

Examining the Experiences of First-Year Honors Engineering Students in Service-Learning

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Introduction

- Service-learning is the pedagogy of matching academic learning goals with community needs.
- Key ABET Student Outcomes include the abilities to communicate effectively and function on multi-disciplinary teams, and an understanding of professional and ethical responsibility.
- We investigated the efficacy of service-learning in the context of students' self-perceived abilities to practice effective communication and strategic teamwork, along with its contribution to their self-concept.

Methods

Participants

- 11 first-year, Honors Introduction to Engineering students, 4 in Fall 2016 and 7 in Fall 2017.
- Students worked in teams to prepare a presentation and hands-on engineering activity for middle school aged teenagers.

Data Collection

Fall 2016 Cohort

Fall 2017 Cohort

- | | |
|----------------------------|-----------------------------|
| • Preliminary Survey | • Post-Presentation Survey |
| • Post-Presentation Survey | • Semi-Structured Interview |
| | • In-Class Reflection |

Projects

The teenagers worked in small teams to complete the following hands-on activities:

Fall 2016 Cohort

Fall 2017 Cohort

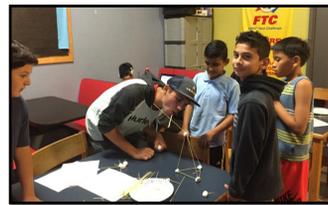
Building a Rubber Band-Powered Car



Constructing a Catapult



Taking the Marshmallow Challenge



Thinking Like a Computer Programmer



Designing a Hover Highway



Creating a Rubber-Band Car



Future Directions

Future investigations will focus on **skill development** and **personal growth** among engineering student service-learning participants with particular attention to variations **by gender**.

Results

Communication

- Development of presentation and public speaking skills.
- Importance of considering audience and being adaptable.

Strategic Teamwork

- Diverse array of skills celebrated.
- Experience with negotiation and group discussions.

Self-Concept

- Duty to encourage adolescents to pursue higher education.
- Interest in participating in future service learning opportunities.

Discussion

Students' takeaways related to ABET Student Outcomes:

- **Communicating effectively:** Self reported growth of communication skills.
- **Functioning on multi-disciplinary teams:** Gained experience with highlights and challenges.
- **Understanding professional and ethical responsibility:** Enhanced sense of duty to serve adolescent peers.