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AGE AND GENDER AS DETERMINANTS OF ACADEMIC ACHIEVEMENTS IN COLLEGE MATHEMATICS

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ABSTRACT

Mathematics Education occupies a central position to all disciplines. This study considered age and gender as determinants of academic achievement (CGPA) of Mathematics students. The study used thirty eight (38) females and forty (40) males giving a total sample of seventy eight (78). Scatter-plot, mean and Standard deviation were used for the descriptive statistics while univariate analysis of variance (ANOVA) and multiple regressions were used for the inferential statistics. T-test was used to test the null hypothesis formulated (P< 0.05).Result revealed a linear relationship between, age-CGPA and gender–CGPA. A low positive correlation coefficients was obtained for ages and gender (r=0.142 and 0.004) which were not significant. The predictor variables jointly accounted for 2.1% of the variance, age was the better predictor. The null hypothesis tested was accepted implying no significant gender difference in academic achievement of the students. It was suggested that some more variables be included so as to determine significant correlation of students' academic achievement of Mathematics students.

Keywords: Academic achievement, Age and Gender, Cumulative grade point average (CGPA), Academic Persistence, Predictive ability

INTRODUCTION

Qualitative and functional Education at all levels of education has been the clamour for education policy makers since time immemorial. Mathematics occupies a pivotal position in Science and Technology and is needed by everybody and in every aspect of human endeavour(Agwagah and Harbor-Peters, 1994 ; Akinsola, Tella and Tella,2007; Olayemi, 2009 ; Abubakar & and Eze,2010 ; and Abubakar and Uboh ,2010). Since Mathematics education is a compulsory subject from Universal basic education to Senior secondary level and to a compulsory requirement to be passed or attempted before tertiary education, then, there is need for a qualitative and functional Mathematics education to be in place as one of the fulfilment of the 7-point agenda of the federal government..

Quisumbing in (Acceladjo, 2004) mentioned that true test of quality education is the degree to which one can share what he has learnt with others to improve the quality of life. Qualitative and functional Mathematics education can be evident in the academic achievement of students emphasising their cognitive level .This now brings us to the issue of academic achievement in Mathematics. Agwagah and Harbor-peters (1994) reported gender related differences existed in

Mathematics learning and achievement. Busch (1995) reported female students have significantly lower self-efficacy than males with respect to Mathematics related and other traditionally male dominated subjects including Computer. Other researches on inter-relationship of gender and Mathematics have reported no significant gender difference in academic achievement in Mathematics (Abubakar and Eze, 2010; Grassi, 2004 and Witt-Rose 2003).Another observable trait Age has been reported to have significant influence on achievement in Mathematics. Agwagah and Harbor-Peter (1994) have reported that little differences are identified between males and females in Mathematics achievement at ages 9 through 13 years but at age 17, females perform poorer than the males. Tenzin (2002) reported that younger students outperformed their peers in Mathematics, English, HCG, Science and overall scores while older students achieved at a higher level than the younger ones.

Hence, this current study is designed to assess the significant relationship of both age and gender on academic achievement of Mathematics students at Federal college of Education (Technical), Omoku, Rivers state. Specifically, it will ascertain which variable gives a better percentage of variance to the academic achievement of the students.

STATEMENT OF THE PROBLEM

Development of human capital is a strong tool for a Nation's growth. A qualitative and functional education is an essential ingredient to rebuild human capital in a Nation. Mathematics education stands central to all courses, hence the all-important need to focus on the quality of Education which is evident in the academic achievements of students. Several factors affect Academic achievements, they include gender and age. So, the Problems are how the effect of these two variables does: age and gender contribute to the academic achievement of Mathematics students?

PURPOSE OF THE STUDY

The purpose of this study was to determine if there were significant relationship and contributory effect of gender and age on the academic achievement of Mathematics students. Also, the effect of gender on academic achievement in Mathematics was ascertained.

Research Questions

1. Are there any relationship between gender, age and academic achievement of Mathematicsstudents?
2. What is the individual contribution of each of the two predictor variables: gender and age to students' performance?
3. What is the combined contribution of the two predictor variable to students' academic in Mathematics?

Research Hypothesis

H_{01}:There is no significant difference in the academic performance of female and male mathematics students of F.C.E. (Tech.),Omoku in 2007/08 session

METHODS

Research Design

The study is a non-experimental type hence used expo-factor design.

Population and Sample

The population of this study comprised all the Mathematics students in the School of Science at the Federal College of Education (Technical),Omoku, Rivers state ,south-south Nigeria. From the population, the academic session of 2007/08 was used for this study. The sample consists of seventy-eight 78 students made up of forty (40) males and thirty-eight (38) females spanning NCE I,II and III academic levels.

Materials/Data Collection

The college approved cumulative grade point average CGPA result that reflects the overall academic performance for the session for each student was obtained from the records of the department. Each student's age and gender were obtained from the School of Science Education records and the admissions unit of the college.

Procedure and Data Analysis

The age, gender and CGPA of each student were entered into a database. The statistical Package SPSS was used for the comparative analyses. Mean, standard deviation, and scatter plot were utilised for the descriptive statistics. Inferential statistics was established using bivariate correlation, univariate analysis of variance (ANOVA),t-test and multiple regression analysis. The scatter plot of the variables revealed a linear relationship, hence Pearson correlation was used to determine the significance of the relationship of age -CGPA and between gender-CGPA.T-test was used to test the hypothesis formulated for the study .Level of statistical significance was set at $\propto = 0.05$

RESULTS

Results are as presented below

Research Question 1

Are there any relationship between gender, age and academic achievement in Mathematics?

Table 1: Correlation matrix of age, gender and CGPA

Variables	CGPA	Age	Gender
CGPA	1		
Age	0.142	1	
Gender	0.004	0.151	1

Result from Table 1 revealed that both Age and Gender correlated positively with CGPA, hence they both have predictive validity on CGPA. The correlation coefficients however, were not significant.

Research Question 2

What is the individual contribution of each of the two predictor variables: gender and age to students' performance?

Table 2: Percentage contribution of Age, Gender on CGPA

	Age	Gender
Multiple R	0.142	0.004
R square (R^2)	0.020	0.000
% Contribution	2%	0%

Table 2 revealed that Age contributed only 2% to the variance observed in CGPA while Gender contributed 0%.

Table 3:Relative contribution of each of the variables and their significance

Variables	Standard	Beta values	t	Significance
Age	0.031	0.145	1.259	0.213
Gender	0.214	-0.018	-0.154	0.878

Research Question 3

What is the combined contribution of the two predictor variable to students' academic achievement in Mathematics?

Table 4: Summary of the Multiple Regression Analysis

Multiple R=0.143

R square =0.021

Adjusted R square= -0.006

Standard Error= 0.93462

ANOVA [b]

	Sum of squares	df	Mean square	F	Significance
Regression	1.377	2	0.689	0.788	0.458 [a]
Residual	65.514	75	0.874		
Total	66.891	77			

a. Predictor (constants), Age, Gender
b. Dependent Variable: CGPA

Results in Table 4 shows that the predictor variables jointly account for 2.1% of the variance observed in students CGPA, the result is however not significant.

Research Hypothesis

H_{01}:There is no significant difference in the academic performance of female and male mathematics students of F.C.E. (Tech.),Omoku in 2007/08 session

Table 5:Mean rating, standard deviation and t-analysis of Mathematics students

Sex	N	Mean	Std	df	t_{cal}	t_{crit}	Decision on hypothesis
Female	38	2.30	4.27	76	0.09	2.0	Accept
Male	40	2.19	5.2				

The result in table 5 revealed that tcalculated was 0.09 which is lesser than critical t-value of 2.0 indicating acceptance of $H_{01.}$ Hence, gender was insignificant in the academic performance of Mathematics students in the 2007/2008 session.

DISCUSSIONS

In 2007/2008 session the department of Mathematics/Computer Education, recorded thirty –eight females and forty males. The highest and lowest ages for females and males were 35 & 15years , and 30 & 15years respectively. The highest and lowest CGPA for females and males were 4.58 & 0.65 and4.53 &0.88 respectively. Findings from the study revealed that the two predictorvariables age and gender had low positive correlation (r= 0.142 & 0.004) respectively on CGPA of Mathematics students .However, the result was not significant at 0.05 confidence interval. This implies that both age and gender were positively related to CGPA of the students. Russell, Barfield, Turnbull, Leibach and Pretlow (2008) also recorded a low correlation coefficient (r= 0.07) between age and GPA of Registered health information administrator RHIA certificate examination scores. Also, Yousefi, et al(2010)recorded a low correlation coefficient (r= 0.22) between age and academic achievement among 400 Iranian students in the age range of 15-19years. From Table 2, Age was a better contributor to the variance in CGPA of the students at only 2 %, while gender did not contribute anything at 0%. Owolabi and Etuk-iren (2009) recorded a low positive correlation 1.3% variance between gender and academic achievement of Pre-NCE Mathematics students. However, Olayemi (2009) reported an insignificant low negative correlation (r = -0.143) with 4.6% variance for gender-academic achievement of Physical Chemistry students of F.C.E (Tech.), Akoka. Using multiple analyses of variance, (MANOVA), De Paula and Hlawaty (2004) reported a statistical significant relationship for their four two-way interactions of age-country, gender-country, achievement-country and achievement-age. Using the extended-Fisher application, for the three levels of ages 13-, 15-, and 17-year olds, they illustrated a significant difference on the 22-dependent learning styles.

The Beta values from Table 3 can be used to express mathematically the combined influence and contribution of the Variables thus:

$$y = 0.15x_1 - 0.018\ x_2$$

y = CGPA , x_1 = Age , x_2 = gender

Table 5 revealed a lesser t-value than the critical t-value. So, gender is not significant in the academic achievement between females and males in the department. Equally, Abubakar and Eze (2010) ,Abubakar and Ejimaji (2010),Abubakar and Ihiegbulem (2010) ,Abubakar and Uboh

(2010) have all reported no statistical gender differences in Mathematics, Chemistry ,Integrated Science and the overall School Science students of F.C.E. (Tech.),Omoku, Rivers state in the 2007/2008 session. On the contrary, Yousefi et al (2010),reported a significant gender difference in academic achievement of Iranian students. Akinsola et al (2007) recorded no gender difference in procrastinatory behaviours and academic achievements between males and female students of University of Ibadan and University of Lagos.

CONCLUSION

This research contributed to the broad understanding of the connectedness of observable traits: age and gender on academic achievement of Mathematics students. It sought to establish the significance and relational effect of age and gender on Mathematics students' academic achievement (CGPA).The data have provided evidence of a positive correlation between age-academic achievement and gender-academic achievement .Both age and gender were insignificant in academic achievement of the students but age was the better contributor to academic achievement. This findings reiterate the success of the increasing clamour for gender equity at all levels of education which the Millennium development goals advocates for and in line with the Federal Government's 7-point agenda of a qualitative and functional education at all educational level towards improving the teaching of Mathematics

RECOMMENDATION

Based on the findings from the study, it is recommended that for further studies, more predictive variables be added to age and gender so as to ascertain more significant predictors of academic achievements of Mathematics students .There is the need to keep learners firmly anchored on a set of human values; to teach young teachers how to process the vast variety of information so that they pick up Mathematical knowledge that are qualitative and functional to themselves and the society at large. Interactive approaches and activities should be put in place to address our foremost concern of strengthening the moral fibre of our learners and opportunities inside the classroom and within classroom that will help them acquire life-long skill and imbibe esteemed principles and values, all these go a long way in improving the teaching of Mathematics for the attainment of the 7-point agenda of the federal government.

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