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**

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

**Projects**

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

<table>
<thead>
<tr>
<th>Fall 2016 Cohort</th>
<th>Fall 2017 Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a Rubber Band-Powered Car</td>
<td>Constructing a Catapult</td>
</tr>
<tr>
<td>Taking the Marshmallow Challenge</td>
<td>Thinking Like a Computer Programmer</td>
</tr>
<tr>
<td>Designing a Hover Highway</td>
<td>Creating a Rubber-Band Car</td>
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**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.

**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.