The Difference of Fear of Failure on Undergraduate Students of Engineering Faculty based on Gender

Amil Fitrianda, Zaujatul Amna
Department of Psychology at Universitas Syiah Kuala

Abstract: The number of women and men studying at Engineering Faculty as well as the rate of women and men's involvement in engineering-related profession is different. The differences cause fear of failure on men and women. This study aimed to find out the difference of fear of failure on Students of Engineering Faculty based on gender in Universities in Aceh. Sampling Technique was purposive with 70 students of Engineering Faculty as the samples consisting of 35 men and 35 women. Data collecting technique was using *Performance Failure Appraisal Inventory* (PFAI) scale by Conroy (2002) with reliability coefficient score of (α) =0.920. Hypothesis testing used *independent sample t-test* with significance score of 0,174 (p>0.05). Based on the result, it can be concluded that there is no different *fear of failure* based on sex on Students of Engineering Faculty in Universities in Aceh. Additional analysis shows that there is different fear of failure in term of Academic Level with significance score of 0,029 (p<0.05), in contrary, no different fear of failure in term of age and major with significance score of 0,279 (p>0.05) and 0.943 (p>0.05) respectively.

1 INTRODUCTION

Gender differences issue in various life aspects is still happening today. One of them is a discussion on gender based on participation and success level in educational fields. A case related to the difference of gender participation level in educational field happened in University of Syiah Kuala (Unsyiah) that the differences of specialization in the Faculty of Engineering based on gender was present. It is based on the 2018 student data of University of Syiah Kuala which showed that male students dominated with 2,879 students and only 1,588 female students (Data Kemahasiswaan Unsyiah, 2018).

Level of participation on Engineering field also happened in the working world. According to a survey by International Labour Organization (2015), in Indonesia in 2015, even in the present time, occupations related to engineering field such as factory operators, machine operators, and assemblers were dominated by males with percentage as many as 87.1%. Furthermore, Debora (2016) explained that 82% staff working at technology division in Google were males and the rests were females. Moreover, Debora (2016) stated that the number of engineers in Apple.Inc was 80% and only 20% of whom were females.

The difference of participation level based on gender as explained above could be caused by several things. First, it is caused by the difference of individuals' biological characters related to tendency of occupational preference (Browne, 2002). Second, there is a stereotype that occupation on engineering is masculin, tough, and dirty job or outdoor-related job, so that the number of women is less than men because it is considered unsuited for women who are described weak and feminine (Madara & Cherotich, 2016).

Nelson, Newman, McDaniel, and Buboltz (2013) explain that the different participation between men and women raises fear of failure among women in undergoing their education. Moreover, Sherman (1988) explains that the dominance of men in engineering field emerges lack of self-efficacy on engineering-related abilities among women. The research by Papastergiou (2008) supported the previous statement that women's self-efficacy in undergoing engineering education was lower than men's. The lack of self-efficacy would emerge fear of failure (Elliot & McGregor, 1997).

Conroy (2001) states that fear of failure is an anticipation of failure negative consequences. Moreover, Conroy (2001) says that an individual with fear of failure tends to avoid some unpleasant consequences,namely embarrassment and shame in front of significant others, losing respect and social influences, self-esteem devaluation, and self-underestimating. Specifically, Nelson, Newman, McDaniel, and Buboltz (2013) explain about fear of failure that men and women involved in engineering have different reasons why they fear of failure. First, women have more feeling about failure being able to cause uncertain future than men do. Second, men consider that failure could affect losing of important others' interest in them which does not happen to women.

2 LITERATURE REVIEW

2.1 Fear of Failure

Conroy (2001) defines fear of failure as an anticipation of negative consequences of failure. According to Conroy (2001), there are 5 dimensions of fear of failure, namely fear of shame and embarrassment, fear of devaluing one's self-estimate, fear of losing social influence, fear of having an uncertain future, fear of upsetting important others.

2.2 Sex

Taylor, Peplau, and Sears (2009) define sex as the most fundamental category in social life which categorizes into masculine and feminine. Generally, sex is classified into two, male and female. Moreover, Santrock (2002) defines sex as individual's biological dimension as female and male and its existence in social, cultural and psychological dimension which is frequently termed gender.

3 RESEARCH METHOD

This study used quantitative approach with comparative design. The samples were 70 students of Engineering Faculty, Universitas Syiah Kuala consisting of 35 men and 35 women, each of studying year contributed for 10 students. Data collecting method was The Performance Failure Appraisal Inventory (PFAI) consisting of 25 items

by Conroy (2002). The scale was 5-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree) used to fill the instrument of PFAI. Data were analyzed with Statistical Product and Service Solution (SPSS) by conducting several tests namely normality test with One-Sample Kolgomorov Smirnov, homogeneity test with One-Way Anova, and hypothesis test with Independent Sample T-Test.

4 RESULT

Table 1: Socio Demographic Data.

Description	Sex		N	%
	Male	Female		
Studi year				
2012	5	5	10	14,29
2013	5	5	10	14,29
2014	5	5	10	14,29
2015	5	5	10	14,29
2016	5	5	10	14,29
2017	5	5	10	14,29
2018	5	5	10	14,29
Semester				
I	5	5	10	14,29
III	5	5	10	14,29
V	5	5	10	14,29
VII	5	5	10	14,29
IX	5	5	10	14,29
XI	5	5	10	14,29
XII	5	5	10	14,29
Major				
Industrial Engineering	4	11	15	21.43
Civil Engineering	7	6	13	18.57
Electro Engineering	5	5	10	14.29
Architectural Engineering	2	4	6	8.57
Mechanical Engineering	6	0	6	8.57
Geophysical Engineering	2	3	5	7.14
Chemical Engineering	2	2	4	5.71
Planology Engineering	3	1	4	5.71
Computer Engineering	2	1	3	4.29
Mining Engineering	1	1	2	2.86
Electrical	1	0	1	1.43

Description	Sex		N	%
	Male	Female		
Engineering				
Geological Engineering	0	1	1	1.43
Age				
16-Year-Old	1	0	1	1.43
17-Year-Old	0	1	1	1.43
18-Year-Old	6	5	11	15.71
19-Year-Old	4	4	8	11.43
20-Year-Old	5	6	11	15.71
21-Year-Old	4	4	8	11.43
22-Year-Old	5	6	11	15.71
23-Year-Old	6	5	11	15.71
24-Year-Old	5	2	7	10
25-Year-Old	1	0	1	1.43

Total subjects based on semester and study year were similar for 10 students (14.29%) consisting of 5 males and 5 females. Meanwhile, based on major, the majority subjects were from Industrial Engineering for 15 students (21.43%). Based on age, subjects were dominated by those from 18, 20, 22, and 23-year-old, each of which was accounted for 11 students (15.71%).

Normality test held to 70 subjects resulted that the instrument of Performance Failure Appraisal Inventory (PFAI) was normally distributed with significance score (p) = 0.973 (p>0. 05). On the other hand, homogeneity test showed the research data were homogeneous with significance score 0.326 (p>0.05). Meanwhile, hypothesis test conducted using Independent Sample T-Test showed the result in the table 2 below.

Table 2: Analysis of Independent Sample T-Test to the Students of Engineering Faculty Based on Gender.

Fear of Failure	N	Mean	Sig.
Males	35	70.51	0.174
Females	35	75.37	

Table 2 shows significance score of the research (p) = 0.174, that the score was higher that standard level of significance (p<0.05), therefore the hypothesis was **rejected**. In conclusion, there was no difference of fear of failure on undergraduate students of Engineering Faculty in Syiah Kuala University based on Gender.

In addition, descriptive analysis was conducted to see hypothetical and empirical data of fear of failure variable. Data description is showed in the table 3.

Table 3: Description of Fear of Failure Variable.

FoF	Hypothetical Data				Empirical Data			
	Xmax	Xmin	Mean	SD	Xmax	Xmin	Mean	SD
Males	125	25	75	6.66	92	36	70.51	13.933
Females	125	25	75	6.66	103	41	75.37	15.613

Description of Hypothetical Score Formula:
1. Minimum score (Xmin) is result of total scale items multiplied by the lowest score of answer.
2. Maximum score (Xmax) is the result of total scale items multiplied by the highest score of answer.
3. Hypothetic mean (μ) has formula μ = (max score + min score)/2.
4. Standard deviation (σ) of hypothetic is: σ = (max score - min score)/6.

Based on statistical analysis, hypothetically descriptive analysis showed that the minimum answer was 25 and the maximum answer was 125. Mean was 75 and standard deviation was 16.66. Meanwhile, empirical data showed that minimum answer of males was 36 and maximum answer was 92, while mean was 70.51 and standard deviation was 13.933, on the other hand minimum answer of female was 41 and maximum answer was 103 with mean for 75.37 and standard deviation for 15.613. Based on the description of research result above, the subject categorizing was three categories, low, moderate and high. The categorization used by the researchers in this study was normal distribution-based categorization with stratified category because the population was distributed normally (Azwar, 2013). The categorization based on the formula in the table 4.

Table 4: Formula of Categorization Norm.

Interval Formula	Categorization
$X < \mu - 1,0\,\sigma$	Low
$\mu - 1,0\,\sigma \leq X < \mu + 1,0\,\sigma$	Moderate
$\mu + 1,0\,\sigma \leq X$	High

Description:
μ = Hypothetic mean of Scale
σ = Standard Deviation of Scale

Based on categorization norm above, so it can be formulated as follows:

$$X < \mu - 1,0\,\sigma \qquad X > \mu + 1,0\,\sigma$$
$$X < 75 - 1,0\,(16,66) \qquad X > 75 + 1,0\,(16,66)$$
$$X < 75 - 16,66 \qquad X > 75 + 16,66$$
$$X < 58,34 \qquad X > 91,66$$

Meanwhile, categorization norm of diagnosis based on samples score of fear of failure variable is presented as follows:

Table 5: Categorization of Fear of Failure.

Score	Category	Males		Females	
		Total	(%)	Total	(%)
X < 58.34	Low	8	8.57	2	20
58.34 ≤ X < 91,66	Moderate	27	68.57	26	71.43
≤ 91.66 X	High	0	22.86	7	8.57
Total		34	100	35	100

Based on table 5, it can be concluded that 8 males and 2 females were at low category of fear of failure, 27 males and 26 females were at moderate category of fear of failure. Meanwhile, 7 subjects were at high category of fear of failure, all of them were females.

5 DISCUSSION

This study was conducted to know the difference of fear of failure on undergraduate students at Engineering Faculty based on gender in Universitas Syiah Kuala. Based on independent sample t-test, significance score was (p) = 0.174 (p<0,05). The result of independent sample t-test showed that the hypothesis was rejected which meant there was no difference of fear of failure on undergraduate students at Engineering Faculty based on gender in Univesitas Syiah Kuala.

The result of this study is in accordance with the study conducted by Correira, Rosado, Serpa and Ferreira (2017) about the difference of fear of failure among atheletes which showed that there was no difference of fear of failure between males and females. The research by Sagar, Boardly and Kavussanu (2011) showed the similar result that there was no difference of fear of failure between males and females.

The research by Fried-Buchalter (1997) also showed there was no difference of fear of failure between males and females. According to Fried-Buchalter (1997), fear of failure is part of motivation to achieve on a student, so that each individual convert fear to be an action to achieve something. Furthermore, Fried-Buchalter (1997) explains that no difference of fear of failure between males and females because each individual, either male or female, has a motivation to achieve despite gender difference.

Hersh (2000) states that the absence of fear of failure among genders can be seen from many females being involved in the field of engineering which keeps increasing until present day, therefore it could raise females' self-efficacy to keep taking part in engineering field. The assumption would emerge that the increase number of spesialization based on gender shows that there is no anxiety or fear inside a gender, especially females, to compete with the dominating gender, in this context is males. The assumption was supported by data of *Kemahasiswaan Unsyiah* (2018) showing that from 2010 to 2018 there was an increase number of female students studying at Engineering Faculty, it raised females' self-efficacy related to their involvement in Engineering Faculty. Thus, it can be concluded that there is no fear of failure between males and females was caused by the rise of females' self-efficacy who were involved at engineering field.

The absence of fear of failure difference on students of Engineering Faculty based on gender in this study was caused by the women showing that their ability was equal or even higher than men in term of engineering education, it was proven by Data of Kemahasiswaan Unsyiah (2018) that there were 200 female students with Cumulative Index of Achievement (IPK) from 3.5 to 4.00, while there were 95 male students obtained Cumulative Index of Achievement (IPK) 3.5 – 4.00. Felder, Felder, and Mauney (1995) explain that women who feel that their performance is not better than men have higher level of fear of failure, while those who feel that they have good performance have the same level of fear of failure as men. Therefore, the female subjects in this study did not show higher fear of failure than men because they have same performance or even better than men.

Based on analysis of each dimension of fear of failure, there was difference of fear of failure between men and women at dimension of fear of devaluing of one's self-estimate, while the other dimensions showed there were no differences between men and women. Analysis result of the difference of fear of failure based on dimension can be seen in table 6.

Table 6: Difference of Fear of Failure Based on Dimension.

Dimensions	Sig.
Fear of Embarrasment and Shame	0.064
Fear of Devaluing of one's self-estimate	0.031
Fear of Having Uncertain Future	0.247
Fear of Losing Social Influence	0.973
Fear of Upsetting Important Others	0.1000

Based on tabel 6, there was no difference of fear of failure between men and women who studied at Engineering Faculty based on dimension of fear of embarrasment and shame with significance score (p) = 0.064 (p<0.05), fear of having uncertain future with significance score (p) = 0.247 (p<0.05), fear of losing social influence with significance score (p) = 0.973 (p<0.05), and fear of upsetting important others with significance score (p) = 0.1000 (p<0.05). the research which is in accordance with this research is by Sunkarapalli and Agarwal (2017) that showed that there was no difference of fear of failure between men and women based on dimension of fear of embarrasment and shame and having uncertain future. Sunkarapalli and Agarwal (2017) stated that no difference of fear of failure based on dimension of fear of embarrasment and shame and dimension of fear of having uncertain future was caused by same roles between men and women which made them responsible for failure causing shame and uncertain future.

Based on table 6, there was difference of fear of failure on undergraduate students of Engineering Faculty based on dimension of fear of devaluing of one's self-estimate (0.031). Nelson, Newman, McDaniels, and Buboltz (2013) supported this study by result of their research that there was difference of fear of failure between men and women studying in Engineering Faculty based on dimension of fear of devaluing of one's self-estimate, in this context women had fear of devaluing of self-estimate higher than men did. According to Nelson, Newman, McDaniels, and Buboltz (2013), the reason why women had higher of fear of devaluing self-estimate was because women had lower self-efficacy and self-esteem in term of their role in engineering education. Another research supporting this research is by Sagar, Boardley and Kavussanu (2011) showing that there was difference of fear of failure between men and women based on dimension of fear of devaluing of one's self-estimate.

Analysis of difference of fear of failure was also conducted based on subject demography namely year of study, age, and major. Analysis result of difference of fear of failure based on year of study showed in table 7.

Table 7: Analysis Result of Difference of Fear of Failure Based on Year of Study.

Year of Study	Total Subjects	(%)	Minimum	Maximum	Sig.
2018	10	14,29	45	85	0.029
2017	10	14,29	49	83	
2016	10	14,29	54	92	
2015	10	14,29	36	88	
2014	10	14,29	49	92	
2013	10	14,29	53	95	
2012	10	14,29	50	103	
Total	70	100	36	103	

Tabel 7 shows that there was fear of failure on undergraduate students of Engineering Faculty based on year of study (0.029). The result is in accordance with research by Azkhazaleh and Mahasneh (2015) finding that there was fear of failure among the first, second, third and fourth year undergraduate students. According to Azkhazaleh and Mahasneh (2015), difference of fear of failure among undergraduate students was caused by level of expectation and demand faced by the students, the early year students tended to have lower demand than the last year students, so that the level of fear of failure perceived by the early year students lower than that of the last year students. Analysis result of difference of fear of failure based on age is showed in table 8

Table 8: Analysis of Difference of Fear of Failure Based on Age.

Age	Total	(%)	Sig.
16-Year-Old	1	1.43	0.279
17-Year-Old	1	1.43	
18-Year-Old	11	15.71	
19-Year-Old	8	11.43	
20-Year-Old	11	15.71	
21-Year-Old	8	11.43	
22-Year-Old	11	15.71	
23-Year-Old	11	15.71	
24-Year-Old	7	10	
25-Year-Old	1	1.43	
Total	70	100	

Tabel 8 shows that there is no difference of fear of failure on undegraduate students of Engineering Faculty based on age of subjects (0.279). the subjects in this study mostly were early adult from

18 to 24-year-old, according to Hidayah (2002), students at early adulthood have similar responsibilities for their education, so that their fear of failure is also at similar level. In addition, according to Sunkarapalli and Agarwal (2017), there is no fear of failure on early adults from 18 to 27-year-old. Sunkarapalli and Agarwal (2017) also state that there is no difference of fear of failure among early adulthood shows that the level of fear of failure does not change despite age, the change starts at 40-year-old in which the failure is not important thing for that group of age, it is because all achievements have obtained by 40-year-old individuals. Other study that is in accordance with this research is by Coreira, Marco, Rosado, Serpa, and Ferreira (2017) that showed that there was no difference of fear of failure based on age. Analysis result of difference of fear of failure based on major is showed in table 9.

Table 9: Analysis Result of Difference of Fear of Failure Based on Major.

Major	Total	%	Sig.
Chemical Engineering	4	5.71	0.943
Architectural Engineering	6	8.57	
Civil Engineering	13	18.57	
Mechanical Engineering	6	8.57	
Planology Engineering	4	5.71	
Geophysical Engineering	5	7.14	
Industrial Engineering	15	21.43	
Geological Engineering	1	1.43	
Electro Engineering	10	14.29	
Mining Engineering	2	2.86	
Electrical Engineering	1	1.43	
Computer Engineering	3	4.29	
Total	70	100	

Table 9 shows that there was no difference of fear of failure on undergraduate students of Engineering Faculty based on major with significant score (p) = 0.943. The reason behind that can be explained based on level of fear of failure. According to Nelson, Newman, McDaniels and Buboltz (2013), factor that affect level of fear of failure among engineering students is students' fear of having uncertain future career at engineering field. According to Hersh (2000), an individual working at engineering field tends to have proper career and income. Therefore, every students at various engineering major did not have difference of fear of failure due to the absence of fear of uncertain future.

This study is in accordance with research conducted by Hartati (2018) that showed that there

was no difference of fear of failure based on major. Hartati (2018) explained that the absence of difference of fear of failure based on major was caused by students' perception on their tasks which were mostly similar despite their major, the perception on easy or difficult tasks depends on an individual.

6 CONCLUSION

Research result showed that there was no difference of fear of failure between men and women studying in Engineering Faculty of Universitas Syiah Kuala. The result also showed that there was no difference of fear of failure between men and women based on age, year of fstudy and major. Futhermore. The result showed that there was difference of fear of failure between men and women based on dimension of fear of devaluing of one's self-estimate, while there is no difference of fear of failure on other dimensions namely dimensions of fear of embarrasment and shame, fear of having uncertain future, fear of losing social influence and fear of upsetting important others.

Several limitations of this study were first short time, which cause unequal number of subject based on majors, second only one faculty. Future researcher, who is interested in conducting research with similar variable to this research, is better to use qualitative approach in order to deepen research result, especially the topic related to dynamic and description of fear of failure on students of Engineering Faculty. Moreover, future researcher can conduct research on fear of failure at other faculties.

REFERENCES

Alkhazaleh, Z., & Mahasneh, A. A. (2015). Fear of failure among a sample of Jordanian undergraduate students. *Journal of Psychology Research and Behavior Management, 9,* 53-60.

Azwar, S. (2013). *Penyusunan skala psikologi.* Yogyakarta: Pustaka Pelajar.

Browne, K. L. (2002).*Biology at work: Rethinking sexual equality*. New York: Rutgers University Press.

Conroy. D. E. (2001). Progress in the development of a multidimensional measure of fear of failure: The Performance Failure Appraisal Inventory (PFAI). *Anxiety, Stress and Coping, 14*(4), 41-452.

Conroy, D. E., Willow, J. P., & Metzler, J. N. (2002). Multidimensional fear of failure measurement: The

Performance Failure Appraisal Inventory. *Journal of Applied Sport Psychology, 14,* 76-90.

Coreira, M., Rosado, A., Serpa, S., & Vitor, F. (2017). Fear of failure in athletes: Gender and type of sport differences. *Revista Iberoamericana de Psicologia del Ejercicio y el Deporte, 12*(1), 185-193.

Deborah, Y. (15 Oktober 2016). Sentuhan tangan perempuan dijagat teknologi. *Tirto.id.* Diakses dari https://tirto.id/sentuhan-tangan-perempuan-di-jagat-teknologi-bUNN

Elliot, A. J., & McGregor, H. A. (2005). The shame of failure: Examining the link between fear of failure and shame. *Personality and Social Psychology Bulletin, 31*(2), 218-231.

Felder, R. M., Felder, G. N., & Mauney, M. (1995). A longitudinal study of engineering student performance and retention. III. Gender differences in student performance and attitude. *Journal of Engineering Education, 84*(2), 151-163.

Fried-Buchalter, S. (1997). Fear of success, fear of failure, and the imposter phenomenon among male and female marketing managers. *Journal of Sex Roles*, *37*(11-12), 847-849.

Hartati, R. (2018). Perbedaan *fear of failure* pada mahasiswa yang menyusun skripsi di Universitas Syiah Kuala. (*Skripsi*). Tidak diterbitkan. Fakultas Kedokteran Universitas Syiah Kuala, Aceh.

Hersh, M. (2000). The changing position of woman in Engineering worldwide. *IEEE Transaction of Engineering Management, 47*(3), 345-359.

Hidayah, (2012). Tentang persepsi mahasiswa harapan orang tua terhadap pendidikan dan ketakutan akan kegagalan. *Educational Psychology Journal. 1*(1), 62-67.

International Labour Organization. (2015). *Tren tenaga kerja dan sosial di Indonesia 2014-2015* (Publikasi No. 64). Jakarta: ILO.

Madara, D. S., & Cherotich, S. (2016). Challenges faced by female-students in engineering-education. *Journal of Education and Practice*, 25, 8-22.

Nelson, K. L., Newman, D. N., Mcdaniel, J. R., & Buboltz, W. C. (2013). Gender differences in fear of failure amongst engeneering students. *International Journal of Humanities and Social Science, 16*(3), 10-16.

Papastergiou, M. (2008). Are Computer Science and Information Technology still masculine fields? High school students' perceptions and career choices. *Computers & Education Journal*, 51 (2), 594-608.

Sagar, S. S., Boardley, I. D., & Kavussanu, M. (2011). Fear of failure and student athletes' interpersonal antisocial behavior in education and sport. *British Journal of Educational Psychology*, *81,* 391-4-8.

Santrock, J. W. (2002). *Life-span development. Perkembangan masa hidup*. Jakarta: Erlangga.

Sherman, J. A. (1988). Achievement related fears: Gender roles and individual dynamics. *Women & Therapy Journal*, 6(3), 97-105.

Sunkarapalli, G., & Agarwal, T. (2017). Fear of failure and perfectionism in young adults. *The International Journal of Indian Psychology,* 4(3), 93-103.

Taylor, S. E., Peplau, L.A., & Sears, D. O. (2009). *Psikologi Sosial* (Edisi Kedua belas). Jakarta: Kencana Prenada Media Group.

Universitas Syiah Kuala. (2018). Data Mahasiswa Aktif. *Artikel online*. Diakses tanggal 16 September 2018, dari https://data.unsyiah.ac.id/index.php/mahasiswa_aktif

Universitas Syiah Kuala. (2018). Data Mahasiswa Diterima. *Artikel online*. Diakses tanggal 3 Oktober 2018, dari https://data.unsyiah.ac.id/index.php/mahasiswa_diterima