AGE AND GENDER AS PREDICTORS OF ACADEMIC ACHIEVEMENT OF COLLEGE MATHEMATICS AND SCIENCE STUDENTS

R.Bada.Abubakar
and
O.Dokubo Oguguo
Department of Mathematics,
Federal College of Education (Technical), Omoku,Rivers State, Nigeria

Abstract: This study examined the correlates between age and gender on academic achievement (CGPA) of Mathematics and Science students. The study used three hundred and thirty-two (332) students; two hundred and twenty-three(223) females and one hundred and nine (109) males . Scatter-plot, mean and Standard deviation were used for the descriptive statistics while univariate analysis of variance (ANOVA) and multiple regression were used for the inferential statistics. Z-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=0.030 and 0.111) which significant. The predictor variables jointly accounted for 1.3% of the variance, gender 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 contributory effect of students academic achievement of Mathematics students .

Key words: Academic achievement, Age and Gender, Cumulative grade point average(CGPA), Academic Persistence.

Introduction
The quintessential achievement oriented domain education, particularly for college students', includes high performance on tests, passing courses and completing degrees (Habibollah, Margery, Shupe and Yager,2009).Over the years, researches have revealed that academic achievement has numerous determinant factors ranging from socio-economic status (Ajayi and Muraina,2011),students employment status (Wantabe,2005),learning disabilities (Shupe and Yager,2011),Students Interest (Udegbe,2009),attitude (acceladjo,2001),Guidance and counseling (Odubanjo and Adeniji,2010) ,teaching methods (Eniayeju,2010),School entry modalities (Cameson and Wilson ,2011; Olayemi,2009), Gender continuous assessment (Owolabi and Etuk-Iren,2009).Due to the quest for better academic performance of students at all levels of education. Researches have continued to be improved upon by studying joint effect of predictor variables which this study is one of such .Age has played a considerable part

as regards to education, like entry age of students to a school, hence age could be a predictor of success. Gender is the properties that distinguish organism on the basis of their reproductive roles as female or male(Abubakar and Uboh,2010).Sudies is fast disrupting many past erroneous belief that males perform better than female(abubakar,2010;Eniayeju,2010).The world is fast changing due to Science and technology hence the emphasis on Science Technology and Mathematics.

This study sought to find out the contributory effect of age and gender on students academic performance of Mathematics and Science students of Federal College of Education (Technical) ,omoku ,Rivers State ,Nigeria

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 Mathematics and Science students ?

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

3.What is the joint contribution of the two predictor variable to students' academic achievement in Mathematics and Science?

RESEARCH HYPOTHESIS

H_{01} :There is no significant difference in the academic performance of female and male mathematics and science 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 students of Federal College of Education (Technical),Omoku, Rivers state ,Nigeria. The college is a technical college that has five (5) Schools: Technical Education, Vocational Education, Science Education ,Buisness Education and School of Education. School of Science Education students was purposively sampled out due to the nature of the study. The academic session of 2007/2008 was selected for the study. School of Science has five (5) departments :Integrated Science ISC, Mathematics MAT, Chemistry CHM, Physics PHY and Computer COMP. Computer department serves as the technical department to all the remaining four department, so, each science student has prefixes: ISC/COMP,MATHS/COMP,CHM/COMP AND PHY/COMP. In 2007/2008 academic session, ISC recorded One hundred and forty-five students; Mathematics recorded seventy-eight (78) students ,Chemistry department had seventy-six (76) students while Physics recorded thirty-three (33) students. So, all the three hundred and thirty-two (332) Mathematics and Science students constituted the sample for the study.

Data collection

The study employed secondary data for the study. Data was obtained from School of science Education data records and the admissions unit of the College. The

college approved result that reflects each students session cumulative grade point average CGPA were obtained from School of Science record data base. For the records ,CGPA of students is the cumulative Grade point average divided by the cumulative credit unit of all the courses registered and taken by each student for first and second semester. Age and gender of the students were obtained from the admissions unit of the college.

Data Analysis

The age, gender and CGPA of each student were entered into a data base .The statistical package SPSS was used for the comparative analysis. Mean, standard deviation and scatter plot were utilized for the descriptive statistics. Inferential statistics was established using bivariate correlation, univariate analysis of Variance ANOVA,T-test, Z-test and multiple regression analysis. The scatter plot of the variables revealed a linear relationship ,hence Pearson's correlation was used to determine the significance of the relationship between the predictors age, and gender and the dependent variable CGPA.

Results are as presented below

Table 1: Percentage Gender composition of Mathematics and Science Students

Department	female	%	Male	%	Total
ISC/COMP (06)	115	79	30	21	145
MAT/COMP(07)	38	49	40	51	78
CHM/COMP(08)	55	72	21	28	76
PHY/COMP(09)	15	45	18	55	33
TOTAL	223	67	109	33	332

Research Question 1

Are there any relationship between gender ,age and academic achievement of Mathematics and Science students ?

Table 2: Correlation matrix of age, gender and CGPA

Variables	CGPA	Age	Gender
CGPA	1		
Age	0.030	1	
Gender	0.111*	-0.006	1

*Correlation significant ($P < 0.05$)

Research Question 2

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

Table 3: Percentage contribution of Age, Gender on CGPA

	Age	Gender
Multiple R	0.030	0.111
R square (R^2)	0.001	0.012
% Contribution	0.1	1.2

Table 3 revealed that Age contributed only 0.1% to the variance observed in CGPA while Gender contributed 1.2%.

Table 4:Relative contribution of each of the variables and their significance

Variables	Standard Error	Beta values	t	Significance
Age	0.014	0.031	0.559	0.577
Gender	0.104	0.111	2.036	0.043

Research Question 3

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

Table 5: Summary of the Multiple Regression Analysis

ANOVA [b]
Multiple R=0.115[a]
R square =0.013
Adjusted R square= 0.007
Standard Error= 0.89134

ANOVA [b]

	Sum of squares	df	Mean square	F	Significance
Regression	3.529	2	1.764	2.221	0.110 [a]
Residual	261.384	329	0.794		
Total	264.913	331			

a. Predictor (constants), Age, Gender

b. Dependent Variable: CGPA

Results in Table 5 revealed that the combination of the two independent variables age and gender yielded a multiple regression (R) of 0.115 with the dependent variable CGPA.

Research Hypothesis

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

Table 6:Mean, standard deviation and z-analysis of Mathematics and Science students

Gender	N	min	max	mean	std	Z_{cal}	Z_{crit}	Decision
Female	242	0.27	4.58	2.18	0.87	-1.76	1.96	Accepted
male	123	0.67	4.59	2.36	0.98			

Result from Abubakar and Uboh (2010)

Discussion of Findings

Table 1 revealed the gender composition of Mathematics and Science students.ISC department recorded the highest enrolment with one hundred and fifteen female at 79% composition and 21% male followed by Chemistry department that recorded 72% female out of it's seventy-six (76) total enrolment. Mathematics

department recorded 51% males and 49% female while Physics recorded the lowest enrolment and gender composition of 15:18 female to male percentage ratio. Overall, school of Science had 67% female enrolment and 33% male enrolment.

Table 2 revealed that predictor variable of age had lower positive correlation than gender with their dependent variable CGPA. However, gender revealed a significant correlation with student CGPA. Gender had a negative correlation with age which was not significant .This implied that both age and gender were positively related to CGPA of the students. Abubakar (2010) earlier also recorded a positive but insignificant correlation between age gender and CGPA of Mathematics students of F.C.E (Technical) in the 2007/2008 academic session. Owolabi and Etuk-Iren (2009) however, found out that the best correlates of students performance in Pre-NCE Mathematics in F.C.E.(Tech.),Akoka, Lagos was the Continuous assessment score.

From Table 3,it was evidently revealed that age is insignificant as it relates to CGPA ,it was responsible for 0.1% of variance in performance of Mathematics and Science students while gender was responsible for 1.2 % of the variance. Owolabi and and Etuk-Iren (2009) recorded a similar result where gender was responsible foe 1.3% of the variance in the performance of two hundred and thirty-three (231) Pre-NCE Mathematics students of F.C. E (Technical), Akoka, Lagos state. Abubakar (2010) however recorded a 0% variance contribution in the CGPA of Mathematics students of F.C.E.(T),Omoku, Rivers state, Nigeria.

From Table 5,neither age nor gender contributed significantly to the varianceof CGPA of the students.The combined influence and contributions of the variables can be presented thus:

$Y = 0.031x_1 + 0.111 x_2$

Where x_1 = age ,x_2 = gender   and y = CGPA

Olayemi (2010) in his study recorded a statistically significant contribution of only average score in Mathematics AVM as a predictor of academic performance in Physical Chemistry using Year II and III chemistry NCE students of F.C.E.(Technical),Lagos, Nigeria during the 2006/2007 session among nine other predictor variables of chemistry score, attitude to Mathematics ,Course combination, gender, Senior secondary examination SSE Mathematics, NCE grade in Mathematics ,SSCE grade in Chemistry, National examination council NECO grade in Chemistry and mode of entry.

From Table 5, the predictor variables jointly accounted for 1.3% of the variance observed in students CGPA, result however was not significant. Olosunde and Olaleye (2009) found that combined effect of nine independent variables yielded a multiple regression explaining 63.4% of the variance in female students achievement in Mathematics. However, Owolabi and Etuk-Iren (2009) in their study using predictor variables of : Mathematics Performance Test, Mathematics continuous Assessment score and course of study jointly accounted for 24% of the Pre-NCE Mathematics performance Test. Wilson and Cameson (2011) found a statistically significant but relatively small achievement differences between oldest and youngest children when cognitive ability scores were controlled using three hundred and thirteen students. Ajayi and Muraina (2011) reported that social economics status predictor variable of

Parents education, occupation and real mothers age jointly produced 0.3% variance but was significant on academic performance of students in Ogun state in Nigeria. Similarly, Habibollah et al(2009) discovered that creativity ,age and gender jointly accounted for 0.143 of the variance in GPA of Iranian undergraduate students in Malaysian Universities.

Table 6 showed that male student had the highest CGPA of 4.59 while a female had the lowest CGPA of 0.27.Student with CGPA less than one repeats the level, hence, from ISC, eleven students repeated, Mathematics had five repeaters .Chemistry and Physics recorded one repeaters each .The age range for both male and female was between 15 -37 years. Hypothesis formulated was accepted ,hence, no significant difference in the academic performance of female and male Mathematics and Science students of F.C.E.(T.),Omoku. Abubakar(2010) recorded a similar gender result with only Mathematics students in the same session. Habibollah et al (2009) also recorded no significant gender difference in CGPA in their study.

Conclusion and Recommendation

Evidently from the study is the fact that during the 2007/2008 academic session of F.C.E (Technical),Omoku, Rivers state, Nigeria, age gender was a predictor of the academic performance (CGPA) of Mathematics and Science students. However, gender was a better predictor. Both age and gender jointly accounted for 1.3% of the variance in the students CGPA..The session also recorded no significant gender difference in CGPA of the students. In the general academic performance of the student, eighteen students out of the three hundred and thirty-two students used for the study had to repeat their level implying a 95% success rate in the academic performance of the students. This present study can be carried out in sister colleges to establish an affirmative or refutive result .Also, more variables can be included to detect what most significantly and effectively contribute to mathematics and science students academic performance.

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