Inclusive Teaching in Engineering Education: Faculty Beliefs, Practices, and Challenges

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ABSTRACT
Inclusive teaching is vital in engineering education because of its potential to enhance learning for all students. The purpose of this research is to explore faculty experiences with inclusive teaching, specifically focused on engineering settings. Our findings highlighted dominant beliefs, practices, and challenges that emerged from our preliminary analysis. Future work will corroborate these findings with additional faculty as well as engineering student perspectives and beliefs.

Research Methods
LITERATURE REVIEW
• Relevant literature topics—like gender and inclusivity in engineering, gender bias, and qualitative research methods—were explored and used to develop protocol documents necessary for the study
• Used existing literature to develop preliminary deductive codebook.

HUMAN SUBJECTS RESEARCH DESIGN
• Gained experience with relevant issues in human subjects’ research and how to conduct ethical research with individuals
• Developed a qualitative research study including methods, recruitment, interview protocols, and informed consent forms
• Obtained approval for human subject testing from the Cal Poly Institutional Review Board (IRB), allowing us to proceed with participant recruitment

INTERVIEWS
• 6 faculty members from within the Cal Poly College of Engineering across 5 different departments
• Faculty participants were interviewed to explore their experiences and perceptions regarding inclusivity in the engineering classroom
• The interviews were semi-structured and shaped to explore emerging findings
• Coded using a combination of a priori and emergent codes

Preliminary Analysis
QUALITATIVE CODING
• We used a combination of deductive and inductive coding to identify dominant themes in faculty interview data. Here, we identified common themes regarding faculty Beliefs, Practices, and Challenges.
• Our initial findings, as shown in the subsequent tables, contribute to the ongoing effort of cultivating inclusivity in engineering classrooms by shedding light on important aspects of faculty thinking and doing around a critical issue.

GUIDING RESEARCH OBJECTIVES
1. How do engineering faculty describe practices related to inclusive teaching?
2. How do faculty beliefs align/disalign with practices related to inclusive teaching?
3. How might Student Evaluations of Teaching (SET) be augmented to meaningfully evaluate inclusive teaching?

GUIDING RESEARCH QUESTIONS
We structured the interviews around these main questions:
1. What comes to mind when you think of inclusive teaching?
2. What lessons, actions, or activities have you provided/ben provided to foster inclusivity in the engineering environment?
3. What are some characteristics of an engineering teacher that fosters an inclusive environment?
4. How do you know or measure if you are being inclusive in the classroom?
5. What are some challenges you have experienced related to inclusive teaching in engineering?

FUTURE WORK
• Collect student data to explore their beliefs and perceptions
• Expand faculty data collection
• Refine analysis and report findings in MS Thesis work and other journals and conferences
• Use findings to make recommendations for assessing and improving inclusive teaching in engineering