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EMERGING MYTHS AND REALITIES IN TEACHING AND LEARNING

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Abstract

One of the key points in Late President Yar'adua's 7- point agenda is the accomplishment of qualitative and functional Education. This can be monitored through assessing academic achievement of students. Chemistry Education occupies a central position to all disciplines. This study examined the correlates between age and gender on academic achievement (CGPA) of Chemistry students. The study used thirty six (36) females and forty (40) males giving a total of sample seventy eight (76). Scatter – plot, mean and standard deviation were used for the descriptive statistics while univariate analysis of variance (ANOVA) and multiple regression were used for 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 ($r=0.006$ and 0.105) which were not significant. The predictor variables jointly accounted for 1.1% of the variance, age was the better predictor. The null hypothesis tested was accepted implying no significant difference in academic achievements of students. It was suggested that some more variables be included so as to determine significant correlation of students' academic achievement of Chemistry students.

Introduction

On assumption of office on May 29th 2007, late President Musa Yar'adua met a nation with vital infrastructure such as roads, power, water etc in comatose state, while key sectors such as manufacturing, agriculture, education and transport were floundering (Ochiama, 2008). It was against this background that the president unveiled a 7-point agenda which he hoped would put back the economy on track. In his inaugural speech, late Yar'adua had said that his administration would focus "on accelerating economic and other reforms in a way that makes a concrete and visible difference to ordinary people". These, he said are the kernel of what has come to be known as the President's economic blueprint. He enumerated the seven point agenda as: power and energy; food security and agriculture; wealth creation and employment; mass transportation, land reforms; security; qualitative and functional education and pursuance of the rule of law. Qualitative and functional education at all levels of education has been the clamour for educational policy makers since time immemorial.

Chemistry 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 & Eze, 2010; and Abubakar and Uboh, 2010; Ejimaji and Abubakar, 2010). Since Chemistry education is

a compulsory subject in engineering and allied courses for tertiary education, then, there is need for a qualitative and functional Chemistry 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 Chemistry 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 chemistry. Agwagah and Harbor-Peters (1994) reported that gender related differences existed in Chemistry learning and achievement. Busch (1995) reported that female students have significantly lower self-efficacy than males with respect to Chemistry related and other traditionally male dominated subjects including computer. Other researches on inter-relationship of gender and Chemistry have reported no significant gender influence on achievement in Chemistry. Agwagah and Harbor-Peters (1994) have reported that little differences are identified between males and females in Chemistry achievement at ages 9 through 13 years but at age 17, females perform poorer than the males. Tenzin (2002) reported that younger students out performed their peers in Chemistry, 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 gender and age on academic achievement of Chemistry students of the 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

The late President Yar'adua's 7-point agenda is to build on the greatest accomplishments of the past few years, concentrate on rebuilding our physical infrastructure and human capital in order to take our country forward. 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. Chemistry 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: age and gender contribute to the academic achievement of chemistry students?

Purpose of the study

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

Research Questions

1. Are there any relationship between gender age and achievement of Chemistry students?

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

3. What is the combined contribution of the two predictor variable to students' academic in Chemistry?

Research Hypothesis

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

Methods

Population and Sample

The population of this study comprised all the chemistry students in the School of Science at the Federal College of Education (Technical), Omoku, Rivers State. From the population, the academic session of 2007/08 was used for this study. The sample consists of seventy-six (76) students made up of forty (40) males and thirty-six (36) females spanning NCE 1, 11, and 111 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 chemistry 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 gender, age and CGPA of each student were entered into a database. The statistical package SPPP was used for the comparative analysis. 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 $\alpha = 0.05$

Results

Results are as presented below

Research Question 1

Are there any relationships between gender age and academic achievement in Chemistry?

Table 1: Correlation matrix of age, gender and CGPA

Variables	CGPA	Age	Gender
CGPA	1		
Age	0.006	1	
Gender	0.104	0.015	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 student's performance and which variable most significantly affect their CGPA?

Table 2: Percentage contribution of Age, Gender on CGPA

	Age	Gender
R - (R)	0.006	0.105
R- square (R^2)	0.000	0.011
% Contributed	0.000	1.100

Table 2 revealed that Age contributed only 0 % to the variance observed in CGPA while Gender contributed 1.1%

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

Variables	Standard Error	beta values	t	Significance
Age	0.021	0.004	0.035	0.972
Gender	0.204	0.105	0.900	0.371

Research Question 3

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

Table 4: Summary of the Multiple Regression Analysis

ANOVA [b]

Multiple R=0.105
R square = 0.011
Adjusted R square = 0.016
Standard error of estimate = 0.80718

model	Sum of square	df	Mean square	F	Significance
Regression	0.529	2	0.265	0.406	0.668 [a]
Residual	47.563	74	0.652		
Total	48.092	76			

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

H01: There is no significant difference in the academic performance of female and male chemistry students of F.C.E (Tech.), Omoku in 2007/08 session.

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

Sex	N	Mean	Std	df	t-cal	t-crit	Decision on hypothesis
Female	36	2.30	4.27	76	0.09	2.0	Accept
Male	40	2.19	5.2				

The result in table 5 revealed that t calculated was 0.09 which is lesser than critical t-value of 2.0 indicating acceptance of H01. Hence, gender was insignificant in the academic performance of chemistry students in the 2007/2008 session.

Discussions

In 2007/2008 session the department of Chemistry/Computer Education, recorded thirty-six females and forty males. The highest and lowest ages for females and males were 35 & 15 years, and 30 & 15years respectively. The highest and lowest CGPA for females and males were 4.58 & 0.65 and 4.53 & 0.88 respectively. Findings from the study revealed that the two predictor variables age and gender had low positive correlation (r=0.006 & 0.105) respectively on CGPA of Chemistry students. However, the result was not significant at 0.05 confidence interval. This imply that both age and gender were positively related to the students. Russell, Barfield, Turnbull, leibach and Pretlow (2008) also record 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, gender was a better contributor to the variance in CGPA of the students at only 1.1% while age 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, Olayami (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 analysis of variance (MANOVA), De Paula and Hlawaty (2004) reported a statistical relationship for their four two-way interaction 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:

$$Y = 0.15\ x - 0.018x_2$$

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 of Science students respectively 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 females 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 Chemistry students. It sought to establish the significance and relational effect of age and gender on Chemistry 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 gender 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 qualitative and functional education at all educational level towards improving the teaching of Chemistry.

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 Chemistry 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 chemistry 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 Chemistry for the attainment of the 7 point agenda of the federal government.

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