Self-efficacy in Female and Male Undergraduate Engineering Students: Comparisons Among Four Institutions

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PATHWAYS TO SELF-EFFICACY AND RETENTION OF WOMEN IN UNDERGRADUATE ENGINEERING

Hypotheses
- Self-efficacy is the principal predictor of retention of women in undergraduate engineering programs.
- Formal co-op education and internships can predict women’s retention directly and indirectly through their impact on self-efficacy.
- Contextual support variables affect work, career, and academic self-efficacy as well as retention both directly and indirectly through self-efficacy.
- Demographic variables have an independent effect on retention but also interact with contextual variables and with self-efficacy to indirectly affect retention.
SELF-EFFICACY

- an individual's perceived level of competence or the degree to which an individual believes she is capable of completing a task.
- a dynamic trait that changes over time and can be influenced by experience.
- expectations are considered the primary cognitive determinant of whether or not an individual will attempt a given behavior.

SELF-EFFICACY

- Academic: success in one's major
- Work: success in learning tasks, organizational processes, expectations
- Career: occupational information, self-assessment of future plans, problem solving
CONCEPTUAL FRAMEWORK

Demographic Characteristics
- Age
- Sex
- GPA, etc.

Cooperative Education

Self-Efficacy
- Work
- Academic
- Career

Contextual Supports

VARIABLE CLUSTERS
- Demographic variables: h.s. performance, SAT, GPA
- Formal work experience programs: co-op & internships
- Contextual supports: mentorships and advising
- Self-efficacy in 3 dimensions: work, academic, & career
- Principal dependent variable: retention
METHODS

- Survey administration: online, paper, in or outside of class

PRELIMINARY FINDINGS

Table 2
Significant Bivariate Gender Differences

<table>
<thead>
<tr>
<th></th>
<th>Academic Self-Efficacy</th>
<th>Career Self-Efficacy</th>
<th>Mentorship</th>
<th>Prof. Support</th>
<th>Friend Support</th>
<th>Friends Matter</th>
<th>Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>3.88</td>
<td>3.67</td>
<td>3.98</td>
<td>3.54</td>
<td>4.25</td>
<td>4.19</td>
<td>3.60</td>
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<tr>
<td>Females</td>
<td>3.74</td>
<td>3.74</td>
<td>4.24</td>
<td>3.75</td>
<td>4.49</td>
<td>4.43</td>
<td>3.78</td>
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<tr>
<td>F-Ratio</td>
<td>5.60</td>
<td>2.42</td>
<td>2.23</td>
<td>6.07</td>
<td>12.51</td>
<td>14.60</td>
<td>4.57</td>
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<tr>
<td>Sig.</td>
<td>0.018</td>
<td>0.120</td>
<td>0.137</td>
<td>0.014</td>
<td>0.000</td>
<td>0.000</td>
<td>0.033</td>
</tr>
</tbody>
</table>

Bold figures indicate higher value
CONCLUSIONS

- Women have lower academic self-efficacy
- Women take advantage of support mechanisms
  - Friends
  - Living/learning communities
  - Mentor
- Women believe they can succeed in an engineering career

NEXT STEPS

- Survey #2 administered 2009-10 AY
- Analyze surveys for effects of co-op and internship experiences
- Suggest the institutionalization of co-op programs?