

Retention of Undergraduate Engineering Students: Extending Research Into Practice

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What is PACE?

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



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

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

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)



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

Curriculum Recommendations

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



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

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 URM's (5)
- Increase opportunities for internships, co-ops, REU's (5)



Next Steps

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



Appendix

Survey Respondent Demographics

	Male	Female	TOTAL
African American	209	164	373
Native American	86	53	139
Hispanic American	851	389	1,240
Hawaiian/Pacific Islander	17	18	35
White	3,321	2,994	6,315
Asian American	429	409	838
International	636	434	1,070
Unknown	88	62	150
Other	5	2	7
TOTAL	5,642	4,525	10,167

Interviewee Demographics

	Male		Female		TOTAL
	Leavers	Climate	Leavers	Climate	
African American	3	7	1	5	16
Native American	0	2	0	2	4
Hispanic American	1	13	1	8	23
White	25	29	16	36	106
Asian American	3	5	2	9	19
Asian Indian	2	2	0	4	8
Other	0	0	1	2	3
SUB-TOTAL	34	58	21	66	
TOTAL	92		87		179