

# **INFLUENCE OF SCHOOL LOCATION AND SCHOOL TYPE ON SENIOR SCHOOL STUDENTS' ACHIEVEMENT IN PHYSICS IN ILORIN, KWARA STATE**

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## **Abstract**

*This study investigated the influence of school location and school type on senior school achievement in physics in Ilorin, Kwara State. The study specifically examined the influence of school location and school type on students' academic achievement in WASSCE physics examinations from 2010- 2014. SSCE results of 1124 senior school students that sat for WASSCE examinations from 2010- 2014 were collected from eight schools in both rural and urban areas of Ilorin East, Kwara State. Two hypotheses were formulated. The t-test statistical tool was used to test both hypotheses at 0.05 level of significance. This study reveals statistical significant difference in the achievement of senior school students in WASSCE physics examinations based on school location from 2010-2014 in favour of rural schools,  $t(1122)=3.404$ ,  $p<0.05$ ; there was also a significant difference in the achievement of senior school students in WASSCE examinations based on school type from 2010-2014 in favour of private schools,  $t(1122)=12.12$ ,  $p<0.05$ . Recommendations and conclusions were made in line with the findings of this study.*

**Keyword:** School Location, School Type, Achievement, Physics, West African Senior School Certificate Examinations (WASSCE)

## **Introduction**

Science may be defined as a body of knowledge, a way of investigating or method, and a way of thinking in the pursuit of an understanding of nature (Abimbola & Omosewo, 2006). Ogunleye (2000) posited that science is a dynamic human activity concerned with understanding the working of our world. This understanding helps to know more about the universe through the use of science and technology. Science and technology contribute to human physical life especially in areas of medicine, shelter, leisure, communication, security, education, transportation and sports (Omosewo, 2009). At the senior secondary school level, science basically comprises physics, chemistry and biology.

Physics is a branch of science that deals with the fundamental constituents of the universe, the force they exert on one another, and the effect of these force (Omiwale, 2011). Physics is an important science subject that makes immense academic demands on students in its learning as well as its teaching. Physics, being the most fundamental of all the sciences, derives its reputation as a difficult subject primarily from its dominant problem-solving nature. Ayodele (2009) asserted that physics deals with physical quantities and mathematical exactitudes, and that virtually all branches of physics are concerned with problem-solving.

Teaching of physics and other science subjects has various challenges and the performance of students at the secondary school level have been the concern of government and parents (Onah & Ugwu, 2010). In the teaching-learning process, both the teacher and the learners must be active. The learner learns through some activities while the teacher does all considered necessary to make learning possible. Okooboh and Afolabi (2004) opined that unimpressive response to science and technical education is particularly evident in students' poor performance in science subjects at secondary school level. Hence, the need to improve upon students' performance becomes imperative as inadequacy in the number of physics teachers can only limit the teaching and also the learning.

Teachers' distribution to rural schools cannot be compared to urban schools. The number of teachers in rural schools is usually low because teachers may not readily accept postings to rural areas, because rural communities are characterized by low population, monotonous and burdensome life. Most teachers prefer to stay in schools located in urban areas because of the benefits and comforts of the city which include good roads, satisfactory means of communication, availability of books and teaching materials, etcetera. Qualified teachers also prefer to stay in city schools. This however affects the schools in the rural areas. Most schools in rural areas lack qualified teachers who can handle subjects like physics and the practical aspect respectively (Osokoya & Akuche 2012).

The attitude to practical physics is likely to be affected negatively in the rural areas because of lack of qualified teachers and inadequate practical equipment. Alternatively, schools in urban areas are also crowded which may negatively affect students' concentration and also hinder effective practical sessions. Although, school location be it in rural or urban areas comes with certain benefits and limitations (Owoeye, 2000). School type is another important variable that influences students' academic performance.

As the world is fast advancing in technology and every facet of life is technologically driven, there is the need to look at what transpires in our public and private schools with regards to students' understanding of science concepts especially physics, to be in tune with modern realities. Some researchers showed conflicting views, while some researchers reported significant difference. Ariyo and Ibeagha (2011) pointed out that school type has both direct and indirect causal linkages in students' achievement in physics.

Johnson (2013) found that majority of the parents believed that public schools do not provide a safe, orderly environment and teaching of the basics. It has been revealed that the general public is of the opinion that private schools have higher academic standards, have secure and conducive environment and more likely to encourage honesty and responsibilities. The structure of activities in private school are well different from public schools resulting in various outcomes (Anderson & Resnick, 2007).

In spite of the various innovations introduced into science teaching in general and physics in particular, the performance of students still remains low. The mass failure being recorded by students in the final year examinations year after year also brings to light one of the problems facing the country's educational sector (Omosewo, 2002). This is buttressed by the poor achievement of students in physics examination conducted by West African Senior School Certificate Examinations [WASSCE]. The Chief Examiner's Report in physics for May/June 2011 revealed that, the poor performance of candidates were attributed to the following weaknesses:

- Poor interpretation of questions;
- Poor skill in arithmetic;
- Inadequate knowledge of basic concepts in Physics; and
- Inability to apply knowledge sufficiently.

The suggested remedies were as follows:

- Physics teachers should strive harder to ensure adequate coverage of the syllabus at all times;
- Meaningful test items should be administered from time to time, and matched with true assessments;
- Enough time should be allocated for physics on schools time table;
- Teachers' adequacy should be examined by seasoned and more experienced physics teachers to create rooms for improvement in delivery;
- Physics teachers should participate in WASSCE coordination exercise;
- WAEC should make impromptu inspection of schools' laboratories in order to checkmate inadequacies; and
- School libraries should be stocked with enough recommended physics textbooks.

The problem of poor academic performance is of great concern to many stakeholders. The resulting implication of poor academic performance are tension, depression and social maladjustment among secondary school students. Although, it is a fact that not all the times are students themselves responsible for this poor performance. School variables such as availability of instructional materials, school location, school type and even school environment have all been considered to influence students' performance (Akinbode, 2005; Omosewo, 2009; Adeyemo, 2012).

### **Purpose of the Study**

The main purpose of this study was to investigate the influence of school location and type on physics students' achievement in WASSCE in Ilorin East, Kwara State, Nigeria.

Specifically, this study:

1. investigated the influence of school location on students' academic achievement in WASSCE physics exams from 2010-2014.
2. examined the influence of school type on students' academic achievement in WASSCE physics exams from 2010-2014.

### **Research Questions**

The following research questions were raised and answered in this study:

1. does school location influence students' academic achievement in WASSCE physics exams from 2010-2014?
2. does school type influence students' academic achievement in WASSCE physics exams from 2010-2014?

### **Research Hypotheses**

The following hypotheses were formulated and tested in this study:

HO<sub>1</sub>: there is no significant difference in the academic achievement of students in WASSCE physics exams based on school location.

HO<sub>2</sub>: there is no significant difference in the academic achievement of students in WASSCE physics exams based on school type.

### **Methodology**

The population for this study consisted of all Senior Secondary School three Students who sat for WASSCE in Ilorin East from 2010-2014. This study sampled one thousand one hundred and twenty four (1124) students from eight schools purposively selected using Stratified random sampling techniques. Four schools were from urban areas (i.e. 2 private and 2 public) and the other four schools were from rural areas (i.e. 2 private and 2 public). The grade points of students in

physics (WASCCE) from 2010-2014 in the selected secondary schools constitute the data. While the grade were interpreted thus: A = 5; B = 4; C = 3; D = 2; E = 1 and F = 0

## Results

### Research Question One

Does school location influence students' academic achievement in WASSCE physics exams from 2010-2014?

Table 1

*senior school physics students' academic achievement in WASSCE based on school location from 2010 – 2014*

Year	Group	N	Mean	Std Dev.	Mean Diff.	Remark
2010	Rural Area	80	3.49	0.75		
	Urban Area	99	2.38	1.07	1.11	In favour of Rural Area
2011	Rural Area	125	2.87	1.31		
	Urban Area	98	3.03	0.68	0.16	In favour of Urban Area
2012	Rural Area	139	3.10	0.69		
	Urban Area	128	3.10	0.57	0.00	Not in favour of any group
	Rural Area	112	2.75	0.95		

2013					0.34	In favour of Urban Area
	Urban Area	101	3.09	0.62		
	Rural Area	128	3.05	0.41		
2014					0.44	In favour of Rural Area
	Urban Area	114	2.61	0.76		
	Rural Area	584	3.03	0.90		
2010- 2014					0.18	In favour of Rural Area
	Urban Area	540	2.85	0.80		

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Table 1 shows the mean achievement of students in WASSCE Examinations in Physics for 2010 based on school location. The mean score of students in rural schools was 3.49, while the mean score of students in urban schools was 2.38. The mean score of students in the rural schools was 1.11 higher than that of the students in urban schools. Likewise, the mean score of students in rural school was 2.87, while the mean score of students in urban schools was 3.03 in year 2011. The mean score of students in the urban schools was 0.16 higher than that of the students in rural schools.

Analysis from table 1 further revealed that the mean score of students in rural and urban schools was the same with both having 3.10 as the mean score in 2012. In 2013, the mean score of students in rural area was 2.75, while the mean score of students in urban schools was 3.09 with a difference of 0.34 in favour of students in rural school. In 2014, the rural schools had a mean score of 3.05 compared to 2.61 in the urban schools. The mean score of students in the rural schools was 0.44 higher than that of the students in urban area.

The analysis carried out on the achievement of students in WASSCE physics examinations from 2010 – 2014 based on school location as shown in table 1 indicates that the mean achievement of students from rural schools was 3.03, while the mean achievement students from urban schools was 2.85. The mean scores of students in the rural schools was 0.18 higher than that of their counterpart in urban schools.

Since the result from this finding has not significantly tilted in support of a particular location (i.e. rural or urban) consistently throughout the years under review. It can be deduced therefore that, school location has no influence on students' academic achievement in WASSCE physics examinations. Further analysis was therefore conducted to test whether the difference observed in the means was statistically significant or not.

### Hypothesis One

HO<sub>1</sub>: there is no significant difference in the academic achievement of students in WASSCE physics exams based on school location.

*Table 2*

*t-test analysis of senior school students' academic achievement in WASSCE in physics based on school location from 2010-2014*

Year	Group	N	Mean	Std Dev.	Df	Tcal	Sig.	Remarks
2010	Rural Area	80	3.49	0.75	177	7.835	0.000	Significant
	Urban Area	99	2.38	1.07				
2011	Rural Area	125	2.87	1.31	221	1.090	0.277	Not Significant
	Urban Area							

	Urban Area	98	3.03	0.68				
	Rural Area	139	3.10	0.69				
2012					265	0.011	0.991	Not Significant
	Urban Area	128	3.10	0.57				
	Rural Area	112	2.75	0.95				
2013					211	3.043	0.003	Significant
	Urban Area	101	3.09	0.62				
	Rural Area	128	3.05	0.41				
2014					240	5.591	0.000	Significant
	Urban Area	114	2.61	0.76				
	Rural	584	3.03	0.90				
2010					1122	3.404	0.001	Significant
-								
2014								
	Urban	540	2.85	0.80				

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Further analysis was conducted to test whether the difference in the means observed in table 1 was statistically significant. In year 2010, the t-test value was 7.835, df was 177, p-value was 0.00. Since the p-value is less than 0.05 level of significance. Therefore, there is a significant difference between the achievement of students in rural schools and those in urban schools in WASSCE examination in Physics in 2010 in favour of the rural schools. In 2011, the t-test value was 1.090, df was 221, p-value was 0.277. Since the p-value is greater than 0.05 level of

significance, therefore, there was no significant difference between the achievement of students in rural schools and those in urban schools in WASSCE physics examinations in 2011.

In 2012, the t-test value was 0.011, df was 265, p-value was 0.991. Since the p-value is greater than 0.05 level of significance, therefore, there was no significant difference between the achievement of students in rural schools and those in urban schools in WASSCE physics examination in 2012. While in year 2013 the t-test value was 3.043, df was 211, p-value was 0.003. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in rural schools and those in urban schools in WASSCE physics examination in 2013 favouring the urban schools. Also, in year 2014 the t-test value was 5.591, df was 240, p-value was 0.000. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in rural schools and those in urban schools in WASSCE physics examination in 2014 favouring the rural schools.

The combined analysis of students' results from 2010 – 2014 indicated that; the t-test value was 3.404, df was 1122, p-value was 0.001. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in rural schools and those in urban schools in WASSCE physics examinations in 2010 to 2014 in favour of the rural schools. Thus; the null hypothesis which stated that there is no significant difference in the academic achievement of rural and urban senior school students in physics was thereby rejected.

## **Research Question Two**

Does school type influence students' academic performance in WASSCE physics exams from 2010-2014?

Table 3

*Senior school physics students' academic achievement in WASSCE based on school type from 2010 – 2014*

	<b>Group</b>	<b>N</b>	<b>Mean</b>	<b>Std Dev.</b>	<b>Mean Diff.</b>	<b>Remark</b>
2010	Private School	124	3.07	1.14		
					0.63	In favour of Private School
	Public School	55	2.44	0.79		
2011	Private School	152	3.29	0.66		
					1.09	In favour of Private School
	Public School	71	2.20	1.39		
2012	Private School	185	3.24	0.58		
					0.46	In favour of Private School
	Public School	82	2.78	0.65		
2013	Private School	121	3.31	0.55		
					0.93	In favour of Private School
	Public School	92	2.38	0.84		
2014	Private School	138	2.86	0.68		
					0.03	In favour of Private School
	Public School	104	2.83	0.58		
	Private School	720	3.16	0.75		

2010				0.61	In favour of Private
-					School
2014					
	Public School	404	2.55	0.90	

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From table 3 it can be deduced that the mean score of students in private school was 3.07, while the mean score of students in public school was 2.44. The mean score of students in the private school was 0.63 higher than that of the public school. This implies that students in private schools performed better in WASSCE physics examinations than their counterparts in public schools in year 2010. Also, the mean achievement score of students in private school was 3.29, while the mean score of students in public school was 2.20 for the year 2011. The mean score of students in the private school was 1.09 higher than that of the public school. This indicate that students in private schools out-achieved their counterparts in public schools in year 2011.

The mean achievement score of students in WASSCE physics Examination in year 2012 had private school scoring 3.24, while the public school was 2.78. The mean score of students in the private school was 0.46 higher than that of the public school. This indicates that students in private schools achieved better in WASSCE physics examinations than their counterparts in public schools in year 2012. Also, the mean performance of private school students in WASSCE Examinations in Physics in year 2013 was 3.31, while the mean score of students in public school was 2.38. The mean score of students in the private school was 0.93 higher than that of the public school. By implication, students in private schools achieved better in WASSCE physics examinations than their counterparts in public schools in year 2013.

Table 3 also shows the mean achievement score of students in WASSCE physics Examinations for the year 2014 based on school type. The mean score of students in private school was 2.86, while the mean score of students in public school was

2.83. The mean score of students in the private school was 0.03 higher than that of the public school. This shows that students in private schools achieved better in WASSCE physics examinations than their counterparts in public schools in year 2014.

The analysis carried out on the overall achievement of students in WASSCE physics examinations from 2010 – 2014 based on school type as shown in table 3 indicates the mean achievement of private school students to be 3.16, while the mean achievement score for public school students was 2.55. The mean scores of private school students was 0.61 higher than that of their counterpart in public schools. Since the result from this finding has really in favour of students from private school consistently throughout the years under review, therefore, it can be stated that school type has influence on students' academic achievement in WASSCE physics examinations. Further analysis was therefore conducted to test whether the difference observed in the means was statistically significant.

### **Hypothesis Two**

HO<sub>2</sub>: There is no significant difference in the academic achievement of students in WASSCE physics exams based on school type.

Table 4

*t-test analysis of senior school physics students' academic achievement WASSCE based on school type from 2010-2014*

Year	Group	N	Mean	Std Dev	Df	Tcal	Sig.	Remarks
2010	Private School	124	3.07	1.14	177	3.752	0.000	Significant
	Public School	55	2.44	0.79				
2011	Private School	152	3.29	0.66	221	7.978	0.000	Significant
	Public School	71	2.20	1.39				
2012	Private School	185	3.24	0.58	265	5.792	0.000	Significant
	Public School	82	2.78	0.65				
2013	Private School	121	3.31	0.55	211	9.816	0.000	Significant
	Public School	92	2.38	0.84				
2014	Private School	138	2.86	0.68	240	0.03	0.339	Not significant
	Public School	104	2.83	0.58				
2010 - 2014	Private School	720	3.16	0.75	1122	12.12	0.000	Significant
	Public School	404	2.55	0.90				

The analysis in table 4 shows the t-test analysis of senior school students' academic achievement in WASSCE in physics based on school type from 2010-2014. For year 2010, the t-test value was 3.752, df was 177, p-value was 0.00. Since the p-value is less than 0.05 level of significance. Therefore, there was a significant difference between the achievement of students in private school and those in public school in WASSCE examination in Physics in 2010 in favour of private school students. In 2011, the t-test value was 7.978, df was 221, p-value was 0.00. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in private school and those in public school in WASSCE physics examination for 2011 favouring students in private school.

Also, the analysis of students' performance in 2012 shows that the t-test value was 5.792, df was 265, p-value was 0.00. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in private school and those in public school in WASSCE examination in Physics in 2012 in favour of private school students.

Further analysis also reveals that the t-test value of students' achievement in physics based on school type was 9.816, df was 211, p-value was 0.00. Since the p-value is less than 0.05 level of significance, therefore, there was a significant difference between the achievement of students in private school and those in public school in WASSCE physics examination for 2013 in favour of private school.

The analysis of students' achievement in WASSCE physics examinations in 2014 shows that the t-test value was 0.339, df was 240, p-value was 0.735. Since the p-value is greater than 0.05 level of significance, therefore, there was no significant difference between the achievement of students in private school and those in public school in WASSCE physics examination for 2014 in favour of the students in private school. The grand analysis of students' results from 2010 – 2014 indicated that; the t-test value was 12.122, df was 1122, p-value was 0.000. Since the p-value is less than 0.05 level of significance, therefore, there was a significant

difference between the achievement of students in private schools and those in public schools in WASSCE examinations in Physics in 2010 to 2014 in favour of the private school students.

Thus; the null hypothesis which stated that there was no significant difference in the academic performance of private and public senior school students in physics was thereby rejected. And it thus concluded that there was a significant difference in the academic performance of private and public senior school students in physics in favour of private school.

### **Conclusion**

The findings of the study revealed that students in the rural schools achieved better in WASSCE physics examinations than their counterparts in urban schools. It can be concluded that school location has influence on students' academic achievement in physics.

The findings of this study also indicated that students' in private schools achieved better in WASSCE physics examinations than their counterparts in Public schools. This implies that school type had influence on students' academic achievement in physics.

## **Recommendations**

Adequate infrastructure/equipment should be provided to both rural and urban schools in order to enhance better academic achievement of students in their final examinations.

Adequate attention should also be paid to public schools while their students should also be closely monitored so that their achievement can be improved upon.

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