

# **ANALYSIS OF SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN SENIOR SECONDARY CERTIFICATE EXAMINATION. PHYSICS IN JOS METROPOLIS, PLATEAU STATE**

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## **Abstract**

*The purpose of this study was to compare the achievement of students in Senior Secondary School Certificate Examinations (SSCE) in physics as conducted by the West African Examinations Council (WAEC) and the National Examinations Council (NECO) in Jos metropolis, Plateau State. Survey research design of the ex-post facto type was adopted for the study. The study was carried out using private and public senior secondary schools in Jos metropolis which were purposively sampled. Randomly selected 450 candidates, from a population of 3,465, constituted the sample for the study. The instrument for the collection of data was the WAEC and NECO Results Pro forma (WANERP) designed by the researchers and validated by two experts. WANERP was used to collect data of May/June WAEC and June/July NECO SSCE in physics for four years (2013 – 2016). Two research questions and three hypotheses guided the study. The research questions were answered using mean and standard deviation while the hypotheses were tested using the t-test statistics at 0.05 level of significance. The results revealed that there was significant difference in the candidates' achievement in WAEC and NECO SSCE physics, and school type (public and the private school) had significant influence in the candidates' achievement in both WAEC and NECO SSCE physics. It was recommended among others that that physics teachers should attached importance to skillful and full coverage of physics syllabus before candidates are presented for external examinations such as WAEC and NECO SSCE.*

**Keywords:** SSCE, WAEC, NECO, school type.

## Introduction

Physics is one of the core science subjects taught to students at the senior secondary school level in Nigeria (FRN, 2013) and has often been recognized as the basic tool for industrialization and national development. Physics as a subject deals with matter in relation to energy, which constitute the bedrock for the development of science and technology. It has numerous applications: the principles and laws of physics are applied in fields such as engineering, health, agriculture, information technology, communication, biology, electronics, manufacturing, mining and construction (Holzner, 2006). Therefore, the place of a functional physics education in our society needs no emphasis and every child need to be given the opportunity to acquire its basic concepts, principles and skills. This is even against the backdrop that UNESCO (2009) report stated that Nigeria has remained a developing country with low economic, social, political, cultural, and technological indicators.

In recognition of the contribution of science education, especially physics, to national development, Nigerian government has been making considerable efforts towards encouraging the study of science through policies actions, and programmes. However, despite these efforts, students' achievement in Senior School Certificate Examinations (SSCE) in science subjects and physics in particular, has been low and is a matter of concern stakeholders in the education sector (Kpolovie, Ololube & Ekwebelem, 2011).

The SSCE is the final examination written by students in Nigeria at the end of their three-year education at the senior secondary school level. Thus, it serves as an end-of-course evaluation for all secondary school graduates. The SSCE is a required examination before the award of the senior secondary school certificate and is mandatory for admission into any science related courses at the tertiary institutions. Hence, high premium is attached to senior secondary school certificate due to its economic and social importance and the opportunities it offers for higher education. Therefore, the awarding of SSCE certificate to students on completion of SSIII is a significant event in Nigerian education system. To this end, much is expected from the bodies that are saddled with the responsibility of conducting the SSCE such that the spirit and focus of the examinations is not compromised (Salako, Adegoke & Ogundipe, 2017; Udofia & Udoh, 2017).

The West African Examination Council (WAEC) and the National Examination Council (NECO) are major bodies responsible for conducting SSCE for senior secondary school students. WAEC conducts SSCE examinations in several West African countries such as Ghana, Gambia, Liberia, Sierra Leone and Nigeria while NECO conducts SSCE examination only in Nigeria. The school based SSCE by WAEC is held every year in May and June and that of NECO is held in June and July every year WAEC (n.d.). Therefore, SSCE are conducted,

one after the other. The two examination bodies are common in some ways as observed by Utibe and Agah (2015): for example, (i) the use of same physics curriculum; (ii) candidates in a school are taught by the same physics teachers; (iii) use of same set of continuous assessment score to compute the physics final results in each school; (iv) almost the same set of physics students in each school write the examinations in a given year; (v) use of same set of physics equipment and examination environment in each school; (vi) the certificates and grading systems are the same and results can be combined for the purpose of admission and any other use in the country.

It is worth noting that, WAEC and NECO, having been given the same mandate to conduct the SSCE, adheres to a uniform mode of test construction, administration, scoring and interpretation, hence are categorized as standardized test. In addition, the examination bodies were found to be similar in terms of the distribution of examination across the levels of the cognitive domain. Therefore, differences in achievement by physics candidates should be exclusively the result of chance factors like the individuality and academic dedication of the candidates (Kpolovie, Ololube & Ekwebelem, 2011; Bandele & Adewale, 2013). This is a likely situation that will leave stakeholders pondering upon; especially with a subject like physics where students' achievement has always been an issue of concern because of the low level of achievement being recorded in external examinations. Researches (Yusuf, Gambari & Olumorin, 2012; Adegoke, 2013) have attested to the fact that students' achievement in WAEC and NECO SSCE physics have been unsatisfactory.

Furthermore, the issue of the difference in physics candidates' achievement in WAEC and NECO in the same physics leaves much to be desired. For instance, the study undertaken by Amuche, Amuche, Bello and Marwan (2014) on the achievement by secondary school students in Taraba state revealed that the physics students performed significantly better in the NECO SSCE than WAEC SSCE. Similarly, Utibe and Agah (2015) in a study of comparative analysis of physics candidates' scores in WAEC and NECO SSCE in Akwa Ibom State obtained a result which indicated that the candidates' achievement in WAEC is significantly higher than that in NECO SSCE. Another study by Salako, Adegoke and Ogundipe (2017) on the comparative analysis of physics candidates' scores in WAEC and NECO SSCE in Osun State, also obtained a result which showed that students' achievement in physics for WAEC SSCE is significantly higher than that of the NECO SSCE. This is happening even when the WAEC and NECO SSCE are comparable by all standards.

A contentious factor among others that has been identified to contribute to the low achievement in physics by secondary school students is the issue of school type, which means school ownership. Alimi, Ehinola and Alabi (2012) observed that causes of poor academic achievement by students could include

ownership of the school. School ownership can be described to mean public and private school. Oke and Maliki (2009) remarked that whereas the public school is any school controlled and supported by the government, the private school, on the other hand, is a school supported and controlled by individuals or religious groups. The public schools in Nigeria have Federal, State, and Local Governments as their proprietors while the private schools have individuals, associations or organisations as the owners. Irrespective of ownership, secondary schools are expected to function in compliance with the national education objectives. Thus, students are expected to achieve satisfactorily in final examinations because this determines the quality of output of secondary schools. This in turn is used as one of the criteria to measure the effectiveness of a secondary school system.

Therefore, the higher the achievement of the students in SSCE, the more effective the school system is assumed to be (Philius & Wanjobi 2011). This gives us reason as to the choice made by parents for school type for their children and wards based on academic achievement. Ajayi (2006) in a study found out that school type make a difference in students' academic achievement. Olatoye and Agbatogun (2009) also asserted that students in private schools achieve significantly better than their counterpart in public schools. This fact is corroborated by the study carried out by Okon and Archibong (2015) in which the result revealed that students' achievement in private secondary schools was better than that in public schools. Additionally, Olasehinde and Olatoye (2014) established in their study that private schools students achieved better in science than their counterparts in the public schools: result of the study particularly depict that there is a significant difference in physics achievement between public and private school students.

Although, Lubienski, Lubienski and Crane (2009) had observed that after holding demographic factors constant, public schools achieve just as well if not better than private schools, Okon and Archibong (2015) remarked that the popular trend as obtained from school survey is consistent with the long standing perception of students' higher achievement of private schools over public schools. This however, goes to portend that scholars are contesting the superiority of the schools in terms of achievement in science and physics in particular. Thus, students' achievement in physics in a country like Nigeria will necessarily remain a point for discourse; more importantly that physics is a sine qua non for science and technological development.

Many researches (Amuche, Amuche & Marwan, 2014; Utibe & Agah, 2015; Salako, Adegoke & Ogundipe, 2017) have been conducted on students' achievement in WAEC and NECO SSCE in different states of Nigeria. However, there appears to be scanty researches carried out in the area of study to determine whether differences exist between WAEC and NECO SSCE

achievement of the candidates in physics. Therefore, the problem which attention was directed to in this study sought to answer the following broad questions: (1) What is the mean difference between WAEC and NECO SSCE candidates' achievement in physics? (2) What is the influence of school type on the achievement of physics candidates in WAEC and NECO SSCE in Jos metropolis? The purpose of this study was to compare the performances of physics candidates in senior secondary school certificate examinations conducted by West African Examinations Council (WAEC) and National Examinations Council (NECO) in Jos metropolis, Plateau state. The objectives of this study include to:

determine the difference between the achievement of physics candidates in WAEC and NECO SSCE and find out the influence of school type on the achievement of physics candidates in WAEC and NECO SSCE.

### Research Questions

The following research questions were answered in the study:

1. What is the mean difference between the achievement of physics candidates in WAEC and NECO SSCE?
2. To what extent does school type influence the achievement of physics candidates in WAEC and NECO SSCE?

### Research Hypotheses

The following null hypotheses were formulated and tested in this study:

1. There is no significant difference between the achievement of physics candidates in WAEC and NECO SSCE.
2. There is no significant influence of school type on the achievement of physics candidates in WAEC SSCE.
3. There is no significant influence of school type on the achievement of physics candidates in NECO SSCE.

### Method

The research design employed for this study was the survey research design of the ex-post facto type. This design is considered suitable since the study involves the collection of data from records. The population for the study, 3,465, was made up of all the May/June WAEC and June/July NECO SSCE physics candidates in senior secondary schools in Jos metropolis, Plateau state of Nigeria, for the years 2013, 2014, 2015 and 2016. The sample for the study was 450 May/June WAEC and June/July NECO SSCE physics candidates from 2013 to 2016 that were randomly selected. The sample constituted 225 candidates from private schools and 225 candidates from public schools.

Purposive sampling technique was adopted in selecting five private and five public secondary schools for the study.

WAEC AND NECO Results Pro forma (WANERP) was constructed by the researchers and used for the collection of data for this study. WANERP was face validated by two experts: one from science education and the other from test and measurement evaluation. The scores of the candidates were extracted and recorded in the instrument with grades transformed using the Stanine scale (Utibe, & Agah, 2015) and identified along with the school type of the candidates. The grades, according to WAEC and NECO SSCE, ranges from A1 as the highest to F9 as the lowest. However, the Stanine transformed scale used in this study had the grades for A1 - F9 as A9 - F1 for convenience in calculations. That is A1 had the value 9, B2 had value 8, B3 had value 7, C4 had value 6, C5 had value 5, C6 had value 4, D7 had value 3, E8 had value 2, and F9 had value 1. The data generated in the study were analyzed by using mean and standard deviation for research questions, and t-test statistics at 0.05 level of significance for the hypotheses.

## Results

### Research Question 1

What is the difference between the mean achievement scores of physics candidates in WAEC and NECO SSCE?

**Table 1: Mean and Standard Deviation of Candidates' Achievement in WAEC and NECO SSCE in Physics**

Examination	N	Mean ( $\bar{X}$ )	Standard Deviation (S.D)	Mean Difference
WAEC	450	3.95	0.99	0.48
NECO	450	3.47	3.01	

The results in Table 1 show that the mean achievement score of physics candidates in WAEC SSCE (3.95) is higher than that in NECO SSCE (3.47) which indicated a mean difference in favour of WAEC of 0.48.

### Research Question 2

To what extent does school type influence the achievement of physics candidates in WAEC and NECO SSCE?

**Table 2: Mean and Standard Deviation of Candidates' Achievement in WAEC and NECO SSCE in Physics based on School Type**

School Type	Examination	N	Mean ( $\bar{X}$ )	Standard Deviation (S.D)	Mean Difference
Private	WAEC	225	4.47	1.90	1.29
	NECO		3.18	2.43	
Public	WAEC	225	3.09	0.51	0.41
	NECO		2.68	1.66	

Table 2 display results which show that the achievement by physics candidates in private schools (4.47) and public schools (3.09) in WAEC SSCE is better when compared to the NECO SSCE achievement of the candidates in private schools (3.18) and public schools (2.68).

**Hypothesis 1**

There is no significant difference between the achievement of physics candidates in WAEC and NECO SSCE.

**Table 3: Summary of t-test Result for Candidates' Achievement in WAEC and NECO SSCE in Physics**

Examination	N	Mean ( $\bar{X}$ )	S.D.	df	Calculated t-value	Critical t-value	Decision at $p < 0.05$
WAEC	450	3.95	0.99	898	3.21	1.96	Significant
NECO	450	3.47	3.01				

From Table 3, it is evident that the difference in candidates' achievement between WAEC and NECO SSCE in physics is significant, since the calculated t-value of 3.21 is greater than the table value of 1.96 at 0.05 alpha level. Thus, the null hypothesis 1 is rejected, and so, there is a significant difference between the achievement of physics candidates in WAEC and NECO SSCE.

**Hypothesis 2**

There is no significant influence of school type on the achievement of physics candidates in WAEC SSCE.

**Table 4: Summary of t-test Result for School Type and Candidates' Achievement in WAEC SSCE in Physics**

School Type	N	Mean ( $\bar{X}$ )	S.D.	df	Calculated t-value	Critical t-value	Decision at $p < 0.05$
Private	225	4.47	1.90	448	10.53	1.96	Significant
Public	225	3.09	0.51				

The t-test result in Table 4 revealed that the calculated t value of 10.53 is greater than the critical t value 1.96 at 0.05 alpha level. Hence, hypothesis 2 is rejected. Therefore, there is a significant influence of school type on the achievement of physics candidates in NECO SSCE.

### Hypothesis 3

There is no significant influence of school type on the achievement of physics candidates in NECO SSCE.

**Table 5: Summary of t-test Result for School Type and Candidates' Achievement in NECO SSCE in Physics**

School Type	N	Mean ( $\bar{X}$ )	S.D.	df	Calculated t-value	Critical t-value	Decision at $p < 0.05$
Private	225	3.18	2.43	448	2.55	1.96	Significant
Public	225	2.68	1.66				

Table 5 shows that the t-test result for hypothesis 3. It indicates that the calculated t-value of 2.55 is greater than the critical t-value of 1.96 at 0.05 alpha level. Therefore, the hypothesis is rejected. Hence, there is a significant influence of school type on the achievement of physics candidates in NECO SSCE.

### Discussion

The analysis of the results shown in Table 1 revealed that the achievement in physics by the candidates in WAEC SSCE is better than that of NECO, SSCE. Table 3 further revealed that the difference in the candidates' achievement in WAEC and NECO, SSCE was significant. Therefore, the null hypothesis was rejected and it can be concluded that physics candidates achieved significantly higher in WAEC than in NECO, SSCE during the period under review. This result is however contrary to the findings of Amuche, Amuche, Bello and Marwan (2014), Utibe and Agah (2015), and Salako, Adegoke and Ogundipe (2017) whose studies reported significant higher achievement by physics candidates in NECO SSCE.



The results in Table 2 indicated a higher achievement for physics candidates in WAEC SSCE for private schools than for candidates in public schools. Table 4 further showed that physics candidates in the private schools achieved significantly higher in WAEC, SSCE than their counterparts in the public schools. Similarly, Table 2 also indicate a higher achievement for physics candidates in NECO SSCE for private schools than for candidates in public schools. The results in Table 5 further showed that physics candidates in the private schools achieved significantly higher in the NECO, SSCE than their counterpart in the public schools. These results clearly depict that there exists a significant influence of school type in the achievement of the physics candidates in WAEC and NECO, SSCE for the years under review. The results of this study are in line with the works of Olatoye and Agbatogun (2009), Olasehinde and Olatoye, Okon and Archibong (2015) who reported that school type has influence in students' achievement and that students in private schools achieve significantly better than their counterparts in public schools. This is expected since private schools, according to Adebayo (2009) have for example, more teacher quality and quantity, better facilities, good curriculum practices, stability of academic activities and good disciplinary concerns.

### **Conclusion and Recommendations**

It can be concluded that, for the years under review, physics candidates' achievement in WAEC, SSCE was higher than that in NECO, SSCE. However, it is important to point out that the mean achievement scores in physics for both WAEC and NECO, SSCE were low. There was also a significant influence of school type between the achievement mean scores of physics candidates in WAEC and NECO, SSCE.

### **Recommendations**

Based on the findings of this study, it was recommended that;

1. Physics teachers should attach importance to skillful and full coverage of physics syllabus before candidates are presented for external examinations such as WAEC and NECO SSCE.
2. Students should be made to be aware of the need to be dedicated to their study for optimal achievement in both WAEC and NECO, SSCE.
3. School administration should always provide suitable environment that will hinder all forms of examination malpractices.
4. Authorities in charge of school physics/science programmes should made available necessary teaching/learning inputs that will ensure high achievement by students.

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