



**PREDICTIVE VALIDITY OF ENTRY MODES ON ACADEMIC
ACHIEVEMENT AMONG COMPUTER SCIENCE STUDENTS AT AIR
FORCE INSTITUTE OF TECHNOLOGY, KADUNA, NIGERIA**

<https://doi.org/10.83151/mq8k-6p08>

Goshit Nenbunmwa Amos, Aminu Abubakar Danladi, and Agi Abdulahi Owuna

Department of Educational Foundations, Nasarawa State University, Keffi, Nigeria

jemimahamos7@gmail.com, aminuabubakardanladi@gmail.com and

agiabdullahi@gmail.com

Abstract

This study explored the Predictive Validity of Entry Modes on Academic Achievement among Computer science students at AFIT, Kaduna. Two research questions and two null hypotheses guided the study. The study employed the correlational research design. The population of the study comprised 313(298 UTME and 15 IJMB) students of 100 and 200 levels of the 2020 to 2023 academic session of the Department of Computer Science. The sample for the study comprises 175 (125 male and 50 female) students, comprising of 160 (115 male and 45 female) UTME students and 15 (10 male and 5 female) IJMB students. The researcher designed a record of performance of students and their mode of entry (PROMOE), which was used for extracting data from the students' record files for data collection. Research questions were answered using PPMC. The OLS Regression method statistics at the 0.05 level of significance were used to test the hypotheses. The findings revealed that the students' scores in UTME significantly predict their CGPA scores in their First year, and also the students' IJMB results significantly predict their CGPA scores in their second year. The study recommended, among others that UTME and IJMB examination syllabi should be given keen attention since the two examinations predict the academic success of students in the university and that therefore, can affect the quality of graduates the university produces.

Keywords: Computer Science, IJMB Scores, UTME Scores, and Students' Achievement

Introduction

Education is an important issue for the development of any nation in the world. As global economic competition grows sharper, education becomes an important source of competitive advantage and appears to be one of the key determinants of lifetime earnings. Amucha (2019) stated that the hope of every country of the world to develop human capital for the effective functioning of society is hinged on education, being an instrument of change. Afu & Ukofia (2017) stated that assessment in education is best described as an action to determine the importance, size, or value of teaching and learning. Everyone with an interest in Nigeria's education sector has been deeply concerned about the academic achievement of students accepted to universities. Academic achievement is the extent to which a student meets the objectives and standards set by an educational institution in terms of learning outcomes, knowledge acquisition, skills development, and overall achievement in academic endeavours (Amucha, 2019). The cumulative Grade Point Average (CGPA) is mostly used in institutions to determine students' achievement. The academic achievement of students in Nigerian universities can be affected by various factors, which include the student-related factors, lecturer-related factors, institutional-related factors, and home-related factors (Okoedion, Okolie & Udom, 2019). Understanding the relationship between university mode of entry and academic achievement is crucial for several reasons (Sariem, Fwangkat, Shalkur & Adeniyi, 2016).

The educational system's decline necessitates a solution, which is why there is a search for the most ideal and effective method of choosing applicants for Nigerian universities in order to achieve the finest outcomes (Emaikwu, 2015). Some students in AFIT withdraw from their programs before graduation, contrary to the expectation that all admitted students, regardless of entry mode, should cope with academic rigor. Many students change their field of study, while others prolong their academic journey before completing their degrees. However, a significant number of students obtain third-class degrees from the institute, which impacts their employability prospects.

Opinions regarding the superiority of specific entry methods in terms of students' academic success in university vary. The predictive ability of entry modes in forecasting achievement in university examinations has yielded inconsistent findings (Wambugu & Emeke, 2016). Existing studies on university admissions in Nigeria often overlook the unique challenges and dynamics present in specialized institutions like AFIT. Thus, there is a compelling need to conduct a systematic investigation into the impact of the university mode of entry on the academic achievement of computer science students at AFIT. The findings of this study may have implications for educational policy and practice, particularly in the context of admission processes and student support services. By identifying effective strategies for enhancing academic achievement among students admitted through various entry pathways, the university can improve retention rates, graduation rates, and overall student success. It is against this background that the study determined the extent to which entry modes were used to predict the future academic achievement of computer science students of the AFIT because of their varying academic experiences. The academic performance of computer science students in the institution from 2021 to 2023 recorded 57% pass in 2021, 62% pass in 2022, and 59% pass in 2023. Therefore, the trend does not show academic growth. It is believed that these entry

qualifications and their examinations will possibly predict candidates' achievement in the university. Therefore, this study determined the extent to which entry qualifications can be used to predict the academic achievement of computer science students of the Air Force Institute of Technology.

Amucha (2019) carried out a study on the academic achievement of 200-level science students enrolled through the Unified Tertiary Matriculation Examination (UTME) and Joint Universities Preliminary Examinations Board (JUPEB) programmes for the 2014–2015 session, which was compared in their study. The findings demonstrated that the mode of entry had no significant effect between gender, mode of entry and school type on the academic achievement of 200-level science students. The present study considered IJMB and UTME of 2021-2023 100-level and 200-level computer science students of AFIT. Similarly, Matawal, Gotring and Emefo (2016) investigated the mode of entry as a predictor of first-year mathematics undergraduate students' academic performance in university of Jos, Nigeria. They discovered that the primary goal of their study was to determine whether the method of entrance to the University of Jos is a predictor of the academic performance of first-year undergraduate mathematics students. The examination of the data revealed a strong correlation between the mode of entrance and the academic performance of first-year undergraduate maths students. The population of the previous study was 100 level of two academic sessions, while the present study focused on 100 and 200 level students of three academic sessions. The pre-degree remedial program was considered different from UTME, unlike the present study.

Faleye (2015) investigated the predictive validity of students' entry qualifications into mathematics programmes in Nigeria's Osun and Oyo States' Colleges of Education. They looked at the connection between students' entry exam scores and their maths proficiency in the College of Education (CoE). It was found that there was no discernible correlation between the CoE students' performance in mathematics and their entry-level qualifications. The examination results for the two sessions of CoE students were used for the previous study, but only the first-year and second-year CGPAs were used for the present study. Moreso, Olaewe and Abioye (2020) investigated the predictive validity of UTME scores on the final degree results of university students in Nigeria. The study was to determine whether UTME scores could accurately predict Osun State University students' final degree results in Nigeria. The findings of the study showed that there was a weak negative association between the Final Degree Grade point and the UTME score for the academic years 2007-2011. This suggests that there is an inverse link between the Final Grade point and the UTME score.

The present study used a different population and geographical location from the previous study. Adeosun and Ebite (2023) investigated entry qualification and academic achievement of direct Entry students in the faculty of education, University of Benin, Nigeria. The study determined whether there were any differences in the academic achievement of direct-entry students. Based on the study's findings, it was determined that direct-entry students' academic achievement differs significantly depending on their entry requirements. The previous study considered direct entry students only, while the

present study considered only IJMB as direct entry and UTME students. Also, Tobih, Adebayo and Aina (2019) investigated the predictive validity of different entry modes on the mathematics achievement of tertiary students in Ogun State. The study was on how various entry modes could be utilised to predict students' achievement in mathematics. The findings showed that students' academic achievement is not significantly different based on their mode of entrance. The final year students were the target population, unlike the present study, which targets first year and second year students, so that proper adjustments can be made on time. Chinyere (2021) investigated the extent to which University Matriculation Examinations (UME) - now Unified Tertiary Institutions Matriculation Examinations (UTME) scores predicted students' final grades in four departments (Nursing Sciences, Medical Radiography and Radiological Sciences, Medical Laboratory Sciences, and Medical Rehabilitation Sciences) of the Faculty of Health Sciences and Technology, University of Nigeria, Enugu Campus. Results showed that there was a significant relationship between the UME scores and the FCGPA among students. The population of the present study covered a department unlike the one in the previous study. Also, Abdulkadir and Ogwueleka (2017) investigated if any of the entry requirements, such as Ordinary Level (OL) results, Unified Tertiary Matriculation Examination (UTME) scores, or Post-UTME (PUTME) scores, could predict an outstanding academic performance of first-year undergraduate students admitted into the Faculty of Science at Kaduna State University, Kaduna. The results revealed that with a weak correlation, OL is a good predictor of the CGPA, and it concluded that the use of OL and UTME as instruments is not enough to select candidates for admission.

The present study considered first-year and second-year students; it also considered UTME and IJMB scores to predict students' performance, unlike the previous study. Lastly, Olalere, Akinoso, and Abioye (2021) investigated entry qualifications as predictors of undergraduates' final grades in the science programme of the University of Ilorin in Nigeria. The finding indicated that there was a statistically significant difference at the $p < 0.05$ level in final grade scores for the undergraduates who were admitted through UTME remedial and direct entry. The method of data analysis for the two studies differs.

Research Questions

The following research questions guided the study:

- i. Is the UTME score a predictor of the first academic achievement of computer science students in the Air Force Institute of Technology, Kaduna?
- ii. Is the IJMB score a predictor of second-year academic achievement of computer science students in the Air Force Institute of Technology, Kaduna?

Statement of the Hypotheses

To facilitate the investigation, the following hypotheses were tested at 5% level of significance;

H₀₁: UTME scores do not significantly predict the first-year CGPA of computer science students in the Air Force Institute of Technology, Kaduna.

H₀₂: IJMB scores do not significantly predict the second-year CGPA of computer science students in the Air Force Institute of Technology, Kaduna.

Methodology

The design of the study was correlational research. The population of the study consisted of all the 313 (298 UTME and 15 IJMB) first-year and second-year students in the department of Computer Science, Air Force Institute of Technology, Kaduna, from the 2021-2023 academic session (Nigerian Air Force Base, Kaduna, 2021-2023). A sample of 175 students was selected from the university. The sample consisted of 160 unified matriculation examination students and 15 IJMB students. A simple random sampling technique was used in the selection of the UTME sample, and a purposive sampling technique was used for the IJMB samples. In carrying out the study, a record of performance of students in computer and their mode of entry (PROMOE) was used to extract information about each student from the records kept in their files (students' data files) at their department by the researcher. Face validity was obtained for the instrument by subjecting the instrument to critical appraisal by a research expert in Educational Measurement and Evaluation at Nasarawa State University, Keffi. The instrument was rated on a 5-point validation scale, where clarity, ambiguity of items, and relevance of items to the investigation were checked. The logical validation index of 0.83 was obtained. The instrument was pilot tested by using it to collect the same data from 20 student data files, which were part of the study but not part of the study sample. Cronbach Alpha method of estimating reliability was employed to compute the coefficient of internal consistency. The reliability index of 0.84 was obtained. The research questions were answered using the Pearson Product-Moment Correlation. The hypotheses were tested using the Ordinary Least Squares (OLS) regression method at the 0.05 level of significance. The variables included in the general correlation analysis are students' second-year CGPA, students' first-year CGPA, students' score in IJMB, and students' score in UTME. The relationship between the variables is linear, both variables are continuous data, and are both independent of each other, which satisfies the assumptions for correlation and regression.

Results

Research Question 1: To what extent do UTME scores predict the first-year CGPA of computer science students in the Air Force Institute of Technology, Kaduna?

To determine the extent to which UTME scores predict the first-year CGPA of computer science students, the linear regression model was used as presented in Table 1

Table 1: A linear relationship between UTME scores and first-year CGPA among computer science students at the Air Force Institute of Technology, Kaduna

No of Cases	R	R Square	Adjusted R-Square	Remark
160	0.74	0.55	.025	Positive

a. Predictors: (CGPA), UTME-Scores-X

The result in Table 1 shows a multiple correlation coefficient $R=0.74$, $\text{adj-R}=0.25$, $R^2=0.55$, indicating a moderate positive linear relationship between UTME scores and

first-year CGPA among computer science students at the Air Force Institute of Technology, Kaduna. This implies that higher UTME scores are moderately associated with higher first-year CGPA. Given that $R^2 = 0.55$, this suggests that 55% of the variance in the first-year CGPA can be explained by UTME scores.

Research Question 2: To what extent do IJMB points predict the second-year CGPA of computer science students in the Air Force Institute of Technology, Kaduna?

To determine the extent to which IJMB points predict the second year CGPA of computer science students, the Pearson product-moment correlation coefficient was to answer research question 2 as presented in Table 2

Table 2 Summary of Pearson Product-Moment Correlation Coefficient (PPMC)

No of Cases	R	R Square	Adjusted R-Square	Remark
15	0.75	0.56	.035	Positive

a. Predictors: (CGPA), IJMB-point-X

The result in Table 2 shows a multiple correlation coefficient $R=0.75$, $R^2=0.56$, and $\text{adj-R}=0.35$, **indicating** a moderate positive linear relationship between IJMB points and second year CGPA among computer science students at the Air Force Institute of Technology, Kaduna. This implies that higher IJMB points are moderately associated with higher second-year CGPA. Given that $R^2 = 0.56$, this suggests that 56% of the variance in the second-year CGPA can be explained by UTME scores.

To test this null hypothesis, the students' grades in UTME and IJMB (criterion variable), CGPA (predictor variable), were collected and related to obtain a correlation coefficient (r) that was subjected to t-test transformation to establish the significance level. The results obtained are shown in Table 3.

Ho1: UTME scores do not significantly predict the first-year CGPA of computer science students in the Air Force Institute of Technology, Kaduna.

Table 3 Regression Coefficients Analysis for UTME

	Unstandardized Coefficients		Standardized Coefficients	t	Df	Sig
	B	Std. Error	Beta			
(Constant)	1.984	.067	29.594		159	.000
UTME_Scores_X	.064	.029	0.55	2.193		.029

Table 3 shows regression equations for predicting UTME scores on the first year CGPA of computer science is $Y = 1.984 + 0.55X$. Implies that for a unit increase in X (UTME scores), Y(CGPA) will increase by 0.55. At the 95% confidence level, $df=159$, $t\text{-test}=2.193$, $\text{sig} = 0.029$, that is $P<0.05$. H_01 is not retained, hence UTME scores significantly predict the first CGPA of computer science students in the Air Force Institute of Technology, Kaduna.

H₀₂: IJMB scores significantly predict the second-year CGPA of computer science students in Air Force Institute of Technology, Kaduna.

Table 4 Regression Coefficients Analysis for IJMB

	Unstandardized Coefficients		Standardized Coefficients	t	Df	Sig
	B	Std. Error	Beta			
(Constant)	2.984	.077	21.594		14	.010
IJMB_Scores_X	.064	.049	0.66	2.0237		.023

Table 4 shows regression equations for predicting IJMB scores on the second year CGPA of computer science, which is $Y = 2.984 + 0.66X$. Implies that for a unit increase in X (IJMB scores), Y(CGPA) will increase by 0.66. At the 95% confidence level, $df=14$, $t\text{-test}=2.237$, $sig = 0.023$, that is $P < 0.05$. H_{02} is not retained, hence IJMB scores significantly predict the second year CGPA of computer science students in the Air Force Institute of Technology, Kaduna.

Discussion and Findings

They were analysed according to the demand of the research questions, hypotheses formulated, and the designs of the study.

Findings based on Hypothesis 1 indicated that students' UTME scores significantly predict their CPGA scores in the first year in AFIT. This finding is in agreement with the findings of Chinyere (2017), who reported that there was a significant relationship between the UTME scores and the FCGPA among students. Also, Matawal, Gotring and Emefo (2016) investigated the mode of entry as a predictor of first-year mathematics undergraduate students' academic performance in the University of Jos, Nigeria, and reported a strong correlation between the mode of entrance and the academic performance of first-year undergraduate maths students.

The result, however, contradicts the findings of Abdulkadir and Ogwueleka (2017) who investigated if any of the entry requirements such as Ordinary Level (OL) results, Unified Tertiary Matriculation Examination (UTME) scores or Post-UTME (PUTME) scores could predict an outstanding academic performance of first-year undergraduate students admitted into the Faculty of Science in the Kaduna State University, Kaduna and reported a weak correlation. Also contradicts the findings of Olaewe and Abioye (2020) whose study showed that there was a weak negative association between Final Degree Grade point and the UTME score. Findings based on hypothesis 2 indicated that students' IJMB points significantly predict their CGPA scores in the second year in AFIT. This finding agrees with the findings of Olalere, Akinoso and Abioye (2021), who investigated entry qualifications as predictors of undergraduates' final grades in the science

programme of the University of Ilorin in Nigeria and indicated that there was a statistically significant difference in the final grade scores for the undergraduates who were admitted through UTME, remedial, and direct entry (IJMB). Also, Adeosun and Ebite (2023) reported that direct-entry students' academic achievement differs significantly depending on their entry requirements. The findings contradict the study done by Tobih, Adebayo and Aina (2019), who investigated the predictive validity of different entry modes on the mathematics achievement of tertiary students in Ogun State and reported that students' academic achievement is not significantly different based on their mode of entrance. Also, Faleye (2015) reported that there was no discernible correlation between the students' performance in mathematics and their entry-level qualifications. The study sustained the findings that the students' scores in UTME significantly predict their CGPA scores in their First year, and the students' IJMB points significantly predict their CGPA scores in their second year. These standardized assessments provide a reliable measure of students' academic preparedness for university-level coursework, with their scores correlating meaningfully with academic performance in the first year.

Debates as to whether the mode of entry affects the academic achievement of students or not, and also which mode of entry should be given emphasis on, have brought about admission policies in response to societal changes, educational reforms, and workforce demands. These policies aim to accommodate the diverse academic backgrounds, experiences, and qualifications of prospective students while promoting inclusivity, access, and academic excellence.

Conclusion and Recommendations

The magnitude of the relationship and the percentage of prediction of CGPA is high; there is a positive relationship between UTME score and CGPA, and also IJMB points and CGPA. This finding underscores the value of UTME and IJMB as criteria in the admissions process for computer science programs. The IJMB program has a very small number of students compared to the UTME students, which makes achieving a high prediction index possible. The findings imply that UTME scores and IJMB points are good predictors of students' CGPA. Consequently, the following recommendations are made:

- i. UTME and IJMB curricula should be reviewed to conform to the university system to enhance their predictive validity.
- ii. Establish academic support systems tailored to students with lower entrance exam scores, helping them bridge potential knowledge gaps to improve academic performance.

References

- Abdulkadir, S. & Ogwueleka, F. N. (2019). Predicting Students' First-Year Academic Performance Using Entry Requirements for Faculty of Science in Kaduna State University, Kaduna – Nigeria. *American Journal of Computer Science and Technology*, 2(1), 9-21.

- Adeosun, P. K. & Ebite, G. O. (2023). Entry Qualification and Academic achievement of Direct Entry Students in the Faculty of Education, University of Benin, Nigeria. *British Journal of Education, Learning and Development Psychology*, 6(1), 38-48.
- Afu, M. O. & Ukofia, I. B. F. (2017). Predictive Validity of UTME and Post-UTME Scores on first Year Students' Performance in four Departments in University of Abuja. *International Journal of Education and Evaluation*, 3(4), 26–35.
- Amucha, H. O. (2019). A Comparative Analysis of 200 Level Science Students' Academic Achievement Based on Mode of Entry – JUPEB/UTME. *Education & Science Journal of Policy Review and Curriculum Development*, 9(2), 123-131.
- Chinyere, E. (2021). University Matriculation Examination as a Predictor of Students' Final Grades in the Faculty of Health Sciences and Technology of University of Nigeria, Nsukka. *Afribary*. Retrieved from <https://afribary.com/works/university-matriculation-examination-as-a-predictor-of-students-final-grades-in-the-faculty-of-health-sciences-and-technology-of-university-of-nigeria-nsukka>.
- Emaikwu, S. O. (2015). Assessment of the Impact of Students' Mode of Admission into University and their Academic Performance in Nigeria. *International Journal of Academic Research in Progressive Education and Development*, 1(4), 118–131.
- Emaikwu, S. O. (2015). Predictive validity of unified tertiary matriculation examination (UTME) on post-unified tertiary matriculation examination (UTME) scores in Nigeria. *Asian Pacific Journal of Research*, 1(26), 56-68.
- Faleye, B. A. (2015). Predictive Validity of Students' Entry Qualifications into Mathematics Programme in Nigeria's Osun and Oyo States' Colleges of Education. *Journal of Education and Human Development* December, 4(4), 209-217.
- Matawal, D., Gotring, D. & Emefo, C. (2016). Mode Of Entry as A Predictor of First Year Mathematics Undergraduate Students' Academic Performance in University of Jos, Nigeria. *Research journal's Journal of Education*, 4(4), 78-84.
- Okoedion, G. E., Okolie, U. C. & Udom, I. D. (2019). Perceived factors affecting students' academic performance in Nigerian Universities. *Studi sulla Formazione*, 2(2), 409-422.
- Olaewe, O. O. & Abioye, B. A (2020). Predictive Validity of UTME Scores on the Final Degree Results of University Students in Nigeria. *African Journal of Research in Education*, 3(1), 103-107.
- Olalere, O., Akinoso, T. & Abioye, A. (2021). Entry Qualifications as Predictors of Undergraduates' Academic Achievement in Science Programme of University of Ilorin, Nigeria. *Journal of Educational and Social Research*, 3(1), 1-7.
- Sariem, C. M., Fwangkat, D. F., Shalkur, D. & Adeniyi, M. A (2016). Factors affecting academic performance of Pharmacy students in the University of Jos, Nigeria. *Journal of Pharmacy and Bioresources*, 11(2), 85-92.
- Wambugu, L. & Emeke, A. (2016). Relationship between Entry Qualification and Academic Performance in Undergraduate Science Courses at the University of Nairobi, Kenya.

Tobih, D., Adebayo, J. & Aina, E. (2019). Predictive validity of different entry modes on the mathematics achievement of tertiary students in Ogun State. *Journal of Educational Development and Practice*, 3(1), 45-59.