**Framing Engineering Problems to Motivate Students on Climate Risk Mitigation**

Civil engineering education requires a strong foundation in technical problem solving. Not surprisingly, according to (several?) studies, civil engineering students tend to see global warming as more of a technical than social issue. Yet, only half of these civil engineering students view global warming as personally important to them and even fewer want to address climate change in their career. The lens through which students perceive the effects of global warming is critical to ensure global warming and its effects on climate change are addressed through engineering. In this study, we tested an approach to increase students’ willingness to mitigate the risks associated with climate change through framing. Framing of information can help decision makers focus on some options over others based on how the information is presented; for example, framing with positive (gain) or negative (loss) connotations.

To test the effects of framing on student engineering decision making about climate change, 133 fourth-year engineering students participated in a decision-making scenario that described a 1,000-year flooding event in Nashville, TN and the construction of a waste water holding facility for Nashville’s combined sewer overflow system. A third of the students received the case study information presenting the negative effects from the flooding event (i.e., the number of people who died, stories about community members displaced from the flooding), another third received information about the technical aspects associated with the flooding event (i.e., the amount of rain fall in an hour, the apex of the rivers flooding, the tributaries and watershed size for the creek that flooded), and the remaining third received no additional framing about the technical or social implications of the flooding event. The students were then asked to (a) select credits from the Envision rating system’s category of Climate and Resilience that the project team should prioritize for the construction of the wastewater holding tank and (b) justify their selections. On average, the students who received the technical information chose more credits related to climate and resilience, specifically the credits about evaluating risk and resilience and improving infrastructure integration. However, the difference in frequency was not statistically significant.

We further explored the reasons students provided for why specific credits are important to pursue. We compared the difference in justifications between groups. The results are not conclusive but point towards a trend, focusing on technical issues rather than discussing the impact on people and others even when students were provided information about the effects of extreme flooding events on people. We discuss why focusing the technical issues associated with the risks and natural disaster events may help increase motivation among engineering students specifically and why this is counter to the literature about motivating the general public. We end by talking about future possible interventions in the classroom to help students recognize the effects of climate change risks and motivate these students through the structure of problems to eventually address these issues in their career.