What Makes an Inquisitive Engineer?
Exploring question-asking self-efficacy and outcome expectations among engineering students
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What are the results?

1. IT’S NOT WHAT YOU’D THINK

Demographic Traits
- Gender
- Under-represented minorities

School characteristics
- Number of undergraduates
- Percentage of classes under 20 and above 100 students.
- Large vs. medium/small engineering program
- Research vs. non-research school

No statistically significant difference on question-asking self-efficacy or outcome expectations

2. CONFIDENCE FROM OUTSIDE THE CLASSROOM

Participation Rates in Undergraduate Experiences by High and Low Question-Asking Self-Efficacy

<table>
<thead>
<tr>
<th>Experience Type</th>
<th>High QSE</th>
<th>Low QSE</th>
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</thead>
<tbody>
<tr>
<td>Internship</td>
<td>74.2%</td>
<td>56.1%</td>
</tr>
<tr>
<td>Research group</td>
<td>44.2%</td>
<td>33.8%</td>
</tr>
<tr>
<td>Student group</td>
<td>88.8%</td>
<td>79.8%</td>
</tr>
<tr>
<td>Role in company</td>
<td>49.8%</td>
<td>36.3%</td>
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Note: All differences in participation rates between high and low QSE detailed above are statistically significant (p < 0.05).

3. POSITIVE EXPECTATIONS RELATE TO EXPERIENCES

students with positive social outcome expectations
more likely to be involved in group extracurricular activities
(Internships, student groups, leadership)

students with positive career outcome expectations
more likely to have workplace experience (Internships, already working in job)

4. THE MORE EXPERIENCES, THE BETTER

Average Risk on SHS Scale

Social outcome
Career outcome
Self-efficacy

The greater the variety of experiences a student tries out, the greater their self-efficacy and outcome expectations around asking questions.

What are the implications?

1. Asking questions may improve your class and work experience.
2. To get better at asking question, take advantage of many experiences outside of class.
3. Encourage student participate in summer experiences and activities outside of class.

What are the next steps?

Design-activity intervention: How does working in groups affect question-asking self-efficacy?
Internship intervention: How do students' question-asking self-efficacy and outcome expectations change after a summer internship?
Longitudinal study: How do engineering students’ question-asking self-efficacy and outcome expectations change over time?

More robust surveys: What parts of these experiences foster question-asking? Can we develop a more robust question-asking self-efficacy instrument?
Question types: What makes a good engineering question?
State of engineering education: To what extent do current engineering classes encourage question-asking?

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