TEACHING FACILITIES, TEACHERS' QUALITY AND STUDENTS' ACADEMIC PERFORMANCE IN PHYSICS IN ILORIN METROPOLIS' SECONDARY SCHOOLS, KWARA STATE

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Abstract

Scientific and technological development is crucial and essential to the sustenance and growth of any nation. To achieve reasonable scientific and technological development, the application of the knowledge of physics is required. Despite this crucial role of physics to national development, the academic performance of senior school students in the subject is poor, which poses a great danger to scientific and technological development of the nation. In order to improve the academic performance of the students in the subject, variables that may influence the academic performance of the students in the subject needs to be investigated. This study therefore investigated the influence of teaching facilities and teachers' quality on academic performance of senior school students in Physics. The study adopted a survey approach and used proportionate random sampling technique to ensure fair representation. A sample of five schools which were randomly selected from each of the three local government areas that constituted the metropolis participated in the study. Questionnaires were distributed to Physics teachers and grade of Physics students who sat for May/June West African Senior School Certificate Examinations between 2017 and 2019 were collected in the selected schools using a proforma. Frequency count, mean and percentage were used to answer the research questions raised while t-test statistic was used to test the hypotheses formulated. The result showed that teaching facilities and teachers' quality influences the academic performance of senior school Physics students. The study also showed Ilorin metropolis schools have high level of qualified teachers but inadequate teaching facilities. This study recommends, therefore,

that government/school proprietors should provide more teaching facilities to improve its adequacy among others.

Keywords: *Teachers' Quality, Teaching Facilities, Academic Performance*

Introduction

Science is a crucial instrument for national development. The knowledge of science has brought about improvement in drug resistance diseases, effect of genetic experimentation and engineering, ecological impact of modern technology, dangers of nuclear war and explosions and global warming among others (Ayodele, 2000). As a result of these, there are rapid changes taking place in education, industry, communication, agriculture, and medicine. Abimbola (2006) defined science as the body of knowledge a way of investigating or method and a way of thinking in the pursuit of an understanding of the nature. Science as a field of study has made it possible for man to know more about the universe. Jolayemi (2002) viewed science as any intellectual activity concerned with the physical world and its phenomena and entailing unbiased objectives and systematic experimentation.

Physics has been found to be one of the basic science subjects for scientific and technological development worldwide. Both developed and developing countries such as United States of America and Nigeria respectively have realized the impact of physics in national development. (Adeyemo, 2010).

Thus, for noticeable development in human society, basic concepts and principles of Physics are indispensable (Jegede & Adebayo, 2013). The teaching of science in secondary schools is intended to produce young scientists who would be able to design the technological devices that would make day-to-day activities easier and living more comfortable (Ajayi, 2008).

Therefore, to ensure a good and more comfortable environment for the society, the knowledge of Physics is needed especially in the areas such as food production, medicine and pharmaceutical industries, biotechnology and so on. In other words, Physics can directly contribute to the much needed scientific and technological development necessary for providing a good working environment and hence national development.

Government around the world has recognized science and technology as a powerful tool towards social, political and economic liberation and

advancement of the country. This is reflected in the policies put up by the government on Science, Technology, Engineering, and Mathematics (STEM) education. Despite this crucial role of science in general and Physics in particular, especially to national development, students still perform poorly. The issue of poor performance of students has been of much concern for all and sundry. The problem is so much that, it has led to the decline in standard of education. Since the academic success of students depends largely on the school environment, it is imperative to examine the influence of school facilities and quality of teachers on the academic performance of students in secondary schools. The level of academic performance in our secondary schools today could be attributed to the level of teachers' quality and teaching facilities (Jegede, 2013). Teaching facilities and teachers' quality have significant roles to play in ensuring a successful implementation of effective educational programmes. Though there is a great awareness of the importance of teaching facilities and teachers' qualities as stated by the Federal Republic of Nigeria in National Policy on Education (FRN, 2013) but this seems not fully implemented in our secondary schools.

In science, academic achievement is very crucial, this is because education impacts ideas, skills, values, knowledge and culture of any society. This academic achievement can be very high, low or poor. In an educational set up, behavioural objectives must be lay out in which a teacher must pursue in order to enhance good performance of learners. To ensure good performance of learners, certain variables have to be considered and these include teaching method, teachers' quality, adequate teaching facilities and instructional materials among others. The curriculum is very germane because it plays a great role towards the social and educational achievement of the learners as well the society (Ajayi, 2008). By virtue of this, it is important to examine various factors that may be responsible for this poor level of academic achievement in order to improve the students' academic achievement in our secondary schools to a satisfactory level. To do this, we need to bring out strategies that can be adopted so as to enhance good performance in Physics by the students. One of the variables that influence students' performance in Physics is teaching method, this is a very vital part of given instruction in every educational sectors as it aids the easy way of acquiring knowledge and also determine the success

of knowledge acquisition. In a situation where the teacher adopts poor or unsuitable method of teaching, there can be no effective teaching and learning. Another factor that can influence students' performance is the teaching facilities. According to Ivowi (2005), a good aid is like a window which should not call attention to itself but should just let in the light. Teaching aids and other teaching facilities provide a means of reiterating lessons and they provide students with the opportunity to learn in a new light. More than classroom decoration, teaching aids are designed to teach, illustrate and reinforce lessons. Students learn in a variety of way and therefore, teaching aids and facilities incorporates various techniques that prove most beneficial to students into learning process. Gana (2012) created 'the cone of experience' which shows that the more sensory channels engaged during interaction with a resource, the better the chance that the students learn from it.

Since the average child needs to be exposed to new materials several times before the knowledge acquired is retained, teachers must implement teaching aids in the classroom. The best way a teacher approach his teaching is not through textbooks alone but through the use of instructional materials. When a teacher wants to be successful in his teaching and learning, instructional materials are very necessary.

Ezike (1997) stated that the role of instructional materials is that of aiding the teacher to communicate effectively in his/her teaching. This becomes very important in teaching and learning as the increased number of pupils makes it impossible for one teacher to teach one pupil as it was in the Stone Age, that is, during elitist era of education. In modern age, one teacher could attend to many pupils at the same time during teaching and learning.

Bitner (2007) pointed out that learning through hearing alone proves to be the least effective means of learning. One learns eleven percent by hearing as against eight-three percent by seeing. As far as retention of hearing is concerned, learning through hearing again stands at the lowest because after three days, we recall only ten percent of what we learn through hearing as against fifty percent of what we learn through both hearing and seeing and ninety percent of what we acquire by applying three of our senses that is seeing, hearing and doing. These materials assist both the teacher and students to acquire knowledge, skills and basic ideas, the students need to have enough facilities and qualified teachers to improve the learning. The resources for

learning may have some impact on the students which may lead to an improvement in the student's achievement.

Significant proper use of teaching facilities/ aids with qualified teachers is expected to enhance students' academic performance in their senior secondary final examinations while the improper use of teaching facilities / aids with unqualified teachers is expected to retard the learners' academic performance.

Statement of the Problem

The progressive decline in secondary school students' academic performance has raised a lot of questions as regards Nigeria's educational system, of which qualities of teachers and adequacy of teaching facilities are a key factor attributed to the decline. Bosetti (2011) observed that the absence of qualified teachers to teach Physics contributes significantly to the poor performance of students in the subject. This is corroborated by West African Examinations Council reports on science subjects especially Physics. It is an obvious and glaring fact that in most of the secondary schools in Nigeria, some teachers teaching Physics are not qualified professionally and also teaching facilities are not readily available.

The professional qualifications required of any teacher in Nigeria are NCE, B. Sc. (Ed), B. Ed. or PDGE. In general, teachers without educational background have been found to be ineffective in terms of instructional delivery, competency and so on which may affects the performance of students in the subject concerned. It is against this background, this study was carried out to ascertain the importance of teaching facilities and teachers' quality on senior school students' academic performance in Physics in Ilorin Metropolis, Kwara State, Nigeria.

Purpose of the study

The main purpose of this study was to investigate the influence of teaching facilities and teachers' quality on senior school students' academic performance in Physics in Ilorin Metropolis, Kwara state, Nigeria. It specifically:

i. Examined the availability of facilities for teaching Physics at senior school level.
ii. Examined the level of availability of professionally qualified and unqualified Physics teachers at senior secondary level.

iii. Investigated whether teachers' use of teaching facilities improves students' academic performance in Physics at senior school level.
iv. Investigated whether significant difference exist in the academic performance of students taught by professionally qualified and unqualified teachers at senior secondary level.

Research Questions

To effectively carry out this research, the following questions were raised and answered:

i. How adequate are the teaching facilities in the schools?
ii. What is the average level of teachers' quality?
iii. What is the level of students' academic performance?

Research Hypotheses

The following hypotheses were formulated and tested in the course of this work:

HO_1: There is no significant relationship between teaching facilities and students' academic performance.

HO_2: There is no significant relationship between teachers' quality and students' academic performance.

Methodology

This study was a descriptive research of the survey type. This is a research method in which emphasis is placed on fact finding regarding a current problem which is pertinent in the context of education. Owolabi (2006) noted that survey is important in research studies because it enable researcher to gather information from large data through the use of sample regarded to be a representative of the entire population.

This study was aimed at investigating the influence of teaching facilities and teachers' quality on the academic performance of Physics students in Ilorin metropolis. Relevant information and data on teachers' qualities and the level of available teaching and learning facilities in the selected schools was collected using a questionnaire. Also, the grades of students in West African Senior School Certificate Examination of students in the selected schools were collected so as to analyze the students' performance on the bases of level of available resources and teachers' quality in the selected schools.

Sample and Sampling Techniques

The sample for this study was 15 senior schools selected from the three local governments that make up Ilorin metropolis. Five senior schools were selected from each of the three local government areas using simple random sampling techniques. Random sampling was used to select the sample so that all the schools will have equal chance of being selected.

Instrumentation

The instruments used in the study were a questionnaire and a Proforma. The questionnaire titled **"**Teaching Facilities and Teachers' Quality Questionnaire (TFTQQ) was used to obtain necessary data from the teachers. TFTQQ consists of two sections; A and B. Section A comprises of items that will check the level of availability and thus adequacy of teaching and learning facilities in the various schools while section B comprises of questions on the qualities of the teachers in the schools. A proforma tagged "Proforma for Collecting Grades of Students in WASSCE" was used to collect students' grade in West African Senior School Certificate Examinations of the selected schools from 2017 to 2019 academic sessions.

The Questionnaire and proforma used for this study were validated through the help of academic experts in Science Education who established the content and face validity of the research instruments. The comments and recommendations of the various experts consulted were put together and taken into consideration in drawing up the final instruments.

Thereafter, the instrument was administered twice in some schools which did not participate in the study at an interval of three weeks. The result obtained was analyzed using Pearson product moment correlation statistic in order to ascertain the reliability of the instrument and a coefficient of 0.71 was obtained.

Results and Discussions

Research Question 1: How adequate are the teaching facilities in the schools? From the questionnaires administered, 28 respondents representing 62.22% out of a total of 45 respondents were of the opinion that teaching facilities available in their various schools were inadequate for effective and efficient teaching and learning of Physics while 17 respondents representing 37.78% out of the total

respondents agreed that the available facilities in their various schools were adequate for effective and efficient teaching and learning of Physics as shown in Table 1.

Table 1
Adequacy of Teaching Facilities for Teaching of Physics in Schools

Adequacy	Number of Respondents	Percentage (%)
Adequate	17	**37.78**
Inadequate	28	**62.22**
Total	**45**	**100.00**

It can be concluded from Table 1 that the teaching facilities available in senior schools in Ilorin metropolis is highly inadequate as most of the Physics teachers (62.22%) agreed that the facilities available for teaching Physics in their various schools are not adequate.

Research Question 2: What is the average level of teachers' quality?
From the information and data gathered through the questionnaire administered, 35 respondents representing 77.78% of the total of 45 respondents were qualified teachers who have the minimum required certificate for teaching Physics in senior secondary schools and are certified by the Teachers' Registration Council of Nigeria while the 10 respondents representing 22.22% of the total respondents were not qualified teachers because they do not have the required qualification for teaching Physics and were not recognized by the Teachers' Registration Council of Nigeria due to their little or no background knowledge in teacher education as summarized in Table 2.

Table 2
Level of Availability of Qualified Physics Teachers in Senior Schools

Physics Teachers	Number of Respondents	Percentage (%)
Qualified	35	**77.78**
Unqualified	10	**22.22**
Total	**45**	**100.00**

It can be concluded from Table 2 that the level of availability of qualified teachers for teaching Physics in senior secondary schools in Ilorin metropolis is very high (77.78%).

Research Question 3: What is the level of students' academic performance?
The students' academic performance of Physics students in West African Senior School Certificate Examination (WASSCE) in the years 2017, 2018 and 2019 were collected in selected schools in the three local government areas of Ilorin metropolis. The students' grades were analyzed in Table 6. In the year 2017, 487 students representing 25.1% of the total students of 1,937 students that sat for Physics in the selected schools passed the subject at Credit level while the remaining 1,450 (74.9%) failed the subject because they did not have a minimum of Credit pass in the subject. Likewise in the year 2018, only 349 students representing 26.1% out of the 1,336 students that sat for Physics in the WASSCE have a minimum of Credit pass in the subject while 987 students representing 73.9% did not pass at Credit level.

Table 3
Students' Performance in Physics in WASSCE

Year	No. that Sat	No. with As	No. with Bs	No. with Cs	No. with Ds and Es	No. with F	Total/% Pass at Credit Level	Total/% Failed
2017	1,937	0	7	480	727	723	487(25.1%)	1,450(74.9%)
2018	1,336	0	10	339	662	325	349(26.1%)	987(73.9%)
2019	892	0	18	374	257	243	392(43.9%)	500(56.1%)
Total	4,165	0	35	1193	1646	1291	1,228(29.5%)	2,937(70.5%)

In the same vein, 392 students representing 43.9% of the total of 892 students that sat for Physics in 2019 in the selected schools pass the subject at minimum of Credit level. The remaining 500 students (76.1% of the total students that sat) did not pass at minimum Credit level and thus failed the subject.
It is obvious from Table 3 that the level of students' academic performance in Physics is too low in the recent years considered. The highest performance was in the year 2019 where the percentage of students that pass at Credit level is even less than the average of 50% of the students that sat for the examination. It is highly discouraging that for the three years considered, none of the 4,165 students that sat for the subject in the selected schools has excellent!
Research Hypothesis HO_1: There is no significant relationship between teaching facilities and students' academic performance.

In order to test hypothesis HO_1, the obtained grades of students in schools with adequate teaching facilities and those with inadequate teaching facilities were converted to scores and then subjected to independent t-test analysis using SPSS 21.0 and computed at level of significance of 0.05. The analysis output is shown in table 4.

Table 4
t-test Analysis of Students' Performance on the Basis of Adequacy of Teaching Facilities

Teaching Facilities	No	Mean	Standard Deviation	df	Cal t-value	Sig.	Decision
Adequate	1706	7.72	1.21	4163	1.46	0.036	**S**
Inadequate	**2459**	**3.40**	**1.86**				

P < 0.05

It can be seen from Table 4 that the calculated Sig. (0.036) was less than the 0.05 level of significance with degree of freedom of 4163. Therefore the research hypothesis HO_1 was rejected. This means that there was a significant relationship between adequacy of teaching facilities and students' academic performance in Physics. To ascertain the nature of the relationship, the mean of the academic performance of the students in schools with adequate facilities and those with inadequate facilities were compared. From table 4, the mean score of students in schools with adequate facilities (7.72) was greater than the mean score of students in schools with inadequate facilities (3.40). This implies that there is positive relationship between teaching facilities and students' academic performance in Physics in Ilorin metropolis, Kwara state.

Research Hypothesis HO_2: There is no significant relationship between teachers' quality and students' academic performance.
In order to test hypothesis HO_2, the obtained grades of students in schools with qualified teachers and those with unqualified teachers were converted to scores and then subjected to independent t-test analysis using SPSS 21.0 and computed at level of significance of 0.05. The analysis output is shown in table 5.

Table 5
t-test Analysis of Students' Performance on the Basis of Adequacy Teachers' Quality

Teachers' Quality	No	Mean	Standard Deviation	df	Cal t-value	Sig.	Decision
Qualified	2902	6.31	1.49	4163	1.02	0.022	**S**
Unqualified	**1263**	**2.54**	**1.60**				

P < 0.05

It can be seen from Table 5 that the calculated Sig. (0.022) was less than the 0.05 level of significance with degree of freedom of 4163. Therefore the research hypothesis HO_2 was rejected. This means that there was a significant relationship between teacher's quality and students' academic performance in Physics. To ascertain the nature of the relationship, the mean of the academic performance of the students in schools with qualified teachers and those with unqualified teachers were compared. From table 5, the mean score of students in schools with qualified teachers (6.31) was greater than the mean score of students in schools with unqualified teachers (2.54). This implies that there is positive relationship between teachers' quality and students' academic performance in Physics in Ilorin metropolis, Kwara state.

Discussion

The level of academic performance of Physics students as found out by this research was low which requires urgent revival as it could be seen from Table 3 that there has never been a year within the years considered, where more than 50% of the students had a minimum Credit pass. The highest academic performance was in the year 2019 where only 43.9% of the students have a minimum of Credit pass.

The teaching facilities available in senior schools in Ilorin metropolis are highly inadequate for effective and efficient teaching and learning of Physics as obvious in Table 1 where most of the Physics teachers (62.22%) agreed that the facilities available for teaching Physics in their various schools are not adequate. Aina, (2012) posited that instructional materials and other teaching

facilities are very important in teaching and learning science. Thus, the performance of Physics students in schools can be improved if the required teaching/learning facilities are made available to schools and are used by Physics teachers. This finding is in agreement with that of Aina and Adedo (2013).

This study also revealed the important of teaching facilities in the teaching and learning of Physics. It can be deduced from Table 4 that students in senior secondary schools that have adequate teaching facilities has higher mean score and hence, perform academically better than their counterpart in senior schools with inadequate teaching facilities. This result is inline with the findings of Ayodele (2000), Akinfolarin (2008) and Aina (2012) where they found positive relationship of teaching facilities on students' academic performance.

The quality of Physics teachers in Ilorin metropolis is impressive as found out by this study. This is because most Physics teachers (77.78%) are qualified teachers recognized by the Teachers' Registration Council of Nigeria as shown in Table 2. It is however worthy to note that most of the Physics teachers do not update their content knowledge and subject methodology through seminars, conferences and the likes.

It was also found out in this research that positive relationships exist among teaching facilities, teachers' quality and students' academic performance. The implication of this is that when teaching facilities are adequately input into schools and effectively and efficiently used by Physics teachers, students' performance will improve. Likewise, better students' academic performance will be achieved if, and only if, qualified teachers are employed to guide, instruct and teach students in their various schools. These findings is in agreement with those of Omosewo and Ogunlade (2012) and Stuart and Rutheford (1998) where they all agreed that teachers' quality and teaching facilities have positive relationships with students' academic performance.

Conclusion

From the discussion of the major findings, the following conclusions were made:

1. The teaching facilities available in senior schools in Ilorin metropolis are highly inadequate for effective and efficient teaching and learning of Physics.

2. The level of availability of qualified teachers for teaching Physics in senior secondary schools in Ilorin metropolis is very high (77.78%).
3. The students' academic performance of Physics students in Ilorin metropolis is low and need urgent attention.
4. Students in schools with adequate teaching facilities performed significantly better in Physics than those in schools with inadequate teaching facilities. Thus, there was statistically a positive relationship between teaching facilities and students' academic performance in Physics in Ilorin metropolis.
5. Students in schools with qualified teachers performed significantly better in Physics than their counterparts in schools with unqualified teachers. And there is statistically a positive relationship between teachers' quality and students' academic performance in Physics in Ilorin metropolis.

Recommendations

Base on the findings of this study, the following recommendations were considered appropriate:

1. Adequate teaching facilities should be made available in senior schools in Ilorin metropolis by government/school proprietors for effective and efficient teaching and learning of Physics.
2. The level of availability of qualified teachers for teaching Physics in senior secondary schools in Ilorin metropolis is very high (77.78%) but there is still room for improvement. However, all Physics teachers should be ensured by government/school proprietors that they updated their content and pedagogical knowledge by attending seminars, conferences, workshops, etc.
3. Other factors that are likely to influence or affects students' academic performance should be attended to, with the sole aim of improving the students' academic performance in Physics.
4. Physics teachers need to be aware of the positive relationship between teaching facilities and students' academic performance so that they can develop better attitude towards effective and efficient use of the available teaching facilities.
5. Government, School proprietors, School administrators, and other educational stakeholders needs to be aware of the positive relationship

between teachers' quality and students' academic performance so as to ensure that only qualified teachers are employed and allowed to guide, instruct and teach students in their various schools.

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