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FACTORS AFFECTING FEMALE STUDENTS IN CHOOSING ENGINEERING AS AN ACADEMIC DEGREE AND PROFESSION IN GENDER-SEGREGATED SOCIETY IN SAUDI ARABIA

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ABSTRACT

The study had discussed factor of Saudi female student in chosen Engineering as an academic degree and profession in gender-segregated society of Saudi Arabia and attempt to explore motivational factors behind their decisions. The study purpose was understanding the Saudi female students who choose engineering as major even though the female student expected to face cultural issues or less job opportunities in the Saudi culture. The data collection was using quantitative method. The data were collected through anonymous survey included several statements about motivational factor and issues. The study targeted Saudi engineering students at universities in Jeddah especially EFFAT University used convenient sampling. The sample sizes were 50 females engineering students. The result showed intrinsic and social motives lead female student preferred engineering as a profession, their desire to understand engineering more and contribute in helping the society was enough for female students in pursued engineering studies in gender-segregated society. Moreover, future study had studied different possible way to encourage both government and society to improve female engineering image in support Saudi female students to choose engineering as career path.

INTRODUCTION

Engineering had been known as man profession for its heavy, dirty and tough. However, an engineer focusses more on computer, mathematical models and electronic (Evetts, 1998). The new engineering demotions female had been interested more to choose engineering as career path. The concern is female chosen engineering as work profession and their reasons are based on social judgements or prove the females are capable of handling thing.

The female number studied engineering course was drop (Balakrishnan et al., 2016). National Science Foundation, female students are less number in engineering filed along with graduate school (Fouad et al., 2012). In Japan. female students who studied engineering was 9.5% in 2004 and increased to 0.5% in 2010 (Nakata et al., 2011). Meanwhile, engineering female students continues their master's degree is lower than male engineering students (Balakrishnan et al., 2016).

The female engineering students are more likely to receive negative comments from the societies because engineering is acceptable than male. In additions, difference societies still assume engineering as a profession for men. The Japanese culture believes that female roles are only limited to certain profession such as teacher. The cultural and social contribution lead to motivate and support female students in choosing engineering as their career (Marra, et al., 2009). The social stereotype issues should be familiarized for female's student because affected their decision about choosing engineering as a career (Frieze et al, 2006). Family does not play an essential role in influencing female students' choice about engineering as career path (Fouad et al., 2010). On other hand. the parents will disagree if their son decided to quit their engineering studies (Mau, 2003). Moreover, female engineer needs to get support and equal opportunities in the work place, organization must supportive for female engineer. The career choice may affect by gender preference (Lent et al., 2005). Furthermore, the cultural expectations from each gender determine or influence female decision about certain profession (Hackett et al., 1981). The study aimed to determine motivational factors of young Saudi female student toward their choice in engineering education.

METHODOLOGY

Quantitative research is considered as one of research approach and commonly used in the study. The quantitative research was referred to systematic observational investigation of any phenomena through numerical and mathematical technique. The survey or questionnaires was used in quantitative research approach based on mathematical methods to read or analysed collected data. The study aimed to determine factors that motivate Saudi female students to choose engineering studies and f any cultural barriers had an impact on their decision. The quantitative research method explained reason or difference factors that inspired Saudi females' student in choosing engineering as their professional. The motivational factors used in the study were motivational factor, gender and engineering education article.

The data were collected by questionnaire distributed to the respondents. The questionnaire was divided into three sections included demographic,

motivational factors and eight statement on an expected issue. Moreover, the study was targeted Saudi females who choose engineering studies with sample of 50 female students. There were two sections included four motivational factors included intrinsic and financial motivation and section two was issues that female students regarded their engineering studies. The respondents were selected by stratified random sampling. The survey reached the respondents by email and through social media.

RESULT AND DISCUSSION

In Fig.1, 39.2% respondents were aged between 18 years and 21 years old and 3.9% respondents aged between 26 years and 29 years old. Half of respondents (56.9%) aged between 22 years and 25 years old.

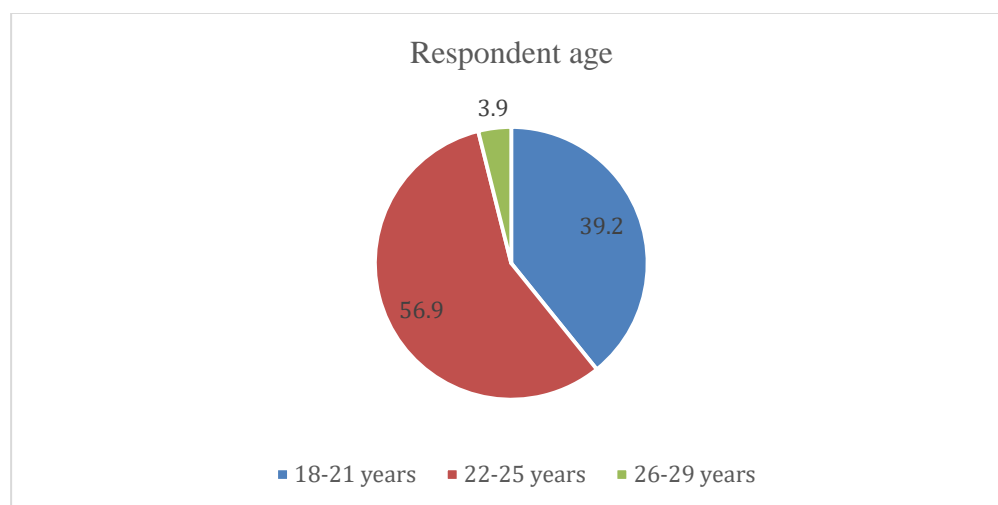


Fig. 1. Respondent age.

Meanwhile, 16.7% respondents were graduated from King Abdulaziz University and 2.1% respondents completed their study in Prince Sultan University, Riyadh. There were 75% respondents were graduated from EFFAT University, Jeddah and 11.8% respondents were graduated from other universities as shown in Fig.2.

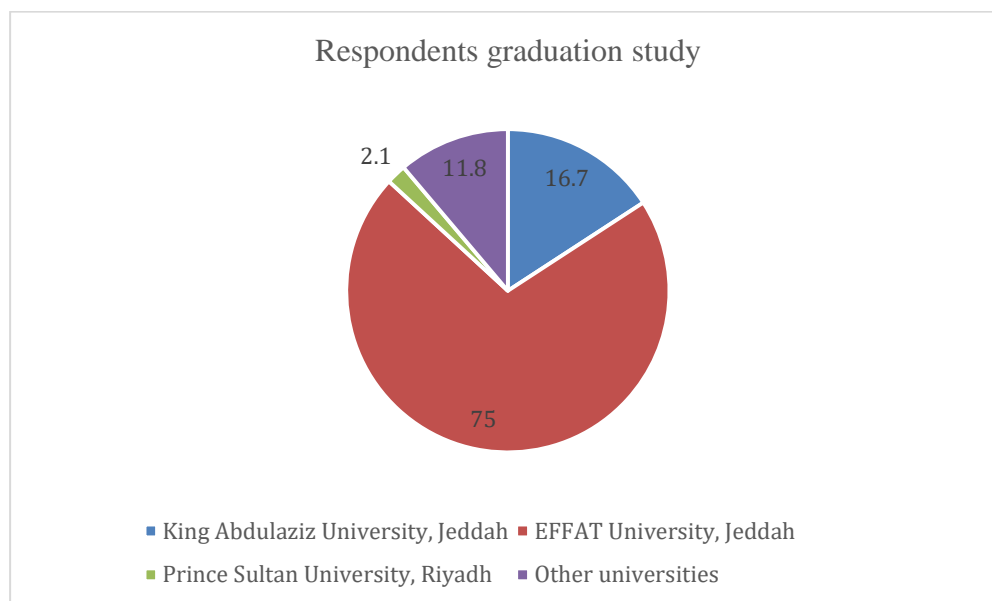


Fig. 2. Respondents graduation study.

Meanwhile, 32.7% respondents were specialized in electrical engineering and 2% respondents were specialized in biomedical engineering as shown in Fig.3. Besides, 18.4% respondents were specialized architecture engineering and 26.5% respondents were specialized in computer engineering.

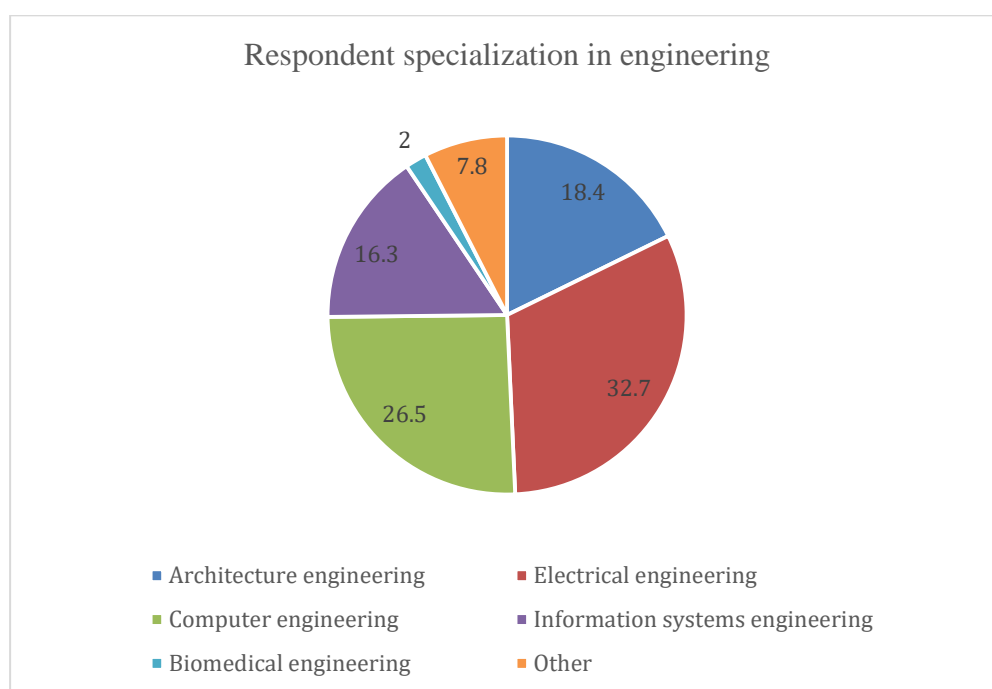


Fig. 3. Respondent specialization in engineering.

In Table 1, there were 37.3% respondents answered strongly agreed and 41.2% respondents agreed that engineering was fun. Meanwhile, 15.7% respondents were neither agreed nor disagreed and 2% respondents were strongly disagreed that engineering was fun.

Table 1. Intrinsic motivation.

| | Engineering was fun | Engineering was interesting | Interest in build stuff |
|----------------------------|----------------------------|------------------------------------|--------------------------------|
| Strongly agree | 37.3 | 60.8 | 47.1 |
| Agree | 41.2 | 35.3 | 25.5 |
| Neither agree nor disagree | 15.7 | 2 | 23.5 |
| Disagree | 3.9 | 0 | 2 |
| Strongly disagree | 2 | 2 | 2 |

In additions, 60.8% respondents strongly agreed and 35.3% respondents were agreed that engineering was interesting. 2% respondents were answered neither agreed nor disagreed and 2% respondents were strongly disagreed that engineering was interesting.

There were 47.1% respondents strongly agreed and 25.5% respondents agreed that their interest in build their stuff. Besides, 23.5% respondents were neither agreed nor disagreed and 2% respondents answered disagreed that their interest in build their stuff as in Table 1.

Table 2. Social motivation.

| | Engineers had contributed greatly to solve problems in the world | Engineering skills used for society good | Technology played an important role in solve society problem |
|----------------------------|---|---|---|
| Strongly agree | 35.3 | 54.9 | 47.1 |
| Agree | 51 | 33.3 | 35.3 |
| Neither agree nor disagree | 5.9 | 3.9 | 13.7 |
| Disagree | 5.9 | 3.9 | 0 |
| Strongly disagree | 2 | 3.9 | 3.9 |

In Table 2, the social motivation indicated 54.9% respondents answered strongly agreed that their skills in engineering used to benefit society. Moreover, the respondents wanted to involve their engineering studies in good for society. In additions, 47.1% respondents strongly agreed that technology played an important role for solved problem which linked between engineering and technology. 51% respondents agreed that engineering had contributed to solve the problem.

Table 3. Financial motivation.

| | Engineers earned more money than other professional | Engineers were well paid | Engineering degree was guaranteeing a job once graduated |
|----------------------------|--|---------------------------------|---|
| Strongly agree | 15.7 | 25.5 | 13.7 |
| Agree | 39.3 | 45.1 | 35.3 |
| Neither agree nor disagree | 31.4 | 19.6 | 21.6 |
| Disagree | 7.8 | 2 | 17.6 |
| Strongly disagree | 5.9 | 7.8 | 11.8 |

In Table 3, the financial motive showed 45.1% respondents agreed that engineers were well paid and 39.3% respondents also agreed that engineering field earned money compared other profession. Besides, 60.8% respondents motivated by their interest to learn about engineering was higher than money factor. 35.3% respondents agreed that engineering well guaranteed a job after graduation but 21.6% respondents answered neither agreed nor disagreed with the statement.

Table 4. Mentor Motivation.

| | A teaching assistant or other university affiliated person had encouraged or inspired student to study engineering | Mentor had supported their decision in study engineering | Family member who encouraged to study engineering. |
|----------------------------|---|---|---|
| Strongly agree | 11.8 | 7.8 | 25.5 |
| Agree | 33,3 | 35.5 | 37.3 |
| Neither agree nor disagree | 15.7 | 21.6 | 15.7 |
| Disagree | 25.5 | 21.6 | 13.7 |
| Strongly disagree | 13.7 | 13.7 | 7.8 |

In Table 4, the mentor motivational factor indicated 37.3% respondents agreed that family member encouraged respondents to choose engineering. Besides, 35.5% respondents claimed mentor support their decision in choosing engineering as major. In additions, 33.3% respondents agreed that teacher inspired respondents in choosing engineering studies. The respondents had external factor that motivated in choosing engineering.

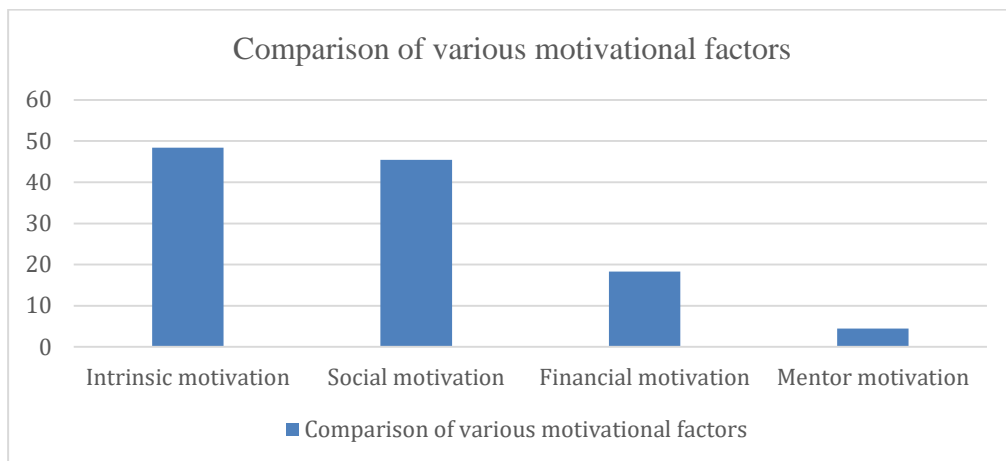


Fig. 4. Comparison of various motivational factors.

Moreover, each factor contained different statement to understand if respondents agreed and disagreed with the given statement as shown in Fig.4. The first factor was intrinsic motivation contained three statements. The female engineering students had their own personal motives which encouraged in choosing engineering studies.

In additions, second factor was social motivation which female engineering students were any interest or desired for helping other people and improving the society. The female engineering students had external factor that affected their choice, respondents wanted helped people and society with using their engineering knowledge. The fact that intrinsic and social motivation were highest percentage highlighted that female engineering students believed more about in life achievement and contribution for society compared with financial and mentor motive.

Furthermore, the result indicated that female engineering student are acknowledge that engineers earned more money. Female engineering student found the engineering was guaranteed job after graduation. The mentor motivation indicated female engineering students were inspired to choose engineering as profession.

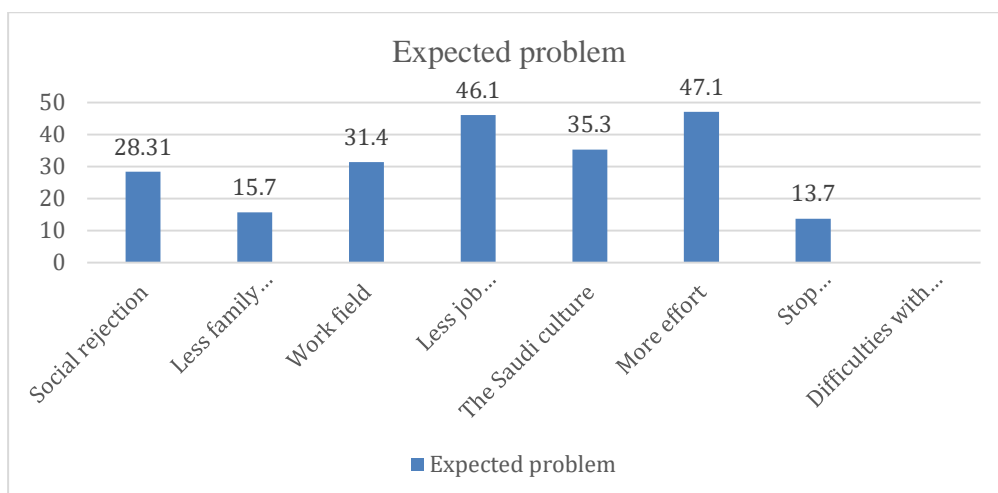


Fig. 5. Expectation problem.

In Fig.5, the result showed 47.10% and 46.110% agreed to face these problems. There were two expected issues that female engineering students believed to use more effort for proved their ability to perform job professionally. In additions, 35.30% agreed that Saudi culture considered engineering as male profession based on several society values. 31.40% agreed that organization did not allowed female engineers had full access in the work.

The first expected issue was related to social rejection and gender. The result showed 41.2% respondents agreed a with this statement. On other hand, 21.6% respondents disagreed with given statement.

The second statement was related to family role when their daughter decided to choose engineering as profession compared with male. 39.2% respondents agreed that families did not support male engineer students than female engineer students. The female engineering student agreed that there is social rejection which agreed that families support male student more.

The third statement was highlighted work environment. Furthermore, 43.1% respondents were agreed with the given statement. The fourth statement indicated 47.1% respondents strongly agreed with given statement meant female engineering students graduated might face problem for better job.

The fifth statement showed 45.1% respondents agreed that Saudi culture considered engineering suitable more for male. The sixth statement showed 47.1% respondents strongly agreed that companies did not observed female engineering students qualified for job, resulted respondents put more effort and work to prove for better chances. The seventh statement showed 31.4% respondents were agreed with given statement.

The result showed engineering culture image did not affected negative influence toward female engineering students. The last statement was related to the gender differences and if female engineering students was expected had difficulty to communicate with other male engineers in future job. In additions, the results showed female engineering students were agreed with this statement.

CONCLUSION

In conclusions, the result showed their desire or interest in understanding the engineering influence their professional choice even though social rejection regarded to their choice. Another factor was their willing to contribute their knowledge for help the people included improved the society. The government should play role to develop program in schools to aware student in importance of career. Meanwhile, the society should support the female student decision in choosing their profession by providing an awareness campaign.

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