

Insights into Power Relations from the Co-designing of Classroom Norms between Students and Faculty

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Abstract—In this Work in Progress, we detail the piloting of a virtual co-design session as an Innovative Practice between students and faculty who were invited to co-create inclusive classroom norms. In these co-design sessions, participants identified exclusive practices they had previously seen or experienced and then came together to create inclusive norms that addressed these observed practices. This is relevant to engineering education as we seek to create more inclusive learning environments. In the first 20-minute co-design sessions, faculty designed among themselves as did students, each group in a separate breakout session. In the second session, all participants worked together in the same room. The full one-hour session was followed by an open-ended survey. The data analyzed includes the survey results, ideation artifacts, and the final list of norms. The research team aided in scaffolding the sessions and facilitating the discussions. Each research team member reflected on their positionality as observers of the interaction. This work in progress contributes insights into structuring co-design sessions that take into account and address differing power dynamics and also identifies ways power dynamics inadvertently show up in student-faculty interactions, including student-student and faculty-faculty interactions.

I. INTRODUCTION

As work in diversity, equity, and inclusion in engineering education continues to be of utmost importance in a polarized country, there is a need to find new methods that uncover systemic issues and allow us, as a community, to address large scale problems of inclusion in our day-to-day activities. This work-in-progress paper presents the promising practice of using co-design sessions to have students and faculty work together to create a more inclusive culture, in addition to providing a way to surface issues of power dynamics that result from student-faculty interactions. To differentiate between co-design as a method and co-design as a methodology, we will use the words co-design and research through co-design respectively. Co-design, the method, is when participants or stakeholders create something together, while research through co-design refers to the commitment to include different stakeholders as experts in different parts of the research process, such as in the design of the study or analysis of the data. Co-design as a practice is not new to engineering education. It is both a relevant method in the

student design process of engineering technologies as related to user research and as a research methodology to inform curriculum design [1].

In planning for the co-design session between students and faculty, the research team intentionally planned for ways to level the power dynamics that could surface based on different identities.

There are many definitions of power, but for this work, we are defining power as something that is exercised to enable change, and individuals who are able to lead the change are able to exercise more power. Different aspects of identity and social privilege contribute to one's ability to exercise power. In attempting to level power dynamics in these co-design sessions, some of the power dynamics in the interactions were mitigated, but others surfaced despite the efforts to lessen them. And still others surfaced, unintentionally, from design decisions. Here, we explore how power showed up in both expected and unexpected ways. In order to understand how norms, or socially enforced expectations, are perceived, we look at the co-design sessions through the lens of power, in that norms are a form of power being exercised. As Michel Foucault writes "This [norm] exercises over individuals the constant pressure to conform to the same model [2]." This statement poses the power of norms as neither a positive nor negative characteristic, rather, it pushes us to understand how this constant pressure is perceived by marginalized identities, who are less likely to have a say in the making of these norms, in particularly in engineering spaces historically designed for the "ideal student [3]."

Given our interest in learning more about how power dynamics emerge, the research question guiding this work became:

How might research through co-design surface instances of power dynamics between students and faculty in engineering?

II. BACKGROUND

There is a lot of research in trying to understand how to help more minoritized students into STEM fields, and once they are in, how to create inclusive environments to help them thrive [4],

[5]. In this work, it is important to differentiate between diversity and inclusion where diversity means having people of different backgrounds in the same space, while inclusion goes one step further and ensures everyone feels they belong in that space. One roadblock between diversity and inclusion is the realities of power dynamics entrenched in systemic structures. Previous work has shown that students in engineering exhibit blindness to surface level dimensions of diversity (e.g. race, gender, or ethnicity) when prompted to speak about the diversity of their teams [6]. As Colcer et al. suggest, we need to do more work against complicit silences [7], and addressing power is one way to do that. There is work that shows positive faculty-student interactions leads to a better learning experience [8]. In creating opportunities for faculty and students to co-design inclusive practices together, we have an opportunity to observe power dynamics and have conversations about them, while also trying to find solutions to the problem of inclusion together.

III. METHODS

A research team composed of three undergraduate students, two graduate students, and one faculty member from the University of Washington worked to design a co-design session to explore power dynamics. The team recruited a group of four engineering faculty and six engineering undergraduate students interested in participating in a co-design session to explore classroom norms and power dynamics in university-level engineering education. Researchers sought out grant funding to compensate each participant with a \$25 gift card of choice in recognition of the time and labor shared with the research team. Participants joined researchers for a one-hour, remote co-design session using Zoom as the platform to host the session. The virtual session allowed participants to pivot between breakout room activities among students or faculty and then join a joint co-design session with both students and faculty. Researchers prepared an interactive digital whiteboard on Miro, a tool for participants to collaborate and brainstorm using sticky notes to write and group together contributions. The Miro board facilitated the design activities and provided all participants with the opportunity to contribute.

The research team designed two sequential co-design activities to explore the power dynamics between students and faculty in engineering. The first activity explored how power is enacted among student-only and faculty-only groups through co-designing “a list of exclusive practices that you have either observed or experienced in the classroom” and selecting “one exclusive practice as a group that you would prioritize getting rid of”. The second activity joined faculty and students together to explore how power is enacted across academic roles through co-designing inclusive norms to address the exclusive norms identified in the previous activity.

Throughout the co-design activities, researchers took notes on how participants engaged in the co-design activities including what participants said, which participants spoke in group discussions and interpersonal dynamics among participants. After the co-design session concluded, researchers triangulated findings from discussions of personal takeaways and reflections along with individual research session notes and the Miro board design artifacts.

IV. RESULTS

In this section, we present the results from our intentional design decisions to level power dynamics in each step of the co-design session.

A. Session Introductions

The research team was intentional in structuring the activities in the co-design session to mitigate any power differentials. When having participants introduce themselves, we had everyone share their name, preferred pronouns, and where in the world they were located. In addition to this information, we added an icebreaker question that would set an informal tone for the session. The icebreaker question asked: “if you could turn any animal cat-sized, which animal would you pick?” From there, participants popcorned to another person.

The introduction worked to create a more informal environment, as people laughed and joked about their animal of choice. But awareness of power imbalances surfaced despite these efforts. Although we did not ask participants to share their role, two of the four faculty members mentioned being faculty in their introductions. None of the students shared being students. Additionally, when reviewing the data, we noticed that people with less Eurocentric names were called on last. We do not currently have more information as to why, but these participants that were called last also ended up participating less in the sessions.

B. Activity 1: Students

To create a comfortable experience for participants, the three undergraduate researchers facilitated co-design session between the six engineering undergraduate students. In this first session, the participants worked together to brainstorm exclusive practices they had either personally experienced or observed. The option to share an experienced or observed practice was intended to add anonymity to their own experience if they felt uncomfortable sharing an experience as their own. One researcher facilitated the activity, while the other two observed and took notes on the session. During recruitment, researchers attempted to have student participants from every class standing for representation of different experiences in engineering courses but ended up with five freshmen and one senior. The undergraduate researcher facilitating the session consciously allowed the power dynamics in the room to play out by not engaging in the discussion and stepping back into the role of an observer between directions. The two notetaking researchers did not interact with the participants. Participants were first given the opportunity to ideate on Miro with virtual sticky notes to give everyone a chance to write down ideas before sharing.

When the brainstorming time was over, the facilitating researcher prompted the students to begin their discussion. A few students continuously spoke up and stayed unmuted throughout the conversation. Other students stayed muted nearly the entire time. There was a significant amount of silence in the room for a majority of the session, something that the researchers had hoped to avoid in building rapport earlier. When a few students that hold marginalized identities started to share personal experiences of exclusion in engineering classrooms related to professors shutting down ideas, one student who did not hold visible marginalized identities remarked: “I have a

question; since I haven't experienced this, does this actually happen?" While this student did not find the conversation around exclusive practices to be relatable, he took on a facilitating role by prompting the students with directions that was originally the role of the facilitating researcher present in the session. The student did offer the opportunity for other students to speak up, saying, "Does anyone else who hasn't spoken yet [want to answer the question]?" Despite this effort to bring others into the conversation, none of the other students said anything and had blank faces on. Because of this silence, this student quickly moved on and chose an idea himself to bring and share with the combined session that included faculty.

C. Activity 1: Faculty

In a parallel session, two graduate students and a faculty researchers facilitated and took notes during the faculty-only co-design session. The researchers were intentionally divided into observation and facilitation groups to match seniority and academic role-based power as close as possible. Assigning researchers the roles of facilitator and notetakers sought to confirm power differences between researchers and participants and attempted to level power dynamics among faculty. All participants, including students would receive the same activity instructions and tools such as the Miro board at the same time.

During the co-design session, faculty participants initiated the activity before the graduate researcher who was facilitating could join the Zoom breakout room. A faculty participant from a department rooted in design and familiarity with the online platform Miro took the lead by beginning the activity. When the facilitating researcher joined the activity, she provided assistance to one participant who did not know how to navigate Miro. The researcher attempted to establish their role as the facilitator by stating that they would be facilitating the activity, but the one participant continued to facilitate for the remainder of the activity by asking questions to the group and initiating a group vote to select the exclusive practice to conclude the activity. Faculty debated on how to select an exclusive practice to bring for discussion in the combined session. The main contention was between choosing "low-hanging fruit" or issues of exclusion that could be resolved relatively quickly such as accessibility to technology and issues that could use the most insight from students, such as issues of participation. The decision was reached after one faculty member suggested voting for what each person thought was the issue that should be prioritized.

D. Activity 2: Combined Session

The undergraduate students, faculty members, and researchers came together to debrief what they had talked about in their individual sessions. The researchers invited both groups to have someone from their group share out what they had discussed. This open format was intentional; researchers wanted to observe which group would go first, who would use their voice to present to the researchers, and how their positionalities could be involved in those decisions. One student laughed and urged the faculty to speak about their group discussion first. The faculty member who had taken the lead in the previous session volunteered a second faculty member to present their discussion. Once both groups presented, participants were instructed to spend some time brainstorming inclusive norms that might

address these exclusive practices. Again, this individual brainstorming time was intended to give participants time to think of ideas before it was time to share. After a few minutes, the facilitating researcher invited people to discuss openly.

Similar to the student only session, a few people did the majority of the speaking. Faculty did the majority of collaborating (moving around and grouping sticky notes) on the Miro board. While all the participants discussed inclusive norms, one student shared their experience of a professor denying them accommodation. In reaction, three white male participants (two faculty and one student) remarked that it was "bad" and "horrible" and expressed feeling shocked. The conversation centered on this student's experience for much of the session. The group of three male participants continued to talk, stopping when the student clarified more about the experience. At one point, the male student responding to the other participant's experiences says, "I just want to echo [one of white, male faculty member]". One professor states that although there is a legal obligation to the school, there is a moral obligation to accommodate. The rest of the cohort stays silent for most of the session. Later in the session, the same white male students says: "It is a competitive school and that really sucks but that's the way the world works." Participants that were not the three white male participants had neutral expressions on camera and did not unmute during the discussion. At one point, a female student of color unmuted her microphone, but muted a few minutes later without saying anything.

E. Closing

In recognition of the different access to power between researchers and participants, researchers prepared a variety of resources and compensation to share with participants, attempting to provide varying types of value to participants, not only for the research team. Resources included links for support, such as university policies, groups, and mental health resources, and further exploration into inclusive design. Researchers also sought to compensate participants with \$25 gift cards.

In practice, the co-design session ran behind schedule. As the one-hour mark neared, the facilitating researcher acknowledged the time and stated participants could leave the Zoom call and would receive a follow-up email with the slide deck and gift card within a week. Participants remained on the call until the session concluded. A few faculty stayed on the call beyond the session to discuss the importance of connecting with students. The white male student stayed as well to share an educational update to a faculty member with whom he previously took a course.

V. DISCUSSION

In using research through co-design, we were able to explore power dynamics by utilizing the commitments of doing research through collaborative, cooperative, and community-based design to create a semi-controlled environment, where we tried to level the power dynamics. In this section, we will discuss how the three components of research through co-design: research, co(laborative), and design, each allow different ways for us to mitigate and observe power dynamics.

We first discuss how research allows us to observe power. Because this was a planned research study, we were able to use

a semi-controlled environment to make observations. Although the activities were not traditional classroom interactions, participants knew they were working with students and faculty within a university-based research study. As researchers, we created informal introductions, allowed for students and faculty to brainstorm and discuss ideas among themselves before having an ideation session together, and we allowed for multiple modes of participation, including typing up ideas on sticky notes, responding out loud to questions, and finally, giving participants time to decide on and share the most important ideas. Even so, we had identities that made the most use of the talking space, which was the most salient way of participating. Having this be a research study allowed us to have multiple researchers participate as solely as observers. Within student/faculty-only groups, seniority was one determining factor of who said the most. Two other identities that were salient within each group were being white and male. In the combined session, white presenting students and faculty did most of the speaking, with the most talking being done by white presenting males. As a research team, we were surprised to see this result, given that we were transparent about our intentions to observe power dynamics.

The second aspect that allowed us to observe power was the collaborative nature of the method. Collaboration involves bringing every individual to an equal level to create an output through teamwork—there is no written expectation of any person to take on a managing role or a backseat role, but inevitably, power dynamics surfaced. The collaboration component of the co-design session played a key role in the session. In bringing together faculty members and students to interact with each other in using the same technology at the same time and be able to have discussions together, researchers were able to create a unique setting. In this setting, there was fluid discussion between participants unlike in a one-sided classroom setting where the power dynamics are mainly unspoken professor/student roles. Because of this environment, the researchers were able to observe conversations, collaborative design artifacts, and identities outside of their academic role that revealed power dynamics between the groups. Within collaboration, participants were able to decide how they would participate in the session and what role they would take in each conversation.

Finally, the intentionality behind design also allowed us to observe different aspects of power. Design is an active process of making decisions to create an artifact. Put another way, design makes decision-making visible through the creation of an artifact. Through the act of design, power becomes observable in the decision-making process and the resulting artifacts. During the co-design session, the design activities asked participants to reflect on their experiences and perceptions of exclusion in the classroom and share their response with the group on the Miro board and in discussion. This participation resulted in artifacts in the form of sticky notes on the Miro board and contributions in conversation sharing thoughts and perspectives rooted in lived experiences, both outputs that could be observed by researchers. From these observations, researchers had the ability to visually see how artifacts were negotiated and used for decision making and in turn, how power was enacted. With the structured design activities, researchers

were also able to map out who was doing a lot of the talking, how participants directed the conversations, and whose voices were not heard and whether or not people made space for everyone's voice to be heard.

Power dynamics in engineering education spaces rely heavily on the identities and positionality of the people interacting. The results from this work support literature that suggests that marginalized students are in spaces that were built for and normalize whiteness and masculinity [9]. In order to change how marginalized students experience engineering education, there needs to be actionable equity as well as intentional co-design. Something we noticed through our research is that students in engineering (when asked about their positionality) identify with their major/field before their demographic identity although their race and gender is far more impactful to peers and educators around them. It is necessary to pay attention to which identities are present in the room, whose voices are prominently heard and prioritized, and to take steps to amplify marginalized student voices and level the playing field more than just representation.

VI. FUTURE WORK

In future instantiation of co-design sessions to explore power dynamics, it will be important to use identity-based frameworks to understand power dynamics. Although in these sessions, researchers were able to see how different identities tended to behave in different ways in terms of participating and directing the conversations, it is difficult to say why exactly those identities, in that exact moment, chose to act that way. Incorporating Nieto and Boyer's [10] "Onion" diagram provides a framework to differentiate between status, rank and power: "status is the outermost layer, the one that is easiest for other people to see and the one we are most likely to be aware of, rank refers to the system of valuing people differently depending on certain social memberships, and power is the innermost layer, related to the core of our being." This framework also identifies sites of enactment on individual and systematic levels that could inform future iterations of co-design sessions seeking to specifically understand different facets of power. Additionally, it is difficult to know how other participants felt about those who took the lead in conversations. Future work should look to understand how participants believe they acted in each session, how their behavior impacted others, and how they were impacted by the behaviors of others.

VII. CONCLUSION

In doing research through co-design, the research team was able to both mitigate potential unhelpful power differentials and observe power dynamics that surfaced from student and faculty conversations about exclusive practices in engineering education. Using this research methodology allowed the research team to observe identity-based power dynamics that directed conversations and negotiations between participants. Although the analysis of this co-design session and the design of follow up studies is in progress, the current work shows promises of co-design as a methodology to observe and interrogate power dynamics between and within students and faculty. Together, students and faculty can work to create more inclusive spaces by being more aware of the effects of power dynamics on inclusion.

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REFERENCES

- [1] C. A. Keller, "Using a Collaborative Design Model for Developing Quality Online Courses," presented at the 2018 ASEE Annual Conference & Exposition, Jun. 2018. Accessed: Jul. 25, 2021. [Online]. Available: <https://peer.asee.org/using-a-collaborative-design-model-for-developing-quality-online-courses>
- [2] M. Foucault, *Discipline & Punish: The Birth of the Prison*. New York: Vintage Books, 1995.
- [3] A. L. Pawley, "Learning from small numbers: Studying ruling relations that gender and race the structure of U.S. engineering education," *J. Eng. Educ.*, vol. 108, no. 1, pp. 13–31, 2019, doi: 10.1002/jee.20247.
- [4] B. Berhane, S. Secules, and F. Onuma, "Learning While Black: Identity Formation and Experience for Five Black Men Who Transferred Into Engineering Undergraduate Programs," *J. Women Minor. Sci. Eng.*, vol. 26, 2020, doi: 10.1615/JWomenMinorScienEng.2020024994.
- [5] M. Brewer, N. Sochacka, and J. Walther, "Into the Pipeline: A Freshman Student's Experiences of Stories Told About Engineering," Jun. 2015, p. 26.1018.1-26.1018.19. Accessed: Jun. 28, 2019. [Online]. Available: <https://peer.asee.org/into-the-pipeline-a-freshman-student-s-experiences-of-stories-told-about-engineering>
- [6] M. D. Bonds, V. van Montfrans, J. M. LeDoux, and W. C. Newstetter, "Identifying a 'Starting Point' for Diversity and Inclusion Initiatives," presented at the 2019 CoNECD - The Collaborative Network for Engineering and Computing Diversity, Apr. 2019. Accessed: Jun. 28, 2019. [Online]. Available: <https://peer.asee.org/identifying-a-starting-point-for-diversity-and-inclusion-initiatives>
- [7] L. Colcer, C. Smith, and D. Montfort, "Problems of Our Own Devising: Individuals' Challenges in Enacting Systemic Changes to Increase the Inclusivity of Engineering Departments," presented at the 2017 ASEE Annual Conference & Exposition, Jun. 2017. Accessed: Jun. 28, 2019. [Online]. Available: <https://peer.asee.org/problems-of-our-own-devising-individuals-challenges-in-enacting-systemic-changes-to-increase-the-inclusivity-of-engineering-departments>
- [8] S. A. Bjorklund, J. M. Parente, and D. Sathianathan, "Effects of Faculty Interaction and Feedback on Gains in Student Skills*," *J. Eng. Educ.*, vol. 93, no. 2, pp. 153–160, 2004, doi: 10.1002/j.2168-9830.2004.tb00799.x.
- [9] S. Secules, "Putting Diversity in Perspective: A Critical Cultural Historical Context for Representation in Engineering," presented at the 2017 ASEE Annual Conference & Exposition, Jun. 2017. Accessed: Jun. 28, 2019. [Online]. Available: <https://peer.asee.org/putting-diversity-in-perspective-a-critical-cultural-historical-context-for-representation-in-engineering>
- [10] L. Nieto and M. F. Boyer, "Understanding oppression: Strategies in addressing power and privilege, Part 3: Skill sets for Agents," *Colors NW Mag.*, vol. 6, pp. 34–38, 2007.