

Q&A

Anonymous Attendee 01:38 PM

How do you think your findings might have compared to these if you had interviewed graduates vs undergrads?

If we had interviewed graduates instead of undergraduates, we might have seen fewer issues regarding the lack of mentorship. Since graduate students are generally paired with an adviser or committee of mentors, they might have a larger network of mentors than the undergraduate students in this study.

Pat Marsteller 01:39 PM

Engineering seems so possible to open to social justice global issues....

Yes. We see how engineering is related to major social justice issues that are priorities across the globe (i.e. the need for sustainable economic development, climate change and its disproportionate impact on minoritized communities, etc.).

Janice Evans 01:40 PM

I am curious about experiences in the classroom versus in independent research opportunities, and the impact these have (positive or negative) on persistence in the major. Did any of your questions get at this, or did this come up from any of the participants?

Absolutely. Students who engaged in independent research opportunities (i.e. undergraduate research in a professor's lab, research-based internships, etc.) described those experiences as overwhelmingly positive and a highlight of their undergraduate engineering career. We imagine one reason for this is because those out-of-classroom laboratory experiences provided students a chance to develop a strong engineering identity (McGee & Martin, 2011*) and cultivate mentoring relationships with their research supervisors.

*McGee, E. O., & Martin, D. B. (2011). "You would not believe what I have to go through to prove my intellectual value!" Stereotype management among academically successful Black mathematics and engineering students. *American Educational Research Journal*, 48(6), 1347-1389.

Mary Bankhead 01:41 PM

How do we the faculty to see this? I am not sure how to say it but I work with an ERC that is across 4 institutions and we keep talking about how we have low URM participation but the faculty PIs don't know what to do.

For faculty who are invested in supporting URM participation in engineering, we think the results of this study help us consider the following strategies that equity-minded PI's could implement:

- Make default assumptions that URM students are capable of being in a STEM space (students in our study would often point out how both their peers and faculty often assumed that they were incompetent).
- Invite URM students to engage in research outside of the classroom (and offer this as a paid research opportunity whenever possible, since so many of the students in this study cited financial pressures as a major challenge for them).
- Share strategies about the hidden curriculum (Calarco, 2020*) of higher education and the job market with URM students (i.e. what are the norms of socialization in your specific discipline? What are some of the implicit rules of the job search that a student of color, first-generation, and/or low-income student might not be privy to?).

* Calarco, J. M. (2020). *A Field Guide to Grad School: Uncovering the Hidden Curriculum*. Princeton University Press.

Sara Brownell is going to answer this question live.

Anonymous Attendee 01:42 PM

While making student groups for discussion or recitation sections, did students mention if they preferred rotating groups (e.g., spontaneous break out rooms) or if they might feel more comfortable working with the same group all semester? Is it better/easier for them to get over the initial hurdles with their peers once instead of constantly having to prove themselves over and over again?

While we did not ask participants about the distinction between permanent and rotating groups, a few participants did mention that some of the stress of group work was alleviated when their faculty had pre-selected groups. Often, the women in our study were the only woman of color and/or Black woman in a given engineering course. Thus, for some participants, having faculty assign group membership sometimes reduced the anxieties of trying to find people to work with.

Antar Tichavakunda 01:43 PM

Loved the presentation! I often struggle with the umbrella category of STEM. Students' experiences can be so varied depending upon the major. Did you see any notable differences across major? How useful is "STEM" as a category to analyze students' experiences?

Thank you for your kind words. Yes, we would agree that "STEM" as an education research category is not always useful. In fact, we saw some variations in student experience among the different majors within the singular discipline of engineering. While we cannot make causal inferences based on this qualitative project, we did observe some interesting patterns:

- Full time, online students (who are frequently students older than 25 who are returning to finish an undergraduate degree) often major in Information Technology or Graphic Information Technology.
- First time, on-campus students (who are frequently students between 18-24 years old) often major in civil, biomedical, chemical, and mechanical engineering.

Anonymous Attendee 01:45 PM

Did you find that there is a general sense of hope for positive change amongst the study group? Or is it more of a sense of despair that the status quo - or worse, a continued reversal of social justice - will continue in the US.

Overall, we sensed that students tended to be neither hopeful nor in a state of despair. Rather, this group of participants were a pragmatic bunch that were relatively aware of the status of quo and who they are positioned in it, by virtue of their race, gender, and immigrant identity. While they are not necessarily resigned to the sociopolitical context, much of their cognitive and emotional energy seems to be on the pursuit of engineering itself.

Pat Marsteller 01:47 PM

What would you say we should add to faculty development to help them understand immigrant and black perspectives?

Great question! I think some potential additions to STEM faculty development curriculum/workshops to help professors better understand immigrant, Black, and Black immigrant perspectives are:

- A more robust understanding of the sociopolitical context of a particular STEM discipline (for example, what is the history of engineering/engineering education in the geographic area that a faculty's university is located in?)
- Pedagogy workshops that help faculty recognize and eliminate racial micro-aggressions
- Providing financial support for faculty so that they can pay students—particularly minoritized students—to engage in the academic research process.

Anonymous Attendee 01:47 PM

Based on the suggestion earlier that we shouldn't assume that students are already coming in with this privileged knowledge, what do you think about differentiated instruction in college STEM courses and how this strategy might benefit Black immigrant women in STEM? For example having personalized goals that students are graded on rather than a uniform rubric for all students.

We think differentiated instruction (and instruction that allows students to draw from their history, previous experiences, and technical expertise) is a great strategy that could potentially benefit Black immigrant women in STEM. Higher education scholars have written extensively about the vast knowledge that students from minoritized communities often possess, but is largely ignored by conventional methods of academic assessment (i.e. González et al., 2006; Yosso, 2005*). For those who are considering differentiated for engineering classes, in lieu of a final exam, perhaps students could be choose from a list of culminating projects that asks them to draw from: their previous experiences, personal interests, and content learned in the course.

*González, N., Moll, L. C., & Amanti, C. (Eds.). (2006). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Routledge.

*YossoT. J. (2005). Whose culture has capital? A critical race theory discussion of community cultural wealth. *Race ethnicity and education*, 8(1), 69-91.

Michelle Withers She/Her/Hers 01:48 PM

That's (the VR experience) is brilliant. Is that available broadly and how long do you think it would be before it or something like it is?

Thank you for your kind words. To keep up with updates about the availability of this experience, please visit: <https://coleyspacelab.com/>

Pat Marsteller 01:57 PM

I am interested in the idea of success coaches...how does this differ from mentoring? How do we prepare faculty and others for this?

In this study population, success coaches were assigned only to online students to help them navigate their programs of study (think of these as specialized advisors for people pursuing their degrees online). Meanwhile, participants described mentors as anyone who shaped their academic or professional journey, including: academic advisers, faculty, family members who are professional engineers, and friends.

Pat Marsteller 01:59 PM

thanks!

Kristen Parrish 01:59 PM

Thank you SO MUCH for this talk — very informative!

Sarah Deel 02:00 PM

Thank you so much!