Retention of Undergraduate Engineering Students: Extending Research Into Practice

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Center for Workforce Development

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Funded by the Alfred P. Sloan Foundation
What is PACE?

- Project to Assess Climate in Engineering (PACE)
  - Funded by the Alfred P. Sloan Foundation
  - Goal: Improve retention among all engineering undergraduates

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PACE Schools

- Provide data, Benchmark with peer institutions, Conduct follow-ups with schools to track actions taken
- 22 Engineering Colleges
  - 77% Public
  - 55% Carnegie RUVH
  - 18% Minority Serving Institutions
  - 41% Land Grant Institutions
- School Enrollment: Ranges from 1904 to 50995

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PACE Mixed Methods

- Online survey
  - Sample: Current engineering students
  - Oversampled under-represented groups
  - 38,376 students invited
  - 10,554 completions
  - Median response rate: 28%
  - Final sample size of 10,366

- On-site Interviews
  - Sample: Current and former engineering students
  - Oversampled under-represented groups
  - 179 interviews completed at 16 schools, 124 current students and 55 former students

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Faculty Student Interaction Results

- 19% students participate in mentoring programs
- 17% of women were unfairly singled out in class because of their gender
- 22% of women heard faculty express gender stereotypes
- 17% of women are never or rarely comfortable asking questions in class

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Faculty-Student Recommendations

- Increase and Improve Faculty Student Interaction
  - Develop mentoring programs (17)
  - Educate about stereotypes (11)
  - Encourage students to ask for help (11)
  - Facilitate increased student engagement (10)

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Curriculum Results

- Interviewees loved hands-on, real life problem solving activities
- 27% of students can think of other majors they would like better than engineering
- 38% of students usually or all the time felt overwhelmed by the amount of homework

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Curriculum Recommendations

- Improve Curriculum
  - Integrate relevant applications (14)
  - provide greater flexibility in curriculum (5)

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Student Engagement Results

- 59% of students feel like they usually or all the time are part of an engineering community
- 56% of females, 28% of males; 48% URM, 39% non-URM are involved in student professional societies
- 43% of women involved with WIE, 34% of under-represented minorities involved with MEP
- Interviewees had high praise for the value of engineering-related work experiences

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Student Engagement Recommendations

- Strengthen student engagement in engineering study and knowledge of engineering careers

- Encourage participation in professional societies and clubs (9)
- Facilitate communities for women and URMs (5)
- Increase opportunities for internships, co-ops, REU’s (5)

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Next Steps

- Working with schools and following up on their progress toward implementing some of the PACE recommendations

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Appendix
# Survey Respondent Demographics

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<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>TOTAL</th>
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<tr>
<td>African American</td>
<td>209</td>
<td>164</td>
<td>373</td>
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<td>Native American</td>
<td>86</td>
<td>53</td>
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<td>389</td>
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<tr>
<td>International</td>
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<td>434</td>
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<td>62</td>
<td>150</td>
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<tr>
<td>Other</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>5,642</td>
<td>4,525</td>
<td>10,167</td>
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### Interviewee Demographics

<table>
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<tr>
<td></td>
<td>Leavers</td>
<td>Climate</td>
<td>Leavers</td>
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</tr>
<tr>
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<tr>
<td>Hispanic American</td>
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<td>13</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td>25</td>
<td>29</td>
<td>16</td>
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<tr>
<td>Asian American</td>
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<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Asian Indian</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td><strong>34</strong></td>
<td><strong>58</strong></td>
<td><strong>21</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>92</strong></td>
<td></td>
<td><strong>87</strong></td>
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