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
• Preliminary Survey
• Post-Presentation Survey

Fall 2017 Cohort
• 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**

- Building a Rubber Band-Powered Car
- Taking the Marshmallow Challenge
- Designing a Hover Highway

**Fall 2017 Cohort**

- Constructing a Catapult
- Thinking Like a Computer Programmer
- Creating a Rubber-Band Car

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.

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.

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.