THE INFLUENCE OF INSTITUTIONS, DISCIPLINE AND NUMBER OF SITTINGS (TO ATTAIN MINIMUM ENTRY CREDITS) ON THE DEGREE OF PREDICTION OF FIRST YEAR GRADE POINT AVERAGE (FGPA) BY UNIVERSITIES MATRICULATION EXAMINATION (UME)

BY

PROF. 'DIBU OJERINDE & FRANCIS OJO

JOINT ADMISSIONS AND MATRICULATION BOARD (JAMB), ABUJA, NIGERIA.

BEING A PAPER PRESENTED AT THE 35TH IAEA CONFERENCE, BRISBANE, AUSTRALIA.

13-18 SEPTEMBER, 2009

Abstract

The mandate given to the Joint Admissions and Matriculation Board (JAMB) empowers it to conduct selection examinations for placement of candidates into all Universities and Degree-awarding institutions in Nigeria. Since the scores of the Universities Matriculation Examination (UME) which the Board conducts annually form the major tool in the admission process, the expectation is that, those who perform well in the UME will invariably perform well in the chosen field of interest in the universities and degree awarding institutions. However, research findings have proved that the prediction of a student's performance in first year university education may be influenced by factors such as year of examination, discipline, institution, gender, number of sittings to acquire the minimum entry credits into Nigerian universities and degree awarding institutions. All candidates admitted into Nigerian universities through UME conducted in 1998, 1999, 2000 constituted the population of this study. Hierarchical Multiple Regression Analysis was used.

The result of the study shows that the relationship between UME and FGPA varies with the institution, discipline of interest and number of sittings to obtain minimum entry requirements.

1.0 Introduction

Decree No. 2 of 1978 provides the legal backing for the Joint Admissions and Matriculation Board (JAMB) in Nigeria among others; to:

i. conduct Matriculation Examination for entry into all degree awarding institutions in Nigeria and
ii. place suitably qualified candidates in the available places in the institutions.

The essence of this mandate was to solve the triple problems of Multiple Applications, Multiple Examinations and Multiple Admissions as well as address the urgent question of national unity.

Since the UME scores form the major tool in the admission process, the burden is on the score provider to obtain evidence that there is a relationship between score and the outcome of interest to the admitting institutions – which is usually success in the field of interest.

Inherent in these responsibilities is the concept of predictive validity of the Board examination. Basically, the expectation is that, candidates who were successful in the Board's selection examination and got admitted should perform to expectation in the universities. In addition, being a selection examination, JAMB is always concerned with the extent to which Universities Matriculation Examination (UME) can predict performance of candidate at the University.

Research Questions

There are three Research Questions, they are:

Question 1: Is the degree of prediction of FGPA by UME scores influenced by institution?

Question 2: Is the degree of prediction of FGPA by UME scores influenced by the type of discipline?

Question 3: Is the degree of prediction of FGPA by UME scores influenced by the number of sittings to acquire five credits at the SSCE?

Methodology

The Sample

The population for this study comprised all the candidates admitted into Nigerian universities through the UME conducted in 1998, 1999 and 2000. The study focused only on the federal universities whose information can be used to generalize to other universities.

In deciding the universities, considerations were given to existence of the:

i. university before/during the years under review and
ii. identified faculties in the universities where data was to be collected.

Six (6) universities, Bayero University, Kano; Nnamdi Azikiwe University, Awka; University of Ibadan, Ibadan; University of Lagos, Lagos; University of Nigeria, Nsukka and University of Ilorin, Ilorin met the above conditions.

In line with the 40:60 Arts to Science ratio in Nigeria, two (2) faculties were taken from the Arts. These were Arts/Humanities and Law while (3) three faculties were taken from the Sciences these were Engineering, Medical Science and Sciences.

In order to gather sufficient useable data for the study, information on fifty percent (50%) of the students in all the departments in each faculty were gathered. However, where a

department admitted less than 500 students, information was sourced from the total number of students in that department.

The Instrument

A proforma which elicited information such as: candidate's first year grade point average (FGPA) and performance at Secondary School Certificate Examination (SSCE). Others were, the academic year candidate took the UME; name of the institution where data was to be collected; sex of the candidates. Information on number of sittings at 'O' level before meeting the 'O' level requirement.

Definition of Terms

First Year Grade Point Average (FGPA)

FGPA is the final grade obtained by a student at the end of first year of study at the university and is the criterion variable against which the predictive ability of UME and SSCE can be determined.

Performance in SSCE

Senior Secondary Certificate Examination (SSCE) is the examination conducted by the West African Examination Council (WAEC) and or the National Examination Council (NECO) for the purpose of certifying final year students of secondary education. Equivalents of these examinations are the GCE O/level conducted by same bodies

The grades obtained in these national examinations are the equivalents of the High School Grade Point Averages (HSGPA) awarded to final year students of high school in some countries like USA.

UME

Universities Matriculation Examination (UME) is a selection examination for intending candidates into Nigerian Universities and degree awarding institutions. The scores of candidates in UME are used as a criterion with others to determine eligibility of candidates.

Number of Sittings to acquire 5 O' level credits

To be eligible for registration at the university in Nigeria, each candidate is expected to obtain a credit in at least five (5) subjects relevant to the course of interest. The minimum of 5 'O' level credits must be obtained in one or two sittings.

Analytical Procedure

The SSCE as a variable is measured to determine whether candidates have credits in this examination and whether they performed well in UME and their first year university education. The SSCE was measured by converting the five (5) best SSCE credits relevant to the course of study into a scale where AI = 9pts; A2/B2 = 8pts; A3/B3 = 7pts; C4 = 6pts; C5 = pts; C6= P7/D7 = 3 pts; P8/E8 = 2pts; F9 = 1pt. This is labeled as SSAGG. Also, scores obtained by students in the UME were aggregated to form the UAGG.

Statistical Tools Employed in Answering the Questions Raised

In order to determine the degree of prediction of FGPA by UME scores as influenced by the institution, discipline and number of sittings to acquire the five (5) SSCE credits, hierarchical multiple regression technique was adopted. In addition, the use of dummy variables was introduced into the multiple regression to determine the influence of institution, discipline and number of sittings on the relationship between FGPA and UME.

The contribution of each variable introduced was assessed by adding corresponding set of dummy variables and their interactions to the regression of FGPA and UME scores and noting the change in R^2 values.

Results

Description of the Study Sample

Table 1: Number of Students in each cohort and University

Inst/Year	Bayero	Ibadan	Ilorin	Unilag	NAU	UNN	Total
1998	48	891	335	1115	170	670	3429
1999	250	60	385	1189	331	434	2650
2000	360	444	468	880	376	455	2983
Total	658	1395	1189	2304	877	1759	9062

Table 2: Means and Standard Deviations for UME Scores in each cohort in each cohort

UME/Year	N	Min.	Max.	Mean	Std. Dev.
1998	3354	129	286	232.58	22.89
1999	2630	107	336	225.22	23.22
2000	2931	109	311	212.20	33.87

Table 3: Means and Standard Deviations for SSCE grades

SSCE/Year	N	Min. Score	Max. Score	Mean	Std. Dev.
1998	3389	15	45	27.28	4.53
1999	2673	15	45	26.87	4.84
2000	2945	15	45	28.64	5.64

Fa= 1, m=5, max = 9x5 = 45

Table 4: Means and Standard Deviations for FGPA in each cohort

FGPA/Year	N	Min. Score	Max. Score	Mean	Std. Dev.
1998	3003	0.05	5.00	2.56	0.86
1999	2663	0.02	5.00	2.60	0.97
2000	2541	0.06	5.00	2.61	1.05

INFLUENCE OF INSTITUTION ON THE RELATIONSHIP BETWEEN UME SCORES AND FGPA

Question 1: Is the degree of prediction of FGPA by UME scores influenced by institution?

In coding the dummy variable, UNN was used as reference institution.

Table 5a: Coefficients from the Hierarchical Multiple Regression Correlation Analysis between FGPA, UME Scores and Institution.

Variables	Cum R	Cum R^2	F	Df	R^2 Change
UME	0.168	0.028**	223.01	1,7669	
UME + Institution	0.337	0.114**	163.60	6,7657	0.086**
UME + Institution+UME * Institution	0.385	0.148**	120.96	11,7652	0.034**

Resulting prediction equation is

FGPA = 3.210 - 0.005144UME – 3.687I_1 + 2.995I_2 – 1.065I_3 – 0.879I_4 – 3.108I_5 + 0.01509UME *I_1 – 0.0139UME *I_2 + 0.002128UME *I_3 + 0.002559UME *I_4 + 0.0168UME *I_5

Table 5b: Regression Analysis Results of FGPA on UME Scores for each institution

	R	R^2	F	Confi Interval	d.f	Beta	Unstandardized Coeff. (Interaction)
Bayero	0.384	0.148	95.355*	(0.011, 0.016)	1,550	-0.477	0.013546
Ibadan	0.320	0.102	111.682*	(-0.018, -0.012)	1,982	6.205	-0.015234
Ilorin	0.021	0.000	0.481	(-0.001, 0.002)	1,1055	2.144	0.005833
Lagos	0.024	0.001	1.783	(0.000, 0.003)	1,3031	2.330	0.001014
NAU	0.441	0.195	89.368*	(0.011, 0.018)	1,361	0.102	0.014536
UNN	0.042	0.002	2.944	(-0.003, 0.000)	1,1673	3.210	-0.001544

- $p<0.05$

The values in brackets represent 95% Confidence Interval.

Prediction equations of FGPA on UME scores by Institution

FGPA (Bayero) = -0.477 + 0.013546UME

FGPA (Ibadan) = 6.205 -0.015234UME

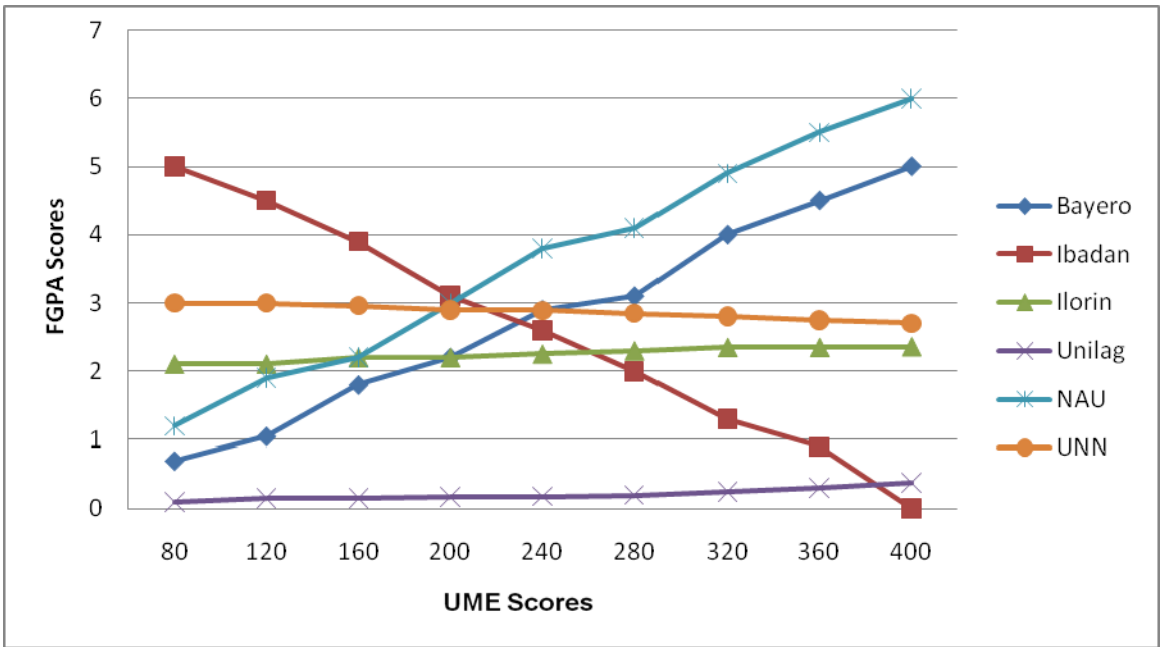
FGPA (Ilorin) = 2.144 +0.005833UME

FGPA (Unilag) = 2.330 + 0.001014UME

FGPA (NAU) = 0.102 + 0.014536UME

FGPA (UNN) = 3.210 -0.001544UME

Fig 1: Plot of the Prediction Equations of FGPA on UME Scores by Institution



INFLUENCE OF DISCIPLINE ON THE RELATIONSHIP BETWEEN UME SCORES AND FGPA

Question 2: Is the degree of prediction of FGPA by UME scores influenced by the type of discipline?

In coding the dummy variable, science was used as the reference discipline.

Table 6a: Coefficients from the Hierarchical Multiple Regression Correlation Analysis between FGPA, UME Scores and Discipline

Variables	Cum R	Cum R^2	F	df	R^2 Change
UME	0.168	0.028	220.92	1,7669	
UME + Discipline	0.224	0.050	54.12	5,7664	0.022
UME + Discipline+ UME* Discipline	0.249	0.062	33.63	9,7660	0.012

Resulting prediction equation is

$FGPA = 1.357 + 0.00476UME + 0.756D_1 - 0.769D_2 + 1.860D_3 – 0.0313D_4 – 0.002891UME*D_1 + 0.004059UME*D_2 – 0.07192UME*D_3 + .002017UME*D_4$.

Table 6b: Regression Analyses Result of FGPA on UME Scores for each Discipline

	R	R^2	F	Confi Interval	d.f	Beta	Unstandardized Coeff. (Interaction)
Bayero	0.384	0.148	95.355*	(0.011, 0.016)	1,550	-0.477	0.013546
Ibadan	0.320	0.102	111.682*	(-0.018, -0.012)	1,982	6.205	-0.015234
Ilorin	0.021	0.000	0.481	(-0.001, 0.002)	1,1055	2.144	0.005833
Lagos	0.024	0.001	1.783	(0.000, 0.003)	1,3031	2.330	0.001014
NAU	0.441	0.195	89.368*	(0.011, 0.018)	1,361	0.102	0.014536
UNN	0.042	0.002	2.944	(-0.003, 0.000)	1,1673	3.210	-0.001544

- $p<0.05$

The values in brackets represent 95% Confidence Interval.

Prediction equations of FGPA on UME scores by Disciplines

FGPA (Arts/Humanities) = 2.113 + 0.001873UME

FGPA (Engineering) = 0.558 + 0.008823UME

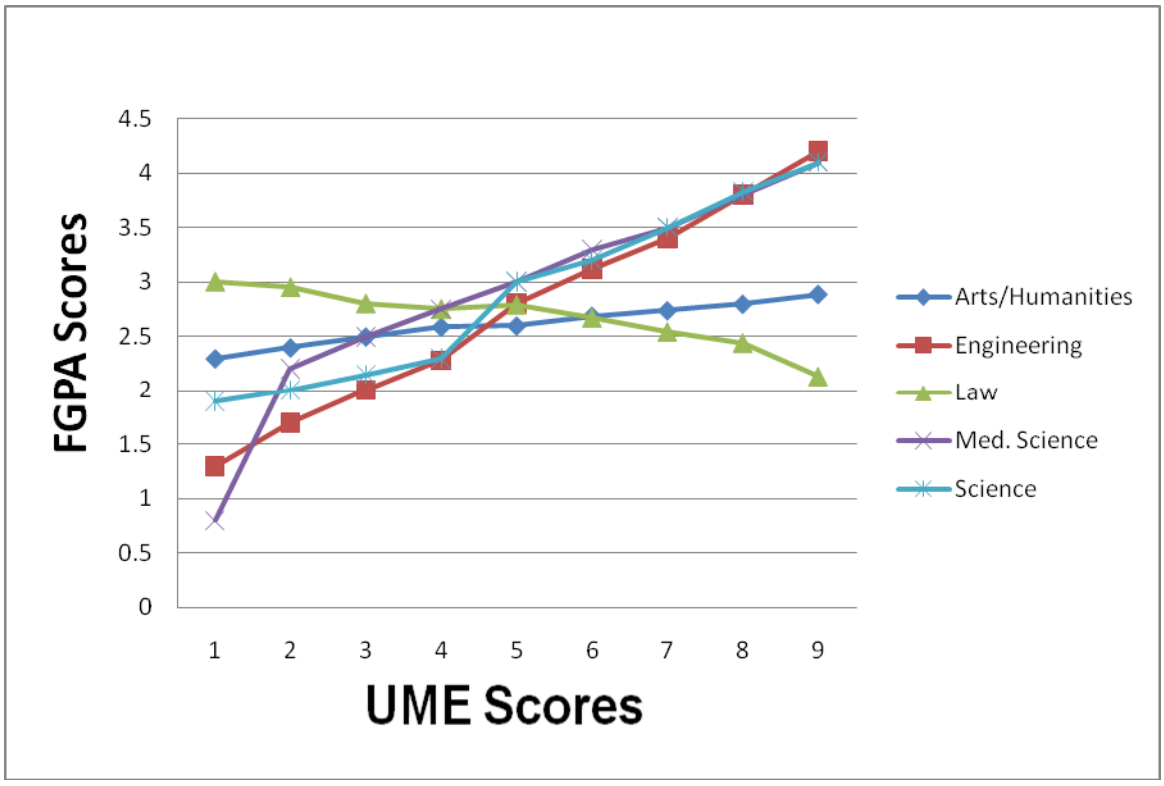
FGPA (Law) = 3.217 - 0.002432UME

FGPA (Medical Sciences) = 1.326 + 0.006781UME

FGPA (Sciences) = 1.357 + 0.004764UME

As can be seen from Table 6b, the unique contribution of UME by discipline to variance in FGPA is significant. This implies that the relationship between UME and FGPA varies with the discipline of interest.

Fig 2: Plot of the Prediction Equation of FGPA on UME Scores by Discipline



INFLUENCE OF NUMBER OF SITTINGS ON THE RELATIONSHIP BETWEEN UME SCORES AND FGPA

Question 3: Is the degree of prediction of FGPA by UME scores influenced by the number of sittings to acquire five credits at the SSCE?

In coding the dummy variables, NST_2 was used as reference number of sittings.

Table 7a: Coefficients from the Hierarchical Multiple Regression Correlation Analysis between FGPA, UME Scores and Number of Sittings

Variables	**Cum R**	**Cum R^2**	**F**	**df**	**R^2 Change**
UME	0.168	0.028	220.920	1,7669	
UME + Nsit	0.182	0.033**	130.245	1,7643	0.005*
UME + Nsit + UME * Nsit	0.199	0.039**	104.661	2,7642	0.006*

**p<0.01

The resulting prediction equation is

FGPA = 2.335 + 0.000728UME -1.298$Nsit_1$ + 0.006389UME*$Nsit_2$

Table 7b: Regression Analysis Results of FGPA on UME Scores for Number of Sitting

No of Sittings	**R**	**R^2**	**F**	**Confi Interval**	**D.f**	**Beta**	**Unstandardized Coeff. (Interaction)**
One	0.214	0.046	266.442*	(0.006, 0.0008)	1,5531	1.038	0.007105
Two	0.022	0.000	0.989	(-0.001, 0.002)	1,2102	2.335	0.0007271

- p<0.01

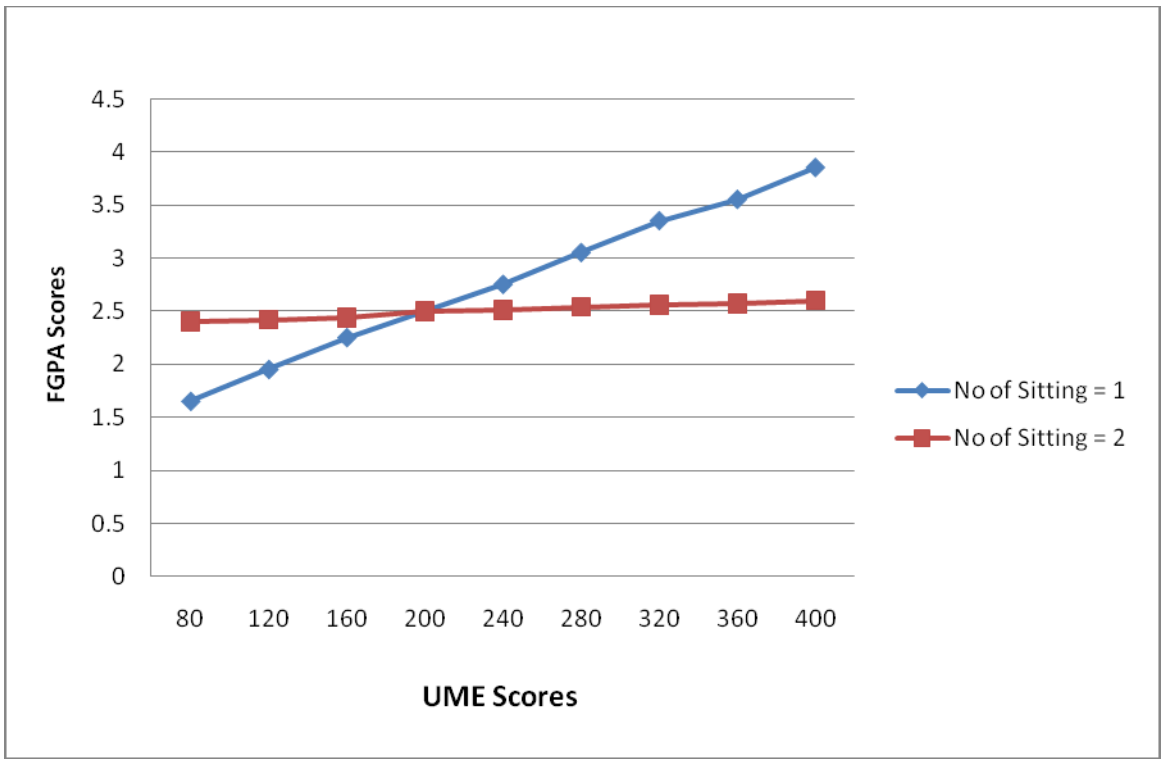
The values in brackets represent 95% Confidence Interval.

Prediction equation of the FGPA on UME Scores by Number of Sittings

FGPA (Number of Sitting = 1) = 1.038 + 0.0007105UME

FGPA (Number of Sitting = 2) = 2.335 + 0.007271UME

Fig 3: Plot of the Prediction Equations of FGPA on UME Scores on Number of Sittings



The unique contribution of the interaction variable (UME scores x number of sittings) is statistically significant (R^2 Change = 0.005; $F_{2, 7642}$ = 40.010; $p<0.01$).

This suggests that the predictive ability of UME scores for FGPA is depended on the number of times the candidate sits for SSCE before attaining the required credits to qualify for admission.

Fig 3 further shows that obtaining the five credits at one sitting is more likely to lead to higher prediction of FGPA than obtaining the five credits in more than one sitting.

Discussion of Result

The influence of institution on the degree of prediction of FGPA by UME scores

The degree of prediction of FGPA by UME depends on the institution. The result showed that higher degree of prediction was found in NAU and BUK. However, inverse relationship exists between students' scores in UME and their FGPA in University of Ibadan and UNN while minimal degrees of prediction exist at Unilag and Ilorin.

The findings tend to agree with the observations of Gracia (1998) that predictive validity has been seen to vary considerably between Colleges and different groups of student. This, he attributed to probable statistical reasons and ability of students to adjust to college life. Cronbach (1971) in his view observed that these differences could be as a result of different schools emphasizing different abilities in teaching and grading.

Influence of types of discipline on the degree of prediction of FGPA by UME scores.

The predictive ability of UME appears conditional i.e., it depends on the respective discipline of study. An inverse relationship was found to exist in the faculty of law. The predictability of UME was best in Medicine, followed by Engineering and then Sciences. Arts/Humanities faculty had the least ability to predict FGPA.

The result shows that science courses had their UME scores predicting FGPA better than the Arts-related courses. This observation confirms the findings of Williams (1950) and Kelsal (1963) who also found that prediction in science subjects was better than in the Arts.

This difference in predictive ability of UME due to discipline points to an absence of commonality of focus and developmental processes for the individual tests that constitute UME. There should be equivalent in certain essential properties of the test. It is therefore worrisome for this difference since the tests are supposed to serve the same function, which is; being an instrument for selection into universities.

Influence in the number of sittings to obtain 5 credits at SSCE on the degree of prediction of FGPA by UME scores

The findings of this study is that the number of times a candidate sits for SSCE before obtaining the required 5 credits for registration in the university appears to influence how well UME predicts performance at first year of university education. It can be deduced from the result that passing the SSCE in one sitting is an indicator for a good performance in the first year of university education.

This may point to the fact that the SSCE although a certification examination, may as well be a test of general ability. Secondly, since it takes more years for those who sit more than once to obtain admission, it is possible that over these years decay in knowledge would have set in.