

Improving Gender Disparity in Engineering Programs in Mississippi

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Background

Rate: Female students obtained 21.9 % of bachelor's degrees, 26.7% of master's degrees, and 23.6% of doctoral degrees in engineering majors.

10.8% is projected for STEM careers between 2021 and 2031.

Variance: 50.6% of bachelor's degrees in environmental engineering were awarded to women in 2018, while computer and electrical engineering programs had only 13.3% and 14.2% of degree recipients as female

Retention: 12.4% in Australia; 13% (civil, mechanical, electrical, and chemical engineers) in Canada; 16.5% in U.K.; 15.9% in U.S.



Research Objectives

- How female students in EC perceive their academic and professional fields
- What factors impact female students as barriers or motivators toward their professional goals



Methodology

- Literature Review
- Expert Discussion
- Instrument Development
- Data Gathering
- Statistical Analysis



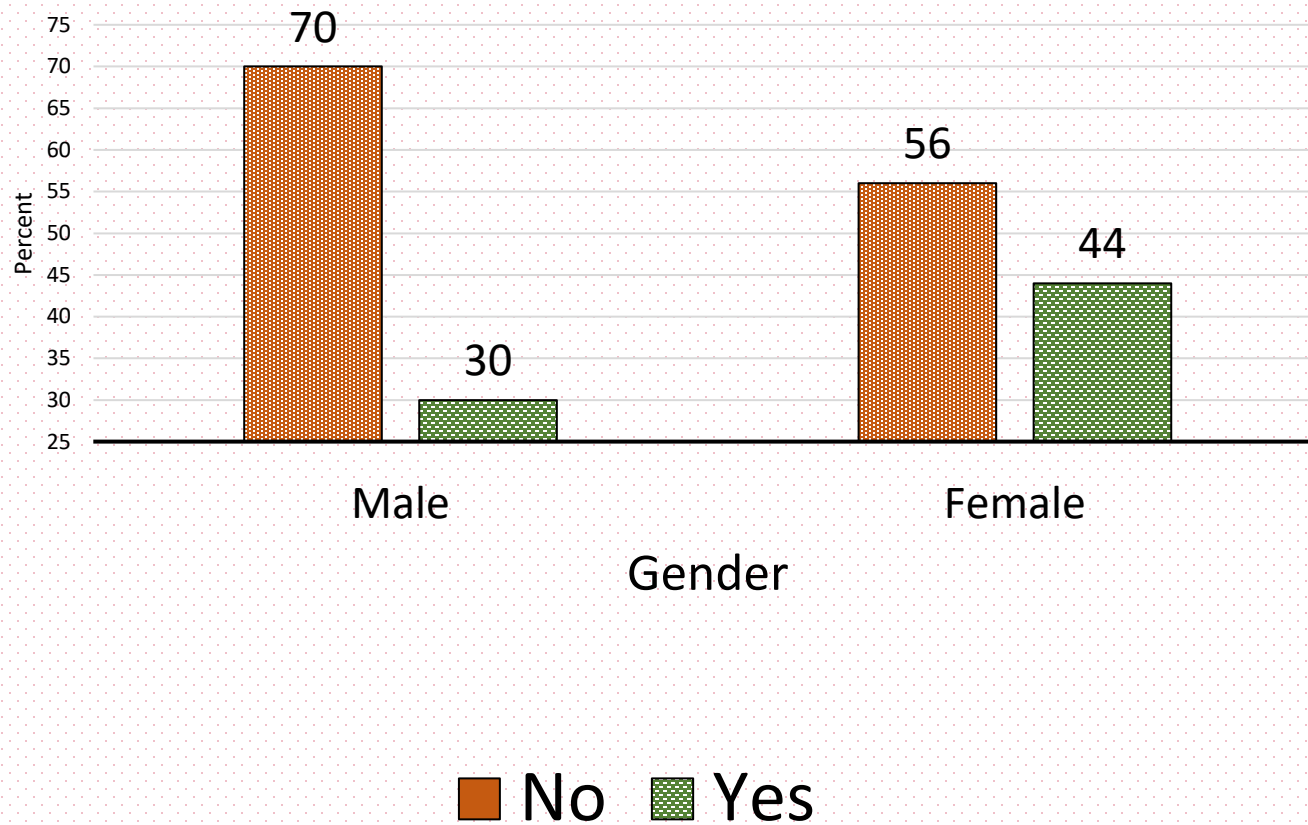
Results

- 369 students, including 105 female (28%) and 264 male students from EC majors
- The male group reported an average of 11.4 months of work experience, while this number was 4.9 for female students.
- Time spent outside the class for male and female groups was 13.6 and 14.1 hours per week, respectively.
- GPA for male and female groups were 2.86 and 3.01 (out of 4)



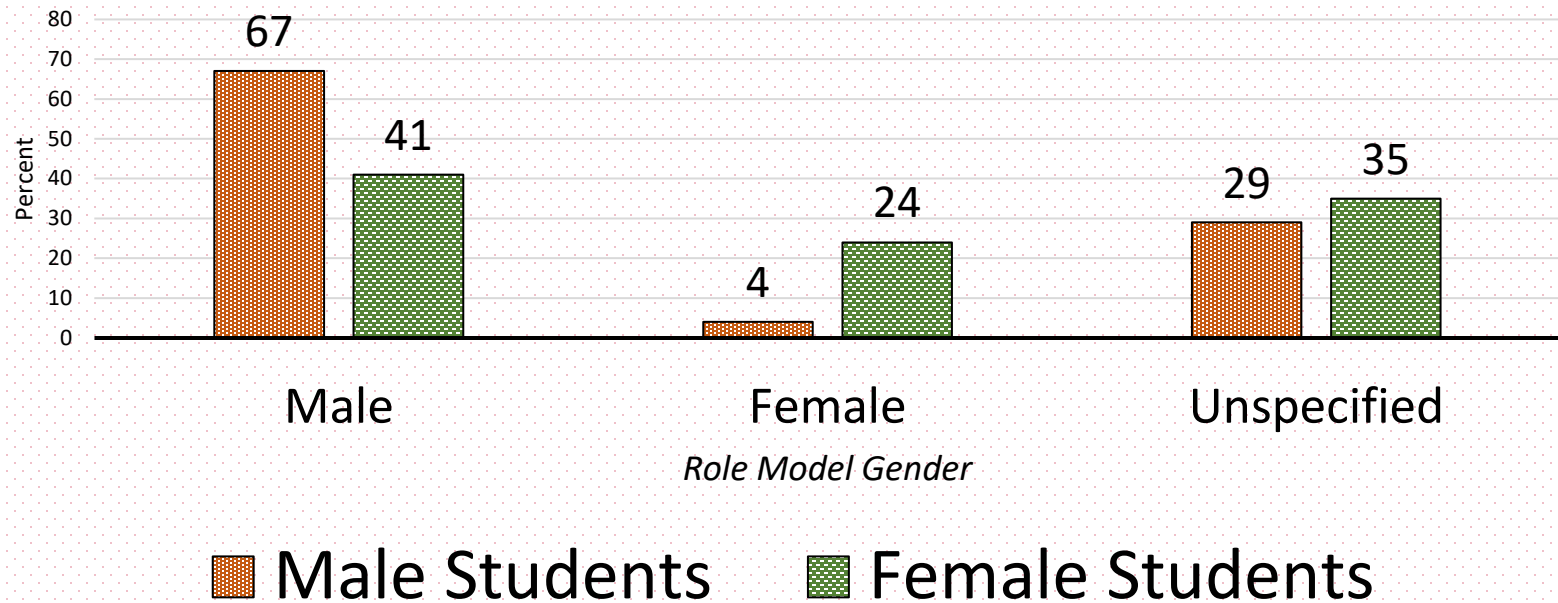
Results

Having a role model when choosing the major



Results

Role model gender



Results

Motivating Factors:

1. Opportunities in the industry
2. Looking at something I created makes me feel good
3. Fascinated by the beauty of buildings/engineering products
4. My background and family members
5. The fact that there were few women
6. To challenge the perception that this major is for males
7. Successful women in engineering/construction
8. High job salary
9. Performance in related high school subjects
10. Encouraged by a teacher or guidance counselor
11. My passion
12. It's intellectually stimulating/challenging

Gender	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
Male	4.15	4.17	3.66	2.86	1.51	1.57	1.65	4.1	3.5	2.78	3.76	4.02
Female	4.41	4.12	3.51	3.02	3.5	3.39	3.57	4.37	4.06	3.2	3.81	4.17



Results

Motivating Factors:

<i>Principal component analysis for motivating factor</i>					
Items	Component			Average	Dimension
	1	2	3		
The fact that there were few women	.860			.740	External Image
To challenge the perception that this major is for males	.817				
Successful women in construction/engineering	.794				
Fascinated by the beauty of buildings/engineering products	.491				
My passion		.805		.663	Personal Sentiment
It's intellectually stimulating/challenging		.742			
Encouraged by a teacher or guidance counselor		.620			
Looking at something I created makes me feel good		.487			
Opportunities in the industry			.773	.628	Growth Projection
High job salary	.422		.599		
Performance in related high school subjects			.513		



Results

Impediments

1. Long hours and inflexible workplaces
2. Male-dominated networks
3. Rigidity of career roles
4. Lack of role models
5. Outmoded stereotypes
6. Lack of sponsorship programs
7. Lack of mentors
8. Difficulty of content
9. Lack of information during high school
10. Unattractive image of the industry

Gender	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Male	3.34	2.4	2.69	2.39	2.34	2.46	2.61	3.85	3.47	2.71
Female	3.5	3.02	3.02	2.68	2.99	2.85	2.88	4	3.75	3.04

Results

Impediments

<i>Principal component analysis for impediments</i>					
Items	Component			Average	Dimension
	1	2	3		
Lack of mentors	.850			.740	(Lack of) Role Model
Lack of sponsorship programs	.832				
Lack of role models	.680				
Outmoded stereotypes	.657	.523			
Rigidity of career roles		.798		.713	Career Characteristics
Male-dominated networks		.724			
Long hours and inflexible workplaces		.619			
Lack of information during high school			.870	.716	(Lack of) Motivating Information
Difficulty of content		.415	.710		
Unattractive image of the industry			.569		



Results

Factors Impacting Success

1. Family responsibilities
2. Sexual harassment on job
3. Lack of respect for women
4. More male professionals in the working environment
5. Administrative job stereotype
6. Heavy work's negative effect on women's reproductive organs
7. Gender equity as a non-priority for management
8. Discrimination
9. Poor safety and risk

Gender	C1	C2	C3	C4	C5	C6	C7	C8	C9
Male	2.8	2.5	2.53	2.6	2.26	1.97	1.87	2.25	2.55
Female	3.37	2.98	3.56	2.73	2.36	2.03	1.62	2.78	2.88

Results

Factors Impacting Success

<i>Principal component analysis for items impacting women success</i>			
Item	Component		Dimension
	1	2	
Sexual harassment on job	.785		Discrimination
Gender equity as a non-priority for management	.776		
Lack of respect for women	.759		
Discrimination	.686		
More male professionals in the working environment	.475	.451	
Poor safety and risk		.817	Inappropriate Position
Heavy work negatively affects women's reproductive organs		.729	
Administrative job stereotype		.571	



Discussion

- Effect of role models (M: 70/30 – F:56/44)
- Gender of role model (M: 67/4- F: 41/24)
- Variability of rating levels between male and female groups
- Less variability between male and female groups in hindering factors compared to compelling factors
- Higher perceived impact/intensity



Thank You!

