PREDICTIVE VALIDITY OF PRE-UNIVERSITY EXAMINATIONS TEST SCORES FOR UNIVERSITY SCIENCE UNDERGRADUATES' ACADEMIC ACHIEVEMENT IN SOUTH WEST, NIGERIA

By

GBORE, L.O

Department of Guidance and Counseling, Adekunle Ajasin University, Akungba, Akoko, Ondo State, Nigeria.

ABSTRACT

This study examined the predictive validity of pre-university examinations test scores (university matriculation examination (UME), Post-UME and pre-degree) for undergraduate academic achievement. The study is planned along the lines of correlational and ex-post-facto research design. A sample of four hundred university science based undergraduates admitted 2006/2007 session which was made up of 100students selected from each of the four purposively selected universities from south west Nigeria using stratified sampling technique Participated in the study. An inventory titled "mode of entry characteristics and academic achievement proforma" was used to collect data from records. The data were subjected to Pearson Product Moment Correlation and multiple regression (Backward solution) analysis. Result reveled that as much as 17.1% of the variations in CGPA is explained by the linear combination of three predictor variables, while pre-degree scores indicated significant contribution to the prediction, UME showed negative contribution to the prediction. The result also showed that significant relationship exists between the independent variables (Pre degree, Post UME scores) and CGPA while there was low relationship between UME and CGPA. Based on the findings of the study, there is need to further strengthen and uphold the pre-degree programme and post-UME tests for continuous utilization as means of recruiting viable candidates for university admission purpose.

Keywords: Predictive Validity, UME, Post-UME, Pre-Degree, Test Scores, Academic Achievement, University Science undergraduate, Admission.

INTRODUCTION

In Nigeria, before the establishment of Joint Admission and Matriculation Board (JAMB) in 1978 by the Federal Government of Nigeria, the available few universities in Nigeria were responsible for the processes of assessing and selecting its candidates for admission into the various degree programmes approved by the authority of each university. Then, candidates seeking admission into the universities had to apply to the few available universities. By this procedure, candidates could apply to all the universities. By implication a candidate wastes a lot of money paying for all forms obtained while seeking for admission into these few universities. Coupled with this problem of paying for multiple entrance examination forms into these universities is the fact that a candidate who had multiple admissions would deny other people the opportunity of placement or admission into the universities where the individual candidate was offered admission but had chosen not to honour the other admissions simply because the candidate has gone to honour the admission granted him or her in another university. This attitude frequently creates vacant spaces which some universities whose admission have been turned down might not be able to fill leading to a short-fall in the admission quota of such universities.

Based on these problems and as the number of universities was increasing, it become clear and imperative to the Federal Government of Nigeria that there is necessity for centralization of admission processes into Nigeria universities. According to Oluwatayo (2003) JAMB was established in 1978 and saddled with the responsibility of conducting entrance examinations into tertiary institutions

in Nigeria and placing suitably qualified candidates into the available tertiary institutions. JAMB, like other examination bodies in Nigeria such as West African Examination Council (WAEC), National Examination Council (NECO), National Business and Technical Examination Board (NABTEB) and National Teachers Institute (NTI) has been subjected to a lot of criticism on issues of Examination Malpractices and cancellations of results. For instance, Deji-Folutile (2004) gave an epitome of JAMB consistency in cancelling candidates' results due to examination malpractices by arguing that JAMB cancelled the results of 58, 121 candidates in 2004, and another 111,969 results in 2003 while in 2002 another 116,990 candidates' results out of 1.039 million results were cancelled. Also, Jemibewon (1997) accused JAMB of depriving the various universities the power to control the number and quality of the candidates that should be admitted into the universities because the conduct of the qualifying examination is by JAMB. All these corroborate the assertion of Ekojo,Igbo and Ekojo (2006) that member of the society kept their watchful eyes on Jamb and its activities seriosly.

As a result of the doubt placed on JAMB test scores by many Nigerian due to fraud in examination on the part of many of the candidates, several researchers (Obioma and Salau, 2007; Salahdeen and Murtala, 2005; Yoloye, 1982 and Nwana, (1981) had differently carried out studies of JAMB university matriculation examination (UME) scores for academic performance and found out that the predictive validity of UME scores in many universities had consistently showed very low reliability coefficients between the UME scores and the first year and second year university examination scores. Also, Oluwatayo (2003) argued that there is no significant relationship between UME scores and core science subjects such as biology, chemistry, physics and mathematics at the university undergraduate examinations.

Many universities in Nigeria, due to the failure of JAMB, have sorted opportunities to amend the inadequacies and inability of JAMB to curtail the excessive and persistent cheating behaviours of the candidates in examination to make up for the short fall in their admission quota created by JAMB punitive measures and the government admission policy of ratio 60 percent science based courses to 40 percent humanities based courses hence the universities adopted post UME screening test to screen out unqualified candidates and to ascertain the genuiness of JAMB UME scores. In attempt to bring quality into the issue of admission, Oluwatayo (2003) argued that there is no significant relationship between UME scores and each of the scores of the science subjects in the university undergraduate examinations. In support of Oluwatayo (2003), Okoye (2010) argued that there is a low and negative relationship between UME scores and post-UME scores. By implication, the high UME scores are at variance with Post-UME scores. This signalled that placing any repose or confidence on UME scores may mislead administrators when taking decisions about admission of candidates. Consequent upon this, some universities also embarked upon self-tutored pre-degree trained candidates to fill up the vacancies which some universities could hardly filled up by total dependence on the university matriculation examination. Oluwatayo (2003) gave credence to this action from the universities by claiming that significant relationship exists between pre-degree scores and university undergraduates' examination scores in chemistry, physics and biology.

Literature have shown that studies on prediction are carried out for different purposes. According to Thorndike and Hagen (1977), some studies are geared towards test development, in which case, the test developers try to test the predictive validity of their newly developed test items. In some other studies, according to Belcastro (1975), and Bridgeman, Mc Camley-Jenkins and Ervin (2000), emphasis is laid on extent to which a criterion behavior pattern could be predicted from the predictor variables, while Geiser and Studley (2001) asserted that in some studies, efforts are geared towards the use of scores derived from standardized tests to predictive success or achievement in a particular course of study. This type of predictive study appeared to have gained much more prominence in education circles. Evidence from studies (Geiser and Studley, 2001 and Camara and Echternacht, 2000) showed that the best tests that are good predictors are applied to practical problems such as selection of

candidates for college admission or provision of scientific basis for the school counselors in helping the students to plan their academic future.

Several studies have been carried out to determine the relationship of academic success, cognitive and non-cognitive variables among university undergraduates. For instance, Okwilagwe (2001) and WAEC (1992) argued that the senior secondary school certificate examination results (SSCE) in its present state is a potent predictor of undergraduates' academic achievement, but Abe (2003) showed that SSCE has a negative predictive strength to students' academic achievement at polytechnic while Adeyeye and Olojo (1996) reported that SSCE mathematics results was a poor predictor of academic achievement at the National College of Education level. Gbore (2006) and Nwana (1981) reported that UME score is a poor predictor of university grade point average. Also Alonge (1986) agued that certificate worth and enhances Examination result were not related to academic performance but formative tests of the learning tasks were the most effective measure of cademic perfomance. As for the non-cognitive variables, most of the researchers except for a few (Bachman, O'Malley and Johnson, 1986 and Pascarella, 1985), over the years agreed that moderate relationship exists between academic achievement and the examined non-cognitive variables such as self-esteem, academic self concept of ability, study habits, academic materials, academic environment (Adebule, 2007; Adeyanju, 2006, Ogunmakin, 2001; Okwilagwe, 2001; Yeung and Lee, 1999; Hamachek, 1995 and Onocha, 1985).

Although much blame has been hurled on the JAMB conducted examinations as the major cog in the wheel of academic quality in Nigeria universities due to inability of JAMB to control the number of candidates that actually merit admission, however, Okebukola (2005) still argued that it is not only JAMB that is guilty with regards to academic deficiency among the undergraduates but also the non-degree programmes such as diploma certificates and pre-degree programmes mounted by many universities. Even though, Oluwatayo (2003) argued that there exists a relationship between pre-degree scores and the university undergraduates' scores in chemistry, physics and biology examinations, and coupled with the strategies put together to bring about improved and qualitative academic performance of the university undergraduates, still the low standard of performance remained unabated. Therefore, Oluwatayo (2007) expressed doubt as to whether the much expected improvement in the standard of academic performance on the part of university undergraduates could be achieved when compared to the era when Nigerian universities were acclaimed for consistently producing high quality graduates who have distinguished themselves in their fields of specializations in the best universities in Europe, America, Africa and others that many of them are now professors across the globe.

Observation has shown that the tests used for the non-degree programmes mounted by many of the universities and those used as post UME screening tests may be faulty as items constituting these test instruments are not likely to be standardized.

From the above, one may begin to ponder whether candidates admitted into the universities through the use of UME scores coupled with the Post UME and the non-degree programme (pre-degree) test scores would show any indices of appreciable and acceptable high academic performance in university examinations. It is also clear that not much works have been carried out to explain the contributions of Post UME and pre-degree test scores to university undergraduates' academic achievement.

Statement of Problem

The concern of the researcher is the daunting in the standard of academic performance of the university undergraduates in the university examination and cumulative grade point average. The problem of this study, therefore, is the probability of accuracy of UME, Post UME and Pre-degree test scores in predicting university undergraduates' academic achievement in the university undergraduates' examinations.

Purpose of the Study

This study is designed purposely to investigate the effectiveness and accuracy of UME, Post-UME and pre-degree test scores at predicting university undergraduates'

academic achievement in the university undergraduates' examinations.

Research Questions

- In addressing this problem, the following questions were generated to guide the study.
- What is the relationship between the pre-university examination test scores and science undergraduates examination scores?
- To what extent would the three independent variables (UME, Post-UME and Pre-degree test scores) when taken together, accurately predict students' academic achievement in the university undergraduates' examinations?
- What is the relative contribution of each of the variables to the prediction?

Methodology

This study is planned along the lines of both correlation and ex-post facto research design. Gay (1996) described correlation research as that involving the collection of data in order to determine whether and what degree a relationship exists between two or more quantifiable variables while it is also ex-post-facto research because the researcher do not have control on both the independent and the dependent variables. The ex-post-facto is not completely experimental but involves a systematic procedure that utilize observation of variables as found in their natural phenomena. This type of design was first postulated by Chapin (1955) and later expanded by Campbell and Stanley (1966) in a desperate bid to solve the problem of randomization and control of variables in educational research. This type of design was also used because the cause and the effect have already occurred. There was no treatment and manipulation of subject rather it involved collection of data from records. The population for the study comprised all the university undergraduate students in the faculty of science from South West Nigeria that were admitted into the universities based on UME, Post-UME and Pre-degree examination scores in 2006/2007 session from four purposively sampled universities namely; University of Ado-Ekiti, Ado-Ekiti, Federal University of Technology, Akure, University of Agriculture, Abeokuta and Ladoke Akintola University of Technology, Ogbomoso. These universities were selected for the study because their students pass through UME, Post-UME and Pre-degree examinations. Four hundred university undergraduate science based students were selected for the study using stratified sampling technique. One hundred (100) students were selected from each of the four purposively sampled universities. An inventory titled "Mode of entry characteristics and academic achievement proforma" was used to collect data from records.

Data Analysis

The data collected for the study were subjected to analysis using Pearson Product Moment Correlation and multiple regression (Backward solution) analysis.

Results

The results of the data analysis are as shown in Tables 1,2 and 3.

Research Question 1

What is the relationship between the pre-university examination scores and science undergraduates examination scores?

From Table 1, it is observed that a low and negative relationship exists between performance in UME scores and scores in biology, mathematics and English and also between pre-degree scores and scores in mathematics. It was also observed that low and positive relationship exists between UME scores and scores in Chemistry, Physics and CGPA and also between Post-UME scores and scores in biology and mathematics. The table also revealed that there was low and negative significant relationship between UME scores and scores in mathematics and English while positive significant relationship exists between post-UME Scores and Scores in Chemistry, Physics, English and CGPA. The table also showed that high and positive significant relationship exists between pre-degree scores and scores in Biology, Chemistry, Physics and performance

Variables	BIO	CHEM	PHY	MATHS	MATHS	CGPA
UME	-0.1890	0.2452	0.2651	-0.3408	-0.3392	0.2841
Post-UME	0.2864	0.3353	0.3251	0.2465	0.3125	0.4635
Pre-degree	0.5786	0.4027	0.3471	-0.1208	0.0389	0.6752

Table 1. Correlation Showing the Relationship Between the Pre-University Examination Scores and Science Undergraduates Examination Scores

in CGPA.

From Table 2, it was revealed that multiple R yielded a coefficient of 0.414 and a multiple R squared of 0.171 while the standard error of estimate was 0.61132 which showed that on the average the predicted criterion variable (undergraduate academic achievement signified by CGPA) will deviate from true value by 0.61132 limits of that measure. The table also indicated that analysis of variance result for the multiple regression data yielded an F-ratio of 32.798 which is significant at 0.05 level of significance. By implication, coefficient of determination is significant. This means that the three predictor variables (UME, Post-UME and Pre-degree test Scores) have significant influence on the dependent variable (CGPA). The multiple correlation of 0.414 which upheld the assumption of linearity of regression equation showed a reasonable relationship between the independent variables (UME, Post-UME and Pre-degree test scores) and the dependent variable CGPA).

Therefore, pre-degree test scores showed to be the best predictor to academic achievement (CGPA) while UME test scores showed to be a poor predictor. Table 3 also indicated the contribution of each of pre-degree, UME and Post-UME test scores to the prediction of academic achievement among university undergraduates as exhibited in the values of the regression coefficients (ranged from -0.071 to 0.392), standard error (ranged from 0.019 to 0.023) and t-values ranged from 0.030 to 8.853. The t-value associated with pre-degree was significant at P 0.05. While Pre-degree was the most potent predictor, UME was the most impotent predictor among the three independent variables to the academic achievement among the university undergraduates.

Source of variation	SS	MS	df	F-ratio
Regression	3676.970	1225.653	3	32.798
Residual	17788.172	37.369	396	
Total	21465.148		399	

Multiple R = 0.414
R2 = 0.171
Adjusted R2 = 0.166
Standard Error of estimate = 0.61132
P 0.05, F-critical = 2.62

Table 2. Summary of Regression Analysis on Sample Data

Variables	Regression Weight	SE.B	Beta Weight	t-crit
Constant	0.071	2.270		0.030
Predegree	0.182	0.023	0.392	8.853
Post-UME	0.047	0.020	0.091	1.820
UME	-0.033	0.019	-0.071	1.423

The regression equation derivable form Table 3 is academic achievement (CGPA) = 0.071 + 0.182 (Pre-degree) + 0.047 (Post-UME) – 0.033 (UME).

P 0.05, F-critical = 1.960

Table 3. Test of Significance of Regression Coefficients

Discussion

The finding of this study revealed that low relationship existed between UME scores and scores in biology, chemistry, physics and CGPA. This finding is in agreement with the findings of Oluwatayo (2003). This result may be due to what Nzeshi (2007) referred to as over-bloated scores in favour of weak candidates which could have occurred by Fraudulent behaviours such as examination malpractice by the academically weak candidates to gain admission into the universities. The result also showed that there were positive significant relationship between Post-UME scorers and scores in chemistry, physics, English and CGPA. This may be attributable to lecturers factors in coaching and strictness in the invigilation of the universities examinations. The result also showed that significant relationship existed between pre-degree scores and scores in biology, chemistry, physics and CGPA. This means that those candidates that scored high marks in Post-UME and pre-degree were also scoring high marks in the core science subjects examinations. This finding is in line with the findings of Oluwatayo (2007), Gbore (2006) and Nwana (1981) who argued that there was a relationship between scores from high school certificate, diploma certificates and performance in first year university undergraduates academic performance. These findings may be as a result of carefully and stringent handling of the candidates of post-UME and the proper tutorials and guidance given to the pre-degree students to train and open up their minds toward the university academic task. From these findings, it implies that no serious confidence could be placed on UME scores as far as its validity for university academic performance is concerned.

The result of the study also indicated that 17.1% of the variability in science academic achievement at the university undergraduate examinations (core science examinations) is accounted for by a linear combination of

UME, Post-UME and Pre-degree scores. The result also showed that pre-degree scores, among the three independent variables, was the most potent contributor to the prediction while UME scores was the least contributor to the prediction. This finding corroborated the findings of Oluwatayo (2003), Salahdeen et al (2005) and Obioma et al (2007) who claimed that the dependability of UME scores is consistently low when compared with university academic performance. The role of pre-degree scores in this predictive study is not surprising because the candidates have experienced academic environment more than some of the UME candidates and hence showed more determined positive attitude towards passing their examinations. The findings of this present study supported the finds of Gbore 2006; Oluwatayo, 2003; Okwilagwe, 2001 and Nwana, 1981, who argued that UME was a poor predictor of university academic performance while scores from programmes such as high school certificate, diploma, pre-degree posses more predictive strength than the UME test scores.

Conclusion

The positive influence of pre-degree on the CGPA of the undergraduates would seem to unravel its stability in establishing predictive validity over time than its UME counterpart. When students are kept under appropriate, condusive approaches and given supportive and better foundational teaching-learning strategies, undergraduate are likely to improve their study behaviours and consequently improved their academic performance. In all, it seems that Pre-degree and Post-UME are more important than the UME in the predictive validity of the university undergraduate academic performance. There is therefore the need to further support, strengthen and hold on to the Pre-degree programme and the Post –UME test as dependent and beneficial source of recruiting viable candidates for university undergraduate academic works.

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ABOUT THE AUTHOR

Gbore, L.O is working as a Lecture in the Department of Guidance and Counseling Adekunle Ajasin University. His areas of interest include test, Measurement and Evaluation, Applied Statistics, Psychology and Research Methods.