

A Comparative Assessment of Performance of University Matriculation Examination and Pre-Degree Science Students in Selected Basic Engineering Courses at Ladoke Akintola University of Technology, Ogbomoso.

J.T. Oladeji, Ph.D.* and E.O. Sangotayo, M.Sc.

Mechanical Engineering Department, Ladoke Akintola University of Technology, PMB 4000, Ogbomoso, Nigeria.

E-mail: oladeji2004@yahoo.com*
jtoladeji@gmail.com
olemsangotayo@yahoo.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 links with the technological know-how of that country. Adequate and in-depth knowledge of basic engineering courses are required to become a successful engineer. This study was carried out to compare the performance of those engineering students who entered through the University Matriculation Examination (UME) and those who gained admission through pre-degree science programme (PDS) in selected basic engineering courses at Ladoke Akintola University of Technology, Ogbomoso.

Secondary data in the form of the results or scores for the past five years were collected from the examination officer of the Department, through the permission of the Head of the Department. Essentially, cumulative grade point average (CGPA) of the students was used. Data were analyzed using means and standard deviations at 95% confidence level. Data were further subjected to ANOVA-tests. The trends of performance of students based on courses and years of study were also investigated.

For UME students, the mean scores of 2.14, 2.98, 2.88, 3.52, 2.88 and 2.78 were obtained for the for period of five years in the twelve selected courses for both Harmattan and Rain semesters, while the corresponding mean scores for the PDS students were 2.08, 3.18, 2.88, 3.08, 2.44 and 3.34 for the same periods. Statistics revealed that there were no significant differences in the performance between UME and PDS students in the selected courses as well as the trend of

performance over the studied years in both Harmattan and Rain semesters.

Based on the results of this study, it can be concluded that, the mode of admission of engineering students into Ladoke Akintola University of Technology, Ogbomoso has no effect on their performance in requisite engineering courses.

(Keywords: University Matriculation Examination, UME, pre-degree science program, students, performance)

INTRODUCTION

Engineering is one of the major disciplines in most of the worlds' universities and higher institutions of learning. In Nigeria, the importance of engineering was underscored with the fact that many universities were established solely as Universities of Technology. This is because of the general belief that Nigeria's prosperity mainly depends on the development of technology. Good technology will also boost our agriculture, and this will support the production of food for the growing population and the generation of employment and the foreign exchange earnings (Anyanwu et al., 1998).

Engineering as a discipline, has many branches including mechanical, civil, electrical, chemical, agricultural, computer engineering, and so on (Khurmi and Gupta, 2006). There are compulsory and basic courses for all students taking mechanical engineering as a discipline. A student cannot become a successful mechanical 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 experience, as most students find it difficult to secure places for student industrial work schemes (Oladeji and Sangotayo, 2011). The compulsory National Youth Service Scheme does not help matters as most graduate engineers are sent to secondary schools to teach.

Poor knowledge in allied subjects such as technical drawing, mathematics, and space geometry at the secondary level also contributes in no small measure to the poor performance of students in mechanical engineering courses (Adebiyi and Oladeji, 2009; Oladeji, et al., 2011).

In Nigeria, admission of prospective students into universities and higher institutions of learning is usually done through written University Matriculation Examination (UME), pre-degree science programme (PDS), and direct entry (DE). Those who are admitted through UME in addition to passing the entrance examination, usually have at least six credits in relevant subjects at ordinary level, while direct entry students must possess advanced level certificates or ordinary national diploma at upper credit level. However, those who are deficient in one subject or another are given the opportunity to make up their deficiency through a pre-degree programme.

It is not unusual for students to argue among themselves which category of them performs better. Therefore, the main objective of this study was to investigate and compare the performance of students who gained admission into Ladoké Akintola University of Technology, Ogbomoso, through university matriculation examination (UME) and pre-degree science programme (PDS) in selected basic engineering courses, which are:

- EEE201- Basic Electrical Engineering,
- EEE203- Basic Electrical Engineering Lab I,
- EEE231- Engineering Analysis I,
- MEE201- Engineering Drawing I,
- MEE203-Workshop Technology I,
- and MEEE 205-Engineering Mechanics I

for the Harmattan semester, and:

- EEE 232-Engineering Analysis II,
- MEE200- Introduction to Engineering,
- MEE202- Engineering Drawing II,

- MEE204-Workshop Technology II,
- MEE206-Engineering Mechanics II,
- and MEE208- Engineering Materials.

The study went further to investigate the trend of performance of students based only on courses and years of study in both the Harmattan and Rain semesters. Direct mode of entrance was not treated, due to lack of data as only few students were admitted during the studied years.

MATERIALS AND METHODS

This study was conducted among the engineering students of Ladoké 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 selected departments through the permission of the heads of department. Data were analysed using means and standard deviations at 95 % confidence level.

The mean scores obtained were subjected to Chi-square tests in order to compare the performance of UME and PDS students in selected basis courses. 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 courses and 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).

RESULTS

The results of performance of students in all the twelve courses examined over the period of five years for both Harmattan and Rain semesters were presented in Tables 1-7, while Figures 1

and 2 depict comparison in the performance of students in Harmattan and Rain semesters, respectively. The results of Chi-square tests were presented in Tables 8-9, while the results of ANOVA tests were presented in Tables 10 – 13.

Table 1: Mean Scores obtained by UME Students in Selected Courses in Harmattan Semesters.

Academic Year	Courses					
	EEE 201	EEE 203	EEE 231	MEE 201	MEE 203	MEE 205
2005/2006	1.40	2.40	2.40	3.80	3.40	2.00
2006/2007	2.00	2.20	2.60	3.80	4.20	2.80
2007/2008	3.00	2.40	2.40	3.60	3.00	2.20
2008/2009	2.00	3.40	3.40	3.40	2.40	4.20
2009/2010	1.40	2.60	2.60	3.80	3.40	3.60
Mean	1.96	2.60	2.60	3.68	3.28	2.90

Table 2: Mean Scores obtained by PDS Students in Selected Courses in Harmattan Semesters.

Academic Year	Courses					
	EEE 201	EEE 203	EEE 231	MEE 201	MEE 203	MEE 205
2005/2006	2.00	2.60	3.00	3.20	3.20	3.00
2006/2007	2.00	2.20	3.20	2.80	4.00	2.80
2007/2008	3.40	2.60	2.40	3.40	3.80	4.20
2008/2009	1.60	3.60	3.00	3.20	2.80	3.40
2009/2010	2.80	3.00	4.40	4.80	3.40	3.00
Mean	2.36	2.80	3.20	3.48	3.44	3.28

Table 3: Mean Scores obtained by UME Students in Selected Courses in Rain Semesters.

Academic Year	Courses					
	EEE 232	MEE 200	MEE 202	MEE 204	MEE 206	MEE 208
2005/2006	2.40	3.20	4.00	3.60	2.20	2.40
2006/2007	2.20	3.60	3.00	3.20	2.20	3.00
2007/2008	1.40	2.80	3.80	2.80	1.60	2.40
2008/2009	2.80	3.60	3.20	3.60	3.20	2.60
2kk009/2010	2.80	3.60	3.20	3.60	3.20	2.60
Mean	2.32	3.36	3.44	3.36	2.48	2.60

Table 4: Mean Scores obtained by PDS Students in Selected Courses in Rain Semesters.

Academic Year	Courses					
	EEE 232	MEE 200	MEE 202	MEE 204	MEE 206	MEE 208
2005/2006	1.40	3.60	2.40	2.40	1.20	2.60
2006/2007	1.20	3.80	3.40	2.20	2.20	2.20
2007/2008	2.40	3.20	3.40	3.60	2.20	3.80
2008/2009	2.00	3.60	1.80	2.60	0.80	4.20
2009/2010	2.00	3.60	1.80	2.60	0.80	4.20
Mean	1.80	3.50	2.56	2.68	1.44	3.40

Table 5: Mean Scores of UME Students for both Harmattan and Rain Semesters in Selected Courses.

Semester	Mean scores in selected courses					
	EEE201/EEE232	EEE203/MEE200	EEE231/MEE202	MEE201/MEE204	MEE203/MEE206	MEE205/208
Harmattan	1.96	2.60	2.32	3.68	3.28	2.96
Rain	2.32	3.36	3.44	3.36	2.48	2.60
Mean	2.14	2.98	2.88	3.52	2.88	2.78

Table 6: Mean scores of PDS Students for both Harmattan and Rain Semesters in Selected Courses.

Semester	Mean scores in selected courses					
	EEE201/EEE232	EEE203/MEE200	EEE231/MEE202	MEE201/MEE204	MEE203/MEE206	MEE205/208
Harmattan	2.36	2.80	3.20	3.48	3.44	3.28
Rain	1.80	3.56	2.56	2.68	1.44	3.40
Mean	2.08	3.18	2.88	3.08	2.44	3.34

Table 7: Comparison of Mean Scores between UME and PDS Students in Selected Courses for Harmattan and Rain Semesters.

Programme	Mean scores in selected courses					
	EEE201/EEE232	EEE203/MEE200	EEE231/MEE202	MEE201/MEE204	MEE203/MEE206	MEE205/208
UME	2.14	2.98	2.88	3.52	2.88	2.78
PDS	2.08	3.18	2.88	3.08	2.44	3.34

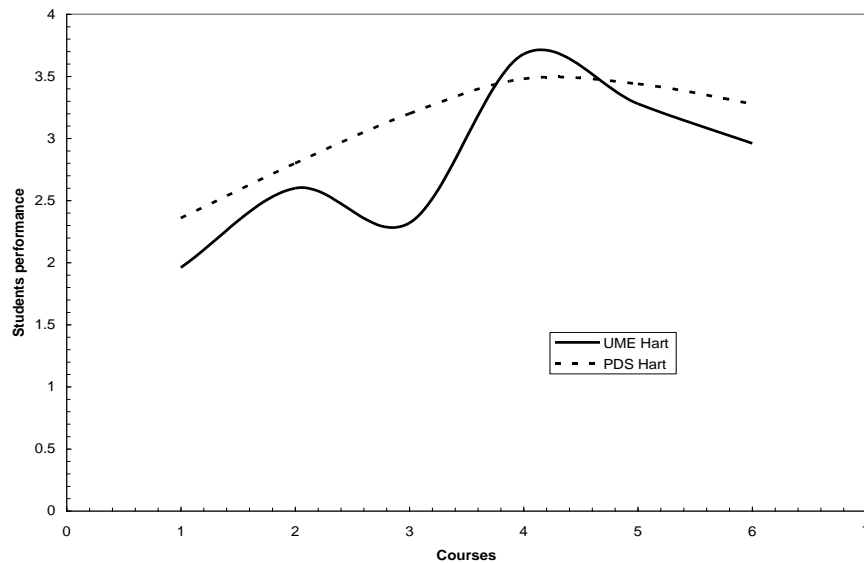


Figure 1: Graphical Comparison of Performance of UME and PDS Students in Harmattan Semesters,

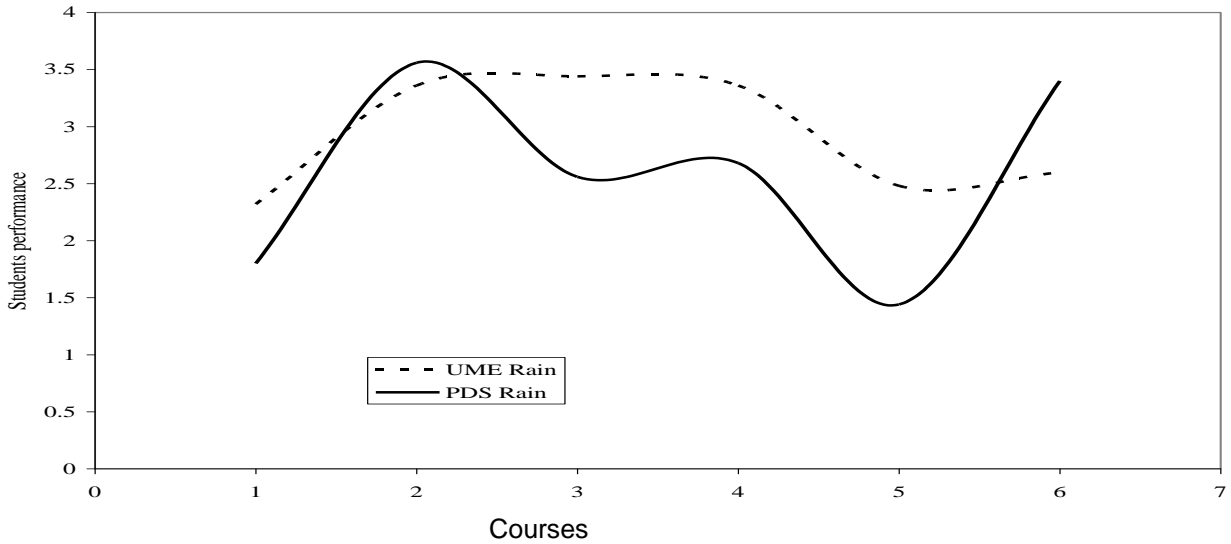


Figure 2: Graphical Comparison of Performance of UME and PDS Students in Rain Semesters.

Table 8: Comparison between the performance of UME and PDS Students in Harmattan Semesters (Chi-square tests).

	<i>Harmattan, UME</i>	<i>Harmattan, PDS</i>
Mean	2.8	3.093333333
Variance	0.40128	0.187946667
Observations	6	6
Hypothesized Mean Difference	0	
Df	9	
t Stat	-0.936043099	
P(T<=t) one-tail	0.186843001	
t Critical one-tail	1.833113856	
P(T<=t) two-tail	0.373686003	
t Critical two-tail	2.262158887	

Table 9: Comparison between the performance of UME and PDS Students in Rain semesters (Chi-square tests).

	<i>Rain, UME</i>	<i>Rain, PDS</i>
Mean	2.926666667	2.573333333
Variance	0.262666667	0.710186667
Observations	6	6
Hypothesized Mean Difference	0	
Df	8	
t Stat	0.877478633	
P(T<=t) one-tail	0.202903146	
t Critical one-tail	1.85954832	
P(T<=t) two-tail	0.405806291	
t Critical two-tail	2.306005626	

Table 10: Performance of UME Students in Harmattan Semesters ANOVA at 95 % Confidence Level.

Source of Variation	SS	Df	MS	F	P-value	F crit
Years/UME	0.826667	4	0.206667	0.500323	0.735811	2.866081
Courses	10.032	5	2.0064	4.857327	0.004536	2.710891
Error	8.261333	20	0.413067			
Total	19.12	29				

Table 11: Performance of PDS Students in Harmattan Semesters at 95% Confidence Level.

Source of Variation	SS	Df	MS	F	P-value	F crit
Years/PDS	2.565333	4	0.641333	1.744017	0.179939	2.866081
Courses	4.698667	5	0.939733	2.555475	0.06059	2.710891
Error	7.354667	20	0.367733			
Total	14.61867	29				

Table 12: Performance of UME Students during Rain Semesters, ANOVA at 95% Confidence Level.

Source of Variation	SS	Df	MS	F	P-value	F crit
Years/UME	1.992	4	0.498	3	0.043201	2.866081
Courses	6.566667	5	1.313333	7.911647	0.0003	2.710891
Error	3.32	20	0.166			
Total	11.87867	29				

Table 13: Performance of PDS Students during Rain Semesters.

Source of Variation	SS	Df	MS	F	P-value	F crit
Years/PDS	2.325333	4	0.581333	1.428571	0.261042	2.866081
Courses	17.75467	5	3.550933	8.726081	0.000161	2.710891
Error	8.138667	20	0.406933			
Total	28.21867	29				

From Table 8, it can be seen that in the Harmattan semesters, there were no significant differences between the performance of UME and PDS students as t-calculated is less than t-critical ($0.18684 < 1.8331133$ at one tail and $0.373686 < 2.262158$ at two tail).

The same situation applied in the Rain semesters (Table 9) between the performance of UME and PDS students as t-calculated is also less than t-critical ($0.20290 < 1.85954$ at one tail and $0.40580 < 2.306005$ at two tail).

The implication of this is that both mode of admission examined in this study are standard and that the deficiencies of those who gained admission through pre-degree program (PDS) have been taken care of during their one year special program.

From Table 10, it can be seen that for UME students, there were no significant differences over the years in their performance as t-calculated is less than t-critical ($0.7 < 2.866$), while based on selected courses, there were significant differences in their performance. However, during the same period for PDS students (Table 11), there were no significant differences in their performance either based on studied years or the selected courses as t-calculated is less than t-critical i.e. $1.7 < 2.8$ (based on the studied years) and $2.5 < 2.7$ (based on the selected courses).

From Tables 12 and 13, during rain semesters, there were significant differences in the performance of the two categories of the students whether based on the years or courses, with the exception of PDS students who recorded no significant differences in their performance over the studied years.

CONCLUSIONS

Based on the results of statistical analyses, the following conclusions can be drawn:

1. The study concluded that, there were no significant differences between the performance of UMS and PDS students in the selected courses in both Harmattan and Rain semesters.
2. For UME students, while there is no significant difference in the trend of performance over the studied years in the Harmattan semesters, there

was significant difference in the trend of performance in the selected courses.

3. For PDS students, there were no significant differences in the performance over the years as well as in the selected courses in Harmattan semesters.

4. For Rain semesters, while there were significant differences in the performance of UME students over the years and as well as in selected courses, there were only significant differences in the performance of PDS in the selected courses.

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ABOUT THE AUTHORS

J.T. Oladeji, was trained as a Mechanical Engineer in the former USSR, where he obtained an M.Sc. degree in Mechanical Engineering. He presently teaches in the Mechanical Engineering Department at Ladoke Akintola University of Technology, Ogbomoso, Nigeria. He is a Doctoral degree holder of the same University. His research interest is in the areas of renewable energy (in form of biomass) and engineering education.

E.O. Sangotayo, is a Mechanical Engineer trained at Ladoke Akintola University of Technology, Ogbomoso, where he obtained his Bachelor and Master's Degrees in Mechanical Engineering. He is at present a doctoral student of the University of Agriculture, Abeokuta, Nigeria. His field of interest is in the area of heat and mass transfer.

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