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# Breaking the Glass Ceiling: Experiences of Female Engineers in the United States

## INTRODUCTION

Approximately 40 percent of women who earn engineering degrees in the United States leave their profession (Singh et al., 2013). Although there is neoliberal push in society to encourage people to go into STEM (Science, Technology, Engineering, and Mathematics) fields and a simultaneous move to address the gender pay and equity gaps in these fields, women still leave science and engineering at a higher rate than men (10%) (Fouad, Singh, Cappaert, Chang, & Wan, 2016). What factors affect female decisions regarding entrance and retention in the engineering profession in the United States?

## METHODOLOGY

To answer this question, this study used both an online survey and semi-structured interviews to create a portrait of the professional arc of female engineers from choosing their major through their decision to stay or leave the field. The participants of the study were 35 female engineers who were entering their program of study, just started out in the field, had a clear identity within their chosen profession after years of work, or left the profession. The close-ended questions were analyzed using SPSS. The open-ended questions were analyzed through NVivo software with in vivo coding for first cycle coding and pattern coding for second cycle coding.

## Conclusion & Implications

The findings of this study contribute to the understanding of female employees' experiences in male-dominated professions. In this study, all participants stated that they felt they belonged to the engineering profession. All but 3 participants responded that they felt that different genders were valued equally in their profession.

However, when additional questions were asked, many study participants shared stories of discrimination and prejudice. Thirteen (13) participants stated that female engineers were often held to different standards than men in recognition, promotion, and salary. Nine (9) participants stated that they were excluded or ridiculed due to their gender. Also, three (3) participants stated that they often felt isolated due to their gender. In other words, there was still perceived discrimination and prejudice in the profession. However, many of them did not recognize or label these practices and culture as discriminatory or prejudicial. This might have been because they understood discrimination and prejudice as ill-intended hostility and sexual violence.

Management must understand female employees' workplace experiences by recognizing the factors that make them motivated to become engineers (Table 1), satisfy and dissatisfy them (Tables 2 & 3), lead them to leave the profession (Table 6), and hurt gender equality (Table 4). In order to improve the workplace culture, they must consider establishing inclusivity practices (Table 5).

## RESULTS

### Why did you become an engineer?

Interests in the general STEM fields

Great future career opportunities

Recommendation or encouragement from others

Passion for the field of engineering

Table 1

““This company has better opportunity because there is one more female,’ is not the driving factor [for why I became an engineer].”

### What makes you satisfied?

Enjoy the work itself

- Love problem solving
- Extremely rewarding since it is related to real-world problems

Good Organizational Culture

- Being recognized and appreciated
- Friendly co-workers
- Help them grow in the profession
- Supportive managers

Great Compensation

Table 2

"[I feel satisfied when I am] being told 'thank you,' 'this is helpful,' 'I can't wait to use this.'"

### What makes you unsatisfied?

Work-related Issues

- Constantly demanding work
- Lack of human interaction

Organizational Culture

- Discrimination against women
- Lack of respect and appreciation for professionalism
- Being held to different standards than men
- Not much mentorship available
- Lack of family accommodation
- Unsupportive co-workers (e.g., co-workers not pulling their weight, difficult personality to work with)

Table 3

"[I am] being relegated to more 'female' engineering tasks. I'm a full stack developer, but I mostly get assigned web development tasks [and] design. One of my coworkers suggested I should design the team t-shirt at one point."

### How does someone get promoted in your organization?

Old boy's network (e.g., Promotion opportunities were never advertised, but someone was promoted.)

Female managers usually have much more experience than their male counterparts

Putting in long hours of work is considered good

Table 4

"We cannot compete in terms of hours. You have to compete on your strengths." "Women do something [other than the work] in order to push (self-promote) themselves [and be recognized as a good engineer]."

### What can your organization do to increase gender inclusiveness?

Formal mentorship program and networking opportunities

Transparent promotion system and salary structure

Respect for work-life balance (e.g., Recognizing that working less hours--in respect to family needs--does not mean that female engineers are less skilled)

Increased awareness about what gender discrimination is in the workplace

Table 5

"Even though I am the top paid engineer in my position on my team, I only earn 80% of the average reported income according to several major career websites."

### What made you leave the profession?

Less organizational support for family accommodation

Better career opportunities

Avoidance from attitudes and biases

Different interest/passion found later

Table 6

"I didn't feel like what I was doing was important for the world and even my little part of the world, and so I wasn't fulfilled."