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Motivation as a Predictor of Students' Academic Achievement in Secondary School Chemistry in Oyo State, Nigeria

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Abstract:
Academic achievement of Nigerian secondary school students in Chemistry has not been satisfactory to many for nearly a decade now and this is becoming one of the most exigent puzzles facing teachers as well as students which require an urgent solution. Motivation has been recognized as one of the factors that have great impact on academic achievement. Therefore, this study examined the contribution of students' academic motivation in predicting students' academic achievement in Chemistry. The study was carried out in two schools of science (Ipade and Oladipo) in Oyo state. The descriptive survey design was employed for the study. A total number of 150 students which comprised 66 male students and 84 female students were randomly selected from the schools. Data were collected from the participants through the researchers designed questionnaire containing the Motivation Scale (AMS) which consists of 20 items and achievement test in chemistry. The achievement test comprised 20 questions in Chemistry. The data collected were analyzed by correlation and simple linear regression using R software version 3.6.2. The results of the analysis revealed a positive correlation between the motivation and the students' achievement in chemistry, and the students' academic achievement was observed to increase with increase in motivation. It was concluded that high motivation is likely to promote higher academic achievement of the students in Chemistry, while low motivation is also likely to diminish it. Therefore, motivation can be seen as an index for determining the levels of students' achievement in chemistry. This finding should serve as a weapon for every potential chemistry teacher, parents/guardians and students in combating poor academic achievement in Chemistry.

Keywords: Academic achievement, chemistry, correlation, motivation, regression

1. Introduction

The function of education in influencing one's life for good cannot be overemphasized. It is a basis for living a stirring life in this world. Secondary education is the level of education where development of skills and mental faculty begin. The respect for the worth and dignity of the personality, conviction on one's ability to make realistic determinations and equipped with skills and attitudes for effective living and survival, as well as respect for dignity of labour all begin at secondary school(Peter, 2017). Attainment of successive education is predicted by some factors in which academic motivation has been taking into consideration as a significant factor that influences students' academic achievement (Alkıs, 2015; Alucdibi and Ekici, 2012; Guay *et al.*, 2010; Pintrich, 2003).

Lin (2012) expressed motivation as intrinsic desires personal to the individual or which are manifested in the individual while obtaining new knowledge. Student motivation has an influence on every aspect of school life, from attending classes, to academic achievement and to extra-curricular activities. Encouraging the greatest student motivation is extremely important for every teacher in secondary schools especially in today's educational surroundings where schools are continuously under demands for improving academic achievement of the student, responsibility and accountability (Lori, 1996). Students with positive academic motivation usually exhibit desires to learn, involve in learning-related activities and believe that education is important. Positive academic motivation not only helps students to succeed in academically but also helps them to see that learning is worthwhile and vital in all aspects of life. This is because they believe that they can be successful if they try hard, work in order to master the material, and are motivated to improve their performance rather than just do better than other students (Michael, 2009).

The relationships between academic motivation and academic achievement have been determined in many studies. Laur (2017) examined the correlation effect of academic motivation and locality academic achievement in biology among senior secondary school students. Academic motivation as well as locality was reported to exhibit

significantly impact on the academic performance of the students. The findings established the worth of academic motivation on academic achievement of the students. Adepoju (2008) investigated the magnitude of association among motivational variable and academic performance of secondary school students in Oyo state, Nigeria. A high relationship between motivation and academic performance was observed in the study. Bedel (2016) determined impact of academic motivation, academic self-efficacy and attitudes regarding teaching in pre-service early childhood education teachers and the relationships among the dependent and independent variables. Academic self-efficacy was observed in the study as the only meaningful predictor of academic motivation and performance.

Moyosola *et al.* (2013) examined the roles of academic self-efficacy, academic motivation and academic self-concept in predicting secondary school students' academic performance. Academic self-efficacy, academic motivation and academic self-concept were observed to serve as significant predictors of students' academic performance with academic motivation making low significant contribution. The direct effects of intrinsic and extrinsic motivation on learning behaviour; intrinsic and extrinsic motivation and learning behavioural on learning achievement; intrinsic and extrinsic motivation from learned behaviour to learning achievement; and the influence of intrinsic and extrinsic motivation and learning behaviour on the learning achievement of students in biology were investigated by Moses and Mbing (2019). Intrinsic motivation was examined to have a direct effect on learning behaviour, and both were found to affect learning achievement directly. Intrinsic and extrinsic motivation, and learning behaviour were observed to jointly affect the learning achievement of the students in biology. Charles and Harriett (2017) examined the effects of the motivational beliefs and learning strategy on academic performance of Liberian junior and senior high school students. The motivational belief component of extrinsic goal orientation was observed to be most preferred belief while test anxiety is least possessed belief that affect academic performance.

Academic achievement of students in the chemistry examinations has been observed to be low and this is becoming one of the most exigent puzzles facing students as well as teachers which require an urgent solution. Many elements have been identified in expounding the causes of low academic achievement in chemistry and possible solutions to the problem of low academic achievement. However, there is a paucity of a report on the effect of motivation on students' academic achievement in Chemistry in Nigeria. Therefore, this research schemed to uncover the influence of academic motivation as one of the determinants of academic achievement of secondary school students in chemistry in Nigeria. The following questions shall be contending within the study:

- What is the link between academic motivation and academic achievement in Chemistry among secondary school students?
- What is the role of academic motivation on the academic achievement of Secondary School students in Chemistry?

2. Research Methodology

2.1 Research Design
The study used a descriptive survey design that utilized questionnaires to obtain data from the respondents. This design enabled the researchers to establish the relationship between the independent and dependent variables used in the study.

2.2 Participants
The total number of 150 students from Senior Secondary School Two and Three (SSS 2& 3) which consisted of 66 Male and 84 Female students were randomly selected from Ipade and Oladipo schools of science-seventy-five students from each school- in Oyo State, Nigeria.

2.3 Instruments

2.3.1. Students' Motivation
The instrument used for the study of motivation scale was a self-designed questionnaire. The questionnaire consists of 20 items that were statements about various academic motivations with responses anchored based on the four Likert points-Strongly Agree, Agree, Strongly Disagree and Disagree. The reliability of the academic motivation scale was determined by Cronbach alpha and has 0.77. The minimum and maximum scores were 20 and 80 respectively.

2.3.2 Academic Achievement
The academic achievement of students in chemistry was measured through a test base on the chemistry syllabus for senior secondary school students in chemistry. The academic achievement test contains twenty chemistry questions.

2.4. Procedure
The survey forms containing demographic questions, motivation scale and achievement test were administered to the randomly selected respondents. Enough time was given to the respondents to complete the questionnaire and answer the achievement test. The respondents were allowed and encouraged to express their honest feelings without any bias. The questionnaires were retrieved from the respondents immediately after the completion.

2.5. Data Analysis

Pearson moment correlation and linear regression analyses were used for the analysis of the research questions with the aid of R software verson 3.6.2 where motivation acted as independent variable and the students' academic achievement acted as the dependent variable.

3. Results

Variable	Number	Percent (%)
Gender		
Male	66	44
Female	84	56
Total	150	100
Achievement Scores		
Low	50	33.33
Medium	53	35.33
High	47	31.33
Total	150	100
Motivation		
Low	4	2.67
Medium	58	38.67
High	88	58.67
Total	150	100

Table 1: Level of Independent and Dependent Variables (N=150)
Note. Low (mean range = 1.0 – 1.99), (Medium=2.0-2.99) and High (mean range = 3 - 4)

Table 1 shows that 150 students were selected for the study and out of the 150 students, 66 (44%) were male students and 84 (56%) were female students. Thirty-three percent of participants obtained a low achievement scores *(mean range = 1.0 – 1.99)*, 35.33% acquired medium achievement scores *(Medium=2.0-2.99)* and 31.33% *mean range = 3 - 4)* obtained high achievement scores. High and medium motivation were acquired by 58.7% *mean range = 3 - 4)* and 38.7% *(Medium=2.0-2.99)* of participants respectively while 2.7% *(mean range = 1.0 – 1.99)* reported low motivation as depicted in the table.

Variable	Mean	SD	Min	Max	Skewness
Motivation	61.79	8.9	39	94	+0.15
Achievement test	39.17	10.41	12	60	-0.33

Table 2: Descriptive Statistics of Independent and Dependent Variables (N = 150)

Motivation items were estimated to have mean of 61.79 and standard deviation (*SD)* of 8.90 with skewness of +0 .15 while a mean of 39.17 and standard deviation (*SD)* of 10.41 with skewness of -0.33 were evaluated for the achievement test as shown in Table 2.

Pearson correlation	N	Academic achievement	T	P	Lower	Upper
Motivation	148	0.210*	2.616	0.0098	0.025	0.358

Table 3: Descriptive Statistics of Pearson Correlation of Academic Achievement and
Motivation
Correlation Is Significant at the 0.05 Level

The correlation coefficient between motivation and students' academic achievement is shown in Table 3. The correlation coefficient value is 0.210 which suggested the existence of a positive correlation between motivation and students' academic achievement in chemistry. The correlation value is not close to 1 and this indicates a weak link between the independent and dependent variables. The p-value of the test is 0.0098 which is less than the significance level alpha of 0.05 established the significant correlation between motivation and students' academic achievement in chemistry. Figure 1 below reveals the weak relationship between academic motivation and students' academic achievement in chemistry. The value also suggests that the higher the level of students' motivation the higher will be their academic achievement in chemistry and vice versa.
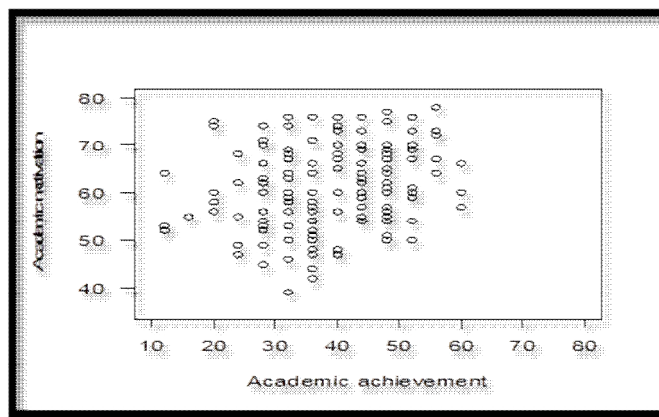
Figure 1: Plot of Motivation against
Student's Achievement in Chemistry

ANOVA					
	Sum of Squares	DF	Mean Square	F	Sig.
Regression	985.111	1	985.111	9.612	0.0023
Residual	15168.383	148	102.489		
Total	16153.493	149			

Table 2: Regression Analysis of Students' Motivation as a
Predictor of Academic Achievement
Multiple R = 0.247; R^2 = 0.061; Adjusted R^2 = 0.055

The fitness of the regression model is measured in Table 2. The F-statistic value is observed to be 5.593 and the Sig value is 0.0023 showing that the regression model fits the data at hand due to the Sig. value which is less than 0.05. The R-value of 0.247 in the table represents the regression coefficient between the independent and dependent variables. The R-square value of 0.061 represents the total variability of the dependent variable as explained by the independent variables (Auwalu *et al.*, 2015). The value revealed that motivation in learning explains 6.1% of the total variability in academic achievement in chemistry.

Model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
(Constant)	21.313	5.820		3.662	0.000	9.813	32.814
Motivation	0.289	0.093	0.247	3.100	0.002	0.105	0.473

Table 3: Regression Coefficient of Students' Motivation as
Predictor of Academic Achievement

The influence of academic motivation on academic achievement is shown in Table 3. The regression coefficient table shows motivation to have a T-statistic value of 3.100 and Sig. value of 0.002. This indicates that motivation is statistically significant.

4. Discussion

Descriptive statistics indicates the means and standard deviations were run with motivation having mean of 61.79 and standard deviation (*SD*) of 8.90 with skewness of +0.15, while achievement test has mean of 39.17 and standard deviation (*SD*) of 10.41 with skewness of -0.33. This shows that motivation is significant in learning. From the pearson correlation analysis which answered the first objective, a positive link between motivation and academic achievement of the students in chemistry was observed with cor. value of 0.210 at Sig. value of 0.0098. The cor. value indicates a weak positive link between motivation and academic achievement in chemistry. This shows that for any upsurge in academic motivation, a positive and low enhancement in the academic achievement of the students in chemistry is envisaged (Abu-Bakar *et al.,* 2010; Auwalu *et al.*, 2015; Sevil, 2018; Mose and Mbing, 2019). The second research objective was answered through Regression analysis where R-squared value of 0.061 and Sig value of 0.0023 were obtained. The R-squared value revealed that motivation contributes only 6.1% to the students' achievement in chemistry. That is, 6.1% of the total variability in students' academic achievement is explained by motivation. From Regression coefficient, the extent to which motivation can predict academic achievement of the students in chemistry is measured by an unstandardized coefficient (Adeyemo, 2001; Greene *et al.*, 2004). When the independent variable is constant, students' academic achievement was predicted to decrease by 21.313%. However, motivation is predicted to increase the academic achievement of the students

by 0.289. This shows that for any increase in academic motivation in the students' learning, academic achievement is envisaged to increase by 2.89%. Consequently, it can be presumed that motivation is one of the predictors of students' academic achievement in Chemistry.

5. Conclusion and Recommendations

The study revealed that students' academic motivation has a positive relationship with their achievement in in Chemistry. This revealed that for a rise in students' motivation there is also possibility of rise in academic achievement of the students in Chemistry. Motivation can be seen as an index for determining the levels of students' achievement in chemistry. As a result of this, promoting students' academic motivation should be priority for every Chemistry teacher in secondary school especially in today's educational atmosphere where students are performing woefully in chemistry. Academic motivation should serve as a weapon for every potential chemistry teacher. Parents or guardians should find ways of motivating their children by creating positive parent-child relationships which are important backgrounds for academic motivation. Motivation should be applied by the students by praising themselves for trying hard and being successful in their study.

6. References

i. Abu-Bakar, K., Tarmizi, R.A., Mahyuddin R., Elias H, Luan W. S. & Ayub, A.F.M. (2010). Relationships between University students" achievement motivation, attitude and academic performance in Malaysia. *Procedia Social and Behavioral Sciences*, 2, 4906–4910.

ii. Adepoju, T. C. (2008). Motivational variables and academic performance of urban and Rural secondary school students in Oyo State, Nigeria. *KEDI Journal of Educational Policy*, 5(2), 23-39

iii. Adeyemo, D.A. (2001). Teachers' job satisfaction, job involvement, career and organizational commitments as correlates of student-academic performance. N*igerian Journal of Applied Psychology,* 6(2), 126-135

iv. Alkıs, N. (2015). The influence of personality traits, motivation and persuasion principles on academic performance (Unpublished Doctoral Dissertation). Middle East Technical University, Ankara. Retrieved from http://etd.lib.metu.edu.tr/upload/12619260/index.pdf

v. Alucdibi, F. & Ekici, G. (2012). The effect of biology teachers' classroom management profiles on the biology course motivation level of the high school students. *Hacettepe University Journal of Education*, 43, 25–36

vi. Auwalu, S. M., Norsuhaily, B., Sadiq, I. M. & Kabara, A. H.(2015). Impact of Motivation on students' academic Performance: A case study of niversiti Sultan Zainal abidin Students. *The American Journal of Innovative Research and Applied Sciences*, 1(6), 221-226

vii. Bedel, E.F. (2016). Exploring Academic Motivation, Academic Self-efficacy and Attitudes toward Teaching in Pre service Early Childhood Education Teachers. *Journal of Education and Training Studies,*4 (1), 2324-8068

viii. Charles, G. & Harriett, P. K. (2017). Student Academic Performance: The Role of Motivation, Strategies, and Perceived Factors Hindering Liberian Junior and Senior High School Students Learning, *Education Research International*, 17, 1-11

ix. Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. *Learning and Individual Differences*, 20(6), 644–653

x. Greene, B.A., Miller, R.B., Crowson, M., Duke, B.L., & Akey, K.L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology*, 29, 462-482

xi. Laur, B. (2017). Achievement among Senior Secondary School Students: A Comparative Study on the basis of Academic Motivation and Locality*. Galaxy International Interdisciplinary Research Journal.*5 (3), 1-13.

xii. Lin, L. C. (2012). Measuring adult learners' foreign language anxiety, motivational factors, and achievement expectations: A comparative study between Chinese as a second-language students and English as a second language students (Unpublished Doctoral Dissertation). Cleveland State University

xiii. Lori, K. B. (1996). Effect of Rewards and Motivation on Student, Grand Valley State University masters project

xiv. Michael, B. B. (2009). Academic Motivation: Strategies for Students. Communiqué *Handout*, 38(1),1-4

xv. Moses, K. T. and Mbing, M. I. (2019). The effect of motivation and learning behaviour on student achievement, *South African Journal of Education*, 39(1), 1-8

xvi. Moyosola, J. A., Abel, O. O. and Gbemisola, M.F. (2013). The Role of Academic Self-Efficacy, Academic Motivation and Academic Self- Concept in Predicting Secondary School Students' Academic Performance, *Journal of Educational and Social Research,* 3 (2), 335-342

xvii. Peter, I. (2017). Problems and Prospects of Secondary Education in Nigeria. *International Journal of Education and Evaluation,* 3 (1), 44-51

xviii. Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–68