

## CROSS-CULTURAL GENDER ISSUES IN ENGINEERING COLLEGES

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The Positive Opportunities for Women Engineers' Retention (POWER) grant at New Jersey Institute of Technology (NJIT) has achieved its central Year I goal of collecting 1728 surveys (613 faculty, 1115 student) and 28 faculty interviews from 5 colleges in New Jersey ( NJIT, and 4 community colleges-- Brookdale, Ocean, Middlesex and Hudson). \*

This research is focused on locating the problems blocking the full scale entrance, retention and graduation of women of all colors in engineering as well as finding solutions to improve classroom/hallway climate for women undergraduate/graduate students and faculty in engineering. Our central research question was: How are the problems of gender complicated by race, ethnicity, and nationality in Engineering classrooms and hallways? A major focus of this research is the study of the intersection of gender with cross-cultural issues in New Jersey engineering colleges and community colleges.

### RACE & NATIONALITY

Regarding race and nationality, there are no non-white American engineering professor respondents at NJIT, Ocean County College, or Brookdale Community College. All Americans are white. None of the non-white respondents are Americans; they are all internationals. But not all whites are Americans; among white men, 57% are American; 43% are internationals at NJIT.

All people of color are from other countries at the engineering professorial rank at NJIT, Ocean and Brookdale, an unexpected find.

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\* I want to thank my secretary Sharon Williams and the P.O.W.E.R. graduate students: Oksana Manzhura (Electrical Engineer), Nusrat Aliya (Computer Science), and Ed Hudak (Math) for the their tireless work on this data. Thanks also to the engineering professors at NJIT for making this study possible; 65% of them returned their questionnaires!



Table 1.

TOTAL NUMBER OF P.O.W.E.R. SURVEY RESPONDENTS

	#	%
FACULTY:	613	36%
STUDENTS:	1115	64%

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TOTAL	1728	100%
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Table 2.

TOTAL GENDER BREAKDOWN

FEMALES:	42%
MALES:	58%

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TOTAL:	100%
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Table 3.

FACULTY GENDER BREAKDOWN

FEMALES:	246	40%
MALES:	355	58%
NO GENDER ID	12	2%

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TOTAL	613	100%
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Table 4.

STUDENT SURVEYS BY GENDER

FEMALES:	43%
MALES:	57%

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TOTAL:	100%
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Table 5.

STUDENT SURVEYS SCHOOL BREAKDOWN

<u>SCHOOL</u>	#	%
N.J. INSTITUTE OF TECHNOLOGY	428	38
BROOKDALE COMMUNITY COLLEGE	103	9
HUDSON COUNTY COLLEGE	66	6
MIDDLESEX COUNTY COLLEGE	218	20
OCEAN COUNTY COLLEGE	300	27
TOTAL	1115	100%

Table 6.  
FACULTY SURVEYS SCHOOL BREAKDOWN

SCHOOL	#	%
N.J. INSTITUTE OF TECHNOLOGY	171	28
BROOKDALE COMMUNITY COLLEGE	154	25
HUDSON COUNTY COLLEGE	49	8
MIDDLESEX COUNTY COLLEGE	164	27
OCEAN COUNTY COLLEGE	75	12
TOTAL:	613	100%

Table 7.  
FULL TIME ENGINEERING FACULTY RESPONDENTS OF POWER  
SURVEY AT 5 NEW JERSEY COLLEGES

	ENGINEERING # Women	% of Total Faculty Respondents
NJIT	4	3%
MIDDLESEX	0	0%
BROOKDALE	1	7%
OCEAN	0	0%
HUDSON	1	25%
Total WOMEN	6 Women =	4% of Engineering Faculty
	(164 Men =	96% of Engineering Faculty)
170 Total = 100%		

Table 8.  
FULL TIME FEMALE FACULTY (SCIENCE & LIBERAL ARTS) RESPONDENTS  
AT 5 NEW JERSEY COLLEGES

	MATH/SCIENCE ♀ % of Faculty	SOCIAL SCIENCE ♀ % of Faculty	HUMANITIES ♀ % of Faculty
NJIT	6%	16%	30%
MIDDLESEX	31%	25%	36%
BROOKDALE	29%	18%	38%
OCEAN	34%	20%	40%
HUDSON	0	40%	40%
Total Number of Women	55=n	11=n	59=n
Faculty in Math/Science			
Social Science & Humanities			



Table 9.

## FACULTY SURVEYS SCHOOL &amp; GENDER BREAKDOWN

SCHOOL:	#	%
NEW JERSEY INSTITUTE OF TECHNOLOGY		
MALES:	144	84
FEMALES:	22	13
NO GENDER ID:	5	3
TOTAL:	171	100%
BROOKDALE COMMUNITY COLLEGE		
MALES:	71	46
FEMALES:	80	52
NO GENDER ID	3	2
TOTAL:	154	100%
HUDSON COUNTY COLLEGE		
MALES:	23	47
FEMALES:	26	53
TOTAL:	49	100%
MIDDLESEX COUNTY COLLEGE		
MALES:	76	46
FEMALES:	85	52
NO GENDER ID:	3	2
TOTAL:	164	100%
OCEAN COUNTY COLLEGE		
MALES:	41	55
FEMALES:	33	44
NO GENDER ID:	1	1
TOTAL:	75	100%
GRAND TOTAL:	613	100%

Table 10.

NEW JERSEY INSTITUTE OF TECHNOLOGY  
FULL-TIME FACULTY SURVEY RESPONDENTS:  
BREAKDOWN OF SCHOOL OF ENGINEERING BY DEPARTMENT

RESPONDENT'S GENDER

DEPARTMENT	MALE	FEMALE
CHEMICAL	19	1
ELECTRICAL	36	0
CIVIL	12	1
MECHANICAL	14	2
INDUSTRIAL	10	1
ENGINEERING TECH.	1	0
TOTAL:	92	5

-There are 34 full-time faculty members in the **Chemical Engineering Dept.**,  
20 returned the P.O.W.E.R. Survey, the return rate is **59%**

-There are 25 full-time faculty members in the **Civil/Environmental Engineering Dept.**, 13 returned the P.O.W.E.R. Survey, the return rate is **52%**

-There are 34 full-time faculty members in the **Mechanical Engineering Dept.**,  
16 returned the P.O.W.E.R. Survey, the return rate is **47%**

-There are 11 full time faculty members in the **Industrial Engineering Dept.**,  
11 returned the P.O.W.E.R. Survey, the return rate is **100%**

-There are 36 full-time faculty members in the **Electrical/Computer Engineering Dept.**, 36 returned the P.O.W.E.R. Survey, the return rate is **100%**

-There are 10 full-time faculty members in the **Engineering Technology Dept.**,  
1 returned the P.O.W.E.R. Survey, the return rate is **10%**

**There are 150 Full-Time Faculty members in the College of Engineering**  
**97 returned the P.O.W.E.R. Survey**

**COLLEGE OF ENGINEERING**  
**RETURN RATE** **65%**

## PERCEPTIONS ABOUT WOMEN'S CONFIDENCE IN ENGINEERING CLASSES

Over 3/4 of all Engineering professors studied, regardless of their own race or nationality, believe non-white women have the least confidence in their class. Sixty percent think African American women students have the least amount of confidence in engineering classes, while another 20% think Middle Eastern women have the least amount of confidence. **Caution: These are perceptions, not necessarily reality.**

## MALE INTERNATIONAL STUDENTS & WOMEN PROFESSORS

About 3/5 of white American engineering professors (both male and female) think that Middle Eastern male students have the most difficulty accepting criticism from a woman professor; 22% think that Indian students do. Two thirds of white non-American professors perceive that Middle Eastern males have difficulty taking criticism from a female professor; 20% said Asian males do; and 13% said Indian males. Non-white non-American professors gave more mixed results: 30% of men said Middle Eastern men have problems with female professors; 30% said Indians do. **Caution: These are perceptions, not necessarily reality.**

The gender of professors seem to make a difference in their opinion of international students: 2/3 of white American male engineering professors agree there are too many international students on their campus; while 2/3 of women professors disagree. The female number is too small; for generalization, however.

## WOMEN TEACHERS IN GRADUATE SCHOOL

No white American male engineering professor at NJIT or Ocean had any women teachers in their specialty in graduate school. Neither did any of the white females. Most (90%) non-white/non-American men didn't have women teachers either; only 10% did.

**Analysis: This may explain why the engineering cultural climate is chilly for women students. Most engineering professors literally have had no experience with women teachers in the engineering classroom.**

**WOMENS RIGHTS:** Respondents were asked to agree or disagree with the statement-- "Women in my culture have the same rights as men." Among American whites, 83% of men and 66% of women agree that American women have equal rights in U.S. culture. Among international people of color we find the reverse; 66% of women and 62% of men say that women are not equal to men in their culture. The final results of this study will be completed late Fall 1995.

