Recruitment and Retention* of the Next Generation of Engineers and Scientists

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Abstract
The United States faces a shortage of engineers and scientists that threatens its security and prosperity. The purpose of this research is to analyze the factors that affect college-level STEM majors—students who are enrolling, staying, and graduating in STEM fields. The study presents an analysis of variables that contribute to recruitment and retention in STEM careers. The study found that while the demand for STEM professionals has increased, the supply of STEM graduates has declined. The shortage of engineering graduates is particularly evident in the United States, with only 13% of the workforce being engineers. The study also notes that the United States is behind in global competitiveness in technological fields. The purpose of this research is to identify and address the challenges facing STEM students and to encourage proactive strategies to improve recruitment and retention in STEM fields.

Introduction
The United States faces a shortage of engineers and scientists that threatens its security and prosperity. The shortage of engineers in the workforce has prompted the United States to increase efforts to attract and retain students in STEM fields. The study examines the motivations that lead students to pursue (or drop) careers in STEM fields, and how these motivations change as students progress through their academic careers. The study also identifies strategies that can be used to improve recruitment and retention in STEM fields.

Here's What We Know:
In the past 20 years, the United States has significantly improved its role in the world in part due to the efforts of students with STEM degrees. However, while the United States has made significant progress in increasing the number of STEM graduates, the number of students pursuing engineering has declined in the United States, but increased ten-fold in China. In the past 30 years, the United States has been significantly outpaced by the rest of the world, falling from 4th to 18th in the percentage of students with STEM degrees. (National Science Board). The GI Bill was responsible for educating thousands of young soldiers after World War II, and was particularly effective for people who “loved” math/science and became engineers. (US Department of Commerce). The United States faces an aging engineering workforce. The supply of incoming engineers will not meet the demand for STEM professionals across the nation. Failing to seek out new, more efficient ways of doing things leads to loss of talent, loss of global competitiveness, and an uncertain future for our children. As Workforce 2.0. Risky Business states: “We cannot simply prepare the latter for our children, but we must prepare our children for the future.”

Recruitment*
Recruitment* is a process of identifying and attracting potential students to STEM fields. The purpose of this research is to identify and address the challenges facing STEM students and to encourage proactive strategies to improve recruitment and retention in STEM fields. The study examines the motivations that lead students to pursue (or drop) careers in STEM fields, and how these motivations change as students progress through their academic careers. The study also identifies strategies that can be used to improve recruitment and retention in STEM fields.

Summary and conclusions
The United States faces a shortage of engineers and scientists that threatens its security and prosperity. The purpose of this research is to analyze the factors that affect college-level STEM majors—students who are enrolling, staying, and graduating in STEM fields. The study presents an analysis of variables that contribute to recruitment and retention in STEM careers. The study found that while the demand for STEM professionals has increased, the supply of STEM graduates has declined. The shortage of engineering graduates is particularly evident in the United States, with only 13% of the workforce being engineers. The study also notes that the United States is behind in global competitiveness in technological fields. The purpose of this research is to identify and address the challenges facing STEM students and to encourage proactive strategies to improve recruitment and retention in STEM fields.

Here are some strategies UTA may consider to maintain students in engineering:
- Clearly define expectations and relevant learning goals.
- Provide engineering Summer Camps: UTA hosts five summer camps for students grades 4-11 that provide exposure to various engineering disciplines, hands-on projects and lectures to help students understand what engineering is about.
- Research Experiences for Undergraduates (REU): The National Science Foundation is responsible for major funding that targets participation from women, minorities and STEM activities. REU programs across the country offer opportunities to engage in research projects that can take students the opportunity to do real engineering research.
- Be sure to separate figures from other figures by generous use of white space. It is important to maintain a clear distinction between different figures and to ensure that each figure stands on its own.

Current Trends in Engineering Education:
This is a Workforce Train Week.

<table>
<thead>
<tr>
<th>Women</th>
<th>Minorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>20%</td>
</tr>
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</table>

In the U.S., the top minority demographic, Black and Hispanic, accounted for 17% of the engineering workforce. (National Academy of Engineering).

<table>
<thead>
<tr>
<th>All jobs</th>
<th>STEM jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>20%</td>
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</table>

Women Account for only have a quarter of STEM positions in the United States. Women in STEM face substantial challenges in healthcare, education, not engineering. (US Department of Commerce)

<table>
<thead>
<tr>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>STEM-Labs</td>
<td>STEM-Labs</td>
</tr>
<tr>
<td>50%</td>
<td>50%</td>
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