higher education to embrace critical perspectives when examining racial inequalities in higher education contexts. Further, Bensimon and Bishop challenge objectivist paradigms that define critical research as biased, arguing that implicit assumptions about the absence of inequalities are equally subjective, are more prevalent in the scholarship, and reinforce existing power structures.

This article draws upon qualitative data collected for the STEM Trends in Enrollment & Persistence for Underrepresented Populations (STEP-UP) research project at the University of Illinois, Urbana-Champaign.[2]

Funded by the National Science Foundation (NSF), STEP-UP is a multi-year, multiple method study designed to examine campus programs that have the goal of increasing underrepresented undergraduate students' participation in STEM fields. From 2007 to 2012, the project examined STEM diversity programs at 10 research-intensive, public universities in the United States. These institutions are significant producers of STEM graduates, granting 9.8% of all baccalaureate STEM degrees awarded by all public, four-year institutions nationwide (National Center for Education Statistics, 2013). As predominately White institutions (PWIs), these universities award a smaller proportion of bachelor's degrees in the STEM fields earned by underrepresented students of color: 4.4%, Ranging in undergraduate student enrollment from 23,000 to 45,000, each institution in this study is listed among the top 40 public universities in the nation by *U.S. News and World Report.* To protect participant identity, further descriptions of each campus are not included and each is identified by a pseudonym.

[2]For more information about the STEP-UP project at UIUC, including additional empirical studies, research highlights, and policy briefs, see http://stepup.education.illinois.edu/.

The qualitative phase of the STEP-UP project examines the perspectives of campus stakeholders on the development and support of STEM diversity programs at their respective institutions. During this phase of the research project, my colleagues and I focused on in-depth examination of STEM diversity programs offered by these institutions, capturing the important background information specific to each institution that may contribute to either the challenges to and/or the success of underrepresented students in enrolling and persisting in STEM disciplines.

Participants

The research team used purposeful criterion sampling and snowball sampling to select participants with valuable insights to STEM diversity programs at the 10 institutions. In purposeful criterion sampling, researchers intentionally select individuals who, they believe, possess rich information on the phenomenon of interest. Through institutional websites, we identified STEM diversity program administrators at each campus and invited them via email to participate in the study. Because of our unfamiliarity with the institutions, we used snowball sampling to identify additional participants whose functions might not have been identifiable by scanning institutional websites. As part of our initial contact, we asked respondents to recommend other institutional colleagues to help us better understand STEM diversity programs at their campus. A total of 76 administrators on the 10 campuses agreed to participate in interviews. This article focuses on data collected from 32 participants who were lead directors of STEM diversity programs at their respective campuses. (See Table 1.)

Data Collection

The primary source of data collection was individual interviews with program administrators. The research team developed a semi-structured interview protocol (Patton, 2002) that included questions regarding the history, funding, mission, services, and intended outcomes of the program. Members of the research team conducted interviews between September 2009 and November 2011. With the exception of a few follow-up conversations by telephone, we conducted all interviews in person at the participant's campus location—usually his or her office or, in a few cases, at an alternate campus location he or she selected. The interview team consisted of senior member from STEP-UP (principal investigator or project manager) and a graduate research assistant with training in qualitative research. Researchers conducting the interview debriefed after each interview, discussing and recording initial impressions and other campus observations. Interviews ranged from 45 minutes to two hours and were audiotaped and transcribed verbatim.

Table 1
Program Director* Participants by Campus

Bay University	5
Canyon University	2
Delta University	2
Forest University	5
Hill University	2
Lake University	3
Mesa University	2
Plains University	2
River University	4
Brick University	5
Total	32

*"Program director" represents the lead administrator of a campus program designed to recruit and/or retain traditionally underrepresented students in STEM disciplines. The formal job title depended on institutional structure, so this category may include participants with titles other than "director" (i.e., "coordinator," "assistant dean," etc.).

Data Analysis

Analysis of the data combined deductive and inductive thematic analysis (Fereday & Muir-Cochrane, 2006). This reflective process included multiple, in-depth conversations among researchers working on the STEP-UP project. Initially, the research team took a deductive approach, focusing on a description of the phenomenon interest—the STEM diversity programs. We compared and contrasted the interview data to the topic areas developed in the semi-structured interview protocol. These topic areas included the history and goals of the program, its structures, support, and the outcome assessments.

To address issues of trustworthiness, at least two members of the research team reviewed each set of campus transcripts. Each researcher assigned words and phrases to detailed coding categories within each area. Once the research team came to a consensus on the comprehensive set of codes, we used NVIVO software to connect these coding schemes to specific quotations from participant interviews.

As the initial coding process was being completed, the research team discussed patterns from the data that supported a more critical interpretation of STEM diversity programs. Researchers returned to the interview data and used inductive pattern-matching logic (Yin, 2003) to consider emerging codes within existing theoretical frameworks. Recognizing connections between participant perspectives and systemic issues of marginalization, I compared a set of patterns from interviews to interest-convergence frameworks for further anlaysis, interpretation, and discussion.

Limitations

Although I capture detailed insights on STEM diversity programs at these institutions, my findings and conclusions are bounded by several limitations. While members of the research team believe that administrators from STEM diversity programs offer valuable insights, this study does not include perspectives of other institutional leaders (faculty, deans, provosts, chancellors/presidents) who might have provided additional information.

Additionally, to protect anonymity, I do not include specific information on environmental contexts. Without background on institutional profiles or geographic characteristics, our analysis is limited to the general insights and perspectives presented.

And finally, although the research team selected research-intensive institutions because of their significant contributions to STEM education, they represent a small subset of the postsecondary sector in the United States. While these findings may not be generalizable in the traditional sense, the descriptions and meanings presented provide in-depth detail to the observable racial inequalities present in STEM education.

FINDINGS

Utilizing interest-convergence, I considered three patterns emerging from the data: (a) the emphasis on compositional diversity, (b) a cost-benefits approach toward diversity, and (c) emphasizing benefits for faculty from majority populations. Each pattern reflects a measured approach to the challenge of diversity in STEM education, paying little attention to larger structural norms that marginalize underrepresented students. Further, these patterns reflect diversity practices that do little to disrupt the universalist ideology ingrained in the STEM professions.

"Increase the Numbers": Emphasis on Compositional Diversity

Most program administrators participating in the study identify increasing the enrollment and persistence of underrepresented students as the primary goal for their program. These goals are driven by mandates from upper-level administrators (department heads and/or college-level deans) who considered numbers to be the most significant measure for improving the climate. A program director from Canyon University bluntly stated, "The bottom line is going to be numbers." Hence, diversity initiatives often reflect enrollment management responsibilities: recruiting underrepresented students in high school, planning campus visits for accepted students, and organizing supplemental academic support for enrolled students. Program administrators state that they are given specific targets to meet, influenced by historical campus trends and comparisons with peer institutions.

We heard several administrators voice frustrations with what they considered to be disproportional emphasis on measuring diversity through quantitative measurements. A program director from Delta University pointed out, "The numbers have been roughly 2 or 3% [increase] each for African Americans and Latinos [over] 30 years, with all the money thrown in. Nothing has really changed. You can't change it until you build the community."

In short, while developing and maintaining a strong critical mass of underrepresented students in the department is important, program administrators suggested that these efforts must be part of a multi-pronged approach to the complex challenge of creating and maintaining an inclusive community. An administrator from Lake University noted:

> If you recruit just numbers, you bring students who are all over the board. You don't have the programs in place, they are not successful, and then everyone is, "I told you they couldn't be successful here . . . [T]hey just don't have what it takes—it's just not part of their background."

This observation reflects a tendency in STEM education to blame academic failure on individual attributes (or lack thereof), rather than considering the role of marginalizing attitudes and practices in shaping student experiences. This focus on failure as individual is problematic as it promotes traditional Mertonian perspectives of STEM education—that science is objective, apolitical, and meritocratic. This normed attitude is further amplified by the notion that underrepresented students did not succeed in spite of the "gift" of opportunity bestowed by the community through diversity programs. Such an approach ignores structural and systematic changes with the result of limited achievement of educational equity.

An interest-convergence framework stresses that expanding opportunities for the traditionally marginalized group tends to focus on individuals, encouraging their assimilation to current institutional norms. However, this strategy has limited success because it does little to address culture within institutions that contributes to systematic inequalities (Bell, 1980; Delgado & Stefancic, 2001). While broadening participation through programs targeting underrepresented individuals is presented as a diversity initiative, the emphasis on numbers does little to improve the racial/ethnic climate for underrepresented students. Additionally, as enrollment goals are not reached or become stagnant, outcomes are often attributed to a lack of merit or interest from the traditionally underrepresented group, rather than the continuation of practices and attitudes that marginalize these students.

"Do More with Less": The Cost-Benefit Approach to Diversity

During our interviews, many diversity program administrators described an intense budgeting process in which they experienced overwhelming pressure from their superiors to minimize costs while maintaining or improving enrollment and persistence outcomes. An administrator from Hill University summarized this dilemma: "So, everything was cast as budget. While [the Dean] certainly was a proponent of diversity . . . [the Dean would] look at it in terms of greater return, 'What does this cost versus what do I get out of it?'"

Program directors also described struggling with piecing together a budget from various sources, while upper-level administrators deflected their access to external sources that have historically supported diversity initiatives. They found that executives preferred having contributions directed to the academic unit rather than to specific programs. An administrator from Forest University stated, "[A corporate source] really wants to increase [diversity] so they know programs like this are valuable." A program administrator from Lake University described the same dilemma: "[The Dean] told us we couldn't ask for more because they wanted the money" for academic programs or other university projects." Yet "people would call us up and say, 'Why don't you send us a letter? We want to give you the money.' We used to have a big pot of money that we could spend any way we wanted."

Program administrators also find themselves competing with other department priorities, including newly developed diversity initiatives. This insight from an administrator at Forest University: "Funding has been routed in other directions, to new programs that are doing what we've been doing for years. Meanwhile, . . . I can't get $10,000 as a partnership budget." While most (but not all) salaries of diversity program administrators were drawn from recurring budget lines, almost all programming efforts and salaries for support staff were funded by nonrecurring funds: supplemental department funds, federal grants, and donations from corporations and alumni.

The emphasis on performance-based budgeting is not unique at a time when state support for public higher education is, at best, stagnant. A cost-benefit approach reflects a bureaucratic decision-making process, attempting to maximize efficiency while limiting budgetary discretion. From this perspective, benefits of diversity initiatives in STEM education are tied to measurable benefits that justify calculated costs. Concerns arise when equity goals are inconsistent, short-term, and rely on compositional results (such as enrollment).

During campus visits conducted for this study, we found little evidence of a consistent, longitudinal investment in equity initiatives that addressed structural barriers such as department climate and/or faculty awareness of diversity issues in STEM education. Additionally, the prominence of nonrecurring budgetary sources forced program directors to devote considerable

attention to identifying potential funds. Limiting communication between funders and diversity program leaders further defined these initiatives as marginal and incongruent competitors to other priorities. This practice has both symbolic and practical influence on how others within the academic unit, specifically other administrators and faculty members, view STEM diversity initiatives.

From an interest-convergence perspective, the cost-benefit approach described by participants in the study reflects the notion that support(s) for diversity programs are present—but only to the point where they do not interfere with the overall revenue-generating efforts of the academic unit (Bell, 1980; Milner, 2008). Controlling communication between external sources of funding and diversity program directors and encouraging donations at the academic unit level ensure that the power to define and dictate equity progress remains at the executive administrative level. Unfortunately, the demographic characteristics of those in STEM academic leadership positions reflect the overall racial (and gender) disparities in the STEM profession.

"What's in It for Us?": Benefits for Faculty from Privileged Backgrounds

Diversity program administrators indicate that, while they invited all faculty members in their department to participate, the core group of initial supporters is small, primarily comprised of faculty from underrepresented backgrounds. Many of these faculty members are interested because they participated in similar programs as students and maintain a commitment to educational equity. Administrators stress that because those committed to the program are few in number, they try not to overburden the group with requests, particularly if faculty members are pre-tenure. An administrator at Lake University acknowledged: "They have to focus on getting tenure, and so you know we want to be cognizant of that balance . . . even in terms of the service versus [research] approach."

Many program directors perceive less than supportive feelings from faculty in their college or department. A Plains University administrator commented, "There are faculty and staff who have no idea who we are and, you know, think that our services are unnecessary." An administrator from Lake University added, "[Our program] is viewed as pro-bono work. It's viewed as charity. It's viewed as eating your spinach because it's good for you." Despite these frustrations, program administrators understand the importance of faculty support for their programs. Brick University was the only institution in our study that had an institutional program focused on increasing attention among STEM faculty on issues of diversity and equity that had formal support from executive deans and the chief academic officer. That interviewee commented:

> Our [program] focus has always been faculty. I mean I have [events] that support students, because I like to hit this from every angle possible . . . but our overall focus has been faculty because we believe that, if you want to change the institutional norms of an academic culture, you have to hit the people that establish those norms and those are the faculty.

At most campuses in our study, to expand faculty participation in STEM diversity programs outside the committed few, directors must articulate benefits that extend beyond concerns about educational equity. They include: (a) highlighting industry mandates for a diverse workforce, (b) additional financial incentives (e.g., summer salary), and (c) emphasis on diversity in request for proposals (RFP) from large granting agencies such as the National Science Foundation. Thus, motivation for participation becomes driven largely by professional benefits to faculty members, many of whom are from traditional demographic backgrounds (e.g., White males). A program administrator from Bay University stated, "I used to be the one that had to go out there with my knee pads on . . . crawling into the office, trying to convince these guys that they should do this." External influences appear to persuade STEM faculty members to collaborate with diversity programs more than personal interest or direct department incentives. Many program administrators specifically mention the influence that the National Science Foundation holds in using grants as a catalyst for increased communication between diversity administrators and faculty.

Diversity program administrators state that support from faculty, regardless of initial motivation, benefits underrepresented students. Faculty participation fosters increased research opportunities, formal mentoring, and aspirational communication about STEM profession. Administrators state that they work hard to make sure initial participation is an overwhelmingly positive experience for faculty as they often have preconceived notions about the program and participants. An administrator from Canyon University put it this way: "Once they have had a chance to interact with these students, they have been somewhat, I think, surprised in positive ways about their abilities." Program administrators describe a process in which faculty members who were initially reluctant to provide lab opportunities for students became advocates for the program to their colleagues.

The interest-convergence framework suggests that, if initial sources of motivation remain grounded primarily in benefits for faculty, rather than in larger notions of equity and social justice, the power for change remains largely within the interest of the dominant group (Bell, 1980; Martin, 2011). As such, there is little dialogue, within departments or across campus, about power and equity. Additionally, those at the top of the hierarchical social structure are allowed to maintain blinders that keep them from seeing how their privileged perspectives limit comprehensive structural change. In this

study, Brick University was a notable exception, offering a diversity program for academic administrators and faculty on campus that was unique from other programs examined in this study. It was situated within an interdisciplinary STEM research center and its director is a full professor with decades of academic experience in one of the participating departments, which has an equity-centered research agenda. Further, the program director articulated strong support from multiple deans and the provost, reporting that over 70 STEM-related departments at the institution had participated in the faculty-targeted diversity initiative.

Discussion

Program administrators interviewed for the STEP-UP research project provide valuable perspectives on institutional efforts geared toward increasing diversity in STEM disciples. There is evidence of an individualistic focus for STEM diversity programs with little attention toward the examination and redevelopment of institutional policies that disproportionately influence experiences of traditionally underrepresented students. Further, diversity program efforts are supported only as long as they do not interfere with other institutional priorities and norms. Finally, administrators point out that diversity efforts are primarily shaped by external stakeholders (e.g., industry, external funding requirements) rather than by an institutional desire for sustainable and transformative changes of inequitable environments.

The study captures observations and experiences from administrators that institutional concepts of diversity do not fully address systematic inequalities that limit participation of traditionally underrepresented students in STEM education. Rather, it seems that diversity is treated mostly as a rhetorical commodity, used to buffer institutions from directly addressing the roots of inequality in STEM education: first, a standardized system for selecting STEM talent that privileges student from particular backgrounds; second, persistent stereotypes that perpetuate, by default, the notion that underrepresented students in STEM education must prove themselves to be capable; and, third, the myth of meritocracy that provides a comfortable rationale for maintaining the status quo.

This conclusion is not meant to suggest that the executive leaders of the departments and colleges at the institutions in this study consciously sought to shape a perfunctory approach toward STEM diversity. Decisions impacting STEM diversity programs can be understood as a reflection of the decades-long push for the higher education sector to adopt a market, technicist approach to governance (Morley, 1997). Hence, decisions that challenge status quo practices must be framed within a rationalist epistemology to protect administration from critiques of politicization. In STEM education, emphasis

on political neutrality fits comfortably with Mertonian concepts of objective meritocracy. Within this context, one can see the particular administrative appeal for identifying and targeting the most efficiently achievable diversity goals. Further, couching diversity goals within more digestible notions of educational progress (e.g., economic viability) could be considered a strategy for minimizing resistance.

Without the acknowledgement of power and privilege embedded in status quo practices of STEM education, the consequences for equity principles in STEM education are severe. The mask of objectivity and emphasis on individual improvement, rather than institutional transformation, reinforce the privilege of the established social hierarchy. This approach, in turn, reinforces a universalist perception that student failure is a result of individual inefficacies, particularly among students of color who did not succeed despite the additional "advantage" of diversity initiatives.

Conclusions and Implications

So how do institutions move beyond a concept of diversity that is merely a rhetorical commodity? First, STEM leaders must recognize that, while there are intersecting points of interests for improving diversity within STEM education, we found little evidence of strategies for a disruptive reshaping of policy and practice related to diversity initiatives. The mission for STEM diversity programs is becoming limited to increasing enrollment numbers among students of color. While access and opportunity are critical components in improving outcomes, addressing cultural norms and practices are key to persistence and degree completion rates (Kezar, 2011; Tanaka, 2002). Moving toward STEM equity means giving more attention to institutional transformation for retention as opposed to individual development for persistence. This process must include a critique of inequalities at the institutional level, as well as fostering opportunities for community-centered progress with particular attention to P-20 partnerships in underrepresented communities.

Second, while it is not uncommon for corporate giving to be funneled through the college and to move program funding from recurring to nonrecurring budget lines, STEM leaders must recognize that both campus-initiated and federally supported STEM diversity programs are disproportionately targeted for reductions or elimination (Rincon, George-Jackson, Williams, Walker, Baber, & Trent, 2010). Moving toward STEM equity must recognize the hypocrisy of supporting an interest-convergence call to address stagnant STEM education outcomes in the United States while underfunding or cutting programs that have the potential to positively influence populations belonging to the fastest-growing demographics. This approach is important, not just at the institutional level, but also at the federal level where there is

minimal or nonexistent support for programs such as the Ronald E. McNair Baccalaureate Achievement Program and the Louis Stokes Alliance for Minority Participation.

Finally, with STEM faculty, stimulating engagement outside of teaching and research responsibilities is a difficult task. Current reward structures for tenure and promotion often reduce incentives for dedicating significant time to service. In particular, underrepresented faculty are sensitive to this process, as they often accrue a "cultural tax" (Diggs, Garrison-Wade, Estrada, & Galindo, 2009; Padilla, 1994) through disproportionate pressure to represent their department in diversity effects. The preservation of a traditional formula for tenure creates a dilemma for faculty, particularly faculty of color in STEM fields. As long as faculty engagement with diversity initiatives is considered trivial rather than being integrated into the reward structure of the institution, progress toward equitable opportunities will remain limited.

Of course, these outlined challenges to the status quo are more attractive to consider in the abstract. Indeed, often the greatest enemy for equity-minded practice is the constructed realities of traditional practices and norms. However, Bell (2012) offers inspiration:

> There is, then, good news that is like water to a thirsty soul. It is the opportunity existing all around us to recognize the injustices that exist and to accept the challenge to make things better. . . . The victory goes to those who accept the challenge and, against all the odds, go forward. (p. 532)

Progress toward increasing postsecondary participation in the United States among traditionally underrepresented students, including students of color, will continue to be stagnant if the motivation of postsecondary policymakers and educators is primarily grounded in national economic prosperity. Substantive shifts will occur only through equity-minded policies at the core of STEM education. Just as stratification of opportunity in STEM did not emerge by mere coincidence, neither will a sustainable diverse STEM community.

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