What helps sustain the motivation of socially conscious engineers?

The overall aim of this project was to initiate boundary-spanning research on how a culture of disengagement hinders the professional formation of engineers. This research aimed to understand why engineering students show less and less concern overtime for how engineering contributes to public welfare.

This preliminary research draws from goal-congruency and expectancy-value theories in order to test the communal values hypothesis. There are two primary questions that we are trying to answer:

1. How do students feel their engineering education aligns with their values?
2. How do students pursue career opportunities that reflect their values?

Using Goal-Congruency Theory (Diekman, et al., 2010), we can look to predict students motivation to persist in the field. Motivation both propels students learning and also describes the willingness of students to persist through the long process of engaging in the field (Harackiewicz, Smith & Priniski, 2016). Using the Expectancy-Value Theory of Motivation (Eccles, 1983), motivation can be broken down into two components, expectancy and subjective task value. By focusing on the value component of motivation, we can look to predict students motivation to persist in the field.

Using this framework we seek to measure the prosocial beliefs and prosocial trait endorsements of students in an electrical engineering program at Montana State University. We seek to determine if diminished prosocial trait endorsement replicates findings in other universities. Therefore, there perceptions of the engineering workforce makes it unappealing to certain students (Bourcher, et al., 2017).

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Participants
- 138 Engineering Students
  - Recruited through their enrollment in freshman level (n=79) and senior level (n=51) Electrical Engineering courses
  - Mountain West University
  - 14-15% female,
  - Majority White
  - No other race/ethnicity information was able to be collected

Measures
- Students in freshman-level and senior-level EE courses completed an online survey.
- The survey included instruments to measure:
  - Affordance beliefs about the EE profession
  - Prosocial trait endorsement
  - Measures on the importance of technical and professional skills

Comparison of Affordance Beliefs and Prosocial Trait Endorsements across Freshman and Senior EE Students

Both freshman and seniors believe that the EE profession afforded agentic value significantly above the neutral point. Both also believed that the EE profession afforded prosocial value significantly above the neutral point. Significant decline in prosocial affordance beliefs for seniors.

Comparison of Affordance Beliefs and Prosocial Trait Endorsements across Freshman and Senior EE Students

Analysis showed beliefs about the communal value of engineering was relatively higher for introductory students and lower for advanced students (d=.68, p<.001).

This relative decline is problematic because multilevel modeling revealed that the more intro students thought engineering afforded communal opportunities, the greater their motivation in the class, and to continue their training (95% CI: .01-.34).

No statistical difference in ethical responsibility endorsement.

Significant difference between freshman and seniors in Empathic concern.

Freshman shown to believe empathy was an important trait working as an electrical engineer.

No other race/ethnicity information was able to be collected.

Along with pointing to new directions to improve social conscious engineering students continued participation in engineering.

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