

Engineering for Good: Community Driven Technology Development Case Study

Summary Paper

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1 TARGET AUDIENCE

Humanitarian engineering educators interested in highlighting social impacts of engineering, engineering researchers seeking to translate research results to practical community benefit.

2 BACKGROUND

There is a culture of disengagement from social consideration in engineering disciplines, but engineering is often described as key to sustained economic development. Research suggests the current “outreach” approach to humanitarian engineering could be more effective if it were transformed to a “community engagement” approach. The work described in this paper is a preliminary effort at engaged-engineering to combat the culture of disengagement.

3 PURPOSE

The objective of this study is to describe a community-driven technology innovation program and identify preliminary outcomes.

4 METHOD

This was an applied research project in which outcomes were assessed through observation and self-reports. The team used qualitative analysis to categorise student responses at each stage of the conceptual change model.

5 RESULTS

All students involved in this project demonstrated a transition from single loop (superficial/abstract) to double loop (in-depth/practical) humanitarian-focused engineering thinking and behaviour. Thinking was assessed using self-reported descriptions and

applications of engineering. Behaviour was assessed using self-reported future plans. The results provide a preliminary roadmap, based on the conceptual change model, that engineering instructors might use to assess the extent to which students adopt humanitarian engineering concepts or behaviours. Exit interviews and post-graduation discussions suggest, some students selected career paths that explicitly involve community outcomes as a result of their project experience. This includes a student studying technology and water policy in Europe and a student who is pursuing non-governmental organisation work on technology development with immigrant communities in the United States. Future work will involve scales, such as the Engineering Professional Responsibility Assessment Tool (Canney and Bielefeldt, 2016) or the Community Service Attitudes Scale (Shiarella et al., 2000)

6 IMPLICATIONS FOR TARGET AUDIENCES

This paper outlines a strategy for involving non-engineers in each stage of the engineering design process. Findings indicate the potential impact of community engagement on engineering students and on the engineering pipeline.

7 REFERENCE

Shiarella AH, Mccarthy AM & Tucker ML 2000, 'Development and construct validity of scores on the community service attitudes scale', *Educational and Psychological Measurement*, vol. 60, no. 2, pp. 286 - 300