

## STUDENTS' MOTIVATION AND ACADEMIC ACHIEVEMENT IN BASIC SCIENCE IN RIVERS STATE, NIGERIA

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### ABSTRACT

*The importance of affective domain in acquisition of scientific knowledge cannot be overemphasized. Hence, the study investigated students' motivation and academic achievement in Basic Science. Quasi experimental research design was adopted for the study and purposive sampling technique was used to select Emohua Local Government Area. Stratified random sampling on basis of school location (urban and rural) was used to select two UBE schools. While simple random sampling by balloting was used to select one hundred (100) JSS2 Basic Science students that participated in the study. Basic Science Achievement Test (BSAT) was used to collect data for the study and the data collected were analyzed by using mean and standard deviation to answer all the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 level of significance. The study found that, students' motivation have significant effect on their achievement mean scores in Basic Science  $P < .05$ . Gender does not have significant effect on achievement mean scores of motivated students in Basic Science,  $P > .05$ . School locations have significant effect on mean scores of motivated students in Basic science  $P < .05$ . The urban motivated students did better than the rural students. Hence, this study recommends that students should often be motivated in order for them to achieve maximally in acquiring Basic Science skills and knowledge. Rural schools should also be well equipped to boast the achievement of students in Basic Science.*

**KEYWORDS:** *Acquisition, Equipped, Balloting, Experimental*

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### INTRODUCTION

In Nigeria education system, Basic Science is a core subject in the junior secondary school level as enshrined in the school curriculum. The purpose is to enable students to acquire basic fundamental knowledge in science and develop skills that can help them to offer sciences and science related courses at higher education level (NERC, 2004) [1]. The impact of Basic Science in enhancing scientific literacy of citizens cannot be overemphasized; as it provides a

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learner with broad view of science which enlightens the learners' interaction with the environment (Wagbara & Egwanwo, 2017) [2].

Despite, the immense importance of Basic Science as the foundation stone which will be laid for students to achieve better science education future at the higher level. The academic achievement of students in Basic Science is still declining (UBEC, 2009) [3]. Odifa (2009) also noted that irrespective of the several efforts made by science educators to improve science education, the skills acquisition and academic achievement of students in science is still low.

In literature, affective domain is also essential for acquisition of scientific knowledge. That indicates that, motivation, attitude and interest may affect students' achievement in Basic Science. Uzoeshi & Iwundu (2014) [4] stated that without motivation, whether intrinsic or extrinsic effective learning cannot take place. Burns (1980) [5] noted that, motivation consist of internal processes that spur us to satisfy some needs.

Furthermore, according to Maslow (1954) [6] motivation is man's quest for self- actualization centred in man's hierarchy of needs. Therefore, motivation which is a factor that can affect achievement in Basic Science could come up from within an individual, such as interest, intelligence, aptitudes, self-confidence, high esteem and meaningfulness. Also, motivation could come from outside the individual, external or environmental factors like; peers, parents, society, church, school, mass media and many others (Uzoeshi & Iwundu, 2014).

Motivation as a propelling force that could stem from within and outside an individual to enable him achieve a goal or stated objectives, can enhance students' academic achievement in Basic Science. Thus, the idea of individual differences has spurred up the feeling that gender may play a role on motivation of students' academic achievement in Basic Science. From the lone, girl children are subjected by their parents to do certain house chores while the boys are allowed to go out to play games of their choice and sometimes indulge in some creative activities. Hence, the up-bringing of children of difference gender could make them be induced or influenced by different categories of motivation (intrinsic and extrinsic) to achieve academic contents in Basic Science. Hence, Njoku (2001) [7] noted that many socio cultural factors jointly and separately depress female interest, participation and achievement in science at all level of education. Okeke (2001) [8] further buttressed this idea of gender difference in motivation with the assertion that, relatively few women venture into men dominated discipline, such as science, technology, engineering and other science based profession.

Also, the probable feeling that the environment could be manipulated so as to bring about good condition of learning has spurred up the feeling that school location could have influence on motivation of students' academic achievement in Basic Science. In line with this context, Alokun & Anjesuyo (2013) [9] notes that many schools in the field of education seem to have shifted studies from measure of individuals to measure of the environment. the reason is due to the probable feeling that environment could be manipulated to bring about optimal good conditions for learning to take place. Wagbara (2015) [10] supported this opinion as he found that rural students did better than the urban students in Chemistry practical skills due to the fact that their laboratories were equipped by multinational companies like Shell and Agip oil while that of the urban schools were ill-equipped by parents teachers association (PTA).

The concern about potential urban-rural differences is a global issue that is not limited to a particular country (Alokan & Adjesuyo, 2013). Hence, it becomes pertinent to determine how school location could as well influence students' motivation and academic achievement in Basic Science.

### **Purpose of the Study**

The main purpose of the study was to investigate students' motivation and academic achievement in Basic Science. Specifically, the study sought to determine the:

1. Effect of motivation on students' academic achievement in Basic Science.
2. Gender effect of motivation on students academic achievement in Basic Science.
3. School location effect of motivation on students' academic achievement in Basic Science.

### **Research Question**

1. What are the mean achievement scores of the motivated and the unmotivated students in Basic Science?
2. What are the mean achievement scores of the motivated males and females in Basic Science?
3. What are the mean achievement scores of the motivated urban and rural students in Basic Science?

### **Hypotheses**

The following null hypotheses which were tested at .05 level of significance guided the study.

1. Students' motivation does not have significant effect on their achievement mean scores in Basic Science.
2. Gender does not have significant effect on achievement mean scores of motivated students in Basic Science
3. School location does not have significant effect on achievement mean scores of motivated students in Basic Science.

### **Methodology**

Quasi experimental research design was adopted for this study. The research study was carried out in Emohua Local Government Area in Rivers State central educational zone in Nigeria. A sample size of one hundred (100) JSS 2 Basic Science students, comprising (52) males and (48) females participated in the study. The purposive sampling technique was used to select Emohua Local Government Area out of the twenty three (23) local Government Areas in Rivers

State. Stratified random sampling on basis of school location (urban and rural schools) was used to select two (2) UBE schools out of 24 UBE Junior Secondary Schools in Emohua Local Government Area. Two intact classes of JSS2 Basic Science students were used for each of the groups (to form a total of 4 intact classes) for the study. Simple random sampling by balloting was used to select 100 students that participated in the study. Basic Science Achievement Test (BSAT) was used to collect data for the study. The data collected were analyzed by using mean

and standard deviation to answer all the research questions while the Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 level of significance.

**Results**

**Research Question I**

What are the mean achievement scores of the motivated and unmotivated students in Basic Science?

**TABLE I: MEAN AND STANDARD DEVIATION SCORES OF MOTIVATED AND UNMOTIVATED STUDENTS IN BASIC SCIENCE**

Motivation Group s	N	Pretest Mean SD	Post Test Mean	Mean Gain
Experimental	50	9.14	17.74	8.6
Control	50	8.94	16.52	7.58
Mean Diff			1.04	

Table I shows that, the mean score of the pretest in the experimental group was 9.14 with associated standard deviation of 1.37, while the mean score of the posttest was 17.74 with associated standard deviation of 1.04. In the control group, the pretest had a mean score of 8.94 with associated standard deviation of 1.49 whereas, the mean score of post test was 16.52 with associated standard deviation of 1.97. The mean gain of the experimental group was 8.6 and that of the control group was 7.58. This shows that, the experimental group had a higher mean than the control group with mean difference of 1.04. This indicates that, the motivated students did better than the unmotivated students in Basic Science.

**Hypothesis I**

Students’ motivation do not have significant effect on their academic achievement mean scores in Basic Science

**TABLE 2: ANALYSIS OF COVARIANCE (ANCOVA) OF THE EFFECT OF STUDENT’S MOTIVATION ON THEIR ACADEMIC ACHIEVEMENT MEAN SCORE IN BASIC SCIENCE**

Source	Type III sum of squares	df	Mean square	F	Sig.
Corrected model	1031.163 <sup>a</sup>	2	22.084	9.033	.000
Intercept	572.381	1	572.381	234.124	.000
Pretest	6.951	1	6.957	2.846	.095
Group	34.801	1	34.801	14.235	.000
Error	237.143	97			

Total	29625.000	100
Corrected total	281.310	99

a. R Squared = 157 (Adjusted R squared = 140)

The result of Table 2 was used to determine whether students' motivation have significant effect on their academic achievement mean scores in Basic Science.

Table 2 shows that an F-ratio of 14.235 with associated probability value of .00 were obtained. The probability value of .00 was compared with .05 and it was found to be significant because .00 was less than .05 ( $P < .05$ ). The null hypothesis one was therefore rejected and inference drawn that, students' motivation have significant effect on their achievement mean scores in Basic Science.

### Research Question 2

What are the mean achievement scores of the motivated male and female students in Basic Science?

**TABLE 3: MEAN AND STANDARD DEVIATION SCORES OF THE MOTIVATED MALE AND FEMALE STUDENTS IN BASIC SCIENCE**

Gender	N	Pretest		Post Test		Mean Gain	Mean
		Mean	SD	Mean	SD		
Male	52	9.33	1.41	17.17	1.75	7.84	
Female	48	8.70	1.42	17.00	1.75	8.30	
	Mean Diff					0.46	

Table 3 shows that, the mean score of the males in the pretest group was 9.33 with associated standard deviation of 1 whereas, the mean score of the males in the posttest group was 17.17 with associated standard deviation of 1.75

The females of the pretest group had a mean score of 8.70 associated standard deviation of 1.42 while the mean score of the posttest group was 17.00 with associated standard deviation of 1.75. The score gain of the males was 7.84 while that of the females was 8.30. This shows that, the females had a higher score gain than the males with mean difference of 0.46. this indicates that the motivated females did better than the males.

### Hypothesis 2

Gender does not have significant effect on achievement mean scores of motivated students in Basic Science.

**TABLE 4: ANALYSIS OF COVARIANCE (ANCOVA) OF THE EFFECT OF GENDER ON ACHIEVEMENT MEAN SCORE OF MOTIVATED STUDENTS IN BASIC SCIENCE**

Source	Type III sum of squares	DF	Mean square	F	Sig.
Corrected model	8.590 <sup>a</sup>				
Intercept	494.688	1	494.688	162.403	.000
Pretest	7.033	1	7.033	2.309	.132
Gender	1.281	2	3.046	.210	.811
Error	292.410	96			
Total	2542.000	100			
Corrected total	301.000	99			

a. R Squared = 157 (Adjusted R squared = 140)

The Table 4 was used to determine whether gender has effect on academic achievement of motivated students in Basic Science. Table 4 shows that an F-ratio of .210 with associated probability value of .811 were obtained. The probability of .811 was compared with .05 and it was found not to be significant because .118 was greater than .05 ( $P > .05$ ). The null hypothesis two (HO2) was therefore accepted and inference drawn, gender does not have significant effect on academic achievement mean score of motivated students in Basic Science.

### Research Question 3

What are the mean achievement scores of the motivated urban and rural students in Basic Science?

**TABLE 5: MEAN AND STANDARD DEVIATION SCORES OF THE MOTIVATED URBAN AND RURAL STUDENTS IN BASIC SCIENCE**

Location	N	Pretest		Post Test		
		Mean	SD	Mean	SD	
Urban	50	9.14	1.37	17.80	1.08	8.36
Rural	50	8.94	1.50	16.54	2.05	7.6
	<b>Mean Diff</b>					<b>0.7</b>

Table 5 shows that, the mean score of the urban students in the pretest group was 9.14 with associated standard deviation of 1.37 while, the mean score of the urban students in the posttest group was 17.80 with associated standard deviation of 1.08. The rural students of the pretest group had a mean score of 8.94 with associated standard deviation of 1.50 whereas, the mean score of the posttest group was 16.54 with associated standard deviation of 2.05. The result in the Table 5 shows that, the urban students had a higher score gain than the rural students with a mean score gain difference of 0.7.

### Hypothesis 3

School location does not have significant effect on achievement mean scores of motivated students in Basic Science.

**TABLE 6: ANALYSIS OF COVARIANCE (ANCOVA) OF THE EFFECT OF SCHOOL LOCATION ON ACADEMIC ACHIEVEMENT MEAN SCORES OF MOTIVATED STUDENTS IN BASIC SCIENCE**

Source	Type III sum Of squares	df	Mean square	F	Sig.
Corrected model	42.080 <sup>a</sup>	2	21.040	7.789	.001
Intercept	634.730	1	634.730	234.969	.000
Pretest	2.390	1	2.390	.885	.349
Location	38.146	1	38.146	14.121	.000
Error	262.030	97	2.701		
Total	29785.000	100			
Corrected total	304.1110	99			

a. R Squared = 138 (Adjusted R squared = 121)

The result of Table 6 was used to determine whether school location have significant effect on motivated students' academic achievement mean scores in Basic Science.

Table 6 shows that an F-ratio of 14.121 with associated probability value of .00 were obtained. The probability value of .00 was compared with .05 and it was found to be significant because .00 was less than .05 (HO<sub>3</sub>, was therefore rejected and inference drawn that school location have significant effect on achievement mean score of motivated students in Basic Science.

## DISCUSSION

The result of Analysis of Covariance used in testing hypothesis one was shown in Table 2 and yielded an F-ratio of 14.24 with associated probability value of .00. The result showed that  $P < .05$  which indicates that students motivation had significant effect on their academic achievement in Basic Science. Hence, the null hypothesis one (HO<sub>1</sub>) which states that, student's motivation do not have significant effect on their academic achievement mean scores in Basic Science was rejected. The findings of this study agree with the findings of Wegbo (2014) [11] and Newlife (2016) [12] as they stated that the students who were motivated performed better than those who were not motivated.

This study have confirmed that motivation have significant effect on students' academic achievement in Basic Science.

Table 4 shows that, an F-ratio of .210 with associated probability value of .811 were obtained. The result of this study in Table 4 shows that, gender does not have significant effect on achievement mean scores of motivated students in Basic Science as  $P > .05$ . hence, the null hypothesis two (HO<sub>2</sub>) was accepted. The findings of this study disagree with the findings of Wegbo (2014) and Newlife (2016) as they stated that, the motivated females performed significantly better than their male counterparts. This study confirmed that gender does not have significant effect on achievement mean scores of motivated students in Basic Science.

In Table 6, it was shown that an F-ratio of 14.12 and associated probability value of .00 were obtained. The result of this study in Table 6 shows that school location have significant effect

on motivated students' academic achievement mean scores in Basic Science as  $P < .05$ . Hence, the null hypothesis three (HO3) was rejected. The findings of this study did not agree with the findings of Ukah (2013) [13] which stated that, there is no significant difference in the mean ratings of urban and rural teachers on the use of outdoor education in teaching the topics in primary 8 Basic Science and Technology curriculum that requires outdoor activities. However, this study have confirmed that, school location have significant effect on achievement mean scores of motivated students in Basic Science.

## CONCLUSION

Firstly, the result of this study has shown that students' motivation have significant effect on their academic achievement mean scores in Basic Science. The motivated students performed better than the unmotivated students in Basic Science. Secondly, the result of the study found that gender does not have significant effect on academic achievement mean scores of motivated students in Basic Science. The males and females had equal mean scores in Basic Science. Hence, no group performed better than the other. Thirdly, the result of this study have shown that school location had significant effect on academic achievement of motivated students in Basic Science. The mean score of the urban students was higher than that of the rural students which shows that the urban motivated students performed better than the rural motivated students in Basic Science.

## Recommendations

Based on the findings of this study, the following recommendations were made:

1. The teachers should use motivational approaches like using the principles of reinforcement to encourage effective participation of students in the classrooms. Incentives should be given to Basic Science students as a way of arousing their interest in learning, rewards could be given to the best performed students in Basic Science examinations as a form of motivation for the students.
2. All Basic Science students should be given equal attention and treatment in the teaching and learning of Basic Science irrespective of their gender as this study have confirmed that both males and females learn at equal capacity. The male and female students should be optimally motivated in the teaching and learning of Basic Science.
3. This study found that, the urban schools did better than the rural schools. Hence, treatment like provision of more amenities and teachers should be done on rural schools to improve the students' academic achievement in Basic Science in rural schools.

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