



Engineering a Culture of Engagement



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Overview

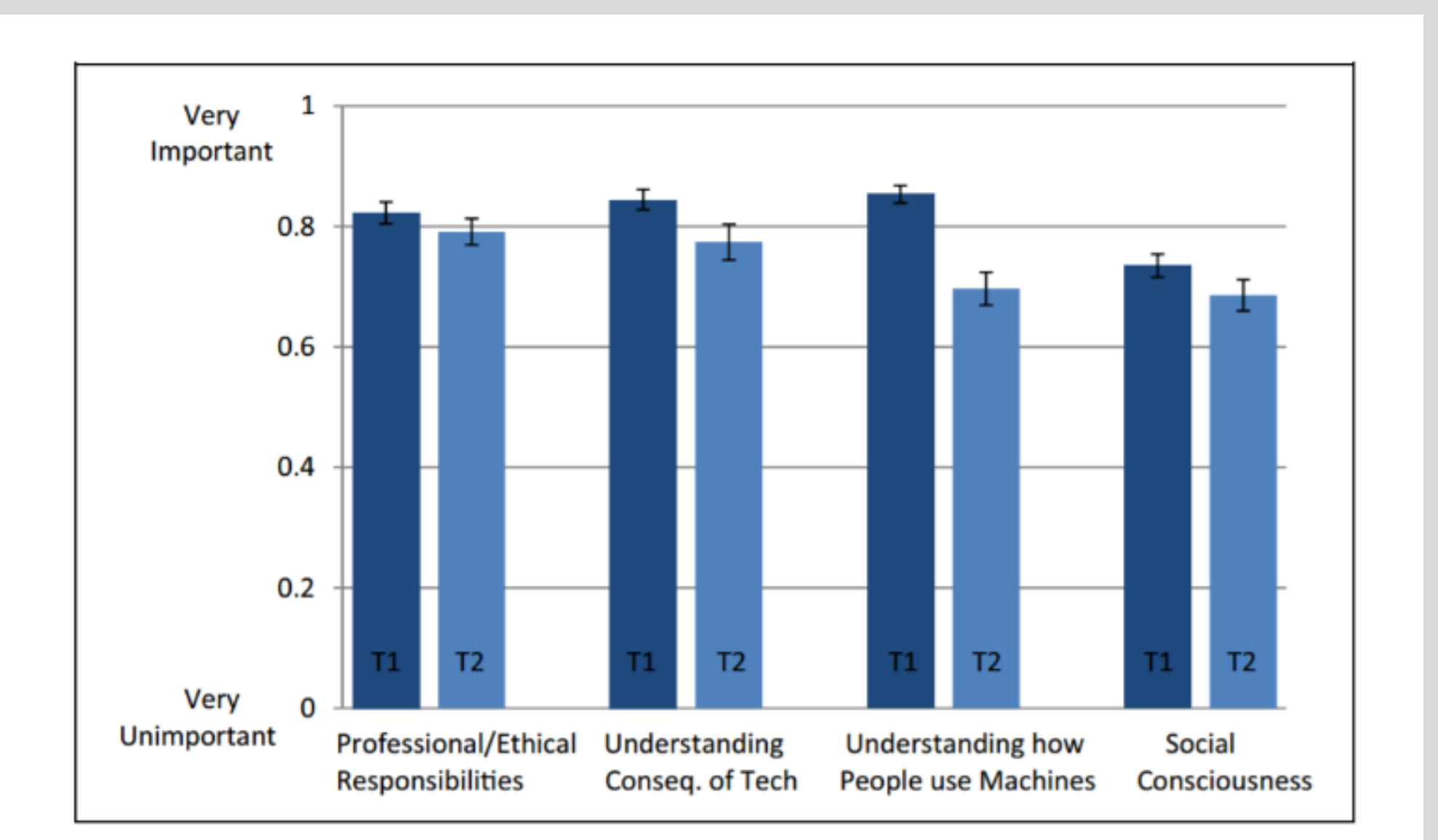
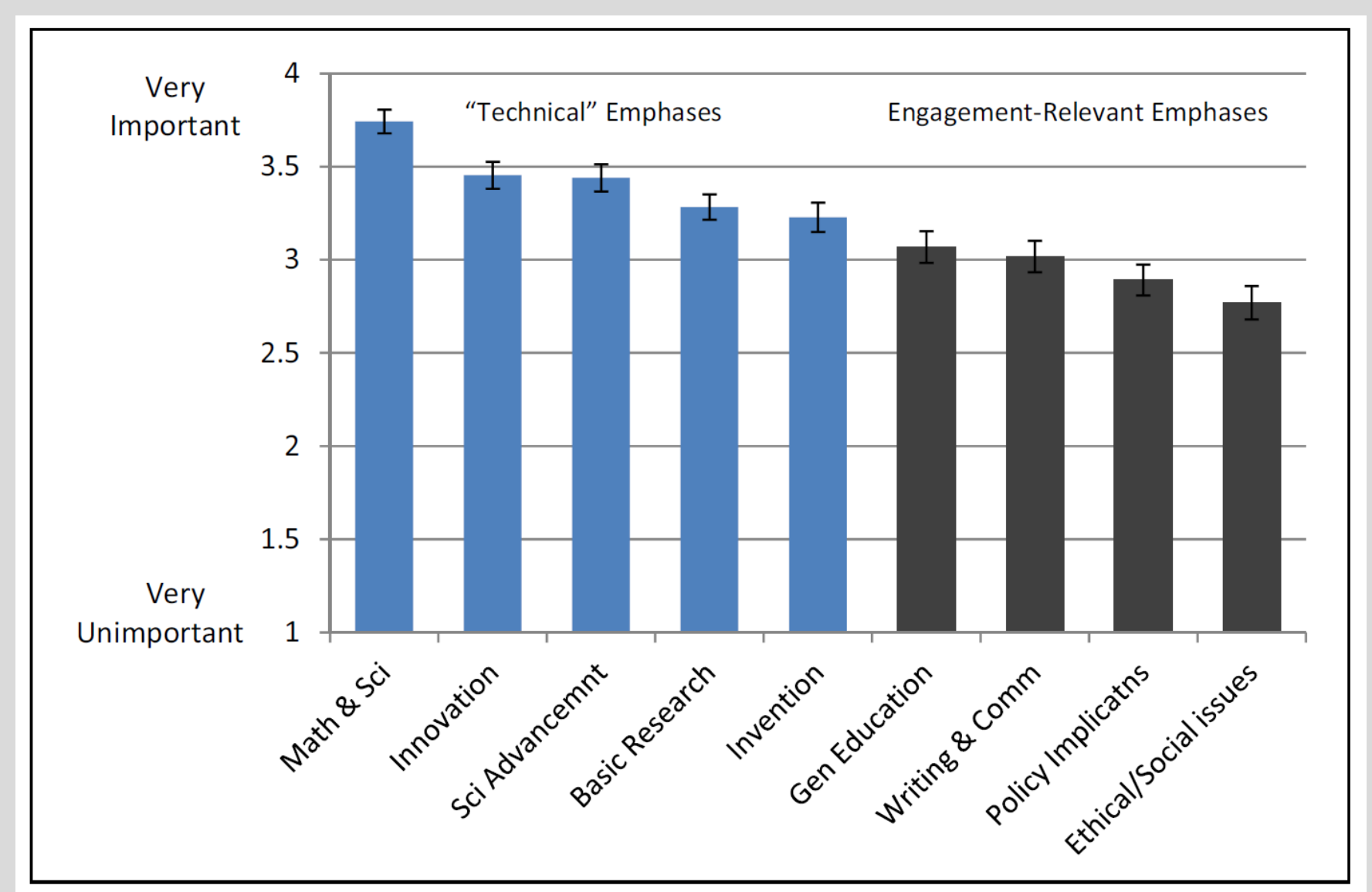
The purpose of this project is to investigate student “dis-engagement” and how it relates to a student’s ultimate motivation to enter the engineering workforce. This research aims to understand why engineering students show less and less concern over time for how engineering contributes to public welfare.

Motivation

Prior work has shown that when the engineering profession is viewed as one that holds only agentic value (i.e., advancement only for one’s self), it is often unappealing to certain student groups, especially women and first generation college students. If interventions can be implemented that change the value system among engineers to create a culture that views engineering as having important prosocial, communal value, this cultural shift will have a transformative impact on the formation of engineers by attracting a more diverse population into the profession.

Simultaneously, the National Academies of Engineering (NAE) is calling for engineering graduates that possess skills to solve the grand challenges facing society and these skills are increasingly outside our traditional technical silos. They include ethics, global thinking, societal impact of technology, and sustainability. These skills overlap with a prosocial value system. To solve the grand challenges facing our society we need an engineering workforce that brings new ways of thinking about societal problems.

Despite these pressing needs, prior work has shown that engineering students still value technical skills over prosocial skills. Or even more concern is that this feeling becomes more severe over time.

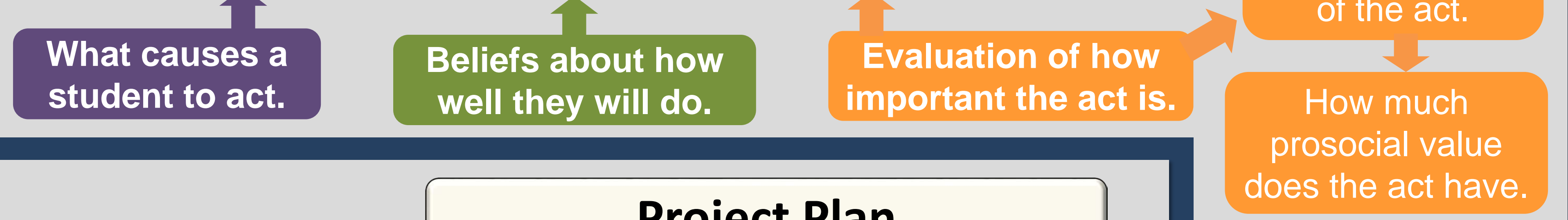


Cech, E.A. (2014). Culture of Disengagement in Engineering Education? *Science Technology Human Values*. 39(1) 42-72.

Theoretical Framework

Our work is guided by the *Expectancy Value Theory of Motivation*, which contributes a students’ motivation to two factors: 1) their own believe in their ability to do well in an activity and 2) how important they feel the activity is. We focus our work on the value side of this equation with specific focus on **Utility Value**. *Utility Value Theory* describes the impact of a students’ belief that engineering has usefulness and/or relevance. Our work specifically looks the students’ view that engineering profession is one that affords prosocial value and how it impacts their motivation to enter the workforce.

$$\text{Motivation} = \text{Expectancy} \times \text{Value}$$

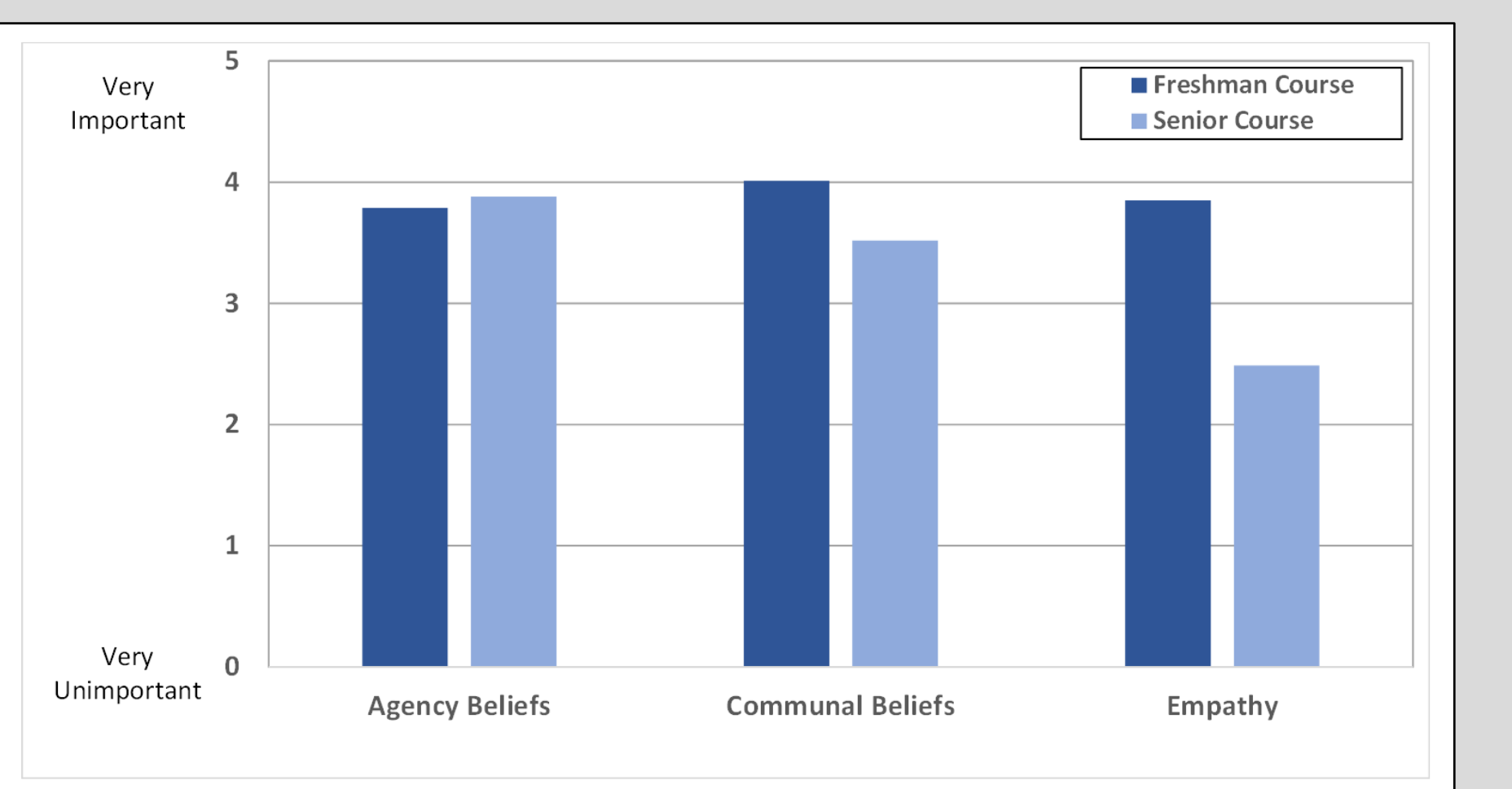
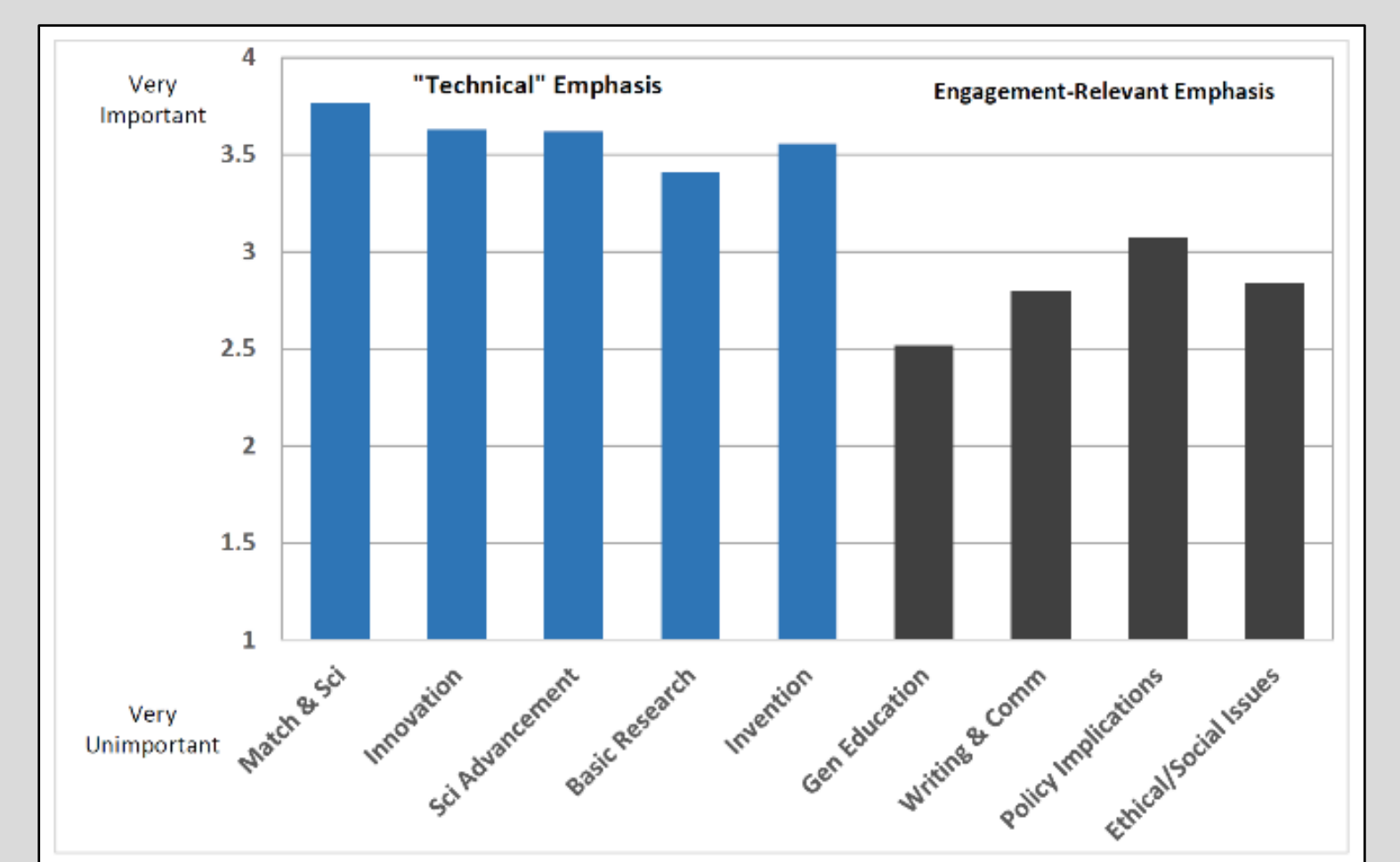


Project Plan

- Aim 1:** Duplicate a study similar to Cech on students’ evaluation of electrical engineering (EE) as a profession that has prosocial value. This will consist of a quasi-longitudinal study (i.e., measure freshman and seniors, but not matched pairs).
- Aim 2:** Train an engineering faculty on the research methods used by social and behavioral scientists.

Results

- MSU EE students valued technical over engagement-related skills, duplicating Cech’s findings.
- Seniors viewed engineering as having less prosocial value than freshman, duplicating Cech’s findings.
- Dr. LaMeris was trained by Dr. Smith in the methods used to conduct this study.



- Question 1:** Does the curriculum cause students to lose the view that the profession has less prosocial value?
- Question 2:** Do students with high levels of prosocial value opt out of the degree program?
- Question 3:** Can interventions that highlight the prosocial value of engineering reverse this trend?

