



Paper: Engineering Students' Perceptions about Female Professors: Insights from the Arabian Gulf

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Engineering Students' Perceptions about Female Professors: Insights from the Arabian Gulf

Introduction

The study investigates the perceptions of engineering students on female professors in Texas A&M University at Qatar, located in the Arabian Gulf region and affiliated to Texas A&M University, College Station, TX. This research examines data collected from the student body using a mixed-method approach. The data collected from the student body of the branch campus is used to identify the differences in student perceptions based on their gender, religion, and previous educational setting.

The authors expect different responses from male and female students. Female students are more likely to enjoy female professors, as they can act as role models to the young female students in a male-dominated field. Authors are also anticipating differences in perceptions of female faculty between students who attended gender-segregated schools, which are common amongst the local population, and those who graduated from international schools. Finally, religion is expected to influence student perceptions because of certain rules and regulations in Islam – the most popular religion in the Middle East – that restrict mixed-gender interactions.

The results may shed light on the potential impact of female faculty on engineering students, especially female students. Based on the results, universities in the region may rethink their faculty model to better cater to the needs of students. The study may also encourage females in the region to pursue a teaching career in Science, Technology, Engineering, or Mathematics (STEM) to inspire their female successors in this field.

The following sections of the paper describe the literature review, the methodology adopted to collect data, the results and analysis, and the conclusions drawn.

Literature Review

Numerous studies have been conducted in different parts of the western world to understand the impact of faculty's gender on students and how students of different genders perceive their male and female professors. Bettinger and Long [1] investigated the data of 54,000 college students in Ohio to find the impact of female faculty on students' choices of course in their early college years. The study concluded that female faculty have the potential to increase the interests of female students in a subject. This was true for female students in mathematics, statistics, geology, sociology, and journalism. However, female students in majors, such as engineering, physics, and computer science did not choose courses under significant influence of any female faculty. The authors argue that the results are due to the underrepresentation of female faculty in those fields.

A notable limitation of this paper is the lack of corresponding data from male students. Although the study briefly analyzes the impact of female faculty on male students, there were no analysis made on male students specifically in STEM majors.

A study led by a professor from Indiana University conducted a survey on students from IT related programs in five US Universities [2]. The study investigated the relationship between students' computer self-efficacy, their gender, and their mentor's gender. While their analysis

show that female mentors could improve the self-efficacy of female students to some extent, female students with male mentors had higher computer self-efficacy. Moreover, male students with female mentors showed worst self-efficacy. The authors, however, were quick to discredit the idea of female mentors as ineffective by arguing that only 9% of the cases they analyzed consisted of female mentors. So, the results are rather due to the under-representation of women in those programs.

Further, studies that use grading and in-class performance of students to examine the impact of faculty's gender on students are often misleading due to two reasons. First of all, women faculty are largely under-represented than men, and hence these studies would yield less variety of data for female faculty. This can lead to misinterpretation. Second of all, a student's in-class performance is a combination of many factors such study skills, retention ability, time management skills, etc.

To tackle this problem, researchers have analyzed student evaluations of professors to study the perceptions of students on faculty. One such study was conducted in a reputed business school in the USA [3]. Students were asked to evaluate their professors based on certain traits, such as, class preparedness, professional attire, encouraging, respectful, rigorous, etc. Female students rated their female professors higher than male professors for only one trait, which was class preparedness. In contrast to that, male students had rated their female professors higher than male professors in four of the traits - organized presentation, engaging, industry experience, and content/subject matter expertise.

Another study led by Mitchell and Martin [4] concluded that there is a gender bias while students write evaluations. Students often referred to their female professors as "Teachers" and male professors as "Professors". Another study [5] at Georgia Southern University examined connections between students' perception on professors' gender and age. Among the conclusions was that students rated male professors as more effective, and younger female professors as attractive. These studies, however, are not specific to STEM, so they cannot be used to draw conclusions for female faculty in STEM.

Further, similar studies are not conducted in the Middle East that make any connection between female faculty and the student body. To the knowledge of the authors, this study will be the first of its kind in this region. We believe that due to the vast differences in cultural settings between the west and the Middle East, the existing literature is unreliable to make significant conclusions for this region.

Methodology

The study implements a mixed-method approach to collect and analyze data from the student body. There are two kinds of data collected from the students:

- 1) Quantitative data through an anonymous survey
- 2) Qualitative data through interviews

The anonymous survey is sent to the entire student body of approximately 400 students. The survey is divided into two parts. The first part consists of questions to acquire background information of students, such as age, nationality, religion, type of school etc. It is essential to

have knowledge of the nationality because the ratio of local students to international student in the branch campus is approximately half. Most of the local students graduate from “independent” high schools, while international students graduate from international and private high schools. This information is critical because “independent” schools are gender-segregated and instructors in the boys’ schools are males and those in girls’ schools are females. Thus, most local students go through a significant transition to adjust to the university atmosphere. This vital information is used to explain some of the answers in the second part of the survey.

In the second part of the survey, students are asked to respond to questions on a Likert scale. The questions are based on certain classroom activities that are impacted by the professor’s gender (Appendix A). Students are asked to indicate the level of impact the professor’s gender make in that situation. The data from the survey was analyzed by making connections between students’ background and their perceptions to find a trend among students who share one or more attributes in the background.

The qualitative data was obtained through interviews. The interviews have been conducted through phone, texts, and face-face. While the survey answers brought up numbers and statistics, interviews are required to get more in-depth understanding and reasoning behind the answers in the survey. Thus, the interview questions are more open-ended questions to allow respondents to bring new perspectives into the analysis (Appendix B). Eight students have been interviewed who roughly represent the different types of students in the branch campus:

1. Local males
2. Local females
3. International males
4. International females

The answers of these interviewees are compared with the survey data to explain any trends within the representative sample.

Results

After carrying out the interviews and surveys, the data collected was analyzed. The results were examined in a statistical and qualitative manner. A total of 115 responses are collected.

From the survey the background of students out of the 115 responses are collected as follows:

- 59 female students, 56 male students
- Education: 41 attended independent high schools, 74 attended international high schools

The survey results are described as shown below:

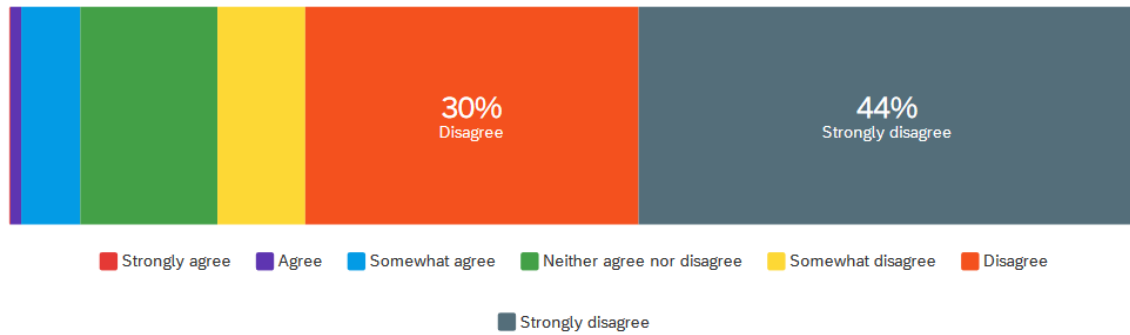


Fig 1: I would choose my professor based on his/her gender

It seems like students in TAMUQ do not choose courses based on their professor’s gender. Almost 80% of the students responded positively to the statement, “I would choose my professor based on his/her gender”.

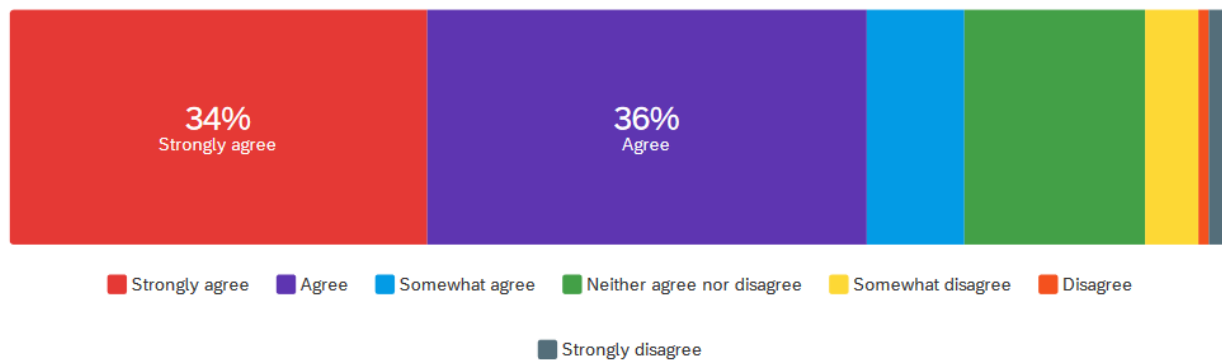


Fig 2: I am comfortable approaching the professor of my opposite gender

A staggering 80% of the student population are comfortable approaching the professor of their opposite gender. Even among the sub-groups of male and female students, most of them agree with the statement. Further, in the sub-group of independent and international school graduates, the majority are comfortable approaching the professor of their gender.

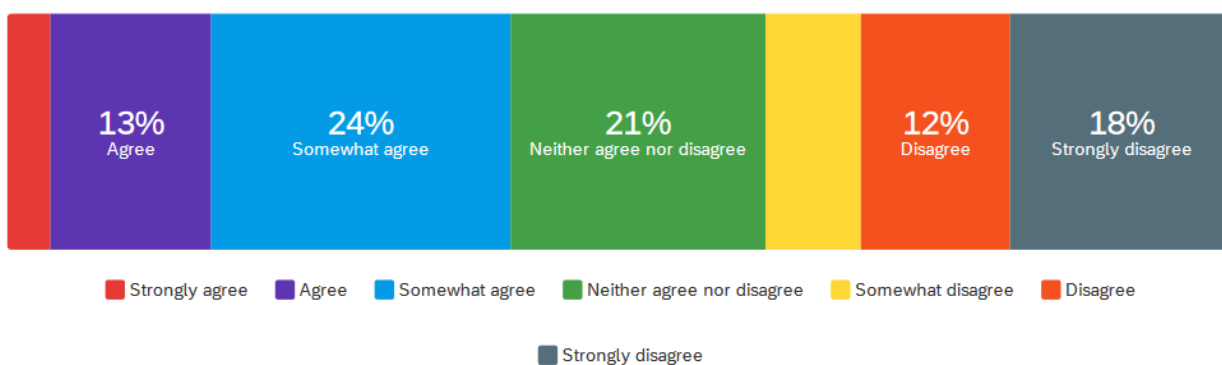


Fig 3: I believe the gender of the professor affects his/her teaching style

Polarized responses are received for the prompt, “I believe the gender of the professor affects his/her teaching style. While 50% of the male students agree with the prompt, only 30% of the female students feel the same. Among the independent school graduates, 57% of them believe the gender of the professor matters. In contrast to that, only 30% of the international school graduates agree, while 60% of them disagree.

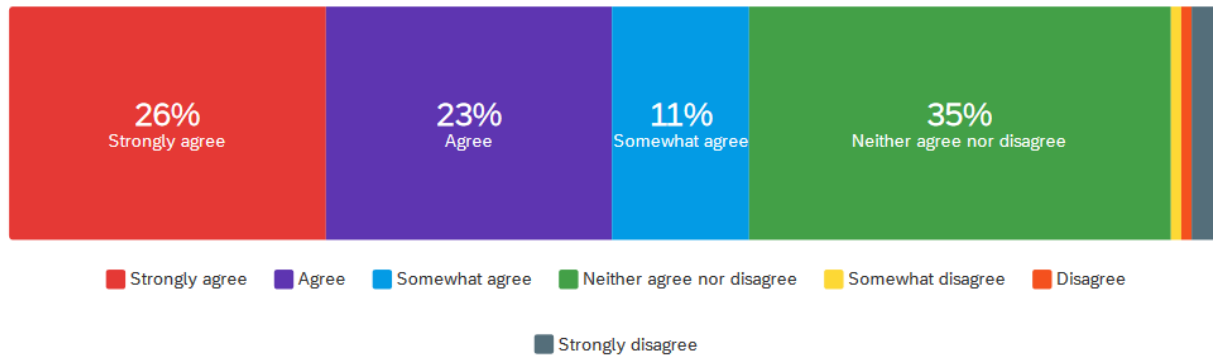


Fig 4: I believe we need more female professors in our program

Most survey responses agreed with the statement, ‘I believe we need more female professors in our program’. Overall, 61% of the students agree with the statement. Among the females, 77% of them responded positively, while among the males, only 43% of them are in favor of the statement. Further, 50% of the male students responded “Neither Agree nor Disagree” to the statement. In terms of independent and international school graduates, both the groups have majority of their population responding positively to the statement.

Discussion

Although the first two questions from the survey don’t give us anything significant, the results from the last two questions indicate a difference in perception between male and female students on their professors’ gender. The lack of female faculty on campus does not seem to concern most of the male students. From Fig 4, 35% of responses to the need for more female professors are neutral and all those respondents are males. Male students, especially the locals, don’t feel the absence of female professors possibly because they have been taught by male teachers since their childhood. At university, most of the STEM courses are taught by male professors, so practically, the environment does not change for them. On asking about the influence of childhood on his perceptions, a local male student remarked, “I think they (male and female professors) are both great, but I prefer males because it is the same gender as the teachers I had in school.” Another interviewee, who is an international male, told us that the gender of the professor doesn’t concern him if the professor teaches well. However, he is not at all impacted by the lack of female faculty at his department.

On the other hand, female students, particularly those who attended independent schools go through a transition period to settle to the university teaching style because unlike male students, they have been accustomed to female teachers. A local female explained her transition saying, “I was so biased to talk to female profs at first. I always shy away from my male professors. But now, after attending the university where I have been exposed to teachers from both genders, this has changed.” With few female professors teaching on campus, the female students cherish their presence. They feel they can relate more with female professors and understand the struggles

women face in STEM by looking up to them as role models. An international female interviewee commented, “I always feel like they (female professors) are easier to approach because they understand me better than male professors do.” Clearly, female students feel the lack of female professors in STEM. As the data shows, 77% female respondents agreed to the need for more female professors.

Students’ household and religious background also influence their perceptions. Most of our interview subjects and survey respondents are Muslims. Due to religious adherence, male-female interaction in Middle East is much more different than that in the west. There are religious rules and restrictions in the Islamic law of Shari’ah between male-female interactions. These rules influence the behavior of an individual towards a person of another gender. A local female reflected on her household saying, “Most of the time the only males I would talk to are my father and uncles. Even my cousins - I don’t see them that much. So, the males are distant from me.” An international male student also related to his religious influence highlighting that the “restriction of communication with females” affect the perceptions.

Despite the difference in perceptions, 80% of the students collectively disagreed with the statement, “I would choose my professor based on gender”. The one-sided data could be because students in the branch campus have limited pool of options to choose courses from. This is more relevant to the 3rd and 4th year students where only one professor is available to offer a mandatory course. In such cases, students adapt to the professor assigned regardless of their preference.

Overall 60% of the respondents expressed the need for more female faculty in the branch campus. This crucial result can be communicated with the university’s Deans’ council to consider more female faculty for the sake of the student body. Consequently, this will encourage female students to pursue their dreams in STEM as the study in [1] has shown that female faculty, to some extent, can influence their interest in STEM.

Conclusion

In this study, the authors examined differences in student perceptions of their professors in Texas A&M University at Qatar, located in the Middle East and affiliated to Texas A&M University, College Station, TX Existing literature has shown how male and female students view their professors and how female professors impact the student population. However, existing studies are based on the Western context. Little has been done to study this topic in the region of Arabian Gulf. Using a mixed-method approach, the authors collected data from the student body through an anonymous survey and interviews with a representative sample. The perceptions are studied based on students’ gender, religion, and previous education background.

The quantitative data confirmed from the survey revealed differences in perception between male and female students, confirming the hypothesis. The two groups differed on two main points. While most male students believe that a professor’s gender affects his/her teaching style, female students disagreed. Male students are also unaffected by the lack of female faculty in the campus, while female students expressed a need for female professors – to have someone to empathize with them in the male dominated field. Another part of the hypothesis is affirmed by the qualitative data, wherein, participants shed light on the impact of religion towards their behavior with the opposite. The results of this study can encourage the concerned people to

consider more female faculty in the faculty model to improve the participation and experience of female students in STEM.

References

- [1] E. P. Bettinger and B. T. Long, “Do Faculty Serve as Role Models? The Impact of Instructor Gender on Female Students,” *American Economic Review*, vol. 95, no. 2, pp. 152–157, 2005.
- [2] D. Goh, C. Ogan, M. Ahuja, S. C. Herring, and J. C. Robinson, “Being the Same Isn't Enough: Impact of Male and Female Mentors on Computer Self-Efficacy of College Students in It-Related Fields,” *Journal of Educational Computing Research*, vol. 37, no. 1, pp. 19–40, 2007.
- [3] Korte, Leon|Lavin, Angeline|Davies, and Thomas, “Does Gender Impact Business Students' Perceptions of Teaching Effectiveness?.,” *Journal of College Teaching & Learning*, 30-Nov-2012. [Online]. Available: <https://eric.ed.gov/?id=EJ1018287>. [Accessed: 24-Nov-2019].
- [4] K. M. W. Mitchell and J. Martin, “Gender Bias in Student Evaluations,” *PS: Political Science & Politics*, vol. 51, no. 03, pp. 648–652, Jun. 2018.
- [5] S. Joye and J. Wilson, "Professor Age and Gender Affect Student Perceptions and Grades", *Journal of the Scholarship of Teaching and Learning*, vol. 15, no. 4, pp. 126-138, 2015. Available: <https://files.eric.ed.gov/fulltext/EJ1074825.pdf>. [Accessed 30 April 2020].

Appendix A

Survey Questions

Background

1. Year
2. Nationality
3. Gender (Male, Female, Prefer not to answer)
4. High school type (International/Private or Independent)
5. Religion

Questions on perspectives

1. Would you choose courses based on the gender of your professor?
2. Do you feel comfortable approaching a professor of the same gender?
3. Do you think the gender of professor affects his/her teaching style?
4. Do you feel the need for more female professor at your program?

Appendix B

Interview Questions

1. Do you believe that your childhood upbringing affects your perception on gender preferences on professors? Explain.
2. Do you believe the schools you have attended affects your professor's gender preference?
3. Which gender professor do you prefer and why?
4. Do you believe there is a correlation between teaching style and gender of professors and why?