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A Comparative Study of Performance of Male and Female Students in Selected Basic Engineering Courses at Ladoke Akintola University of Technology, Ogbomoso *(pp.185-194.)*

J.T. Oladeji* and E.O. Sangotayo
Mechanical Engineering Department, Ladoke Akintola University of Technology,
P.M.B. 4000, Ogbomoso, Nigeria
*Correspondence E-mail: oladeji2004@yahoo.com/jtoladeji@gmail.com

Abstract: The importance of engineering in nation development cannot be overemphasized. This is because, the prosperity and economic well being of any country have direct link with technological knowhow of such a country. Hence, adequate and in-depth knowledge of basic engineering courses are required to become a successful engineer. This study was carried out to determine, if there were significant differences in the performance of male and female students in selected basic engineering courses at Ladoke Akintola University of Technology, Ogbomoso. Secondary data in form of the results or scores for the past five years were collected from the examination officers of various departments, through the permission of their heads of departments. Essentially, cumulative grade point average (CGPA) of the students was used. Data were analysed using means and standard deviations at 95 % confidence level. Data were further subjected to Anova-tests. The trends of performance of students based on gender, courses, and as well as years of study were also investigated. The mean scores of 1.575, 2.40, 1.85, 2.875, 3.175 and 2.65 were obtained for female students for the period of five years in the six selected courses in the harmattan semester, while the corresponding mean scores for male students were 1.725, 1.725, 2.35, 3.40, 3.55 and 3.125. In the rain semester, the mean scores of 2.00, 3.20, 2.375, 2.775,1,775 and 2.675 were obtained for female students, while mean scores of 2.45, 3.625, 3.375, 3.125, 2.65 and 3.525 were obtained for male students. Statistics revealed that, there was significant difference in the overall performance between the male and female students in the six selected basic engineering courses in both harmattan and rain semesters. The study concluded that, the males are academically superiors to females in the six selected basic engineering courses examined.

Keywords: basic engineering courses, female students, gender, male students, performance

1 INTRODUCTION

Engineering is one of major disciplines in most worlds' universities and higher institutions of learning, Nigeria inclusive. In Nigeria, the importance of engineering was underscored with the fact that many universities were established solely as universities of Technology. This is so because; it is mainly on technology that the prosperity of Nigeria depends. Good

technology will also boost our agriculture, and this will guarantee the production of food for the growing population, the generation of employment and the foreign exchange earnings (Anyanwu et al., 1998).

Engineering as a discipline has many branches. Notable among them are mechanical, civil, electrical, chemical, agricultural, computer engineering and so on (Khurmi and Gupta, 2006). There are compulsory and basic courses for all students offering one kind of engineering course or the other. An engineering student cannot become a successful engineer without adequate and in-depth knowledge of these courses (Sharma and Aggarwal, 2006). Engineering as a discipline is faced with many difficulties in Nigerian higher institutions. One of the difficulties being faced by engineering students is lack of exposure to practical, as most students find it difficult to secure places for student industrial work scheme (Adebiyi and Oladeji, 2009). The compulsory National Youth Service Scheme does not help matter as most of graduate engineers are sent to secondary schools to teach (Enweremadu and Mudashiru, 2009). Poor knowledge in allied subjects such as technical drawing, mathematics and space geometry at secondary level also contributes in no small measure to poor performance of students in engineering courses (Adebiyi and Oladeji, 2009). Adhimabi and Heneveld (1995) indicated that teachers believed that males are academically superior to females in a work on factors affecting female participation in education in some developing countries of Africa. However, the work carried out by Adeyinka (2010) countered this view in his study, where a comparative study of male and female students, were conducted in agricultural science and biology in Kwara State College of Education, Ilorin. The result of his study showed that, there was no significant difference in the overall performance between the male and female students in the 2002 set.

The main objective of this study was to compare the performance of male and female students in selected and basic engineering courses, which are EEE 201 - Basic Electrical Engineering I, EEE 203 - Basic Electrical Engineering Laboratory, EEE 231- Engineering Analysis, MEE 201- Engineering Drawing I, MEE 203- Workshop Technology I and MEE 205- Engineering Materials I for harmattan semester, and EEE 232- Engineering Analysis II, MEE 200- Introduction to Mechanical Engineering, MEE 202- Engineering Drawing II, MEE 204- Workshop Technology II, MEE 206- Mechanics of Machines II and MEE 208- Engineering Materials II for rain semester, and to ascertain whether or not biological differences necessarily determine what males and females are able to do in all these courses. The study went further to investigate the trend of performance of students based only on gender, courses, as well as years of study in both harmattan and rain semesters.

2 METHODOLOGY

This study was conducted among the male and female engineering students of Ladoke Akintola University of Technology, Ogbomoso (LAUTECH). LAUTECH is located in Ogbomoso and was established in 1990. The university was jointly owned by Oyo and Osun States in the south-west geo-political zone of the country and was best state university in Nigeria for four consecutive years. The university has a population of about twenty six thousand and it is heterogeneously inhabited by many Nigerian tribes namely: Yoruba, Ibo, Hausa, and other minority tribes. The university has six faculties and the main religions practised within the university are Christianity and Islam. For the purpose of this study, the descriptive method of survey was used. Secondary data in form of the results or scores for the past five years were collected from the examination officers of various departments through the permission of their heads of departments. Data were analysed using means and standard deviations at 95 % confidence level. Data were further subjected to Anova tests. The method was used because it is considered to be the most appropriate method of comparing means of many groups, which are subjected to the same conditions (Ogunleye, 2009; Oladeji, 2011). The trends of performance of students based on gender, course, and as well as years of study were also investigated.

All the statistical analyses were performed on a micro-computer using SPSS 11.0 (Statistical Package for Social Science, 2002).

3 DISCUSSION OF RESULTS

The results of performance of both female and male students in all the six courses examined over the period of five years for both harmattan and rain semesters were presented in Tables 1 - 4, while Figures 1 and 2 depict comparison in the performance between the male and female students in harmattan and rain semesters respectively.

Table 1: Performance of Female Students in Selected Harmattan Courses in Five Years

Academic Year	Courses					
	EEE 201	EEE 203	EEE 231	MEE 201	MEE 203	MEE 205
2005/2006	2.25	2.50	1.875	2.375	3.625	3.375
2006/2007	1.75	1.375	1.625	3.0	3.25	2,25
2007/2008	2.375	2.875	1.50	2.625	3.375	3.00
2008/2009	0.75	2.25	2.00	2.875	2.375	2.375
2009/2010	0.75	3.00	2.25	3.50	3.25	2.25

Mean	**1.575**	**2.4**	**1.85**	**2.875**	**3.175**	**2.65**

Table 2: Performance of Male Students in Selected Harmattan Courses in Five Years

Academic Year	Courses					
	EEE 201	EEE 203	EEE 231	MEE 201	MEE 203	MEE 205
2005/2006	0.75	2.50	1.50	2.625	3.375	3.25
2006/2007	2.00	2.125	2.75	3.75	4.25	3.25
2007/2008	2.875	2.25	2.125	2.75	3.875	3.25
2008/2009	1.75	3.50	2.375	3.625	2.75	3.375
2009/2010	1.25	3.25	3.00	4.25	3.50	2.25
Mean	**1.725**	**1.725**	**2.35**	**3.40**	**3.55**	**3.125**

Table 3: Performance of Female Students in Selected Rain Semester Courses in Five Years

Academic Year	Courses					
	EEE 232	MEE 200	MEE 202	MEE 204	MEE 206	MEE 208
2005/2006	2.375	2.375	3.25	3.375	2.625	3.00
2006/2007	1.50	3.375	2.50	2.75	1.25	1.375
2007/2008	1.0	3.25	2.25	3.125	2.00	3.25
2008/2009	2.375	3.50	2.125	2.375	1.50	3.00
2009/2010	2.75	3.50	1.75	2.25	1.50	2.75
Mean	**2.00**	**3.20**	**2.375**	**2.775**	**1.775**	**2.675**

Table 4: Performance of Male Students in Selected Rain Semester Courses in Five Years

Academic Year	Courses					
	EEE 232	MEE 200	MEE 202	MEE 204	MEE 206	MEE 208
2005/2006	1.50	2.50	2.50	3.00	2.625	2.375
2006/2007	2.375	4.375	3.125	2.875	3.125	3.50
2007/2008	2.25	3.375	2.875	3.375	2.125	3.50
2008/2009	3.625	4.125	4.375	3.375	2.875	4.25
2009/2010	2.50	3.75	4.00	3.00	2.50	4.00

Mean	**2.45**	**3.625**	**3.375**	**3.125**	**2.65**	**3.525**

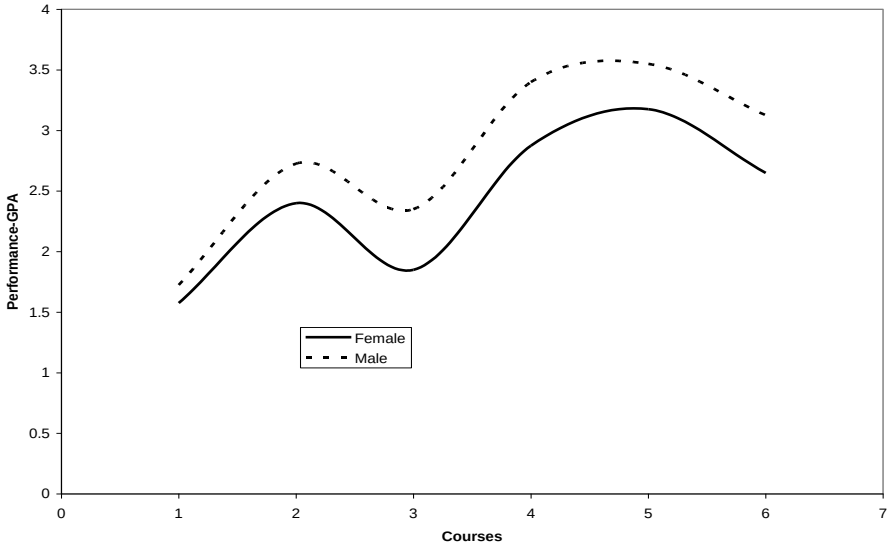

Figure 1: Comparison of Male and Female Performance in Harmattan Semester

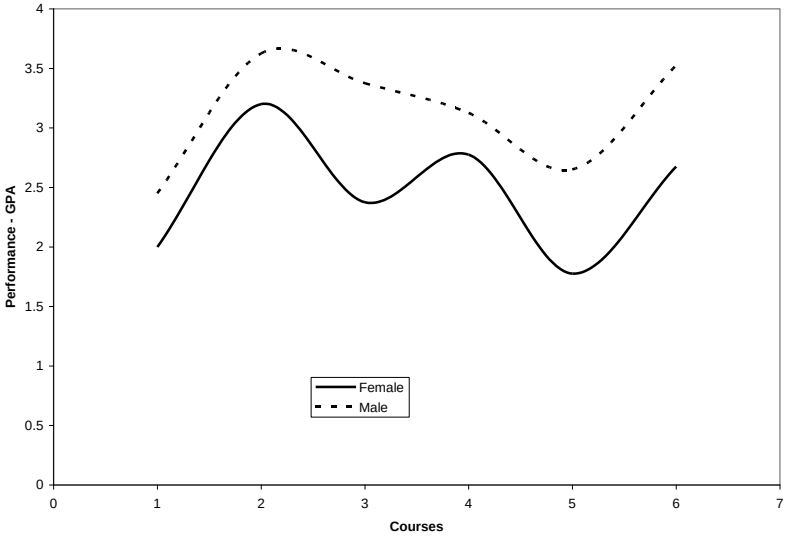

Figure 2: Comparison of Male and Female Performance in Rain Semester

The mean scores shown in Tables 1-4 were further subjected to ANOVA tests and the results were presented in Tables 5 and 6 for harmattan and rain semesters respectively.

Table 5: Harmattan Performance of both Male and Female Students at 5%

ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Genders-Years	5.641667	9	0.626852	***2.135647***	0.045832	***2.095753***
Courses	21.05208	5	4.210417	***14.34464***	2.12E-08	***2.422084***
Error	13.20833	45	0.293519			
Total	39.90208	59				

Table 6: Rain Performance of both Male and Female Students at 5%

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	
Genders-Years	14.03021	9	1.558912	***5.908493***	2.05E05	*F crit*
2.095753	11.68958	5	2.337917	***8.861028***	6.51E06	
Error	11.87292	45	0.263843			***2.422084***
Total	37.59271	59				

It can be seen that, the results of Anova tests presented in Tables 5 and 6 in all the selected courses for both semesters examined showed that, there is significant difference between the performances of male and female students over the studied years. This is because; F calculated is higher than F-critical at 5 % significant level (5.908493<2.095753). In the similar manner, it is also evident that there is significant difference in the performance between the female and male students in all the twelve selected courses as F calculated is higher than F-critical at 5 % significant level (8.861028<2.422084).

The results of Anova tests among the female and male students only for harmattan semester were presented in Tables 7 and 8 respectively, while the corresponding tables for rain semesters were shown in Tables 9 and 10.

Table 7: Performance of Female/Years (Harmattan) at 5%

ANOVA							
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*	
Female/Years	1.522917	4	0.380729	***1.348708***	0.286821	***2.866081***	
Courses	9.346354	5	1.869271	***6.621771***	0.000869	***2.710891***	
Error	5.645833	20	0.282292				
Total	16.5151	29					

Table 8: Performance of Male/Years (Harmattan) at 5%

ANOVA							
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*	
Male-Years	1.817708	4	0.454427	***1.2427***	0.324893	***2.866081***	
Courses	11.95469	5	2.390938	***6.538385***	0.000934	***2.710891***	
Error	7.313542	20	0.365677				
Total	21.08594	29					

Table 9: Performance of Female/years (Rain) at 5%

ANOVA						
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Female-Years	1.523958	4	0.38099	1.077796	0.393769	2.866081
Courses	6.904167	5	1.380833	3.906291	0.012397	2.710891
Error	7.069792	20	0.35349			
Total	15.49792	29				

Table 10: Performance of Male/years (Rain) at 5%

ANOVA							
Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*	
Male-Years	6.005208	4	1.501302	7.860649	0.000561	2.866081	
Courses	5.76875	5	1.15375	6.040905	0.001456	2.710891	
Error	3.819792	20	0.19099				
Total	15.59375	29					

From Table 7, for harmattan semester, it can be seen that among the female students, there is no significant difference in their performance over the studied years as F-calculated is less than F-critical (1.348708<2.866081), while there is significant difference in their performance in all the twelve selected basic engineering courses as F-calculated is higher than F-critical (6.621771>2.710891). Similar results are also obtained among the male students for the similar reasons stated above (Table 8). For rain semester, the results obtained among the female students are the same as that of harmattan (Table 9), while among the male students (Table 10), there are significant differences in their performance over the studied years as well as in all the twelve selected basic engineering courses as F-calculated are higher than F-critical (7.860649>2.866081 for years of study/6.040905>2.710891).

The results of this study seem to disagree with the reports of Buckland and Joyce (1996) and Yahaya (2005) that gender analysis of performance is not on biological differences. This study also disagreed with the work of Adeyinka (2010), where the researcher concluded that, there was no significant difference in the overall performance between the male and female students in the agricultural science and biology in Kwara State College of Education, Oro in the 2002 set. The results of this study also disagreed with work of Aolat (2010), which also gave similar results as that of Adeyinka (2010). However, the results of this study supported the views of some teachers, who believed that males are academically superior to females in some developing countries of Africa as expressed by Adhimabi and Heneveld (1995). Figures 1 and 2 also show that performance of male students is better than their female students' counterpart.

4 CONCLUSIONS

From the results and findings of this study, the following inferences can be drawn:

- The gender of a student as far as this study is concerned has something to do with his/her academic performance.
- Male students are academically superior to their female students' counterparts in the selected basic engineering courses examined in this study.
- There is significant difference between the performances of male and female students over the studied years.
- For harmattan semester, there are no significant differences in the performance of both female and male students over the studied years, while there are significant differences in their performance in all the twelve selected basic engineering courses examined in this study.
- There are significant differences in the performance of male students over the studied years as well as in all the twelve selected basic engineering courses examined in this study.

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