"Moving the Science Forward": Faculty Perceptions of Culturally Diverse Mentor Training Benefits, Challenges, and Support

Damani K. White-Lewis,[†]* Ana L. Romero,[‡] Justin A. Gutzwa,[‡] and Sylvia Hurtado[‡]
[†]College of Education, University of Maryland, College Park, 20742 MD; [‡]School of Education and Information Studies, University of California, Los Angeles, Los Angeles, 90095 CA

ABSTRACT

There is a pressing need for deeper cultural awareness among postsecondary faculty, yet few studies focus on institutions with developing research infrastructure, which enroll large proportions of racially minoritized students. Using social exchange theory, we investigate faculty members' perceptions of "culturally diverse mentor training," which includes culturally aware mentor (CAM) training, *Entering Mentoring*, and self-designed mentor training initiatives. Data come from qualitative interviews with 74 faculty who participated in culturally diverse mentor training activities across 10 master's and doctoral institutions in the early stages of implementing grant-funded interventions focused on determining the most effective ways to engage and retain racially minoritized students in biomedical research. Findings indicate that faculty perceived a deepened understanding of their mentees' challenges and developed enhanced communication strategies to better appreciate cultural differences. Faculty reported several challenges, such as difficulty in adopting culturally sustaining practices, balancing multiple commitments internal and external of grant requirements, and dissatisfaction with facilitators from outside their disciplines. They also described supportive structures that decreased their mentoring workload, such as complementary curricula and tiered mentoring models. We conclude with implications for higher education leaders interested in adapting and scaling culturally diverse mentor training interventions within their own departments and institutions.

INTRODUCTION

U.S. higher education is currently undergoing a momentous racial reckoning. Internal and external pressures from various stakeholders have compelled institutional leaders to grapple with historic and contemporary racial disparities. This is especially true of the professoriate (e.g., Liera, 2020a,b; White-Lewis, 2020, 2021), yet concerns in this area are not merely isolated to matters of representation. The COVID-19 pandemic has exposed deeply intractable inequities in health, wealth, public policy, and technology that negatively impact racially minoritized students'[1] educational opportunities (Laster Pirtle, 2020). Some suggest that postsecondary faculty may not currently possess the necessary skills or means to adequately address these emerging challenges (Gruber, 2020).

This concern is especially salient for science, technology, engineering, mathematics, and medicine (STEMM) disciplines. For decades, STEMM fields have reflected

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[1]We intentionally use the term "racially minoritized" as guided by Chase and colleagues (2014), because terms such as "racial minorities" or "underrepresented minorities" imply that communities of color are minorities by capability alone, which ignores the active role that institutions of higher education play in perpetuating the limited representation of communities of color in STEMM fields.

white faculty majority interests, which subject minoritized students to microaggressions and stereotype threat that jeopardize their educational experiences and degree attainment (McCoy *et al.*, 2015; McGee *et al.*, 2019; Fries-Britt and White-Lewis, 2020). This is made worse by the small proportion of racially minoritized faculty in STEMM fields, who generally spend more time preparing and conducting student-centered teaching (Umbach, 2006; Eagan and Garvey, 2015; O'Meara *et al.*, 2017), and who often have a stronger commitment to training racially minoritized students compared with their white peers (Griffin, 2013, 2020). Although there are documented positive effects of same-race mentoring for minoritized students (e.g., Ortiz-Walters and Gilson, 2005; Blake-Beard *et al.*, 2011), there are too few faculty of color to mentor the increasing number of undergraduates from racially diverse backgrounds, nor should these faculty be expected to mentor all such students due to workload equity issues.

Culturally diverse mentor training is one recent approach to help all faculty adopt new competencies in working with racially minoritized students, particularly in STEMM. In this context, "culturally diverse mentor training" includes three types of mentor training modules that enhance mentor awareness of cultural differences and provide them with skills to address issues related to diversity and inclusion: 1) culturally aware mentor (CAM) training (Byars-Winston *et al.*, 2018, 2020), 2) *Entering Mentoring* (Pfund *et al.*, 2006; Greenberg, 2018; Branchaw *et al.*, 2020), and 3) trainings designed by institutions to address context- and/or population-specific needs (National Academies of Sciences, Engineering, and Medicine [NASEM], 2019; Windchief *et al.*, 2018). Studies of these interventions have shown positive increases in communication between mentors and mentees (Pfund *et al.*, 2006), self-reflection (Womack *et al.*, 2020), self-awareness (Pfund *et al.*, 2014; Womack *et al.*, 2020), empathy (Womack *et al.*, 2020), and likelihood to discuss issues of diversity with mentees (Pfund *et al.*, 2006, 2014; Stolzenberg *et al.*, 2019).

These trainings have become an important fixture for improving postsecondary STEMM education, but for whom? Implementation and evaluation studies of these programs are overwhelmingly at institutions with the highest research activity (i.e., Doctoral Universities: Very High Research Activity as classified by Carnegie; for examples, see Pfund *et al.*, 2006; Hund *et al.*, 2018; Spaulding *et al.*, 2020; Byars-Winston and Butz, 2021). Historically, these institutions have more resources to incentivize training through direct payments and course releases, students with higher levels of traditional academic and career preparation, and more graduate students to reduce and distribute the workload of mentoring students. Conversely, there is very little research in this area at other institutional types, such as those with the Master's Colleges and Universities or Doctoral Universities: High Research Activity Carnegie classifications. Compared with institutions with very high research activity, these institutions have fewer graduate degrees and greater focus on undergraduate education, typically have fewer resources on average to incentivize mentor training, and educate larger proportions of racially minoritized students in STEMM (Espinosa *et al.*, 2019). As more institutions look to their peers for innovative ways to increase their faculties' cultural awareness, there is no guarantee that interventions in one setting will translate seamlessly to others. Disregarding other institutional types fails to account for contextual features that may introduce new challenges to implementing mentor training across a diverse swath of institutions and students.

The purpose of this study is to explore faculties' perceived experiences with culturally diverse mentor training across 10 master's and doctoral institutions in the early stages of implementing a grant focused on enhancing diversity in biomedical research. The institutions in this sample received funding through the National Institutes of Health's (NIH) Building Infrastructure Leading to Diversity (BUILD) program, a component of the Diversity Program Consortium (DPC) whose overarching aims are to develop, implement, assess, and disseminate innovative approaches to research training to help engage a more diverse field of individuals in biomedical research careers (National Institute of General Medical Sciences [NIGMS], 2020). This study uses social exchange theory to examine three different dimensions of mentor training engagement as perceived by faculty: 1) outcomes from participating in training, 2) challenges in participating and implementing outcomes, and 3) supports believed necessary to spur further engagement. Understanding faculty mentor training experiences in different contexts should catalyze more effective change efforts across a wider array of institutions.

SOCIAL EXCHANGE THEORY

Stemming from social psychology and sociology, social exchange theory asserts that individuals engage in activities and relationships based on expected benefits and costs (Homans, 1961; Blau, 1964). That is, social relations are expected to be "reciprocal and bidirectional" (Griffin, 2013, p. 6) and should yield benefits that outweigh, or are at least proximal to, the costs (NASEM, 2019). Indeed, faculty make conscious choices regarding how they spend their time conducting research, teaching, and service based on projected returns. These are largely influenced by disciplinary, institutional, and societal academic reward systems (O'Meara, 2011), which provide faculty clues regarding which activities are expected to yield a return relative to the costs of participation. But culturally relevant mentoring is a recently developed approach with rewards and costs that are still being determined at many colleges and universities (NASEM, 2019). Informed by social exchange theory, we expect that faculty derive benefits and costs from participating in culturally diverse mentor training.

Scholars have used social exchange theory to understand the benefits of mentorship in higher education (e.g., Griffin, 2013; Lunsford *et al.*, 2013). However, these studies primarily focus on mentoring relationships rather than the mentor training experiences that precede them, and are either purely theoretical (Lunsford *et al.*, 2013), or only include faculty at institutions with the highest research activity (Griffin, 2013). Nevertheless, they provide a glimpse into the benefits of culturally diverse mentor training at master's and doctoral institutions. There are multiple benefits to the mentor, such as increased self-reflection (Womack *et al.*, 2020), self-awareness (Pfund *et al.*, 2014; Womack *et al.*, 2020), and likeliness of discussing issues of diversity with mentees (Pfund *et al.*, 2014; Stolzenberg *et al.*, 2019). Faculty also report a sense of personal fulfillment in mentoring students and derive professional benefits, such as research assistance (Griffin, 2013), administrative compliance, and recognition in the

form of departmental, institutional, and national awards for mentoring.

As with any activity, there are costs to participating in mentoring and mentor training. Faculty might perceive emotional taxation (e.g., burnout, anger, guilt) or professional hindrances (e.g., impeding scholarly productivity, shifts in reputation) as drawbacks of engaging in mentoring and mentor training (NASEM, 2019). There are also concerns regarding the time investment and lack of recognition in promotion and tenure (Griffin, 2013; Lunsford *et al.*, 2013). Griffin (2013) found that faculty mentors may also perceive a lack of reciprocity in their mentoring relationships, which may deter participation in mentor training if faculty feel that they are not being properly credited for their involvement. These perceived costs may undermine their receipt of psychosocial benefits that can come from participating in culturally diverse mentor training described in the literature.

Though the costs of mentoring and mentor training are clear, faculty are not without recourse or agency (O'Meara, 2011). Social exchange theory as applied to faculty mentoring considers "structures and policies that minimize or mitigate costs and increase the potential for positive interactions [that] can enhance the possibility of beneficial outcomes for mentors" (NASEM, 2019, p. 47). Although mentor training exists within specified institutional bounds, little research explicates what supportive structures and policies look like at master's and doctoral institutions. Guided by social exchange theory and extant literature on culturally diverse mentor training, the following research questions shaped this study:

1. What is the perceived impact of culturally diverse mentor training on faculty members' mentoring?
2. What challenges do faculty express related to such mentor training?
3. What supports exist to enhance and sustain culturally diverse mentor training for faculty?

METHODOLOGY

Data come from qualitative site visits to the 10 NIH-funded BUILD programs, located at the following institutions: California State University, Long Beach (CSULB), California State University, Northridge (CSUN), Morgan State University (MSU), Portland State University (PSU), San Francisco State University (SF State), University of Alaska Fairbanks (UAF), University of Detroit Mercy (UDM)/Wayne State University, University of Maryland, Baltimore County (UMBC), the University of Texas at El Paso (UTEP), and Xavier University of Louisiana (XULA). At the time of the award, none of the institutions in our sample were considered having very high research activity according to Carnegie's Basic Classification system.

The BUILD sites received grants to spur change at three levels: 1) student training, 2) faculty development, and 3) institutional research infrastructure (NIGMS, 2020). Each institution in our sample was connected by having "less than 7.5 million in total NIH research project grant funding [average over 2011–2013] and student populations with at least 25 percent Pell Grant recipients," and our sample included several minority-serving institutions (MSIs) (NIGMS, 2020). At the time of the site visits, each site, with the exception of UMBC, had installed some form of culturally diverse mentor training,

because the original call for proposals required that campuses "describe potential strategies and novel approaches to enhance faculty development and mentoring capabilities" (NIH, 2013). At the other institutions, faculty were formally paired with undergraduate students to serve as research and/or career mentors, providing them with the skills and encouragement to successfully navigate scientific research activity and careers.

In this study, we analyzed how faculty made sense of their participation in culturally diverse mentor training. We used generic qualitative inquiry (Caelli *et al.*, 2003; Kahlke, 2014) to explore participants' experiences with culturally diverse mentor training through a social exchange theory lens. Generic qualitative inquiry arose from observations that many qualitative studies do not ascribe to rigid demarcations (i.e., phenomenology, narrative inquiry, etc.), nor should they if data were not originally collected in the prescribed manner. Because our data were originally collected in an exploratory manner to understand an entire institution's program implementation and the focus of this study is specifically for "understanding an experience or an event" (Caelli *et al.*, 2003, p. 2), generic qualitative inquiry was the most appropriate method. Thus, we solicited and analyzed participant narratives to understand how faculty at these institutions made sense of their mentor training participation by describing the lessons they took away, the challenges they encountered, and solutions they believed would mitigate them.

Data Collection and Participants

A team of 10 researchers conducted qualitative site visits to 10 BUILD programs. The primary type of data collected were semistructured individual interviews and focus groups ranging from 30 to 60 minutes. Participants in the larger research project spanned a wide range of roles, including principal investigators, program administrators, university leadership (e.g., presidents, provosts), students, and faculty. Interviews were primarily conducted during site visits between January 2017 and December 2018. The goal of these site visits was to broadly understand BUILD program initiatives, their progress toward institutionalization, and individual stakeholder experiences.

Due to the exploratory nature of the site visits, we selected a subset of data from faculty who participated in culturally diverse mentor training activities. Because the DPC included the National Research Mentoring Network (NRMN) as part of the collaborative, many campuses leveraged those resources to construct their own culturally diverse mentor training modules and workshops and/or relied on master trainers provided by NRMN. XULA, UDM, UAF, and CSUN adapted CAM training specifically informed by research and practice from NRMN investigators (e.g., Byars-Winston *et al.*, 2018, 2020; Byars-Winston and Butz, 2021). For more detailed descriptions of each site and its mentor training, please refer to special issue articles written by each BUILD institution's program leadership (Hurtado, 2017).

Faculty participants in culturally diverse mentor training initiatives across campuses were selected via convenience sampling to conduct in-person single interviews and focus group interviews. They were asked questions about their mentor training experiences, the extent to which they felt activities were beneficial to their development as mentors, and how BUILD program leaders could better support their own professional

development in this area. The final analytic sample included 74 faculty participants responding to the same protocols used in individual interviews and focus groups. Pseudonyms are used throughout our findings to protect the anonymity of faculty participants.

Data Coding and Analysis

After the interviews were collected, the research team used a multistep coding procedure to organize data, which included writing analytic memos and inductive and deductive coding procedures (Moses *et al.*, 2020). During each visit, the research team created analytic memos to synthesize their observations after each day of interviews. Because site visits were conducted in teams of four, the team peer debriefed to confirm observations, triangulate preliminary findings, and stabilize data-collection procedures.

Interviews were transcribed and coded using Dedoose, a qualitative coding software. The initial qualitative codebook for the overall study was derived from extant literature on STEMM education and program evaluation. Data from the larger study were categorized into four primary categories: student level, faculty level, program level, and institutional level. Because faculty were the primary units of analysis for this study, we did not analyze data from the other three levels. With such a large volume of data, this initial coding strategy indexed the overarching themes across the BUILD sites, which made data management, retrieval, and analyses more manageable.

Once codes were parsed by level, we engaged in second-level axial codes (Saldaña, 2016). For the faculty interviews, we started with a priori codes informed by research studies on culturally diverse mentor training (e.g., Handelsman *et al.*, 2005; Pfund *et al.*, 2015; Byars-Winston *et al.*, 2018). We used structural and pattern coding techniques to identify recurring patterns in the data and magnitude coding to ascertain how often each theme emerged so as to only include the most durable and consistent themes across our participants. This resulted in codes in our three primary areas of interest, such as "developing psychosocial communication strategies," "challenges with program leadership," and "discipline-specific role models."

Trustworthiness

The trustworthiness of findings is important for accurate interpretation of qualitative data (Merriam and Tisdell, 2016). At the end of each site visit, the research team conducted a debrief meeting with BUILD program administrators to discuss initial findings, a form of member checking (Merriam and Tisdell, 2016). The research team also provided each site with debrief reports and asked each site to respond and provide feedback on their accuracy. During the coding phase, we held iterative process meetings to discuss codes and refine. Two different researchers (D.W.L., A.R., J.G. and S.H.) coded the same transcript to compare results and resolve discrepancies. Intercoder reliability estimates were subsequently established at 0.96%, using a pooled kappa method (De Vries *et al.*, 2008) from half of the sites to confirm. Secondary coding structures and findings were shared between analytic/writing team members at regular meetings for over 5 months to check for accurate interpretations of the data. Finally, members outside the writing team familiar with the sites were asked to review the article to verify campus practices.

Limitations

The primary limitation of this study was the inability to conduct pre- and posttesting, but this was unattainable due to several reasons. First, the BUILD site visits were exploratory, in that there were multiple aims of data collection across different groups. As was stated previously, understanding mentor training experiences was just one activity across multiple faculty activities, which was just one of several stakeholder groups (i.e., students, faculty, and administrators). Additionally, we did not want to overburden faculty with repeated measures. In addition to the team's evaluation, each site had a team of local evaluators collecting quantitative and qualitative data. Conducting pre- and posttesting, while optimal, would have been difficult due to the multilayered approach of the DPC.

FINDINGS

The findings are organized around our three central research questions. Two primary themes emerged that pertain to the first research question related to training outcomes: 1) mentor training participants perceived within themselves a deepened understanding of students' challenges within and outside higher education, and 2) mentor training participants perceived within themselves improved communication practices to better appreciate cultural differences between themselves and their mentees. Guided by social exchange theory, we also share findings that address the second research question, identifying participants' perceived challenges, or structural impediments, to mentoring and mentor training. We conclude our findings by addressing the third research question, identifying what the participants believed were necessary supports to mitigate said challenges.

"It's Not the Same as when I Was an Undergraduate": Understanding and Addressing Student Challenges

The most consistent perceived impact of mentor training across sites was participants' deepened understanding of the complexity of their students' lives, which often differed from their own undergraduate trajectories. For example, one faculty member who participated in MSU's annual mentor training shared, "Students are becoming very busy, you'd be shocked that studying is secondary. A lot of our students have families to take care of. So, juggling between school is not the same as when I was an undergraduate."

The awareness gained through mentor training required that faculty confront their own misunderstandings of "traditional" college-going students, and learn about the challenges undergraduates face across multiple dimensions. One participant from PSU's mentor training shared their realization concerning a student's housing insecurity:

> "Being involved in the mentoring, you become aware of what students are going through in a way that it's easy for a faculty member to not be aware of … and you're better equipped to help other students in the future who are dealing with similar things. It was very tough for me because my last mentee was someone who was really homeless and struggling with that. It was hard just to figure it out and to see, vicariously, some of the frustration somebody was going through. And, you could help some, but you can't help as much as you'd like."—Dr. Klein

PSU's mentor training—informed by *Entering Mentoring*—exposed this faculty member to a different side of their mentee, though not without certain emotional costs. Although mentor training provided faculty with more nuanced insights into their students' divergent realities, how faculty internalized and acted upon these revelations differed. Several faculty in UAF's mentor training and CSUN's critical race theory mentor training—both of which heavily discussed identity—changed the way they worked and conversed with mentees about their unique backgrounds. One participant imparted:

"The cultural competency part about knowing more about where your students come from, and what their family history and ethnic history is, and [how] that expresses itself in how […] they might approach their work […] was the eye-opener for me. I've really fallen into this pattern of just being the professor and not really being that close to my students. That's what I feel I got out of it. I think just opening up the conversation with my student and learning more about her history or their histories, to me, that was the biggest benefit."—Dr. Snyder, CSUN

In select cases, agentic faculty described taking more direct actions to find ways to support students, such as financial support or helping them navigate bureaucracy. Another faculty member who participated in CSUN's critical race theory mentor training recalled a story of supporting a student who, in their first year, had "a lot of missed meetings and scheduling issues." They shared:

"Rather than me having certain assumptions about her motivation or drive or reliability, we would have these discussions where I would find out […] she was working a full-time job on top of commuting, was the caretaker of her grandmother, […] and she doesn't have a parking permit on campus, she was doing some of her work in the car. I let her know anything that's going to help you with being able to come and participate in research, I would like to know about. So, I helped make those contacts, finding out how BUILD can support by getting a parking permit for her."—Dr. Lee

Across these cases, culturally diverse mentor training shifted how faculty members engaged with and supported their students. By viewing their students' lives not as challenges they needed to overcome individually, but rather as areas for potential faculty support, these faculty challenged deficit-based misconceptions of racially minoritized students that often go unchallenged within STEMM mentoring relationships (McCoy *et al.*, 2015). Instead of making assumptions about their students' dedication or preparedness based on missed meetings, they actively sought to understand their students, and in some cases used BUILD resources to address impediments that limited their students' involvement.

"Moving the Science Forward" through Enhanced Communication Strategies and Compacts

Learning about the layered challenges students face represented many participants' first foray into cultivating more meaningful relationships with an undergraduate student. When faculty reflected on how students' circumstances impacted their academic behaviors, they sought additional strategies to fortify those connections. Many faculty adopted communication strategies that supported their mentees' psychosocial development and shifted their views to see their students as people with complex and intersecting identities that impacted the work, thus "moving the science forward" (Dr. Bowman, CSULB). This most often began by creating a "shared space" between themselves and their mentees that sparked vulnerability. A professor at UDM explained how now, posttraining, they are more likely to share about their own struggles with higher education and as a faculty member than they were before participating in culturally diverse mentor training.

Most faculty participants interpreted vulnerable communication as sharing their graduate school and career trajectory experiences. One professor at XULA used this strategy to discuss a mentee's graduate school preparation, which also exemplified their cultural awareness and respect for their students' lived experiences:

"I never really thought about having those kinds of conversations with my students, about going away for the summer and the different environment. It just hadn't even occurred to me and once we started talking about it, I'm like, 'Well, it makes perfect sense that we should talk about that.' I had a [BUILD] technician this last year who went off to grad school and we had conversations about the interview experience: how many faculty there were that looked like her, what was the vibe that she was getting from some of the other people, and [we] really talked about what the best choice was for her in terms of departments because if you got this uncomfortable feeling, nobody really wants to spend five years at this place. I don't know if I would have had that conversation with her in that way if not for some of the stuff that we've talked about in these [culturally aware] mentor workshops."—Dr. Chambers

For Dr. Chambers, mentorship included discussing the personal aspects of graduate school that undergird success, unrelated to work in a lab. Asking their mentee about the racial and gender demographics of the prospective program was also sensitive to the fact that the mentee was a student at a historically black college and university, whereas biomedical graduate programs at non-MSI institutions lack racial faculty diversity. Participation in culturally diverse mentor training equipped faculty to develop communication styles that extended beyond academic mentorship, which opened the doorway for increased awareness of the importance of institutional culture and a willingness to talk openly with students.

Mentoring compacts were a vital tool for jumpstarting better communication between mentors and mentees. Mentoring compacts are a written agreement that enhances communication by explicating bidirectional expectations, shared interests, and project timelines. For one professor at XULA who "would have never thought of that as an idea," it "helped begin the relationship." Another XULA professor admitted that "before P-MAX [mentor training], I would just say 'okay, I'll send them emails and they need to reply.' I never thought about figuring out what was suitable for the other students. It helped me think outside of my little box." Two professors at CSULB and UTEP elaborate how mentoring compacts helped strengthen their communication with mentees:

"The compact has been so helpful. Any time there's the potential of me starting a new mentee/mentor relationship I pull the compact out, and it's one of the very first things we talk about. It has really helped set the stage for the relationship. There are even times when they apologize for not meeting a deadline because something happened in their personal lives, and I'm like, 'I'm a human being too, I know that these things happen.'"—Dr. Marino, CSULB

"What I have really liked is BUILD focusing us to do these compacts with our students. Those are really forcing good and tough conversations that I think I probably would have avoided to some extent. They also force me, which I like, to talk to my students about my vulnerabilities and what I can improve on, or things that I have improved on over the years. It's really helped forge a better relationship with my students."—Dr. Johnson, UTEP

For Drs. Marino and Johnson, mentoring compacts helped concretize the mentor–mentee relationship by providing them with avenues to share their vulnerabilities and engage in difficult conversations with their students.

"A Significant Amount of Time and Effort": Challenges of Mentor Training

Though faculty across the sites acquired many lessons from culturally diverse mentor training, there remained challenges related to training and implementation. Regarding the first theme of deepened understanding, some faculty still felt uncomfortable in this role. One participant at UTEP felt that the emotional attention a mentee requested was unexpected:

"Sometimes I have my student come to me and say 'I don't know how to get myself health insurance.' That's not what I feel like I'm supposed to be doing, but those are challenges nonetheless that I feel like as a group, they have. Difficulty of getting money or maybe family problems or hurdles that they have to overcome and that's a challenge for a mentor. Some of them are expecting that's what the mentor does. That's not what my mentor did. I'm at a loss for that.—Dr. Gonzalez

These struggles in balancing mentorship expectations with personal action were shared by faculty at UAF, CSULB, and UDM, the last of which had one faculty member who described feeling underqualified to emotionally support their mentees. They described how "dealing with students' personal life issues … like anxiety issues'" was challenging because they were "not trained to deal with this" and did not "have a psychology degree" (Dr. Lacey, UDM).

Challenges in this area also translated to difficulties in communication. Some faculty expressed apprehension discussing topics unrelated to course and/or lab requirements, most often describing them as "uncomfortable," "touchy-feely," or "not science-y enough." One professor at CSULB encapsulated these concerns, stating: "It's just a new generation that is really difficult to deal with. And understanding the boundaries of 'I'm your mentor but I don't want to hear about your personal life, because that's beyond … there's a boundary line there'" (Dr. Ginsburg). This also included difficulty with mentoring contracts; one participant at UDM said they did not believe in mentoring compacts, because they were not "being valued [by]

other people," and instead "kept tabs'" on their students via email when they missed meetings.

Outside mentor training content, there were also difficulties with balancing training sessions with other demands. Faculty in a focus group at XULA shared:

"I literally had a situation a couple of weeks ago where I had three mandatory meetings I needed to be at, at the same time, and one of them was BUILD. So it just comes to a point where you have to say, 'I actually have to get some work done at some point.' I think that given the teaching that we have and given that we all are highly invested in our students, we do take that seriously, but there's really only so much we can add without something giving."—Dr. Wu

"I don't think I've had a weekend where I haven't checked and responded to a significant amount of emails from students or about BUILD. At some point in that meeting, you're not exactly sure what they're going to talk about, and you're not 100% sure it's going to be useful, instead I have 20 essays that need to be graded by tomorrow. Sometimes [the latter] one wins out."—Dr. Jennings

Both participants recount tensions where time dictates prioritization, especially at undergraduate institutions where the teaching load for most faculty participants was four courses a semester. However, this was not merely an issue of time, but a deeper evaluation of the value of mentoring and mentor training compared with that of other responsibilities, evident from Dr. Wu's emphasis on what constitutes "work" and Dr. Jennings's concern about effectiveness.

Finally, faculty expressed concerns about *who* delivered the training. For example, two professors at UTEP wanted training to come from departmental faculty who were "more experienced in mentoring to give you some pointers." At SF State, Dr. Hawkins discussed the challenges of mentor training from faculty outside the department:

"The professional development they're doing isn't going to work in math. It isn't even going to work in comm[unications]. It's a different model that needs to be different [for each discipline] and needs to be supported. It needs to be supported here if we're actually going to address students [in our fields]."

Some faculty at MSU and PSU also insisted that a one-size-fits-all model would be inadequate for addressing their students' needs. For this group, being trained by somebody 1) more senior and 2) inside the field who understood their values and norms was especially important for incorporating mentor training into their workloads. Dr. Hawkins also alluded to the need for support, but stopped just short of articulating what that would entail. Several participants across sites had their own ideas regarding support, discussed in the final theme.

"Lessen the Burden on Mentors": Sustaining Mentorship through Structured Supports

Multiple participants across sites shared what was available at their institutions and/or BUILD programs to support, sustain, and institutionalize mentorship practices. Especially at institutions with high commitments to undergraduate teaching and a burgeoning research enterprise, support systems were perceived

as vital for maintaining mentoring at the same pace as other demands. One professor at CSULB described the typical challenges with time and buy-in, but also provided some built-in remedies offered by their BUILD program:

> "Definitely the faculty buy-in, I think, is one of the challenges that you face. One, there are a lot of activities that we ask the [BUILD] trainees to do. So, we ask them to really connect with their mentors a lot, and I think for some mentors, that's just additional time to spend. But I think from our program standpoint, we try to cut those down and try to make it as manageable as possible: the learning communities, the scientific research communication class. Our hope was these types of activities are really going to help lessen the burden on mentors, because they're going to get those skills through these classes."—Dr. Simmons

As required by their NIH awards, BUILD sites developed a suite of student development interventions alongside those for faculty development. At CSULB, students engaged with faculty on multiple levels, such as participation in funded undergraduate research and research colloquia. Thus, Dr. Simmons described the spillover effect that some faculty experienced as a result of student activities. The BUILD learning communities and curricula served a dual purpose: not only did they enrich the student experience, but they also reduced faculty mentoring loads by training students outside their research settings. Because students received requisite skill training through course work, they conceivably asked less of their mentors. Dr. Ward at UDM reached a similar conclusion: in their biology department, the student demand for undergraduate research outpaces the available faculty research output, with many not "in tune with what a faculty advisor needs for a student to come into the lab." In contrast, UDM students received curricular training that "put them well ahead; they can understand the issues of where they're going to fit in the lab, and it's clear that that's a big advantage of these students."

Faculty at BUILD sites that developed multilayered mentoring models cited them as crucial support systems for sustaining mentoring. At sites such as PSU and UAF, multiple faculty and/or academic researchers were responsible for mentoring each BUILD student. This not only spread the work across multiple mentors, but it also reinforced boundaries in mentoring responsibilities, such that no one individual was responsible for all mentoring. PSU trained three types of mentors—research, career, and peer mentors—each with clearly delineated roles; UAF had research advising and mentoring professionals who were also responsible for mentoring undergraduate students. Faculty in these programs expressed a sense of relief knowing that they were not solely responsible for mentoring students but were part of a mentoring community.

Although these support systems are important, they also require context. The BUILD sites were given significant external funding to incentivize mentor training. Implementing any of these supports may be difficult for institutions that do not already have the needed buy-in, momentum, and/or external funding. The final form of support—faculty mentor learning communities—were a generally cost-effective method of faculty mentoring. At both SF State and CSULB, faculty met semi-regularly to discuss successes and challenges related to their BUILD involvement. Although it did not relieve any responsibilities like other support systems, it did aid mentors by providing them a supportive space to learn and practice techniques among their peers. Moreover, many of these spaces were interdisciplinary, which many faculty participants enjoyed in their communities and even in mentor trainings. Dr. Hanson at CSULB explained why:

> "I had never gone through a kind of faculty training … where we talked about the whole idea of communication with students, how to set up reasonable goals and guidelines. And I really like the way that we can discuss among different faculty from different disciplines and see what concerns and problems people had from each discipline, and each kind of pitch-in, in terms of how they deal with different situations. I think it was pretty helpful."

Interestingly, this perspective seems at odds with the previous challenge of not having discipline-specific professional development. However, these are not mutually exclusive; most faculty participants wanted the primary mentor training to be discipline specific but preferred the peer-learning elements of mentor workshops to be interdisciplinary so they could learn novel implementation lessons from faculty in other departments. This blended approach may combine the best of both worlds to deliver tailored, interdisciplinary mentor training.

DISCUSSION AND IMPLICATIONS

Consistent with social exchange theory, findings from this study illustrate both the benefits and costs of culturally diverse mentor training for faculty at master's and doctoral institutions in the early stages of implementing a grant focused on enhancing diversity in biomedical research. The first two themes highlight the different inroads institutions made in promoting cultural awareness among faculty who were mentoring students with unique challenges. Culturally diverse mentor training encouraged faculty to reflect on the shifting demographics of undergraduate students in the sciences, causing some to shift away from the deficit-based understandings of historically marginalized students that "traditional" notions of college students negatively reinforce (McCoy *et al.*, 2015).

Though few faculty supported students beyond mentoring by taking more direct action to personally remove obstacles, many followed up with their mentees by using culturally aware communication strategies. Fries-Britt and White-Lewis (2020) examined the student perspective of Black men in STEMM mentor–mentee relationships and found that they desired relationships with their faculty beyond superficiality and could identify subtle shifts in their behavior that suggested a mutual interest. This study contributes to the student–faculty interaction literature by showcasing how faculty can display their commitment to a sustained mentoring relationship by sharing their own personal challenges and career paths and using mentoring compacts. Findings also push our understanding of professional relationships, showing that empathy and vulnerability are also necessary for developing relationships. Participants repeatedly referenced culturally diverse mentor training as a primary reason for engaging in conversations they might have previously devalued and overlooked.

Faculty cited multiple challenges with mentor training activities, particularly concerning time and effectiveness (Griffin, 2013; Lunsford *et al.*, 2013). Regarding effectiveness, several

participants were concerned about who delivered the training, showing a preference for senior colleagues who came from their disciplines. This makes sense through a disciplinary norm lens (Posselt, 2016; White-Lewis, 2020), and future research should investigate whether having such a trainer increases faculty comprehension and willingness to participate. Related to time, many participants cited the amount of "work" associated with training as an additional roadblock. Despite an increasingly diverse academy, reward systems continue to overwhelmingly prioritize neoliberal values that fail to reward faculty for labor they may find personally and professionally meaningful (O'Meara, 2011; Griffin, 2013). As such, faculty frequently are forced to make value-based judgments that dictate the types of labor they engage in. Findings from this study corroborate that participation in culturally diverse mentor training is viewed by faculty as incompatible within a university's value systems through a rewards-based lens.

A core contribution of this study is not only its description of the costs of culturally diverse mentor training to faculty, but also its documentation of how faculty responded to the supportive structures installed by BUILD program leadership to mitigate those costs. Distributing mentorship responsibilities among teams and communities of mentors was highly beneficial. This aligns with research on faculty workloads, which advocates for equitable distribution of departmental service responsibilities (O'Meara *et al.*, 2017). Faculty mentorship should ideally become the work of the entire department, rather than a select few agentic faculty members. Complementary curricula also helped prepare students outside their mentors' research labs, which faculty reported helped reduce their mentoring workload and increased their ability to attend to multiple mentees. Finally, remarkably few participants noted lack of incentives as a challenge. This may be because BUILD sites invested critical funds into incentives for student and faculty interventions, which represented one of the strongest supports available to mentors.

Implications for Practice and Research

The findings from this study yield a more nuanced depiction of perceived mentor training outcomes, challenges, and solutions as experienced by faculty, particularly at institutions that operate at the complex intersections of higher teaching and consistent research demands. Here, we review several implications for practice and research designed to aid these faculty and academic leaders in designing and/or enhancing culturally diverse mentor training workshops and online modules, which are more important given increases in diversity in undergraduate populations at many institutions like the BUILD sites.

Culturally diverse mentor training must be constantly updated to keep faculty abreast of changes in the field and broader society, from terminology to greater emphasis on having conversations across racial differences. This is why we deliberately use the term "cultural awareness" rather than "cultural competency," as the latter suggests a linear pathway focused on "achieving" competency, whereas awareness suggests an evolving, sustained commitment to matters of cultural difference. This distinction is important, as several participants still made assumptions regarding students' preparation and motivation without considering their familial responsibilities and extracurricular activities. These deficit mindsets often have negative

consequences that make completion even more difficult for racially minoritized students in STEMM (McCoy *et al.*, 2015; Fries-Britt and White-Lewis, 2020). Consulting the growing literature on culturally diverse mentor training may help remedy this lack of understanding and improve faculty members' odds of correctly identifying student challenges.

Trainings themselves, however, are not the only institutional procedures that require revision. For culturally diverse mentor training to be effective, faculty must be rewarded to participate in said training. As discussed earlier, faculty participants cited culturally diverse mentor training as being too much "work" on top of their other engagements, signifying a perceived lack of importance placed on culturally diverse mentor training by their respective institutions. As reward systems directly shape the practices faculty choose to engage in (O'Meara, 2011), institutional leaders must seriously consider revamping and reimagining existing systems that do not currently reward faculty for participating in mentor training. Tenure and promotion procedures, for example, not only inform what labor faculty members take on, but also shape how faculty are socialized and socialize others (O'Meara, 2011). Reimagining "service" in the tenure process to reward faculty for taking steps to develop their abilities to mentor students holding systemically minoritized social identities demonstrates one place where institutional leaders can critically interrogate their university's extant value systems. By restructuring value systems to value culturally diverse mentor training, institutional leaders will not only incentivize faculty to better serve an increasingly diverse demographic of students in the biomedical sciences, but also reframe conversations on what constitutes work that is valued.

Next, institutional leaders need to balance the challenges faculty report with solutions and opportunities for support. Some faculty concerns may be inevitable, such as time conflicts. But according to faculty at some sites, support from BUILD program leadership demonstrated a serious commitment to sustaining and supporting effective mentoring. It is worth mentioning that many of the supports cited by faculty were not present at their institutions before the BUILD grants. This includes some of the complementary curricula and the tiered mentoring models that paid and trained faculty and other academic personnel to mentor BUILD students. Thus, it is important that institutional leaders interested in adopting culturally diverse mentor training within their own institutions think carefully about the surrounding infrastructure that supports faculty in these efforts. As is true in other settings, such as undergraduate research training, getting faculty to commit to cocurricular activities to the benefit of their mentees is not merely a matter of faculty "willingness," but often a matter of support (Eagan *et al.*, 2011).

We see multiple avenues for future research in this area. Given that this was an exploratory study across 10 different institutions, we recommend that future research conduct more localized analyses. Though the institutional sites in our sample were connected by criterion stipulated by the NIH, they still varied by geographic location, student and faculty demographics, and mission (i.e., several are MSIs, whereas others are not). These differences may translate into observable differences in how faculty respond to cultural diversity mentor training. In

fact, programs such as the National Science Foundation's Alliance for Graduate Education and the Professoriate require institutions seeking funding to be similar in terms of some of these dimensions, as these factors are believed to impact intervention efficacy and lessons learned. Therefore, comparing training modules within a bounded field of like institutions may yield more nuanced faculty responses in context.

Ultimately, future research should consider a wider range of institutional types when making such bounded comparisons. It is resoundingly clear that diversifying STEMM disciplines will require significant investments in all areas of higher education, including community colleges and regional comprehensive institutions. Not only do BUILD sites enroll and graduate a significant number of students from historically marginalized groups, but they also represent the types of institutions that are not typically the focus of intervention (NIGMS, 2020). By examining mentor training across institutional types, future studies can elucidate the unique experiences faculty have with training and mentorship programs. Unlocking the fullest potential of the U.S. STEMM talent pool will require implementing culturally affirming mentoring at every level and location of biomedical student training.

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