

## Evaluation of Academic Performance of Electrical Engineering Students based on gender and various entry levels.

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*Abstract:* - The enrollment of students in tertiary education throughout Malaysia shows an imbalance in terms of gender percentage. This paper investigates the female academic performance of Electrical Degree students at the Faculty of Electrical Engineering of Universiti Teknologi MARA's (UiTM) based on the student's entry levels. The study was based on the longitudinal progress based on three consecutive intakes of matriculation students namely July 2005, July 2006 and July 2007. We applied the same methodology to three other consecutive intakes of Diploma July 2006, July 2007 and July 2008. Cumulative Grade Point Average (CGPA) was used as the key performance index. In addition, this paper stresses on the total population of female students compared to male students. The outcomes of the research indicate that female students performed better than males in most cases. The strong ability in fundamental engineering foundation and self efficacy of the female students greatly influenced the overall academic performance.

*Keywords:* - female, academic performance, engineering foundation, self efficacy and CGPA

### 1 Introduction

MALAYSIA is one of the developing countries in the Asian region that has a well-established education system. Malaysian students have equal access to education, from nursery education to higher school education. [1] On the 8<sup>th</sup> March every year, the whole world celebrates women day and this year the theme is "Equal Access to Education, Training, Science, and Technology: Pathway to Decent Work for women". This is in tandem, with the national interest of the Malaysian Government to give equal opportunity to the female in education and to increase the workforce that includes female in the working-age population. [2]

In general, Malaysian students spend an average of thirteen years in primary and secondary schools before entering into Institute of Higher Learnings (IHLs). The results of "Sijil Pelajaran Malaysia" (Malaysian Certificate of

Education) which is equivalent to Ordinary level will determine whether they can register into matriculation or Diploma program. Matriculation program lasts for one year while the Diploma Program takes three years to complete. The advantage of first doing a Diploma is that the students could decide to first gain some work experience before continuing their studies to a degree level as full time students or off campus. [1,3] Engineering diploma holders can work as assistant engineers in the public or private sector or they can immediately further their studies in Institutes of Higher Learning (IHLs).

#### 1.1 Background to tertiary Engineering Education in Malaysia

Malaysia, then called Malaya achieved her independence in 1957. Then, there was no IHL offering tertiary engineering education. In 1955, a Professional Engineering Course was









be user friendly to the female students particularly in Mechanical and Civil Engineering.

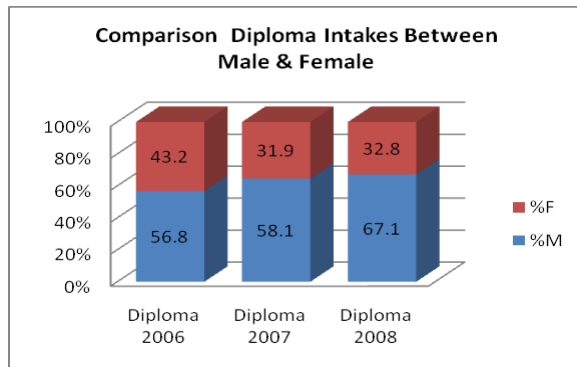


Fig. 7 Electrical Intakes Copmaprison

Tables 4, 5 and 6, shows the overall enrolment of diploma students mainly intake 2006, 2007 and 2008. Such students enter straight into semester three of eight semester system and they can in general complete their Degree Program within three years. It can be seen that the total number of male students are still higher than the female students.

Table 4 Gender Comparison Diploma 2006

Diploma 2006	M	M%	F	F%
1st	0	0	9	12.3
2,1	42	47.2	40	54.8
2,2	26	29.2	7	9.5
3rd	0	0	0	0
Extended	21	23.6	17	23.3
Failed	15		6	
<b>Total</b>	<b>104</b>		<b>79</b>	

Table 5 Gender Comparison Diploma 2007

Diploma 2007	M	M%	F	F%
1st	15	10.8	10	13.8
2,1	60	43.2	29	40.2
2,2	31	22.3	13	18
3rd	0	0	0	0
Extended	33	23.7	19	26.4
Failed	32		8	
<b>Total</b>	<b>171</b>		<b>80</b>	

Table 6 Gender Comparison Diploma 2008

Diploma 2008	M	M%	F	F%
1st	7	8.1	4	8.8
2,1	45	52.3	34	75.6
2,2	17	19.8	3	6.7
3rd	0	0	0	0
Extended	17	19.8	4	8.9
Failed	14		4	
<b>Total</b>	<b>100</b>		<b>49</b>	

From Table 4 it can be seen that fifteen (15) male students and only six (6) female students did not manage to reach the final semester. They either failed a course three times or their CGPA is much lower than 2.0 along the way. [8]

It can also be seen that 12.3% female students secured First class, 54.8% second upper and 9.5% secured second lower upon graduation. Fig. 7, 8 and 9 show the overall comparison of performance between genders for the Diploma intakes.

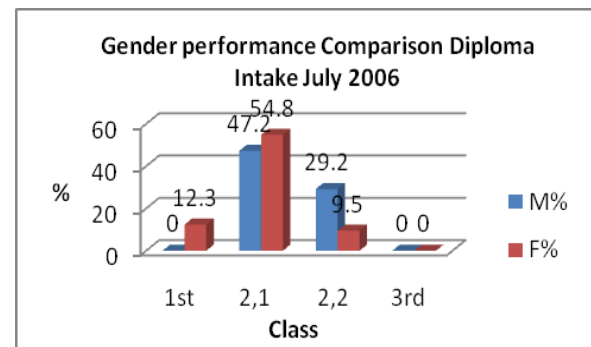


Fig. 7 Final CGPA Gender Comparison

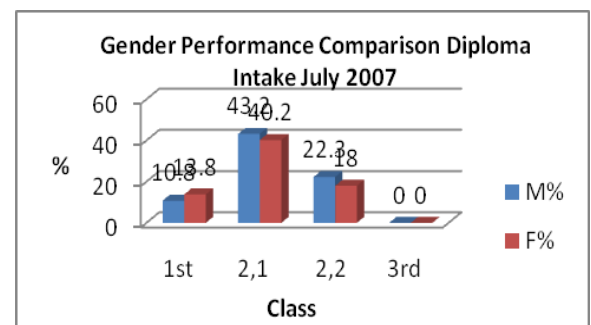


Fig. 8 Final CGPA Gender Comparison

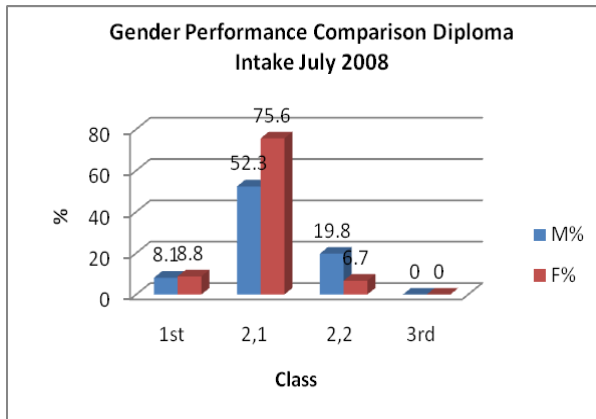


Fig. 9 Final CGPA Gender Comparison

As depicted in the graphs, it can be seen that female students did outstandingly well overall performance upon graduation for batches July 2006 and July 2008

**C Comparison between Matriculation and Diploma Intake students in the same academic program.**

As mentioned earlier students in the Matriculation intake of July 2005 sat the same final examination with the students of the Diploma intake of July 2006 .This due to the fact that Diploma students entered straight into 3rd semester of the same program

Fig. 10, 11 and 12 show such comparison of three different generations of students sitting for the same final examination.

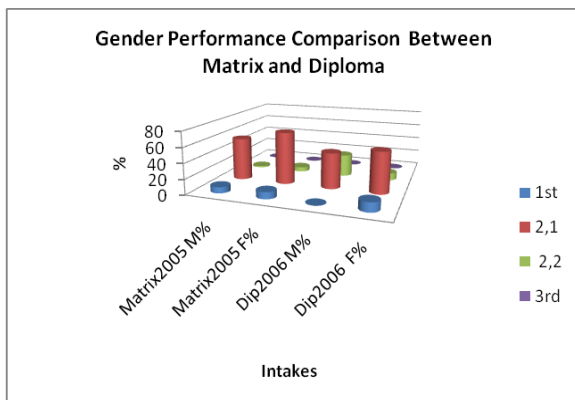


Fig. 10 Gender Comparison between Diploma and Matriculation

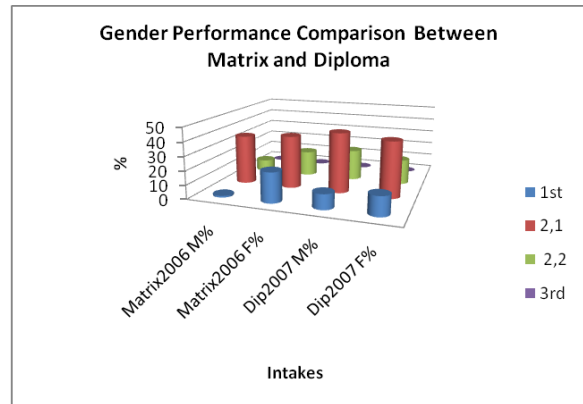


Fig. 11 Comparison between Matriculation and Diploma

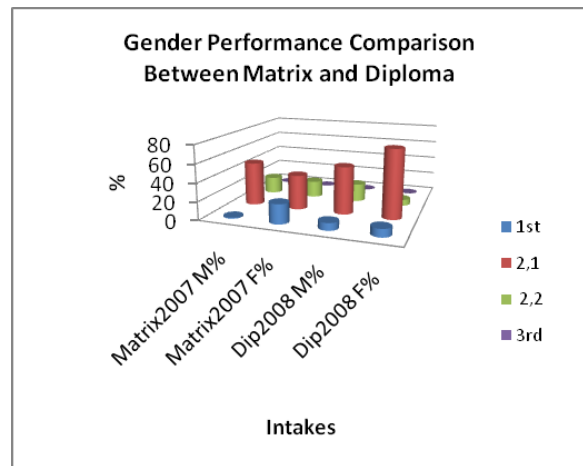


Fig. 12 Comparison between Matriculation and Diploma

From those figures it can be seen that the female students performed better in most cases except for Diploma 2007 whereby the male students did better. This was due to the fact those male students of that batch have built up their ability skills during Diploma studies and maintained their momentum in ability continuously all the way through the Bachelor Degree Program. In all other cases female students performed outstandingly well right from their earlier semester of the program. They seemed to be showing consistently stable even at higher semester despite subjects courses are more difficult indeed. Female students with strong self efficacy and abilities in engineering

fundamentals achieved higher academic performance due to high persistency and focus in their studies.

#### 4 DISCUSSIONS

The findings indicate that in general, female students performed better than males in an academic environment having strong engineering fundamentals right from start of Program. However, other research have showed that as these graduates enter the working environment, more males rather than females applied to obtain to sit for the Professional Interview (PI) conducted by the Institution of Engineers Malaysia to enable them to subsequently on passing the PI to register with the Board of Engineers Malaysia (BEM) to obtain the professional status P. Eng. [13].

The PI failure rate for both genders is almost the same as shown in Fig. 13 below. However, the reasons for failure show correlation with this research. As depicted in Fig. 14 which shows reason for PI interview failure based on gender, the results indicates that the reason why males fail the PI is usually due to poor technical knowledge. Females, however usually fail the PI interview due to poor knowledge in the code of ethics for professional engineer.

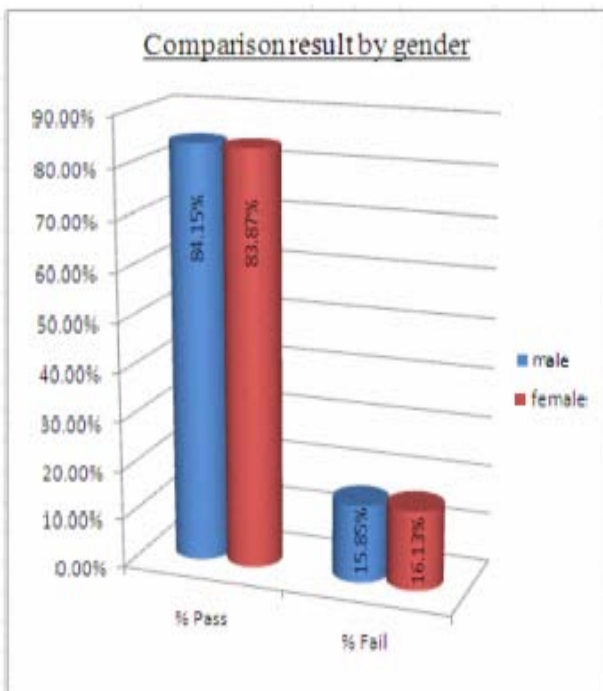


Fig. 13 PI pass/failure percentage of candidates by gender in 2009.

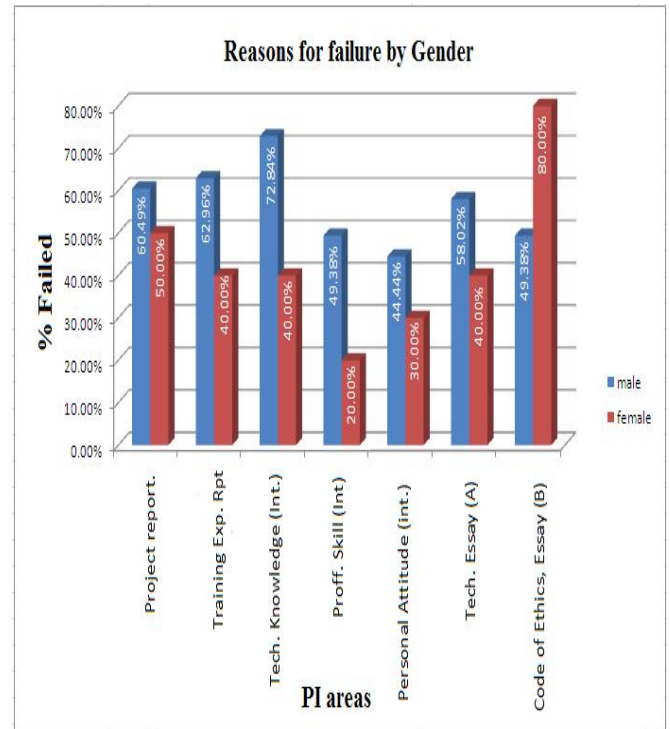


Fig. 14: Percentage of failure by gender for PI candidates in 2009

#### 5 CONCLUSION

This paper evaluates the academic performance of Electrical Engineering students for various entry levels. We investigate the pattern of intake of electrical engineering students in particular from July 2005 onwards. The percentages of female students fall within 30% of the total intakes for both Matriculation and Diploma. The performance of the female students was also analyzed with respect to total number of students that managed to reach the final semester before graduation. It can be concluded that female students with strong ability in engineering fundamentals from the very beginning of program performed very well upon graduation. They maintained their CGPA throughout right from very early semester of their university life. It can be concluded that female students with strong self-efficacy tend to be more focus in their academic that promotes



better performance at the end of their academic courses.

### ACKNOWLEDGEMENT

The authors would like to thank the academic office of the Faculty of Electrical Engineering UiTM for providing data for this investigation that is the students' results for every semester throughout their study.

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