



Effects of Entry Mode on Mathematics Education Students' Academic Performance and Retention

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ABSTRACT

This study investigated the effects of entry mode on mathematics education student's academic performance and retention of mathematics education students in Kogi State University, Anyigba. This study employed the use of ex-post facto research design. 152 subjects were sampled out of 578 population. The research questions were answered using descriptive statistics while the research hypotheses were tested at 0.05 level of significance with the use of Independent t-test statistics as well as analysis of variance and 2-way ANOVA. The result of the finding showed that students who enter the university through direct entry perform higher than their counterparts who enter the university through jamb. Based on the findings of this study, it is recommended that jamb should develop a system of continuous assessment through issuing books on their academic intelligence.

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INTRODUCTION

A country's educational objectives are usually spelt out in its national policy on education, reflect those aspects of the national objectives that are deemed realizable through formal schooling. For more than three decades now, Nigeria has come to realize that the educational institutions in the country have been failing in the performance of their statutory roles. The intellectual attainment as well as the acquired skills of the products of the universities and other educational institutions have been abysmally below expectation (Okpitike, (2001); Ihebuzor, (2007); Frazen, (2003). It is the discouraging state of affairs that gave rise to the phrase "falling standard of education" which has now become a household slogan among Nigerians today. The situation has become so deplorable that a couple of years ago, an international organization in rating the intellectual standard of Nigerian undergraduates intimated that for about one and a half decades to that time, most Nigerian universities had not been producing graduates that are of the world standard (Bulus & Garara, 2007). This assertion was further corroborated by the National University Commission's (NUC) executive secretary in a T.V

programme while justifying the Post-JAMB examination for university bound candidates. The Post-JAMB examination is an innovation to ensure that only good materials are offered university admission since there are doubts on the scores of candidates at JAMB examination (Okoye, 2009).

It was also indicated by the NUC's executive secretary that beginning from the 2006/2007 admission exercise, only first degree holders would be eligible to apply for university admission read certain courses, e.g. in some developed countries medicine, law, engineering which hitherto have been open to senior schools certificate holders (Duro, 2010).

Experience has also shown that people including university lecturers tend to believe that although most of the undergraduates seem intellectually inadequate generally, the education undergraduates in particular seem to be more intellectually sub-standard than the others (Shuiabu, (2004); Ihebuzor, (2007); Okpilike, (2001); Conkline, (2006). This assumption seems justified because of the low cut-off score for education courses in the universities.

Education is universally recognized as one of the instruments for social, political,



scientific and technological development. This is the reason why no society can afford to toy with the education of its citizens as this will result in a snail speed development (Azikiwe, 2000). In the 1960s very few people were seeking for admission into higher institutions and those who were admitted got it through hard work. Any person who found himself/herself there was therefore considered intelligent and academically superior to his/her peers (Erigha, 2001). Although there are basically two modes of entry into Nigerian Universities; that is Universities Matriculation Examination (UME) and Direct Entry (DE), a third mode exists as a way of running away from the Universities Matriculation Examination conducted by Joint Admissions and Matriculation Board, JAMB. Some universities in Nigeria call the third mode Pre-degree Programme (Onuoha, 2005).

There is a conception that the University Matriculation Examination (UME) candidates perform better than the Direct Entry, and Pre-degree candidates in their University Examination. Yet others believe that pre-degree candidates perform better than the UME and Direct Entry candidates in their university examination. Yet another group believes that Direct Entry candidates are superior to both the pre-degree and UME candidates. The people who hold this view argued that the pre-degree and direct entry candidates cannot pass the UME conducted by JAMB, hence they opted for the pre-degree programme or institutions that enable them to get the direct entry requirement (Adekoya, 2006). This belief of people over which mode of entry is better in terms of university performance and retention is different from one group to another, hence this study is included to examine the mode of entry and performance of Kogi State University undergraduate students in mathematics education.

The academic performance of students admitted into the universities in Nigeria has been an issue of great concern to lecturers and all those who are interested in the education industry. There are minimum entry requirement that candidates must possess before they can be admitted into degree programme in the universities. Kogi State University is not an exception. The requirements are met for both the pre-degree, UME and DE candidates. Candidates

are expected to possess NECO/WAEC SSCE or its equivalents with credits in five (5) subjects (including English and mathematics) relevant to their course(s) at no more than one sitting (Adeleke, 2006). It is assumed that all those admitted into the Kogi State University irrespective of the mode of entry will be able to cope with the academic rigours but contrary to this expectations, some drop out on the way without graduating from the university, yet some change their courses and others spend extra year(s) before graduating as can be seen with the extension students and even some end up with pass and third class degrees. This scenario shows that performance may be a function of the mode of entry, hence, the problem of this study is to determine the relationship between the mode of entry and performance of Nigerian undergraduates in our universities, especially Kogi State University.

For a candidate to be admitted into Kogi State University to study any first degree programme, the person must have been subjected to serious academic scrutiny. Such a candidate is expected to have passed Senior Secondary Certificate Examination (SSCE) conducted by the West African Examination Council (WAEC) and/or National Examination Council (NECO) with at least five relevant O-Level subjects with a minimum of credit pass in each subject; must have got the minimum Unified Tertiary Matriculation Examination/Post Unified Tertiary Matriculation Examination (UTME/PUTME) scores as well as other requirements by the department into which the candidate is seeking admission. The UTME/PUTME is used interchangeably with University Matriculation Examination (UME) in the current work. It becomes a point of much concern that in spite of these rigorous screening exercises, many of the students still graduate with bad grades while some come out with good grades. This is despite the relentless efforts made by various stakeholders including the administration of the University to ensure excellent academic performance by fixing the variables that influence it. This suggests that the variations in the academic performances of the graduates of the Institution are predominantly as a result of factors inherent in the students which could have been sorted out during the admission selection process. Consequently, it has become necessary to



investigate the various modes of admission into the mathematics education programme of the university in order to select and admit only those students who are fit for such programmes. Hence, the efficiency of the admission process of a university might have an influence on the academic performance of her graduates. This view is in consonance with the findings of Adeyemi (2009) who embarked on a similar investigation in the University of Ado-Ekiti, Ondo State and came out with a result that the mode of entry significantly predicted the success in degree examinations of the Final Year Bachelor of Education Students. Generally, there are three modes of entry through which a student may gain admission into Bachelor Degree Regular Programmes in universities in Nigeria as specified by the National Universities Commission (NUC). These include admission through Direct Entry, admission through the UTME/PUTME, and admission through the Preliminary Programmes which comprises Certificate Programme, Basic Studies Programme and School of Science Laboratory Technology (SSLT) Programme. The focus of this study is on admissions into the department of mathematics education through UTME/PUTME and Direct Entry. The UTME is developed, organised and administered by the Joint Admission and Matriculation Board (JAMB) that was established to regularize the intake of students into universities to solve the problem of multiple admissions given to some candidates at the expense of others. A candidate must have met the O'Level requirements as well as the JAMB and University Department cut-off points to gain admission into university through this mode. It is customary for JAMB to fix its cut-off point which is still subject to upward review by the University Departments. In the UTME- JAMB, each candidate is required to write examinations in three UTME subjects relevant to the candidate's area of specialization in addition to a forth subject that is compulsory for all candidates to be examined on, the Use of English Language. After this, the successful candidates are subjected to the Post Unified Tertiary Matriculation Examinations (PUTME) which is developed and administered by each university. The PUTME examination is presumed to be a set of

standardized aptitude tests that should predict an individual's ability to study in a particular vocation.

Irtwange and Agbe (2010) conducted a comparative analysis on the academic achievements of UTME and Ex-remedial Students using University of Agriculture, Makurdi as a study area. The findings proved that the Ex-remedial Students had higher, consistent and predictable academic achievements than the University Matriculation Examination (UME) students. Each of these studies cited above is focused on comparing the academic achievements of students admitted through the UTME and direct entry in the department of mathematics education. Sawyer (2000) in support of this view pointed out that direct entry students perform better than jamb students because they were introduced to the techniques of making independent investigations and inquiries which provides these students with opportunities to develop their abilities as these attributes are required for students to excel in the university, they are expected to be more competent scholars than their jamb counterpart.

The study of Omirin (1999), in his study on sex and course of study as predictors of academic performance, where he reported that there is no significant difference in the performance between male and female students with the same entry qualification. Also, the study of Mari and Tongding (2010) on the comparisons of academic performance of undergraduate Biology students admitted into university with different entry qualification showed that there is no significant difference on gender with entry mode. The findings of Mari and Tongding (2010) on comparisons of academic performance of undergraduate students admitted into the university with different entry qualification, the study of Ugwanyi (2008) in a research in which he admitted the effect of entry qualification on students' academic achievement. He observed that entry qualification did not exert much influence on the students' academic achievement.

METHODOLOGY

This research employed the use of expos facto design, the design is suitable for this study as the study source to examine the effect of entry mode on the academic performance and retention of mathematics education students in



which the data that was already on ground were used without any manipulations. The entry scores and the final cumulative grade point averages (CGPA) of the students were used. The Population of the study comprises of 6 academic sessions with a total population of 578 which was 394 male and 154 female. A probability random sampling technique was used to select three sessions with the use of balloting. The sampled academic sessions comprises of 152 students with 122 male and 30 female which Comprises of 137 Jamb entry and 15 direct entry.

The major research instrument that was used in this study is the student's entry details and final results. Students' information were collected via a checklist in the department of mathematics education. The file of students contains their entry scores in their JAMB or Direct entry. The cumulative grade point average of students at graduation that secured admission through Jamb were compared to the ones through direct entry. The exam officers in the department of science education provided the researchers with the CGPA of the mathematics education students at graduation.

The statistics used in this research work is the descriptive mean statistics to answer the research questions while independent t-test, analysis of covariance and one way analysis of variance to test the null hypotheses. To correlate score of Jamb and Direct entry, the scores were transformed into ordinal scale. The scores in Jamb was transformed as follows; 70 to 100 =A (5), 60 to 69 = B (4), 50 to 59 = C (3), 45 to 49 =B (2), 40 to 44 = E (1), 0 to 39 = F (0). All the scores in the four subjects is added and divided by 4 i.e. a student who score four A in the four subject $=5+5+5+5=20/4=5$. The Direct entry scores is already in ordinal scale, A, B, C, D, E, and is also assigned Numbers 5, 4, 3, 2, 1 respectively. The average of the transformed scores were absorbed as done with Jamb scores. Thus, the students CGPA is correlated with the students' average transformed scores in direct entry and also with Jamb scores.

RESULTS AND DISCUSSION

Question One: Will the mode of entry to the University influences the undergraduate students' performance and retention?

Table 1: Descriptive Mean Statistics on Difference in the Performance and Retention of Mathematics Education Students Who Entered the University through Direct Entry and Those through Jamb

Variable	Entry Mode	N	Mean	STD	mean difference	Remarks
Mean Performance	JAMB	137	2.135	0.438	1.431	Differences exist. Direct mode has higher mean performance than JAMB mode of entry
	DIRECT ENTRY	15	3.566	0.319		

The outcome of the descriptive mean statistics showed that difference exist in the performance and retention of mathematics education students who entered the University through direct entry and those through JAMB. Their computed mean performances are 2.1350 and 3.5667 by students who entered the University through direct entry and those through JAMB. This shows that both students who entered

the university through DE had significantly higher performance than their counterparts who entered the university through JAMB.

Question Two: What is the difference in the performance between male and female students who entered the University through JAMB and those through direct entry?



Table 2: Descriptive Statistics on Difference in the Performance between Male and Female Students Who Entered the University through Jamb and Those through Direct Entry Dependent Variable: CGPA_SCORE

Entry Mode	GENDER	N	Mean	Std. Deviation	Remarks
JAMB	MALE	110	2.125	0.432	There is no difference between male and female either through Direct or Jamb
	FEMALE	27	2.176	0.469	
	Total	137	2.135	0.438	
DIRECT ENTRY	MALE	12	3.521	0.291	Mode of entry in their mean performance
	FEMALE	3	3.750	0.433	
	Total	15	3.567	0.320	
Total	MALE	122	2.262	0.592	
	FEMALE	30	2.333	0.664	
	Total	152	2.276	0.605	

Results of the descriptive statistics showed that there is no remarkable difference in the performance between male and female students who entered the University through JAMB and those through direct entry. The descriptive statistics above showed that among those who entered through JAMB the male and female student's performances are 2.1250 and 2.1759 respectively with no pronounced

difference. In the same vein, among those who entered through direct entry the male and female students performances are 3.520 and 3.750 respectively with no pronounced difference.

Question three: what is the difference among the JAMB admitted students in their mean performance over the period under study?

Table 3: Descriptive statistics on difference among the JAMB admitted students of their mean performance over the years under study

	N	Mean	Std. Deviation	Std. Error
Session A	40	2.075	0.424	0.067
Session B	39	2.154	0.489	0.078
Session C	58	2.164	0.415	0.055
Total	137	2.135	0.438	0.037

Results of the descriptive statistics showed that among the students who entered the university with JAMB, there is no difference in their performance within the period under considerations. The descriptive statistics showed that the JAMB students mean performance were 2.075, 2.154 and 2.164 for A, B, and C sessions

respectively. This shows that the performance of the JAMB students have been the same over the Period under study.

Question Four: What is the difference among the direct entry admitted students in their mean performance over the period under study?

Table 4: Descriptive Statistics on the Difference among the Direct Entry Admitted Students in Their Mean Performance over the Period under Study

	N	Mean	Std. Deviation	Std. Error
session A	9	3.4722	.26352	.08784
session B	5	3.8000	.32596	.14577
session C	1	3.2500	0.00.	0.00
Total	15	3.5667	.31997	.08262

Results of the descriptive statistics showed that among the students who entered the university with direct entry there is no difference in their performance within the period under considerations. The descriptive statistics showed that the JAMB students mean performance were 3.4722, 3.800 and 3.250 for A, B, and C sessions respectively. This shows that the performance of

the JAMB students have been the same over the Period under study.

Hypotheses Testing:

H₀¹: There is no significant difference in the performance and retention of mathematics education students who entered the University through direct entry and those through JAMB.

Table 5: Independent t test statistics on difference in the performance and retention of mathematics education students who entered the University through direct entry and those through JAMB

Variable	Mode of Entry	N	Mean	STD	mean difference	Df	t-cal	t critical	P
Mean Performance	JAMB	137	2.1350	0.438	1.431	150	12.281	1.96	0.000
	DIRECT ENTRY	15	3.5667	0.319					

$p < 0.05$, $t_{calculated} > t_{critical}$ at $df\ 150$

The outcome of the Independent t test above showed that significant difference exist in the performance and retention of mathematics education students who entered the University through direct entry and those through JAMB. This is because the p value of 0.000 is lower than the 0.05 alpha level of significance and the t calculated value of 12.281 is greater than the 1.96 t critical value at df 150. Their computed mean performances are 2.1350 and 3.5667 by students who entered the University through direct entry and those through JAMB.

This shows that students who entered the university through direct entry had significantly

higher performance than their counterparts who entered the university through JAMB. Therefore, the null hypothesis which states that, there is no significant difference in the performance and retention of mathematics education students, who entered the University through direct entry and those through JAMB, is hereby rejected.

H₀²: There is no significant difference in the performance between male and female Students who entered the University through JAMB and those through direct entry.

Table 6: Analysis Of Covariance (2 –Way Analysis) On Difference in the Performance between Male and Female Students Who Entered the University through Jamb and Those through Direct Entry

Dependent Variable: CGPA SCORE					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	27.892 ^a	3	9.297	50.259	.000
Intercept	289.341	1	289.341	1564.128	.000
MODE	19.059	1	19.059	103.029	.000
GENDER	.170	1	.170	.916	.340
MODE * GENDER	.069	1	.069	.371	.543
Error	27.378	148	.185		
Total	842.875	152			
Corrected Total	55.270	151			

a. R Squared = .505 (Adjusted R Squared = .495)

Results of the 2 – way analysis of variance (ANCOVA) statistics showed that there is no significant difference in the performance between male and female students who entered the University through JAMB and male and female who entered through direct entry. Reasons being that on the table, at the mode of entry versus gender computation the calculated p value of 0.543 is above the 0.05 alpha level of significance and the computed F value of 0.371 is lower than the F critical value of 2.600. This shows that irrespective of gender status the academic

performance of those who entered through direct entry or JAMB is the same. Therefore the null hypothesis which states that there will be no significant difference in the performance between male and female students who entered the University through JAMB and those through direct entry, is hereby accepted and retained.

H₀³: the null hypothesis state that there is no significant difference among the JAMB admitted students in their mean performance over the period of years under study.

Table 7: One Way Analysis Of Variance (ANOVA) Statistics on Difference among the Jamb Admitted Students of Their Mean Performance over the Years under Study

ANOVA CGPA SCORE					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.206	2	.103	.532	.588
Within Groups	25.921	134	.193		
Total	26.127	136			

Results of the analysis of variance showed that among the students who entered the university with JAMB, there is no significant difference in their performance within the three years under considerations reason being that the calculated p value of 0.588 is higher than the 0.05 and the computed F value of 0.532 is lower than the 3.000 F critical value at df 2, 134. Therefore the null hypothesis which state that there is no

significant difference in the performance of JAMB students in their performance in the three sessions under study is hereby accepted and retained

H₀⁴: The null hypothesis state that there is no significant difference among the direct entry admitted students of their mean performance over the period of years under study

Table 8: One Way Analysis Of Variance (ANOVA) Statistics on Difference among the Direct Admitted Students That Their Mean Performance Over the Here Years under Study

ANOVA CGPA SCORE					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.453	2	.226	2.771	.103
Within Groups	.981	12	.082		
Total	1.433	14			

Results of the analysis of variance showed that among the students who entered the university through DIRECT entry, there is no significant difference in their performance within the session under considerations. Reason being that the calculated p value of 0.103 is higher than the 0.05 and the computed F value of 2.771 is lower than the 3.000 F critical value at df 2, 12. Therefore the null hypothesis which state that

there is no significant difference in the performance of direct entry students in their performance in the period under study is hereby accepted and retained

DISCUSSION OF FINDINGS

Significant difference exists in the performance and retention of mathematics education students who entered the University



through direct entry and those through JAMB as shown in table 5. Their computed mean performances are 2.1350 and 3.5667 by students who entered the University through direct entry and those through JAMB. This shows that students who entered the university through direct entry had significantly higher performance than their counterparts who entered the university through JAMB. This findings supported the findings of Mari and Tongding (2010) on the comparisons of academic performance of undergraduate Biology students admitted into the university with different entry qualification. It also agrees with work of Irtwange and Agbe (2010) on Comparative Analysis of Academic Achievement of UME and Ex-remedial Students, Adeyemi (2009) on Mode of Entry as a Predictor of Success in Final Year Bachelor of Education Degree Examinations in Universities, Drummond (2009) on investigating the impact of entry qualification on student performance in computing programmes at undergraduate level and Okonkwo (2011) on relative performance of students admitted into university through UTME/PUTME and pre-degree programmes in Nigeria.

This study also supported the work of Gilbert (2001) who reported direct entry students perform better than jamb students. Also, the findings of Ugwanyi (2008) who observed that the difference in performance between direct entry and jamb may be attributed to the fact that direct entry curriculum provides those who passed through it with opportunity to have foreknowledge of what they will learn in their early years in the university and enabled them to have less adjustment problems and learning difficulties in the universities compared to those who passed through jamb. Sawyer (2000) in support of this view pointed out that direct entry students perform better than jamb students because they were introduced to the techniques of making independent investigations and inquiries which provides these students with opportunities to develop their abilities as these attributes are required for students to excel in the university, they are expected to be more competent scholars than their jamb counterpart.

There is no significant difference in the performance between male and female students who entered the University through JAMB and

those male and female who entered through direct entry. The descriptive statistics above (table 6) showed that among those who entered through JAMB the male and female student's performances are 2.1250 and 21.1759 respectively with no significant difference. Among those who entered through direct entry the male and female student's performances are 3.520 and 3.750 respectively with no significant difference (table 6). This findings agrees with the study of Omirin (1999) in his study on sex and course of study as predictors of academic performance, where he reported that there is no significant difference in the performance between male and female students with the same entry qualification. Also, the study of Mari and Tongding (2010) on the comparisons of academic performance of undergraduate Biology students admitted into university with different entry qualification showed that there is no significant difference on gender with entry mode.

Among the students who entered the university with JAMB, there is no significant difference in their performance within the periods under considerations (A, B, and C). The descriptive statistics showed that the JAMB students mean performance were 2.075, 2.153 and 2.163 in the sessions A, B and C respectively (table 7). This shows that the performance of the JAMB students have been the same over the period under study.

Among the students who entered the university through direct entry, there is no significant difference in their performance within the period under considerations (A, B and C) the descriptive statistics showed that the direct entry students mean performance were 3.472, 3.800 and 3.250 in the years A, B and C respectively (table 8). This shows that the performance of the direct entry students have been the same over the period under study. This findings agrees with the findings of Mari and Tongding (2010) on comparisons of academic performance of undergraduate students admitted into the university with different entry qualification, the study of Ugwanyi (2008) in a research in which he admitted the effect of entry qualification on students' academic achievement. He observed that entry qualification did not exert much influence on the students' academic achievement.



CONCLUSION

In conclusion, both male and female students who entered the Kogi State University, through direct entry mode had significantly higher mean CGPA mean performance than their counterparts who entered through JAMB within the period of A, B and C under review. On the basis of the outcome of the study, the researchers made the following recommendations

The results showed that direct entry students had significantly higher CGPA performance than JAMB. Therefore it is candidly suggested that JAMB should develop a system of continuous assessment through issuing books on their syllabus many months before the intending candidates as this will boost and sustain their academic intelligence. The mean academic performance for all the period under review has been the same without any remarkable difference for both male and female. therefore the researcher suggest that more innovations such as upward review of curriculum, provision of modern teaching instructional and infrastructural facilities that will significantly improve and enhance the student's academic performance, hence fort.

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