Work in Progress: An Early Analysis of How Language Cultivates Inclusive Engineering Culture for Black Students, Faculty, and Staff

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Introduction

The disproportionately low representation of Black students in engineering is damaging to the engineering community and to the welfare of the nation. Traditionally, diversity initiatives have lumped together strategies for increasing underrepresented racial and ethnic groups in engineering with sexism, homophobia, and other inequities. The Black Lives Matter movement has demonstrated that race must be tackled specifically in order to dismantle systemic racism. In addition to persistent racist language (e.g., "master/slave," "whitelists/blacklists") in the curriculum [1] and scholarship, the unique challenges that Black engineers face are often erased since their identity is homogenized with other racial and ethnic groups under the harmful label "underrepresented minority" or URM [2]. Since language creates the norms and cultures of communities and perpetuates inequities in education, our innovative broadening participation research focuses on understanding the experiences of Black students, faculty, and staff in engineering as it relates to harmful language, which perpetuates their exclusion from the field.

Language is a critical part of organizational culture that influences our beliefs and behaviors and reinforces norms. Schein writes "culture implies stability and rigidity in the sense that how we are supposed to perceive, feel, and act in a given society, organization, or occupation has been taught to us by our various socialization experiences and becomes prescribed as a way to maintain the 'social order'" (p. 3) [3]. By addressing directly how language creates inclusive and exclusive environments, our work provides a framework for people to take responsibility for their language instead of relying exclusively on those harmed by hurtful language. Language permeates everything we do. Itemized lists of "good" and "bad" words (such as those from CNN [4] and the Huffington Post [5]) allow people to plug-and-play word choices without understanding why language choice excludes, includes, harms, or empowers. This research will develop an inclusive language framework for engineering that can contribute to training administrators, educators, and advisors to foster an inclusive culture to support the recruitment and retention of Black engineers.

Study Design

The goal of the research is to develop a language framework in engineering that will foster an inclusive engineering culture for Black engineers. Towards this goal, our study is guided by the following research questions:

    1. How do Black engineers perceive engineering culture and the language used in engineering programs, courses, and spaces?

    2. What factors determine inclusive and exclusive language for Black faculty, staff, and

students in engineering?

To answer these research questions, we are conducting interviews with Black engineering students, faculty, and staff at the University of Illinois at Urbana-Champaign to explore the perceptions about inclusive language used in engineering spaces. Participants will be recruited through email listservs and personal contact. Criteria to participate in the study is self-identification as a Black faculty, student, or staff member in the college of engineering at the focal institution. A total of 15 to 20 participants will be interviewed. We expect interviews to last approximately 60-minutes. Participants will be compensated for their time with a $50 gift card code. All interviews will be audio-recorded and transcribed verbatim. Transcripts will be analyzed by thematic analysis [6]. IRB approval has been received and interview participants are being recruited. Interviews are expected to continue for the summer and fall semesters of 2022.

Interview Protocol

The interview protocol was designed to understand participants' perceptions of engineering culture and language. The interview protocol asks participants about their experiences in their role in engineering (as a faculty member, staff, or student), experiences with inclusive and exclusive language in engineering spaces, the impact of COVID-19, and closes with participant suggested topics (Table 1).

In asking participants about their experiences with language in engineering spaces, questions specifically asked about code-switching, coded directives, and coded messages. *Codes* are systems into which signs are organized. These systems are governed by rules which are consented to by the members of the community that use the code [7]. *Coded messages* have specific meaning to the members of the culture or subculture [7]. For example, an acronym may have different meanings depending on the setting, likewise the directive, "go home" has a unique meaning within the context of a baseball or softball game. A person from a culture that is not familiar with the game would not understand the intended meaning of the directive without it being explained. "*Code-switching* is a practice of parties in discourse to signal changes in context by using alternate grammatical systems or subsystems, or *codes*" [8].

Table 1. Interview Protocol Topics and Example Questions.

Topic	Question
Background	When did you first decide to (become a professor of engineering, major in engineering, work at the college)?
	What has your experience as a faculty/staff/student here been like?
Language	What words or conversations have made you feel included or excluded during your program/employment?
	Do you feel comfortable addressing words or conversations that

	have made you feel excluded during your program/employment?
	Do you feel it is necessary to code switch during your interactions at the college?
	Do you feel there are coded messages and/or coded directives used at the college?
COVID-19	How, if at all, has Covid impacted your responses?
Participant Suggested Topics	Is there something else about the experience of Black students, staff and faculty in engineering that I didn't cover that you would like to discuss?
	Is there something else you would like to share?

Preliminary Results

The interview protocol was piloted with a participant who is outside the participant pool but fits the criteria of being a Black member of the college of engineering. Results of the pilot interview validated our hypothesis that this area of study merits an investment. The resulting recommendations from the pilot participant were as follows; the interviewer should be Black and should avoid organizational power dynamics. The interview should be framed with why the interviewer is personally vested in this research. The interviewer should define and provide a relevant example of *code-switching* (e.g., alternating vernacular, dress, hair)*, coded messages* (e.g., doublespeak) and *coded directives* (e.g., being in the know). Due to the nature of the study and vested interest of the participants, the results should be shared with the interviewees at the completion of the study.

Discussion and Future Work

Future work will include collecting and analyzing interviews. Interviews will be conducted with 20 Black faculty, students, and staff in engineering. Participants will be invited to interview by email in early Spring 2022. All transcripts will be analyzed by thematic analysis [9] to identify how language in engineering spaces can be inclusive and exclusive for Black engineers. Our work has the potential to shape the national conversation on broadening engineering education in order to close the tech talent gap—especially for Black students. Our work can also provide guidance on using inclusive language throughout the university. For example, the "Targets of Opportunity" (TOP) hiring programs [10]–[12]—while one of the most well-intentioned programs—financially supports recruiting outstanding faculty candidates from underrepresented groups who are identified as "targets of opportunity." Certainly, labeling people as "targets" is harmful. Moreover, TOP candidates are targets of systemic injustices that the program aims to

correct. Finally, our inclusive language approach could be extended across disciplines (e.g., STEM) and groups (e.g., LGBTQIA).

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