New Directions from Theory: Implications for Diversity Support from the Theories of Intersectionality and Liberatory Pedagogy

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I. Introduction

Within conversations on broadening participation in engineering, there is a longstanding recognition of the need for and importance of institutional support for students from underrepresented demographic groups [1]. This support comes from many sources, such as institutional offices, programmatic initiatives, and informal mentoring by faculty and peers. Key institutional programmatic interventions include bridge programs, recruitment incentives, scholarship support, and safe space communities for marginalized and underrepresented identity groups. These initiatives act as a front line for addressing diversity and equity in engineering. Their importance has been widely documented to have a positive impact on retention and student experience [2]–[5].

Although the importance of such programs is clearly recognized, an understanding of how and why such programs have an impact is less well-developed. In a review of programmatic student support initiatives, Lee and Matusovich [6] presented a comprehensive analysis of diversity support practices, and then called for more interplay between research and practice on diversity support. Narrowly framed, a relationship between an empirical base and implementation strategies might be summarized as determining “evidence-based best practices.” However, Lee and Matusovich noted that “while the practice of providing students with co-curricular support has been evaluated, theory about co-curricular support has not been as thoroughly developed or investigated” (p. 407). This specific call for theory on co-curricular support suggests that the broader purpose of forming this empirical base is to build towards more strategic, theoretically grounded understandings of the possible organization and approaches to institutional diversity support. In their work, Lee and Matusovich suggested that a comparison and discussion of theory from fields outside of engineering education may play a crucial role in clarifying and modifying current diversity support practice.

In another key empirical evaluation of diversity support programs, Shehab, Murphy, and Foor [7] examined the impact of a shift in the organization of a Minority Engineering Program to incorporate Multicultural and First Generation students. An important element of their research was documentation of the forces that led to the change and the unintended consequences for student perceptions and experiences of support. For instance, changes in the personnel, structures, signifiers, and communication strategies of the program had resulted from a range of political pressures and goals. Although the goals of the programmatic changes were primarily to support a wider range of students, the unintended consequences included students perceiving that institutional support for minority students had waned. This work provides important insight into the not only the intended and positive consequences of diversity support structures, but also the unintended and negative impacts of certain choices and approaches. Empirical work in this vein adds nuance to a conversation on “best practices” by examining contextual and perceptual elements of co-curricular practice in situ.

This paper responds to calls for theoretical work on diversity support, as well as a focus on the enacted and unintended consequences of diversity support approaches. It draws on theories at
differing levels of peripherality to engineering education to suggest consequences and implications for the discipline, including new structures or approaches to diversity support practice, and novel ways of conceiving of existing practices. The paper will discuss current diversity support practices and then discuss the ways theories of intersectionality and liberatory pedagogy can add insight and commentary to current practices and suggest new approaches.

II. Current Diversity Support Practices

This section represents an interpretive characterization of diversity support practices into fundamental approaches. The source of these interpretations come from experience and observation at institutions, national conferences, and publications. In general, what is meant by diversity support practices pertains to specific institutional programming for demographically underrepresented groups, groups expected to experience marginalization in engineering, and/or groups who are expected to have a lack of normative academic preparation.

Diversity support practices often focus on academic improvement, such as bridge programs to supplement the educational preparation, or supplemental tutoring instruction to help students through the core engineering course sequence. Other key aspects include providing academic, professional, financial, and personal resources through a central office. The personnel in these offices often function as pivotal mentors for students, and also help connect students to peers for tutoring and mentoring.

Finally, a key component of institutional support is providing a safe space and community for a marginalized student group. These groups often form around a shared underrepresented demographic identity group, such as student chapters of the Society of Women Engineers, National Society of Black Engineers, Society of Hispanic Professional Engineers, American Indian Science and Engineering Society, Out in STEM, NOGLSTP, groups for first generation students, etc. In addition to student-run chapters, which provide a key resource for self-organization, institutionally-run community groups and living-learning programs that offer these groups with additional resources.

Arguably the strategy of such a support group involves finding a quorum of underrepresented students with a shared primary demographic identity which is underrepresented in engineering. By quorum of students with a shared demographic identity, we mean to point out that in this model a certain minimum number of underrepresented students is required to form a community in the first place. This programmatic quorum is similar to the idea presented by Pawley and Slaton [8] that a sufficiently large “n” is required in order for research results to be significant and generalizable. Pawley and Slaton argued that the focus on a large and homogeneous sample fundamentally disenfranchises underrepresented demographics from empirical study. A similar logic of quorum-building may undergird institutional policies to support marginalized students. For example, while many institutions have quorums to build community groups to support African American and Latino students, far fewer institutions have quorums for Native American students or students with disabilities. If a student in a marginalized demographic category is the only or one of a very few students in the institution, the institutional support based on a quorum of students with shared identity may not be possible or substantive.
III. Intersectionality

Intersectionality is a framework that looks at multiple intersections of systems of oppression. Kimberle Crenshaw, working in Critical Legal Studies, sought to understand the particular impact of the legal system on Black women [9], [10]. Crenshaw and contemporaries purported that Black women have a particular experience of the legal system that is experienced as a whole and not simply reducible to the sexism experienced by all women and the racism experienced by all Black people. That is, intersections of oppression are experienced and should be examined as holistic, rather than additive. Intersectionality grew in prominence due to uptake and similar arguments by Black feminist scholars such as bell hooks and Patricia Hill Collins. With origins in Black feminism and the intersections of race and gender, a subsequent pool of scholars and activists have developed ways of looking at the intersections of not only gender and race, but also class, ethnicity, sexual orientation, ableism, and other systems of oppression.

Intersectionality is not a new theory for engineering education researchers. Several studies have looked at intersections of gender and race in the experiences of women of color in STEM [11], [12]. Bruning, Bystydzienski, and Eisenhart [13] have used intersectionality as a framework to interpret explored how systems and experiences of race, class, and gender impact young women’s interest and persistence to engineering. Pawley and Slaton [8] incorporated intersectionality into a discussion of how research on “small n” populations, such as those at the particular intersection of several underrepresented and marginalized groups in engineering, are overlooked by methodologies which require large sample sizes to draw conclusions. These studies demonstrate the power of looking at student experiences at the intersection of systems of oppression. Although many of the engineering education scholars make practice implications based on their findings, they have less often centered as their primary topic the practical implications the intersectionality framework might have for programs and institutions, as this paper attempts to do.

Other scholarship, particularly from the higher education discipline, have used intersectionality as a framework to inform and interpret the practice and organization of higher education institutions. In a book of collected chapters, Intersectionality and Higher Education [14], several scholars discuss intersectionality in a range of student organizations, conceptions of practice, and institutional policies. Examples of chapter discussions include ways that a large population of White women in student services conceived of their identity regarding gender oppression and racial privilege, and the role of a LGBT student group in taking up racial and socioeconomic oppression as an organizing cause in addition to sexual orientation. In a Journal of Women and Minorities in Science and Engineering article, Armstrong and Jovanovic [15] discuss underrepresented racial minority women faculty and ways that institutional policies and practices affect them, and imagine new possibilities. These examples from higher education and faculty affairs demonstrate the insight an intersectionality framework can provide to institutional practices and policies.

In a chapter from Intersectionality and Higher Education, Robbins and Quaye (2014) discussed and interpreted implications for three original forms of intersectionality: structural, political, and representational, as presented in Kimberle Crenshaw’s original work [10]. In this section, we will retrace both Crenshaw and Robbins and Quaye’s discussions of the three aspects of
intersectionality, as well as discuss some other related concepts (e.g., identity), to suggest implications for engineering education diversity support practice.

### III.A. Structural Intersectionality and Multiple Identities

Structural intersectionality concerns how systems in society shape the experiences of a group at the intersection of systems of oppression [10]. This form of intersectionality is consistent with most of the usage in engineering education research, and is characterized by looking at holistic experiences within the impact of systems of oppression, rather than an additive model [15, p. 145]. In a similar way, engineering education administrators and practitioners could think about how academic programs, support services, recruitment, admissions, etc. are structured and how students at multiple intersections of oppression engage with, are served by, or are overlooked or underserved by their current systems.

An interesting component of structural intersectionality concerns the individual experience of intersections of multiple held identities. While many scholars have insisted that intersectionality should not be reduced to individually held identities, there remains a tension between identity and structure. The ways in which students self-identify are interconnected with their experiences of structural oppression. For instance, given the prevailing consensus among academics of the socially constructed nature of gender and race, one cannot conceive of gender and race as purely structural systems which unproblematically categorize students. The individual student agency to identify and perform gender and race intersects with other physical features and social structures that are beyond the students’ control and make these performances and identities likely or unlikely. Similarly, the anthropological framework Identity and Agency in Figured Worlds [16] suggests, identity is something we actively co-construct for ourselves and one another within cultural (figured) worlds. Each of the underrepresented demographics in engineering (such as gender, race, and sexual orientation) involves both systemic structural forces and the agency of the individual choosing to express and perform that identity.

The discussions of multiple identities also emphasize identity salience, suggesting that the identities we think about most prominently are contextual, and that identities of privilege are less salient and often taken for granted by people than identities of marginality. Thus, Kimmel [17] suggested a Black woman may see herself always as a Black woman, a White woman may see herself as a woman, and a White man may see himself as a human. Importantly, this tension between structure and identity acknowledges that the impact of multiple identities may go beyond salience to the individual—for instance, even if a White woman feels her gender is the most salient aspect of her experience, structural intersectionality may note the significant impact of her race on that experience of gender.

Diversity support systems are often organized around a single shared and marginalized identity, such as Women in Engineering, Minorities in Engineering, or Out in STEM. Within these groups, the primary shared identity is often the baseline shared experience for conversation and community to develop. Intersectionality might suggest, however, that the experience of, say, a Black lesbian in engineering cannot be adequately summed up by conversations on race, gender, and sexual orientation which are segmented into three different groups. Her experience is likely of race, gender, sexual orientation (as well as class, physical ability, etc) as simultaneous and
inseparable. In other words, experiences of the intersections of systems of oppression are often holistic of all of the systems, rather than additive and linear. By attending groups and joining in conversations aimed at processing single identity categories, students with multiple marginalized identities may siphon off and obfuscate other experiences for the sake of majority dominant students. For instance, important work-life-balance conversations for Women-in-Engineering groups will tend towards heteronormative topics of balancing marriage and having children with an engineering career. A lesbian student, or students within other intersections of socioeconomic background, may relate differently to these conversations. An attention to intersectionality in facilitating such conversations might acknowledge multiple identities and systems of oppression with which students might relate to a topic.

**III.B. Representational Intersectionality**

Representational intersectionality pertains to the ways in which individuals are represented in media or literature, in other words, which prototypical examples of a given identity are given representation [10]. For example, in media portrayals of men, thin able-bodied heteronormative White men are often represented as the quintessential or prototypical identity of a man. Representational intersectionality has implications for representations in engineering education literature, for instance to the explication of the range of socioeconomic status and sexual orientations of student participants who fit into a gender or racial category.

Diversity practitioners may use representational intersectionality to think about the ways their programs are representing prototypical student experiences and communicating about the students and purposes of their programs. This relates to the unintended effects of naming and personnel changes outlined in the Shehab, Murphy, and Foor [7] discussed previously, since a key finding was a perception by underrepresented racial minority students that the organization no longer served them. If the organization had attended to representational intersectionality, it might have noted its own messaging about the prototypical student it aimed to serve, and made sure to emphasize and make visible multiple representations of prototypical students at various intersections of systems of oppression. As another example, Women in Engineering programs may implicitly make cisgender women into a prototypical student with their own messaging and naming. In order to demonstrate welcome to particularly marginalized students, diversity support programs may look towards messaging which strategically emphasizes support for multiple populations experiencing gender discrimination for a non-normative gender identity engineering, such as transgender and gender non-conforming students. Likewise, they may express explicit support for Black women, lesbians, and bisexual women to ensure a default interpretation of woman will not default to normative and privileged categories. This representational support may be crucial for a population which is at the margins of a larger group or unsure that a given set of programming is intended for them.

**III.C. Political Intersectionality**

A third component of intersectionality attends to how political formations and movements of solidarity reconcile the different relationships to systems of oppression among the various factions and members in a coalition to take political or social action [10]. One might argue, if the structural intersectionality of systems of oppression divided people into categories of experience
and if these categories precluded a relationship across difference, relationships and political movements would be incredibly difficult. Political intersectionality focuses on the ways political action pertains to the differences, and the ways that certain concerns are addressed, communicated, or ignored within a political or social movement. For instance, the women’s movement of the 1960s, as well as the recent Women’s March of 2017 [18], received and responded to criticism that they centered issues of sexism as experienced by White women, straight women, and middle-class women without putting as much emphasis on the concerns of women at the intersection of other systems of oppression.

Political intersectionality looks to the ways that groups who do not share all identity categories can relate to another, have dialogue, foster allyship, and work with one another towards political and social goals. It emphasizes a strategic and productive “essentializing” [19], where groups with similar goals can band together for a purpose while recognizing distinctions in the political factions and resisting a hegemonic normativity for belonging. The official platform of Black Lives Matter demonstrates an attention to political intersectionality, standing in solidarity with feminist, anti-homophobic, and Native American rights stances as intimately connected to their platform for racial justice [20]. The emphasis in political intersectionality and productive essentializing is on conscientious coalition forming, without losing sight of the important differences of intersectionality that underlie the various coalition members.

This form of intersectionality may have implications for fostering interactions among student groups or administrative offices such as Women in Engineering and Multicultural Engineering programs, who may at times benefit from forming coalitions without losing the identity and goals of individual groups and students. At our home institution, the students of a thriving National Society of Black Engineers chapter have met with a newly forming chapter of the Society of Hispanic Professional Engineers to advise on logistical procedures and strategies for financial support and to co-plan activities. Rather than seeing an identity difference as a barrier or subsuming the groups in a coalition which erased identities of the sub-groups, this strategic political partnership represents a possible productive outcome of considering political intersectionality. The theory may also suggest strategically forming groups around a cross-sectional coalition to take action rather than a shared experience of an individually shared marginalized identity. Marginalized students may find they share many of the same goals with members of other underrepresented groups and/or some allies from dominant groups, and that a strategic attention to those shared goals among divergent intersectional identities is a useful leverage point in working towards change.

IV. Liberatory Pedagogy

A strong link between social justice and education was established in the tradition of liberatory pedagogy and Freirean praxis [21], [22]. Paulo Freire characterizes most education as a “banking model” where resources and knowledge are passively unloaded into students’ brains as if a capitalistic commodity, increasing in value. He contrasts that in liberatory pedagogy, the work of education is empowering students to free themselves from and to transform oppressive institutions and social structures. Although many engineering educational enterprises may arguably employ a “banking” model to transmit valuable knowledge to students within a
capitalistic system, there are prominent counter-examples of liberatory pedagogy being applied to engineering education e.g., [23].

IV.A. Critical Theorizing and Agency

In her 1990s book, Teaching to Transgress, bell hooks extended the argument about liberatory pedagogy to include relational aspects of teaching. For hooks, the teaching role is holistic and expansive, it extends to all aspects of relationship between teacher and student. Rather than providing resources to shape a more educated person, the teacher provides resources towards the personal freedom of the student, sharing in and taking up the student’s struggle towards freedom. As one aspect of this holistic pedagogy, hooks [24] suggests that a marginalized individual engaging critically with oppressive culture to form theory may be more empowering and agentic form of support, a process she terms critical theorizing.

Models of student support which focus primarily on improving the individual’s academic skills, study habits, and professional preparation are primarily operating through a banking model of education, where the institution has selected the form of valuable knowledge to be distributed to students in order for them to be more competitive in the system. While tutoring programs and bridge preparation programs perform a valuable service, hooks and Freire might argue that a student agentially choosing to access these resources through a process of personal liberation is a more empowering and more effective approach.

The aspect of student agency in critical theorizing may have broad implications for the implied positionality of students participating in diversity support programs [25]. Whereas most of the aforementioned programs which focus on improving individuals’ skills position the underrepresented minority student as inherently needing help, programs which engage students in acts of theorizing may enhance their agency and empower students to connect to resources. Although subtle, a programmatic attention to student agency may mean the difference between programs creating “students who need help” versus “students who are empowered to transform oppressive systems.” In our own experience of facilitating groups of underrepresented students [26] as researchers of their own experiences [27] we observed students' passionate desire to not only understand their own experiences of marginalization in community with their peers, but also to direct the insights gained about mechanism of oppression towards institutional change.

IV.B. Intergroup Dialogue

While liberatory pedagogy and intersectionality represent major scholarly social theories of the past century, intergroup dialogue could be seen as a more applied theory, grounded within a dialogic educational practice. Its originators drew on Freire’s theory of liberatory pedagogy in pursuing a critical dialogue model with value for its participants.

Intergroup dialogue is a prominent current approach to diversity and inclusion in higher education. It has a network of proponents and enactors across the nation connected through the National Intergroup Dialogue Institute, including one new program within engineering at Purdue University. Originating from and still most prominent within scholars of multicultural higher education, intergroup dialogue emphasizes establishing a community of trust and dialogue across
difference, rather than requiring similarity for the conversation. As opposed to a “safe space”
model for a single shared identity, intergroup dialogue is a model for dialogue between identity
groups [28]. Although it may seem daily life on a university campus is already an intergroup
experience, it can remain cloistered by identity group [29] and some intergroup interactions can
cause stress [30]. In response, proponents of intergroup dialogue seek an intentional and
constructive conversation across difference, while providing facilitation tools which help broker
these challenging constructive conversations [31].

As a critical dialogic facilitation approach, intergroup dialogue is a similar and complementary
approach to hooks’ critical theorizing: both frameworks enable students to theorize about and
critique marginalization across dimensions of identity, experience, power, and privilege;
intergroup dialogue in particular does so across an identity groups. Intergroup dialogue also
particularly relates to the ideas of structural intersectionality, as students explore differences of
experiences related to and within a framework of identity in oppression, and political
intersectionality, as students engage in dialogue and form coalitions across identity differences.
Intergroup dialogue may be an important model for enacting the possible productive political
intersectionality inherent in diversity support groups.

Intergroup dialogue is often conceived within a multicultural education course setting, where
readings and presentations become a core supplemental resource towards understandings of
oppression, and structured dialogues about and across identity difference help students process
and communicate their own position regarding topics. In adapting for a model of engineering
education diversity support, this may suggest giving students course credit or some other
incentive for engaging deeply with source material and challenging but productive dialogue, or it
may suggest scaling back the academic work components and focusing on facilitation
techniques.

Intergroup dialogue groups are typically small, with two facilitators from different identity
groups themselves in order to model communication across difference, and up to about 15
students. This suggests that substantial facilitator personnel would be required to allow students a
setting conducive to having relative safety during these brave conversations. Having enough
well-trained facilitators is key in elevating the conversation beyond everyday intergroup
interactions that can cause stress [30]. Oftentimes, students who have previously engaged in
intergroup dialogue courses train to become future facilitators. This could become a useful model
for engineering diversity support, helping spread limited university resources while engaging
students in small and personalized settings.

V. Conclusion

In theory there is no difference between theory and practice. In practice there is.
Unknown

While many practitioners in diversity support work have read and value the perspectives of the
seminal scholars we have presented above, this paper asks us to look once again at our own
diversity support practices in light of these theories. The interrelated theoretical considerations of
liberatory pedagogy and agency, and of structural, representational, and political intersectionality
provide important commentary on current practices for supporting marginalized and underrepresented students in engineering.

Nevertheless, as theories they have practical limitations—intersectionality can sometimes turn into an increasingly unwieldy infinite regress of systems of oppression; empowering students towards liberation by upending the social order may run into certain conflict with institutional administrators. Our goal in writing this paper was to begin a thought experiment to play out some consequences of these theories for practice. We invite others to engage with the theories and extend the thought experiment to their own contexts and concerns.

In conclusion, we suggest four primary ways that practitioners in diversity support can think about and explore the theories presented:

1. Understanding current practices. Practitioners could reflect on current practices to help inform their understanding of the purpose and power of these practices. For instance, an analysis of the positioning of students as empowered and agentic or as relatively helpless and needy may help provide clues into how students are engaging in and responding to programs. The analyses of the intersection of race and gender that have emerged in the research literature [12], [13] suggest that significant insights may be gained in applying this analysis to local contexts.

2. Adjusting practices. Informed by an analysis of current practices, practitioners could adjust diversity support practices in minor ways, or use theory to help make subtle design choices for programs in the future. For example, if a tutoring program is vital towards an academic preparation goal, but also seems to position students as fundamentally needing help, perhaps small adjustments could keep much of the benefit while removing drawbacks: adding a short critical reflection on inequity in academic access and preparation prior to a tutoring session, or framing tutoring as optional resources towards empowerment rather than a requirement based on an at-risk status.

3. Clarifying purpose and message. The theories may provide a useful tool for internal and external communication on the reasons why programs have been constructed as they are. Whereas Shehab, Murphy, and Foor [7] demonstrated possible unintended consequences of messaging and optics of program structure, practitioners may use theory for being proactive about placing emphasis on the intentions of a program or service. For instance, if a program might be perceived as benefiting relatively privileged or normative members of a marginalized group, a stated purpose of solidarity with other intersectional groups might help encourage their involvement. If a program providing academic resources might be perceived as helping rather than empowering towards liberation, a message framing that intention might help those goals be clearer.

4. Designing new forms. Finally, the theories may suggest opportunities for new forms of practice beyond the current evidence-based best practices. For example, diversity support programs may wish to embrace new strategies from intergroup dialogue, or restructure support programs to center and empower the theorizing processes of student participants.
Although practitioners are at the front lines and their practice is at the heart of the diversity support work that institutions need to do, as the quote above suggests, sometimes (in practice) theory informs that practice in a new and important way. As a contribution to bridging the knowledge between theory and practice, this paper invites continued communication and collaboration between scholars and practitioners, as we find new and exciting ways to make engineering education a more just and inclusive experience for students.

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Reference:


