Where Do We Go From Here? Strategies for Expanding Access to Undergraduate Engineering in a Post-SFFA Environment

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As post-secondary institutions continue to develop strategies following the U.S. Supreme Court decision to prohibit the use of race-conscious college admissions in *Students for Fair Admissions (SFFA) v. Harvard University* (2023) and *SFFA v. University of North Carolina – Chapel Hill* (2023*)*, engineering programs will inevitably have to do the same. Strategies to support Black and Indigenous populations are especially needed because they already represent disproportionately low participation in engineering undergraduate programs (50K Coalition Data Council, 2021; Integrated Postsecondary Education Data System [IPEDS], 2021; U.S. Census Bureau, 2022). For these and all underrepresented racially and ethnically minoritized (URM[1]) groups, the Supreme Court decision creates challenges that will impact engineering undergraduate enrollment for years to come. In response to the decision, we offer three recommendations that can lead to systemic and lasting increases in URM engineering enrollment.

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[1] In this editorial, we use the term "underrepresented racially and ethnically minoritized (URM)" to refer to the experiences among Black, Latiné, Southeast Asian and Indigenous students. These students disproportionately experience discrimination and structural racism in engineering and have not reached parity with respect to their share of the U.S. population. We recognize that scholars have critiqued references to "underrepresented racial minorities" and note that our term is different in two ways: First, we note that we, the field of engineering (education) scholars and practitioners, have struggled to help these learners reach parity; we place the onus for reaching parity on the field rather than on the students. Second, we point out that these students continue to be "minoritized" and othered despite years of efforts to create a more equitable landscape.

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CENTER EQUITY IN TEST-OPTIONAL ADMISSIONS PRACTICES

Academic institutions and the practices used to admit students are often steeped in tradition, history, and structures of power and privilege that resist change. STEM fields like engineering are no different (Posselt et al., 2017). However, the COVID-19 pandemic forced colleges and universities to adapt in ways many never thought possible (Lovell & Mallinson, 2021). Some institutions moved to variations of test-optional policies (Wood, 2022), while others, such as the University of California (UC) eliminated standardized tests altogether, with positive results (Park & Poon, 2023). The UC, which has struggled to increase racially diverse enrollment since the passage of a statewide ban on affirmative action in 1996, was able to admit its most racially diverse class in system history after implementing test-free policies in 2020 (University of California, 2023). Even as a small group of highly selective colleges have reinstated standardized tests as a requirement for admission, a large share of pandemic adopters, including places like the University of Michigan and Vanderbilt University, have decided to extend their use of test-optional admissions (McLean, 2024). In fact, the National Center for Fair and Open Testing reports that over 1,900 schools use test-optional approaches in some form (Bauer-Wolf, 2023). These institutions often cite positive gains in racial and/or socioeconomic diversity and little to no impact on the academic profile of admitted students (Nietzel, 2023). As admissions offices rethink their practices in light of the *SFFA* decision, test-optional admissions represent a potential tool for mitigating the expected declines in URM enrollment in engineering.

However, even as we recommend test-optional admissions as a strategy for enhancing racial diversity and college access, within a broader system of college admissions where there are many barriers for minoritized students–this approach is not a silver bullet (Baker & Rosinger, 2020; Bennett, 2021; Poon et al., 2023). In fact, these policies could have unintended consequences if admissions professionals are not mindful of how they are enacted (Belasco et al., 2015; Rubin & Canche, 2019). In turning to test-optional or test-free policies, institutions may rely more on non-standardized portions of the application such as recommendation letters, extracurricular activities, and personal essays. However, these components of applicant files also reflect patterns of inequality and inequities tied to race and class-related biases (Jayakumar & Page, 2021; Kim et al., 2024; Lareau, 2011; Meier et al., 2018; Odle & Magouirk, 2023; Waller-Bey, 2021). For example, in a recent study, researchers highlighted barriers to engagement in extracurricular activities across race and socioeconomic status in their analysis of activity descriptions reported by nearly 6 million college applicants (Park et al., 2023). Given that many activities are "pay to play" and require fees for lessons, coaching, and equipment, it is not surprising that White, Asian, high-SES, and private school students reported more activities than did Black, Latiné, Indigenous, and low-income students. In another study, researchers used natural language processing techniques to analyze over 600,000 letters of recommendation

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written by high school counselors and submitted in college applications (Kim et al., 2024). Among their many findings, they discovered letters written for White students were longer compared to those for URM students. Moreover, in contrast to letters for public school students, those submitted for students attending private school more often emphasized personal qualities. These findings suggest admissions personnel must be equity-minded in their use of these non-standardized parts of the application. This requires them to maintain a perspective that acknowledges how racism and the socio-historical context of exclusionary practices shape their applicant pool while also engaging in ongoing efforts to mitigate, not amplify, these inequities (Bensimon & Malcom, 2012; Malcom & Malcom-Piqueux, 2020).

Similarly, with respect to the evaluation of application files, institutions and engineering colleges that remove standardized tests as a requirement, but do not acknowledge that students from privileged backgrounds are still more likely to submit their scores, could reintroduce the very inequities in their enrollment that colleges and universities hoped test-optional policies would help to address. Fundamental attribution error, a type of cognitive bias, is the tendency to under-emphasize situational or environmental factors in explaining observed behaviors and instead emphasize a person's disposition or personality (Pettigrew, 1979; Swift et al., 2013). In evaluating applications, a reviewer might interpret a student's test score (or lack thereof) as a reflection of preparedness for college with little consideration for inequities in access to testing (Bastedo & Bowman 2017; Moore et al. 2010). We recommend a systematic effort to contextualize the scores of students who decide to submit them, which accounts for the level of resources available to applicants in their homes, schools and community environments (Bastedo et al., 2023). Such an approach may enhance equity in the evaluative process and offer a legal means for minimizing expected declines in racial diversity, post-*SFFA*.

IMPROVE K-12 OUTREACH AND RECRUITMENT

When we think about efforts to expand engineering pathways, we often focus on outreach efforts and sparking interest among K-12 students. Outreach programming must be substantive, sustained, and sincere, particularly for families of URM students. Building the pathway into engineering starts by cultivating early relationships with K-12 students, parents, and teachers (Burden, 2020).

However, relationship building is complex. It is an ongoing investment of time and energy with the students and their families. Particularly within the Latiné community, families have been found to influence college enrollment and career selection and provide emotional support critical to persistence and degree attainment (Carey, 2016; Luna & Martinez, 2013; Martinez, 2013). Developing

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trust does not happen through one-time events; therefore, it is important that institutions offer programming that allows for multiple touchpoints over time to nurture opportunities for relationship building.

Integral to each of these touchpoints should be a focus on building a sense of belonging in engineering. Efforts that contribute to developing a sense of belonging include the use of role models and mentors, developing individualized relationships with students and their families, and providing meaningful confidence-building STEM experiences. A wide body of research suggests that students who engage with identity-based role models and mentors receive powerful messages that "I belong here" and will be able to picture themselves in engineering careers (Dortch & Patel, 2017; Rodriguez & Blaney, 2021; Shin et al., 2016; Wilson & VanAntwerp, 2021). We recommend developing outreach strategies that offer hands-on, culturally relevant projects that highlight students' identities and demonstrate how engineering contributes to making a positive impact on society. Such opportunities positively influence younger students' conceptions of engineering as a field (Matusovich et al., 2021) and therefore can be a useful legal strategy for cultivating interest among URM students.

EXPAND HOW WE THINK ABOUT PATHWAYS BEYOND THE K-12 CONTEXT

The merits of direct K-12 to four-year engineering pathways notwithstanding, these strategies alone cannot improve engineering diversity. There are two reasons for this. First, URM populations remain underrepresented despite expenditures of close to one billion in federal funding for K-12 STEM education (National Science Foundation, n.d.). Second, the traditional college-aged population of 18–24-year-olds, which is the group that has recently transitioned from K-12 schools, has and will continue to shrink for years to come (Grawe, 2018).

Engineering education practitioners can complement their K-12 efforts with new initiatives that target other populations. "Post-traditional" students, a term that experts argue should replace the label "non-traditional" students (Soares et al., 2017), represent untapped diversity potential for engineering. Included in the broader category of post-traditional learners are adult learners, defined as individuals who enrolled in college at 25 years of age or older (Soares et al., 2017). Of note, Black and Latiné adult learners represent 28% and 21% of this older demographic, respectively (Buglione & Billups, 2023). Thus, while these URM groups remain *underrepresented* in engineering, URM adult learners are actually *overrepresented* in higher education more broadly. Recruiting and admitting these diverse adult learners and other post-traditional students, who have already expressed interest in post-secondary education, will lead to more URMs in engineering. Admissions processes must be well-conceived and learner-centric, recognizing the totality of who these students are both in and

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outside of the classroom. Colleges and universities should convey that their engineering programs will accommodate these students alongside their busy lives. Thus, post-traditional students need to see options like evening and weekend courses, more online modalities for course instruction and advising, as well as childcare. This will signal that these institutions honor and acknowledge what it will require for these undergraduates to earn engineering degrees. It is also a legally defensible approach in the context of the *SFFA* decision.

Additionally, community colleges are ideal recruitment sites because they enroll diverse populations at rates that equal or exceed their respective share of the U.S. population (American Association of Community Colleges, 2022). Black, Latine, and Indigenous populations also earn 7%, 13%, and nearly 1% of all two-year engineering degrees, respectively; these statistics exceed comparable rates seen in the broader four-year engineering context (50K Coalition Data Council, 2021; IPEDS, 2021). Many of these undergraduates also happen to be post-traditional students, given the age and other demographic factors with which they are associated. Indeed, achieving engineering diversity through community college enrollment is a recognized strategy (Lattuca et al., 2014), and is one that should be further elevated in light of the *SFFA* decision.

CONCLUSION

The Supreme Court's decision to forbid the use of race-conscious admissions has implications for access to higher education that extend well beyond college admissions. In light of the *SFFA* decision, faculty, staff, and administrators in engineering should reexamine the entirety of the college experience to consider innovative ways to expand, rather than restrict access to engineering education. This necessitates a reimagining of everything from the admissions process itself to who and how we recruit.

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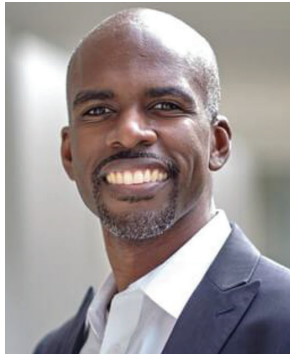
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