



School Type and Academic Achievement in Biology among Senior Secondary School Students in Zaria, Nigeria: Analysis of Difference and Relationship

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Abstract

This study investigated School Type as it correlates and significantly differs with the Academic achievement in Biology among Senior Secondary School Students in Zaria, Nigeria. The research employed an ex-post facto design. The population of the study involved all Senior Secondary III Biology students from twenty-seven public and twenty-four private senior secondary schools who wrote WAEC Examinations in Zaria Education Zone as at 2017. 361 Biology students were taken as sample. WAEC results of sampled respondents in Biology was collected from their various school principals. Frequency, means, standard deviation, t-test and chi-square were used to test the null hypotheses at $P \leq 0.05$ using SPSS version 20. Results revealed that there is no significant difference in the academic achievement of students in public and private senior secondary schools in Zaria Education Zone ($P = 0.32 > 0.05$). Results also indicate a strong positive correlation between academic achievement and school type, which was statistically significant ($r = 0.98$, $n = 361$, $P = 0.00$). Recommendation among others include Government at all levels should provide more funds for provision of facilities for teaching and learning in public secondary schools.

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INTRODUCTION

The domain of science is exceptionally critical to the prosperity of Nigeria in the 21st century and the products of science education are evident in everyday life in Nigeria and other industrialized nations. Given that complex science concepts build upon basic science, it is crucial for students to attain basic science concepts earlier in their education in order to have a solid foundation to build upon. If secondary school students lack a concrete scientific foundation, more complex science concepts learned in tertiary institutions will not be solidified. Inevitably, the inability of students to build upon basic scientific knowledge leads to poor science achievement (Okebukola, 2015). It is worth noting that at the senior secondary level, Biology is taught to students as if they will all be Science students at the University (FRN, 2013). Biology is defined as the science of life (Sunday, Egunyomi & Osakwe, 2016). Interestingly, it is a popular science subject among students and its popular nature among other science subjects has made it a distinct choice for most students (Lawal, 2011). Today, Biology pervades literally every field of human endeavour and plays a fundamental role in

educational advancement (Mberekpe, 2013; Ityokyaa & Adejoh, 2014). It is a key to economic, intellectual, sociological, human resource development and well-being of any society.

School type in this study refers to public and private secondary schools. Public secondary schools are owned and funded by the government while private secondary schools are owned and funded by individuals. In Nigeria, secondary schools irrespective of ownership are expected to function in compliance with the achievement of the national education objectives. To this end, students are expected to perform beautifully in the final examination as this determines the quality of output of secondary schools. This is one of the parameters used to measure the effectiveness of a school system. The better the achievement of the students, the more effective the system is assumed to be (Kumwenda; Cleland; Walker; Lee & Greatrix, 2017).

Sikhwari (2014) stated that there are two broad groups of definitions of academic achievement. The first one which is more objective refers to numerical scores of a pupil's knowledge, which measure the degree of a pupil's adaptation to



schoolwork and to the educational system while the second one is a more subjective one, as its determination of academic success is reliant upon the student's attitudes towards his academic achievement and himself, as well as by the attitudes of others towards his/her success. Okoye and Okechukwu (2010) pointed out that the teaching of Biology is important because, it equips the students to comprehend the world around them and equips them with necessary skills to build a progressive society and ability to apply learning of science concepts and principles in solving every day's problems. However, the issue remains that in most secondary schools in Nigeria, there is high rate of failure in the subject. The result of West African Examination Council (WAEC) on the Senior Secondary School Certificate Examination from 2010-2017 on students' enrolment and achievement in Kaduna state revealed low academic achievement in Biology.

Presently, the teaching and learning of science in Nigerian secondary schools is being limited by a number of factors. Okebukola (2015) noted that learning facilities are lacking in most secondary schools in Nigeria. A school without facilities, either private or public, may not be able to achieve the stated goals and objectives of the system. When facilities are available and skillfully utilized, they influence learning and making it more meaningful. Facilities are very vital and have been observed as a potent factor to quantitative and qualitative education (Owoeye & Yara, 2011). Therefore, this study intends to determine the availability of physical facilities based on school type and its relationship to academic achievement in Zaria Education Zone.

Objectives of the Study

The objectives of the study are to:

1. Determine the difference in academic achievement in biology among public and private senior secondary school students in Zaria Education Zone.
2. Determine the correlation between academic achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone?

Research Questions

The research questions formulated to guide the conduct of the study are:

1. What is the difference in the academic achievement in Biology among Public and

Private Senior Secondary Schools students in Zaria Education Zone?

2. Is there any correlation between academic achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone?

Null Hypotheses

The following null hypotheses were postulated to guide this study at $P \leq 0.05$:

HO₂: There is no significant difference in the academic achievement in Biology among public Private Senior Secondary Schools in Zaria Education Zone.

HO₃: There is no significant correlation between academic achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone.

Research Methodology

The research design for this study was survey and ex-post facto. The population of the study involved all Senior Secondary III Biology students from twenty-seven public and twenty-four private senior secondary schools who wrote WAEC Examinations in Zaria Education Zone as at 2017. From total population of 7234, 361 Biology students were taken as sample for the study in line with Krejcie and Morgan (1970). The Extent of School Physical Facilities Questionnaire (ESPFQ) adapted from Ekundayo (2012) was used for this study. Two Science Education experts with PhD from Ahmadu Bello University, Zaria validated the instrument used for this study. Pilot testing was done to determine the reliability of ESPFQ. Split-half method was done and Spearman rank correlation was used to determine the coefficient value of 0.76 which made the instrument reliable for data collection in this study. Additionally, WAEC results of sampled respondents in Biology was collected from their various school principals. Frequency, simple percentages, means, standard deviation, t-test and chi-square were used to test the null hypotheses at $P \leq 0.05$ using SPSS version 20.

RESULTS

Research Question One: What is the difference in the academic achievement in Biology among Public and Private Senior Secondary Schools students in Zaria Education Zone?

To answer this research question, means and standard deviation of WAEC results in Biology of



respondents in Public and Private Senior Secondary Schools were computed and presented in Table 3.

Table 1: Summary of Means and Standard deviations of Academic Achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone.

School Type	N	Mean	SD	MD
Public Schools	241	18.4	10.1	
Private Schools	120	18.6	9.1	0.2

Results in Table 1 shows that there is no much difference in the mean of academic achievement in private school (18.2) and that of public schools (18.4). The significance of the mean difference was tested in the related hypothesis.

Null Hypothesis One

HO₁: There is no significant difference in the academic achievement in Biology among public Private

Senior Secondary Schools in Zaria Education Zone.

To test this hypothesis, the means and standard deviations of WAEC results in Biology of respondents in Public and Private Senior Secondary Schools were subjected to t-test statistics. A summary of the result is presented in Table 2.

Table 2: t-test on Students' Academic Achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone.

Source	N	Mean	SD	df	t-cal	t-tab	P	Remark
Public School	241	18.4	10.1					NS
Private School	120	18.6	9.1	359	0.044	1.96	0.32	

Not Significant at 0.05 level.

The result in Table 2 shows that the mean achievement of students in private schools (18.6) is slightly higher than their counterparts in the public schools (18.4). However, the t-calculated (0.044) is less than t-critical (1.96). $P = 0.32 > 0.05$ indicate a no significant difference in their achievement. Thus, the null hypothesis was retained.

Research Question Two: Is there any correlation between academic achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone?

To answer this research question, means and standard deviation of availability of facilities and academic achievement in Biology were computed based on school type and presented in Table 3.

Table 3: Summary of Means and Standard deviations of Academic Achievement in Biology based on School Type.

School Type	Academic Achievement	
	Mean	S. D
Public School	18.4	10.1
Private School	18.6	9.1

Means and standard deviations computed were correlated and presented in Table 6

Null Hypothesis Three

HO₃: There is no significant correlation between availability of facilities and academic achievement in Biology among Public and

Private Senior Secondary School Students in Zaria Education Zone

To test this hypothesis, the means and standard deviations of availability of facilities and academic achievement in Biology of respondents in



Public and Private Senior Secondary Schools were subjected to chi-square statistics. A summary of the result is presented in Table 3.

Table 4: Correlation for School Type and Academic Achievement in Biology

Variables	N	\bar{X}	S.D	Df	r-cal	r-crit	P	Remark
Public Schools	361	103.6	11.1	359	0.98	0.14	0.00	Sig
Private Schools	361	96.2	13.4					

***Significant at $P < 0.05$**

Table 4 revealed a mean score of 103.6 with standard deviation of 11.1 for availability of physical facilities against a mean of 96.2 with standard deviation of 13.4 for academic achievement. There is a strong positive correlation between availability of physical facilities and academic achievement, which was statistically significant ($r = 0.98, n = 361, P = 0.00$). Based on the result, the null hypothesis which states that there is significant correlation between availability of facilities and academic achievement in Biology among Public and Private Senior Secondary School Students in Zaria Education Zone was therefore rejected. This is because the p-value of 0.00 is less than 0.05 level of significance. By implication, the availability of physical facilities has positive effect on academic achievement of Biology students in Zaria Education Zone, Kaduna State.

DISCUSSION

Findings revealed that there is no significant difference in the academic achievement of students in public and private senior secondary schools in Zaria Education Zone ($P = 0.32 > 0.05$). One would expect a better achievement in private schools than in public schools. The type of school (public or private) did not make any difference in the determination of students' academic achievement. Result of Alimi *et al.*, (2012) also supports this finding. The study contradicts Okon and Archibong (2015) and Kumwenda *et al.*, (2017) who discovered a significant difference in achievement of students in social studies and in medical students respectively based on school type.

Results in Table 6 indicate a strong positive correlation between academic achievement, which was statistically significant ($r = 0.98, n = 361, P = 0.00$). This study in support of Benjamin, (2008), Ekundayo (2012) and Usen, (2016) who all revealed a significant positive correlation between availability of facilities and academic achievement among Senior Secondary School Students based on school type. However,

Wunti *et al.*, (2017) discovered a no significant relationship between availability of physical facilities and academic achievement.

CONCLUSION

The findings of this study revealed significant difference in the private and public secondary schools which however has no effect on their achievement. It therefore concludes that there might be other factors responsible for poor achievement of secondary school students. This highlights the need for further researches.

RECOMMENDATIONS

The following recommendations were proffered:

1. Government at all levels should provide more funds for provision of physical facilities for teaching and learning in public secondary schools.
2. Corporate organizations, NGOs and individuals should be encouraged by the government to donate generously towards the provision of physical facilities in public schools.
3. Government, researchers and stakeholders should emphasize on effective use of available facilities by teachers for teaching and learning.

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