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INFLUENCE OF SCHOOL VARIABLES ON ACADEMIC ACHIEVEMENTS OF SENIOR SECONDARY SCHOOL BIOLOGY STUDENTS IN TARABA STATE, NIGERIA

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ABSTRACT

The study, investigated influence of school variables on academic achievements of senior secondary school biology' students in Taraba State, Nigeria. The design of the study was ex post- factor. The population of the study consisted of all SSIII Biology students in Jalingo Education Zone, with population of 8,748 students. The sample size of the study was 2,400 from six Public and six private secondary schools in Jalingo Education Zone. The student's WAEC biology academic achievement in Taraba State (proforma) 2013-2017 formed the instrument for data collection. It was validated by three experts from the Department of Environmental and Life Sciences Education, Modibbo Adama University of Technology, Yola. Four research questions and five null hypotheses were used to guide the study. Descriptive statistic of mean score was used to answer the research questions. The t-test inferential statistic was used to test the hypotheses 14 while ANOVA was used to test hypothesis five at 0.05 level of significance. The following findings were recorded; Urban Secondary School Biology Students performed significantly better than their counterpart in Rural Secondary Schools in Jalingo Education Zone of Taraba state (t= 3.81, p= 0.00), Students in Small class size performed significantly higher than their counterparts in large class size in Jalingo Education Zone of Taraba state (t= 3.98, p= 0.00), Students in schools with well-equipped laboratory performed significantly better than students in schools with poorly equipped laboratory in Jalingo Education Zone of Taraba state (t= 3.81, p= 0.04), Students in Private and Public School performed equally(t= -0.29, p= 0.99), and there was no significant cumulative effect of School variables (school laboratory, class size, School Ownership and School location) on biology academic achievement (F=1.12 sig.= 0.29). The study recommended that government and other school proprietors should bridge the gap between the rural and urban school locations by providing both the urban and rural dwellers the social amenities which will enhance better academic achievement of biology students. Likewise, enough grants to school owners to equip laboratories with chemicals and apparatus.

KEYWORDS: School Variables, School Location, School Ownership, School Laboratory, Class Size, Academic Achievement

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INTRODUCTION

The world has become scientific in thinking and reasoning such that without scientific knowledge, people will find it difficult to function effectively in the society. To obtain scientific knowledge, students need to pass through school. The school is a social and learning agent that provides the environment in which a child may be formally educated in order to attain educational goals. Humans, have unlimited capacity to learn, however they may be limited by the behavior patterns and facilities that the immediate environment offers. According to Umoh (2006), nature only provides the raw materials in form of potentials, but it is the environment that determines the extent of development.

The location and availability of educational resources at the disposal of the students in terms of school variable affect their level of academic achievement. A school located in rural area, will have all the characteristics of a rural environments. Similarly, an urban school will have an environment-based activity peculiar to its environments but different from a rural location. Thus, as the school location differs, the level of academic achievement may also differ. (Pascarella & Terenzini in Amannah, Okwelle & Wokocha, 2014). In the same vein, Ayeni (2016), posited that school location influences students' academic achievement in urban area than those in rural areas. Ayeni stated that the students in urban area were exposed to better learning facilities than their rural counterparts. This helped them to be more academically sound than the students in the rural areas.

Class size has both negative and positive effect on the academic achievement of students. The class with highly populated students, with fewer teachers may result in teachers not being able to monitor the achievement of the students and thus result to poor academic achievement. Therefore, it can be seen that a smaller class size with a qualified teacher tends to pave way for better students' Academic outcome compared to a larger class size (Nnaji, 2009). The population of students in a biology class should not be more than the capacity of the teacher, that is small biology class size (35-40 students) enhance better academic achievement among the students (Diovu, 2006).

The laboratory is an important facility for instruction in Biology teaching and learning. The Biology laboratory, which plays such an important role provides the students with a vast amount of special equipment. Making use of all this equipment would require a high level of preparedness on the part of the students and teachers. At this point, it is crucial that teachers should make efforts to employ the latest instructional techniques that are capable of eliciting and sustaining the interest of the students in the subject. Adeyemi (2008), reported that inadequate laboratory facilities, students' attitude towards the Biology which they perceived as difficult and ineffective methods of teaching, teacher-centered rather than student-centered teaching methods are responsible for poor achievement. Adeyemi also traced the poor achievement of students in practical Biology to teachers' inability to take the candidates through practical sessions in the laboratory. There is inadequate provision of science laboratories and equipment in many secondary schools (Adeyemi, 2008).

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The ownership of school in Nigeria which could be viewed as controlling force in terms of the administration of the school could be divided into two broad ownership structures which are the public and private ownership. The public schools are established and owned by the government while private schools are those established and owned by individuals, organization and mission bodies. (Eze, 2010). The public schools are equipped with school facilities, well qualified teachers. All the facilities are used and maintained by the management but abandoned after being found faulty, which in turn affects the academic achievement of students while schools owned by private individuals or bodies always maintain their school facilities after use, which in turn improves the academic achievement of the students (Abati, 2009).

It is against this background that the researcher seeks to determine the influence of school variables (school location, class size, school laboratory and school ownership), on the academic achievement of Senior secondary school students in Biology in Taraba State.

The West Africa Senior School Certificate Results in Biology for the year 2013 -2017 (Taraba State Resource Centre, 2013- 2017) revealed that most of the students performed poorly in Biology examination compared to other science subjects like physics, chemistry and agricultural science. It becomes necessary for the researcher to find out the level to which school laboratory, school location, class size and school ownership contribute to this poor achievement in Taraba Senior Secondary School.

The continued poor performance of students due to these school variables, if unchecked will rob the state from joining other educationally and economically viable states in the nation.

RESEARCH QUESTIONS

The following research questions were raised to guide the study:

1. What are the mean achievement scores of Biology Rural and Urban Secondary School Students of Taraba State?

2. What are the mean achievement scores of Biology small and large class sizes of Taraba State?

3. What are the mean achievement scores of Biology in schools with well-equipped laboratory and those with poorly equipped laboratory in Taraba State?

4. What are the mean achievement scores of Biology students in public and private secondary schools in Taraba State?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

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1. **H0**$_1$ There is no significant difference in the mean achievement scores of senior secondary Biology students in urban and rural schools in Taraba State.
2. **H0**$_2$: There is no significant difference in the mean achievement scores of senior secondary Biology students taught in a small class size and those taught in large class size.
3. **H0**$_3$: There is no significant difference in the mean achievement scores of Biology students taught in a school with a well-equipped laboratory and those taught in a school with a poorly equipped laboratory.
4. **H0**$_4$: There is no significant difference in the mean achievement scores of senior secondary Biology students attending public and private schools in Taraba State.

METHODOLOGY

The study adopted the ex post facto research design aimed at determining the influence of school variables on secondary school students' academic achievements in biology in Taraba state.

The area of the study is Taraba state, the population of the study consists of all senior secondary school (SS III) biology students in Jalingo education zone, with population of 8,748 students which had sat for biology WAEC examination from 2013-2017 (Taraba state education resource centre 2013-2017). The sample comprises of 2,400 SS111 Biology students from 12 secondary schools in Jalingo Education zone using stratified random sampling. The instrument used for data collection was Proforma, used in collecting 2013-2017 students' WAEC biology academic achievement results. The Proforma was used to collect data on the students WASSCE results in biology.

RESULTS

Research Question 1. What are the mean achievement scores of Biology Rural and Urban Secondary School Students of Taraba State?

Table 4.1: Mean and Standard Deviation of Biology Students Academic Achievements of Urban and Rural Secondary Schools in Taraba State.

	Variable School Location	N	Mean	Std. Deviation	Mean Gain
Academic Achievement	Urban	1200	55.79	13.42	0.86
	Rural	1200	51.17	13.06	0.84

The descriptive statistics in Table 4.1 Shows that, urban students are 1200 in number with mean score of 55. 79 and standard deviation of 13.42, while the rural students with sample size of 1200 has a

means score of 51.18 with standard deviation of 13.06. This indicates that, urban students performed better with mean difference of 4.61.

Research Question 2. What are the mean achievement scores of Biology small and large class sizes of Taraba State?

Table 4.2: Mean and Standard Deviation of Biology Students Academic Achievements of students from small and large Class Sizes

	Class Size	N	Mean	Std. Deviation	Mean Gain
Academic	small class	1515	55.32	13.46	0.77
Achievement	large class	885	50.33	12.81	0.96

The descriptive statistics in Table 4.2. Shows that, students in small class are 1515 in number with mean score of 55. 32 and standard deviation of 13.46, while students in the large class size with sample size of 885 has a mean score of 50. 34 with standard deviation of 12.81. This indicates that, small class performed better with mean difference of 5.02.

Research Question 3. What are the mean achievement scores of Biology in schools with laboratory and those without laboratory in Taraba State?

Table 4.3: Mean and Standard Deviation of Biology Students Academic Achievements on Well-Equipped Laboratory and Poor Equipped Laboratory.

	School Laboratory	N	Mean	Std. Deviation	Mean Gain
Academic Achievement	well-equipped lab	1000	55.54	13.46	0.95
	poorly equipped lab	1400	52.01	13.23	0.79

The descriptive statistics in Table 4.3, Shows that, well equipped lab class are 1000 in number with mean score of 55. 55 and standard deviation of 13.47, while the poorly equipped class with sample size of 1400 has a means score of 50. 01 with standard deviation of 13.24. This indicates that, well equipped lab performed better with mean difference of 3.54.

Research Question 4. What are the mean achievement scores of Biology students in public and private secondary schools in Taraba State?

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Table 4.4: Mean and Standard Deviation of Biology Students Academic Achievements of students from Private and Public School.

	School Ownership	N	Mean	Std. Deviation	Mean Gain
Academic Achievement	Private	1515	53.47	13.62	0.78
	Public	885	53.50	13.13	0.98

The descriptive statistics in Table 7. Shows that, private school group are 1515 in number with mean score of 53.47 and standard deviation of 13.62, while the public-school group with sample size of 885 has a means score of 53. 01 with standard deviation of 13.14. This indicates that, private and public schools performed almost equally with slight mean difference of 0.04 in favour of public schools.

Hypothesis 1

$H0_1$ There is no significant difference in the mean achievement scores of senior secondary Biology students in urban and rural schools in Jalingo Educational Zone Taraba State.

Table 4.5: Summary of t-test analysis of students from urban and rural school in Jalingo Education Zone of Taraba State.

	School Location	N	Mean	SD.	T	DF	P
Academic	Urban	1200	55.79	13.42			
Achievement	Rural	1200	51.17	13.06	3. 81	478	0.0

The results of the analysis in Table 4.5 revealed that, there is a significant difference between Urban school and Rural school t = 3.81 (DF 478), P = 0.00. Since the computed p-value (0.00) is less than 0.05 level of significance, the null hypothesis of no significant difference is rejected, meaning there is significant difference between urban school and Rural school on students' academic achievement in biology in favor of urban school in Jalingo Education Zone in Taraba State.

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Hypothesis 2

$H0_2$: There is no significant difference in the mean achievement scores of senior secondary Biology students taught in a small class size and those taught in large class size in Jalingo Educational Zone of Taraba State.

Table 4.6: Summary of t-test analysis of students from small and large Class Sizes in Jalingo Education Zone of Taraba State

	Class Size	N	Mean	SD	T	DF	P
Academic Achievement	small class	1515	55.32	13.46			
	large class	885	50.33	12.81	3.98	478	0.00

The results of the analysis in Table 4.6 revealed that, there is a significant difference between small size class and large size class t = 3.98 (DF 478), P = 0.00. Since the computed p-value (0.00) is less than 0.05 level of significant, the null hypothesis of no significant difference is rejected, meaning there is significant difference between small size class and large size class on students' academic achievement in biology in favour of small size class.

Hypothesis 3

$H0_3$: There is no significant difference in the mean achievement scores of Biology students taught in a school with a well-equipped laboratory and those taught in a school with a poorly equipped laboratory in Jalingo Educational Zone of Taraba State.

Table 4.7: Summary of t-test analysis of students from well-equipped laboratory and poorly equipped laboratory in Jalingo Education Zone of Taraba State

	School Laboratory	N	Mean	Std. Deviation	T	DF	P
Academic Achievement	well-equipped lab	1000	55.54	13.46			
	poorly equipped lab	1400	52.01	13.23	2.86	478	0.04

The results of the analysis in Table 10 revealed that, there is a significant difference between well-equipped lab and poorly equipped t = 2.2.86 (DF 478), P = 0.04. Since the computed p-value (0.04) is less than 0.05 level of significant, the null hypothesis of no significant difference is rejected,

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meaning there is significant difference between well-equipped lab and poorly equipped on students' academic achievement in biology in favour of well-equipped lab class.

Hypothesis 4

HO_4: There is no significant difference in the mean achievement scores of senior secondary Biology students attending public and private schools in Taraba State in Jalingo Educational Zone of Taraba State.

Table 4.8. Summary of t-test analysis of students from well-equipped laboratory and poorly equipped laboratory in Jalingo Education Zone of Taraba State

	School Ownership	N	Mean	SD.	T	DF	P
Academic Achievement	Private	1515	53.47	13.62			
	Public	885	53.50	13.13	0.29	478	0.978

The results of the analysis in Table 4.8 revealed that, there is significant difference between private and public school's t = -0.29 (DF 478), P = 0.98. Since the computed p-value (0.98) is greater than 0.05 level of significant, the null hypothesis of no significant difference is upheld, meaning there is no significant difference between private and public schools on students' academic achievement in biology.

FINDINGS

Based on the data collected and analyzed the following findings were summarized;

1. Urban secondary school Biology students performed significantly than Rural secondary school students in Jalingo Education zone of Taraba state

2. Students from Small size performed significantly than large size classes in Jalingo Education zone.

3. Students in schools with well-equipped laboratory performed significantly better than students in schools with poorly equipped laboratory in Jalingo Education zone of Taraba state

4. Students in private and public school performed equally in Jalingo Education zone of Taraba State.

CONCLUSION

An important implication that could be drawn from this study in terms of School Location, class size, and school laboratory is that the study has proven that:

1. all the school variables have a significant difference in academic achievement of biology students in Jalingo educational zone while school ownership has no significant difference in academic achievement of biology in Taraba State. In other words, students in urban locations have learning advantage than students in rural locations,

2. Likewise, student in small class size has a better academic achievement than student in large class

3. In terms of school laboratory (well-equipped and poorly equipped), student taught in a well-equipped laboratory has a significant better academic achievement than student taught in a poorly equipped laboratory in Jalingo education zone of Taraba State.

4. While in terms of school ownership, students in public school have no significance difference in biology academic achievement than students in private school,

RECOMMENDATIONS

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

1. Government and proprietors of schools should bridge the gap between the rural and urban school's location by providing both the urban and rural schools with qualified teachers which will enhance a better academic achievement of biology students.

2. Laboratories should be equipped and expanded to accommodate and enable professional teachers to adopt methods that will enhance students' academic achievement in biology.

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