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CONTENT

Pre-admission Qualifications and Demographic Factors of Year One National Diploma Students of Federal Colleges of Agriculture as Precursors of Achievement in Mathematics

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Abstract

Mathematics serves as a strong reinforcement to most courses offered in Federal Colleges of Forestry and Federal Colleges of Animal Health and Production Technology. Despite the importance of mathematics in colleges of agriculture, students' achievement in mathematics courses was not impressive. The observed performance could be explained by students' demographic factors and pre-admission qualification. This study investigated students' demographic factors (sex, age, fathers' highest qualification and occupation as well as mothers' highest qualification and occupation) and pre-admission qualification (senior secondary certificate examination and unified tertiary matriculation examination) as precursors of their cognitive achievement in mathematics. This study adopted correlational approach. Four hundred and four students of the colleges that sat for 2010 UTME and admitted into Federal College of Forestry Ibadan and Federal College of Animal Health and Production Technology Ibadan were used for the study. Data was collected from the colleges using students record files and achievement test in mathematics (difficulty level ranging from 0.4 to 0.5 and reliability coefficient = 0.83). The data was analysed using Frequencies, percentages/ and multiple regression analysis. The result showed that the highest percentage of students, 33.9 per cent scored between 40 and 50 per cent,17.6 per cent failed while only 5.2 per cent scored 70 per cent and above. The independent variables regressed against achievement in mathematics had composite influence on achievement in mathematics ($R = .347$ and Adjusted $R^2 = 0.102$; $F_{(8,390)}$

= 6.673; P < .05). It was also found that only UTME scores (β = .224; t = 4.612; p<0.05) mothers' educational qualification (β = .155; t = 2.984; p < 0.05) and mothers' occupation (β = - .176; t = -3.528; p < 0.05) were significant factors that influenced achievement in mathematics. Based on findings, it is recommended that institutions should insist students obtain the required minimum UTME scores because it will go a long way in supporting them to achieve greater performance in their intended courses of study at the higher level.

Keywords: Demographic Factors, Pre-admission Qualifications, Precursors of Mathematics Achievement.

Introduction

Mathematics is both the language and tool of all sciences which enables scientists carry out their work, solve problems and interpret findings as well as predict the future. This viewpoint affirms the position of Osuagwu and Anemelu (2004).Proficiency in mathematics is fundamental to subjects like physics, chemistry, statistics and other science courses, not only at the advanced stages, but also in the understanding of elementary principles of science subjects. The relevance of mathematics to science and technology cannot be overemphasised (Oluwaniyi, 2006).This perhaps explains why mathematics is made a compulsory course at Federal College of Forestry and Federal College of Animal Health and Production. It is a compulsory course for all year one National Diploma (ND) students irrespective of their departments. Also, at the Higher National Diploma (HND), mathematics is a core course for all the students. Thus, for any student to successfully graduate from any of the colleges, he/she must not fail mathematics.

Understanding of many scientific concepts poses problems to many of the students who are admitted into the two federal colleges in question. Majority of the students dislike mathematics because they are not aware of its importance in their chosen field. Obodo (2004) points out that many students in tertiary institutions in Nigeria today are not studying the courses they intended to study because they did not make the required

Senior Secondary Certificate Examination (SSCE) grades in mathematics to gain admission to courses of their first choice. Some candidates secure admission into tertiary institutions like Colleges of Agriculture, yet their performance in mathematics remain poor. Before a candidate can be admitted into any higher institution, he/she is expected to have a number of "O" level credit passes in relevant subjects including English and Mathematics in General Certificate Examination, Joint Admissions and Matriculation Board (JAMB,2010). The second admission requirement is obtaining the required cut-off mark in the Unified Tertiary Matriculation Examination (UTME) conducted by JAMB.

Mathematics is central to the study of science and technology. Igbokwe (2004) highlights the link between mathematics and science as well as technology and states that without mathematics there will be no science, without science there will be no technology and without technology there will be no modern society. Mathematics, a compulsory subject for all students of the two federal colleges is relevant in their day to day activities. For instance, the planting of root and tree crops involves knowing the dimension and spacing needed for adequate propagation and can only be calculated with the aid of mathematics. Also, in fishery and poultry farming, application of mathematics is equally important in measuring the quantity of chemicals needed to induce hatching of eggs of fingerlings and the number of fingerlings each pond will contain. The high number of students with weak pass and carryover in these schools call for urgent and thorough investigation to understand the phenomenon.

Over the years, investigating factors that determine academic performance of students in mathematics has attracted the interest of researchers. Some of these factors are school size (Lee and Smith, 1997), environmental factor (Ajila and Olutola 2000). Also, investigation into predicting students' academic achievement from their previous performance is popular among researchers. Useful Summaries of these researchers' work can be found in Salahdeen and Murtala, 2005; Obioma and Salau 2007; Dibu and Thomas, [illegible]; Ajuonuma and Mkpa [illegible]; [illegible], [illegible] and [illegible];

2010. Most of their results show there is a relationship between students' pre- admission requirements and academic achievement in secondary schools and universities. Limited effort has been directed at explaining poor performance of students of Colleges of Agriculture in mathematics. Indeed, premised on past studies there is little or no empirical evidence on demographic factors and pre- admission qualification as precursor of students of colleges of agriculture's cognitive achievement in mathematics. This study aims at filling the gap, even if marginally.

Statement of Problem

Quite a number of courses offered at Federal College of Forestry and Federal College of Animal Health and Production Technology require mathematics competence. Expectedly, students of the colleges are required to take mathematics seriously. Despite the importance of mathematics in the career of students of these colleges, their cognitive achievement in mathematics has not been enhanced, significantly. It was equally observed that researchers have not given priority to investigation of mathematics achievement of students of Colleges of Agriculture. Hence, sufficient empirical explanations for the poor students' achievement in Mathematics seem not available. A study of this nature is therefore needed to determine the extent to which demographic factors and pre admission qualification will explain variation in students' achievement in mathematics.

Research Questions

1. What is the level of performance of students of the colleges in mathematics?
2. How does demographic factor and pre-admission qualification compositely serve as precursor to students' achievement in

3. How does demographic factor and pre-admission qualification relatively serve as precursor for students' achievement in mathematics?

Methodology

Research Design

This study is a survey type that used correlational approach. No variable was either manipulated or controlled.

Population and Sample

All the students admitted into Federal College of Forestry, Ibadan and Federal College of Animal Health and Production Technology, Ibadan, through UTME conducted in 2010 constituted the population as well as the study sample.

Instrumentation

Two instruments will be used for this study; these are Achievement Test in Mathematics (ATM)/ Student Record Sheet (SRS). The achievement test consists of 25 multiple choice items with four options selected from 42 items conceived by the researcher. Kuder Richardson Formula 20 is used to establish the internal consistency of the instrument which gave 0.83 as reliability coefficient and levels that ranged from 0.4 to 0.5. The Student Record Sheet is made up of two sections. Section A consists of students' demographic information on age, sex, fathers' qualification and occupation as well as mothers'qualification and occupation. Section B contains format for recording 'O' level and UTME results of each student.

Data Collection

The selected colleges were visited by the one of the researchers to obtain permission and make adequate arrangement for instrument administration. The achievement test was administered and retrieved the same day with the cooperation of some lecturers in the schools. The students' 'O'Level and UTME grades were obtained from the school's records using student record sheet. The grades in WAEC and NECO were converted to composite scores. The composite scores as used in this study is the sum of the grade points in the compulsory subjects: English, Mathematics, Physics, Chemistry and Biology/Agricultural Science.

The scores and the points attached are as follows:

A1 = 8points
B2 = 7points
B3 = 6points
C4 = 5points
C5 = 4points
C6 = 3points
D7 = 2points
E8 = 1point

Data Analysis

The data was analysed using descriptive statistics (Frequency counts and percentages) and multiple regression.

Results

Research Question One

What is the level of performance of students of the colleges in mathematics?

Table 1: level of performance of students of the colleges in mathematics

Scores	Frequency	Percentage
0 – 39	71	17.6
40 – 49	133	32.9
50 – 59	92	22.8
60 – 69	87	21.5
70 and above	21	5.2
Total	404	100

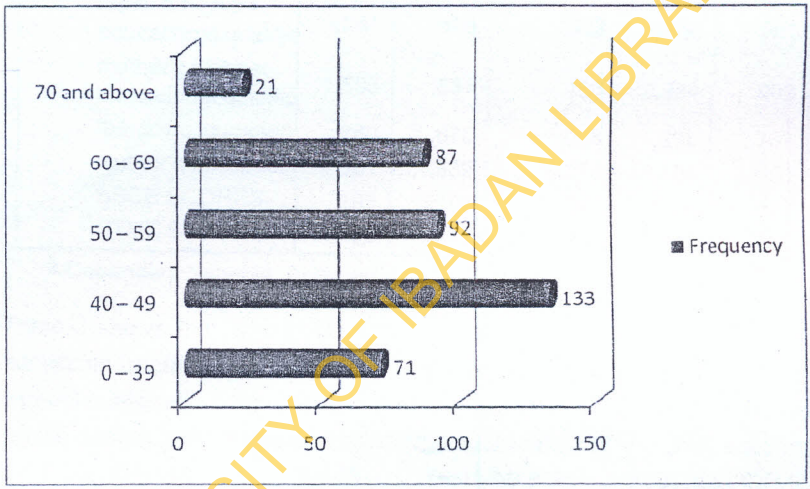

Fig.1. Performance of Colleges of Agriculture Students in Mathematics

Table 1 and Fig. 1 show the level of performance of ND1 students in mathematics. Out of 404 students sampled in this study, 133 (33.9%) fall within weak pass, between 40% and 49%; 92 (22.8%) scored between 50% and 59%; only 21(5.2%) scored 70% and above; while 71(17.6%) failed.

Research Question Two

How does demographic factors and pre-admission qualifications compositely serve as precursor to students' achievement in mathematics?

Table 2: Composite Contribution of Students' Demographic Variables and Pre- admission Qualification to Students' Achievement in Mathematics..

Model	Sum of Square	Df	Mean Square	F	Sig
Regression	9429.188	8	1178.648	6.673	.000
Residue	68888.802	390	176.638		
Total	78317.990	398			

$R = .347$

$R^2 = .120$

Adjusted $R^2 = .102$

Table 2 shows the multiple regression correlation coefficient (R) indicating the relationship between the independent variables (sex of the student, age of the student, fathers' highest qualification and occupation as well as mothers' highest qualification and occupation, SSCE grades, UTME scores) and dependent variable (achievement test in mathematics). Table 2 shows that R = .347 and adjusted R square is .102 implying that the independent variables jointly account for 10.2 per cent of the variation of students' achievement in mathematics. Further verification using multiple regression ANOVA produced $F_{(8,390)} = 6.673$; $P < .05$.and also shows that the composite effect of the students' demographic factors and pre-admission qualification is significant on students' achievement in mathematics.

Research Question Three

How does demographic factors and pre- admission qualification relatively serve as precursor to students' achievement in mathematics?

Table 3: Relative Contribution of Independent Variables on Students' Achievement in Mathematics

Coefficients[a]

Mode		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.104	9.620		.738	.461
	age	2.011	1.658	.058	1.213	.226
	sex	.085	.465	.009	.183	.855
	father's highest educational qualific	-.231	.526	-.023	-.438	.661
	mother's highest educational qualific	1.586	.531	.155	2.984	.003
	father's occupation	.260	.878	.015	.296	.768
	mother's occupatio	-2.961	.839	-.176	-3.528	.000
	SSCE SCORES	.195	.198	.047	.982	.327
	UTME SCORES	.189	.041	.224	4.612	.000

a. Dependent Variable: Achievement Test

Table 3 shows that among the students' demographical factors and pre-admission requirement; students' age and sex, fathers' and mothers' highest qualification, fathers' and mothers' occupation, SSCE grades and UTME scores ;only mothers' educational qualification ($\beta = .155$; $t = 2.984$; $p < 0.05$), mothers' occupation ($\beta = -.176$; $t = -3.528$; $p < 0.05$) and UTME scores ($\beta = .224$; $t = 4.612$; $p<0.05$) were found to have significant contribution to students' achievement in mathematics.

Discussion

The result of this study reveals that mothers' highest qualification predicted students' achievement in mathematics. This is understandable since such mothers who are well- educated and are in good employment fall within the high class socio-economic status of the society and tend to be more involved in their children's education by assisting them with materials and

counterparts who are not as educated. This finding is supported by Ma and Kelinger (2000); Musgrave, (2000)

The result of this study also reveals that entry strength measured by UTME contributed significantly to students' achievement in mathematics. This suggests that the score of students in UTME and achievement test in mathematics positively related. This indicates that the skills and competencies tested in UTME may be in tandem with the skills emphasised in the first year of students' study in the colleges. This viewpoint is corroborated by scholars such as Abdullahi (1983); Afolabi, Majeobaje, Oyedeji and Raji (2007); Obioma and Salau, (2007) who report significant positive relationship between University Matriculation Examination (UME) score and the first year university examination. Similarly, Dibu and Thomas (2009) submit that using UME scores or SSCE grades alone did not predict students' performance as much as when UME and SSCE were combined.

The findings of this study reveal that SSCE do not relate with students' achievement in mathematics significantly. This implies that good SSCE grades do not necessarily lead to better mathematics performance of College of Agriculture students. It is expected that since most of the candidates just finished from secondary school, their level of mathematics knowledge remains the same, irrespective of the kind of mathematics examination they are exposed to. There is a significant relationship between UTME and mathematics achievement but SSCE being at variance with this, calls for investigation into the examination process of Senior Secondary School Examinations.

The finding of this study is in accord with similar finding of Evrono (2009) where performance of students in Delta State University has no relationship with their mode of entry requirement. Meanwhile, the result contradicts Ajuonoma and Mkpa (2009) on predicting validity of West African Senior Secondary Certificate Examination (WASSCE) for academic performance in Universities using Imo and Abia states' universities as a

case study. Bakari (2004) and Ajuonuma (2009) also observe a significant relationship between O/Level examination grade and the first year academic performance of schools in humanities in Bayero University, Kano.

Conclusion

Selection process is central to quality of students in any institution. Stakeholdersof institutions should play prominent role when it comes to selection of students for admission. Established commissions for different levels of education should take admission exercise with seriousness to redeem the glory of educational system in the country.

Recommendations

Based on the findings of this study, the following are recommended:

i. Institutions should insist on students having expected minimum UTME scores because it will go a long way in supporting them to achieve greater performance in their courses.

ii. Given that mothers' educational attainment and occupation revealed significant influence on the achievement of their children, the government and stakeholders involved in educational issues should intensify implementation of educational policies that will promote women empowerment and other related issues affecting child education.

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