



Problems and Prospects of Teaching and Learning of Physics: A Case Study of Five Selected Senior Secondary Schools in Gombe Metropolis, Gombe State, Nigeria

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Abstract: *Physics is seen as a difficult subject with very low students' enrollment in tertiary institutions across the country; hence the use teachers with no Physics background to teach the subject in our senior secondary schools thus complicating issues. A study on the Problems and Prospects of Teaching and Learning of Physics was carried out in Gombe metropolis of Gombe State. A well structured questionnaire was used as an instrument for data collection. The results indicates that 4.7 % of the respondents agreed that one physics lesson is being taught per week, 16 % twice per week and 97.3 % are of the view that more than two physics lessons were delivered per week. On student's performance in physics as a subject 48 % of the respondents are of the view that it is on the average, 24 % below average and 28 % above average. Teacher's perception of students attendance in physics classes indicate that 60 % of the agree that students are regular in class attendance, while 40 % of respondents are of the view that students are not regular in attending physics classes. The results also showed that 70 % of teachers teaching physics in the senior secondary school levels do not have the requisite qualifications, hence the difficulty in the delivery of the content. It is hereby recommended that graduates physics with teaching qualifications be employed to teach at these levels, moreover, frequent practical lessons be organized for students so as to update their knowledge and keep them abreast of the theoretical aspect of physics.*

Keywords: *Physics, Prospect, Performance, Learning, Education and Teachers*

1. Background of Study

Physics is the study of laws of nature that governs the behaviour of universe from the very smallest scales of cosmology (Nelkon and Parker, 1998). Physics is becoming increasingly interdisciplinary as physics work with mathematicians, engineers, chemists and biologists in order to understand and solve a wide range of problems confronting the society (Nelkon and Parker, 1998). Teaching is the act of imparting knowledge or skill by a teacher to the student while learning is an act or experience of one that learns knowledge of skills. It involves changes in behaviours which are demonstrated by people implementing knowledge, skills or practices derived from education (Anka, 2006). According to (Ekaete, 2002) teaching is the guidance of pupils through planned activities so that they may acquire the richest learning possibilities from experiences and requires the active participation of the child. Like every other aspects of human endeavour, teaching has had its own share of problems this has prompted many educational

research works on the problems and prospects of teaching and learning at the various levels. The urge to conduct this research is not because researchers are physics scholars but more importantly because of the role physics plays in the development of science and technology in the world today. The major responsibility of science teachers today is to teach scientific thinking and attitudes as well as the subject matter of science (Anka, Panhwar and Khooharo, 2010).

Teaching and learning process has undergone various changes from pre-historic time; this was when children and adults alike gather round the elders to hear tales at night. Historians called this form of teaching oral tradition (Utuka, 2004). In the traditional setting, children are taught their father's profession and so on (Utuka, 2004). Many centuries ago, Roman and Greek teachers went from house to house to teach children of elites at a fee, through the renaissance period when the first model schools were build and appropriate curriculum was structured. Since then a lot of teaching methods have been put into practice from Socratic Method to Discovery, Lecture, Inquiry, and Field trip Methods. In view of the foregoing, this research work shall examine the problems and prospects of teaching and learning Physics in some selected senior secondary schools in Gombe metropolis, Gombe State, Nigeria.

Education in general is viewed as development of life process and universal practice of human learning resulting from man's interaction with his social and natural environment (Akinbola and Folashade, 2009). In line with this, Akinbola and Folashade (2009) discussed education as a process and practice engaged in by different societies at all stages of development and geared toward shaping an all rounded personality by a harmonious and integrated development of the mental, physical, social, moral, spiritual and aesthetic power of human being.

Science education in particular provides good standards for people and leads to cultural developments. In addition, scientific development is the most affective factor in enabling on developing countries into the main stream of contemporary technology and commerce. It is clear that all the developing countries should accelerate the development of science education as learner-centered, teacher-assisted, action oriented, and project based education program (Gadoko, 2004). For rapid development of science education, government, society and industry should be in a co-operation and work together (Gadoko, 2004). Therefore, the researcher is interested in identifying the problems and prospects in teaching and learning of Physics in Some Selected Senior Secondary Schools in Gombe Metropolis and he seeks to proffer possible solution to the problems.

2. Methodology

2.1. Area of Study

Gombe State, which was created on October 1, 1996, is located in the northeast geopolitical zone of Nigeria. It is bounded in the north by Yobe State, in the south by Taraba and Adamawa States, in the east by Borno State and in the west by Bauchi State. It has a population of about 2.1 million people (NPC, 2006) and occupies a total landmass of 20,265 km², State Economic Empowerment and Development Strategy (SEEDS, 2006).

2.2. Statement of the Problem

The major problem in Senior Secondary schools have been inadequate facilities, poor administration, inadequate training of teachers, lack of incentives, overcrowded classrooms and laboratory, untrained laboratory staff, poor attitude of students to the subject of physics, lack of

adequate background in mathematics to cope with physics, lack of opportunities to improve their skills through workshops and seminars (Anka, Panhwar and Khooharo, 2010). Furthermore, inadequate mastery of some fundamental concept at lower cognitive level could be contributed to the poor performance at higher cognitive level. Some serious problems and understanding of physics is the language difficulties encountered by Nigerian students (Anka, Panhwar and Khooharo, 2010).

Physics is one of the subjects offered in the secondary schools at senior level. It is true that, knowledge obtained from physics is applicable in any technological and engineering work, and its benefit for developing countries like Nigeria is unquestionable. (However, the teaching and learning of physics in the secondary schools of the country in general and the Gombe metropolis in particular have been encountered by many problems). It has been observed that teaching physics in different general senior secondary schools of Gombe metropolis, lots of problems were observed in the teaching and learning of physics. I observed that, the majority of students in the secondary schools, especially in SS 1 and SS 2 had no interest to learn physics and this resulted to the low achievement in SSCE examination. In addition to this, the students in the SS 3 had also low interest in physics when compared with other science subjects. Majority of Senior Secondary students choose natural science stream only to join health related fields when they will be admitted to higher educational institutes, because they assume that, they cannot cope with physics dominated fields like engineering and technology education.

2.3. Purpose of Study

The purpose of this empirical work is to:

- i. To investigate the prospects associated with teaching and learning of physics.
- ii. To examine the problems of teaching of physics.
- iii. To identify whether students like to study physics after Secondary School.
- iv. Assess the performance of students while studying physics.
- v. Analyse the perception of teachers regarding teaching of Physics

3. Materials and Methodology

3.1. Introduction

This section is mainly describing the method that will be used by the researcher in collecting data for the study. This section discusses how the research will be carried out by collecting the relevant information from Some Selected Senior Secondary Schools in Gombe Metropolis. Method of data collection that will be used in the research will be by administering the questionnaire personally to Students and Physics Teachers of Some Selected Senior Secondary schools. Sample and sampling techniques will be used including the validity and reliability of the instrument. Descriptive statistics will also be used to calculate the frequencies and percentages of the collected data. The analysis of data collected from the respondents will be presented in results and discussion.

3.2. Population of the Study

The population of the study comprises of few students and all physics teachers in each of

the Selected Senior Science Secondary Schools (175) in Gombe Metropolis. The schools selected are all from Akko, Gombe, Kwami and Yamaltu-Deba Local Government Areas in Gombe Metropolis. Inclusion of these Senior Secondary schools was due to unavailability of Science Secondary School in the State capital.

A survey research method was used for this study. A survey is a method of collecting information from sample individual Asa, (2003). A survey research is one in which a group of people or item is studied by collecting and analysing data from only a few people or item to be representatives of the entire group.

3.3. Samples and Sampling Technique Used

Random sampling was used to select some Science Senior Secondary Schools in Gombe Metropolis. The sample of the study comprises of five Science Senior Secondary Schools in the metropolis. The schools are as follows:

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|---|----|
| 1. Government Science Secondary School Gombe | 35 |
| 2. Comprehensive Day Secondary School Gombe | 35 |
| 3. Pilot Day Secondary School Gombe | 35 |
| 4. Government Girls College Doma | 35 |
| 5. Government Science Secondary School II Gombe | 35 |

3.4. Method of Data Collection

Questionnaire was used as a means of collecting data for the study. A total of 175 questionnaire was distributed and collected by the researcher with the assistance of some staff in the selected schools. Reliability refers to the measuring instrument that returns consistently the same or similar result at different occasion, when it is used, it gives minimal variation in the leading provides for the same observation Nwna, (1988).

3.5. Method of Data Analysis

Research work cannot be completed without an adequate statistical treatment of the data collected. Descriptive statistics will be used to generate frequencies and percentages from the collected data. The data will be presented in the table for easy interpretation

4. Results and Discussion

4.1. Introduction

This chapter presents the results and findings of the study. The data was analyzed based on informations collected using the questionnaire, descriptive statistics was used. A total of 160 questionnaire were administered and all the distributed questionnaire were completed and returned accordingly.

4.2 Results

4.2.1 Student Responses

Table 1: What are the numbers of physics lessons Taken per week?

Responses	Frequency	Percentage (%)
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1	7	4.7
2	24	16
3 and above	119	79.3
Total	150	100

Source: Survey Results, 2016

Table 1 shows that 7 (4.7 %) of the respondents opined that one physics lesson were taught per week and 24 (16 %) of them are of the opinion that two physics lessons were delivered per week and 119 (97.3 %) of them confirmed that they have more than three Physics lessons delivered per week. It is clear from the table 2 that the times allocated to physics lessons were sufficient, there should be uniformity since the same curriculum is used. But scarcity of teachers can also be another problem students may encounter in the course of delivery of lesson as allocated in the timetable.

Table 2: What is the Perception of Students about Studying Physics after Secondary School?

Responses	Frequency	Percentage (%)
Good	105	70
Poor	27	18
Not interested	18	12
Total	150	100

Source: Survey Results, 2016

Table 2 Perception of respondents regarding studying physics after Secondary Schools revealed that 105 (92 %) agreed that students undertake physics as a course in a tertiary institution while 27 (18 %) does not agree and 18 (12 %) of the respondent are not interested. This indicates that majority of the students prefer to continue studying physics after Secondary School.

Table 3: Supervision of Physics Practical lesson is been carried out by

Responses	Frequency	Percentage (%)
Teachers	83	55.3
Laboratory Assistants	67	44.7
Total	150	100

Source: Survey Results, 2016

Table 3 indicates the responses in respect of supervision of physics practical lesson. The results shows that 83 (55.3 %) of teachers supervises physics practical while minority 67 (44.7 %) of the respondents are Laboratory Assistants who supervise physics practical lesson. Ideally there should be laboratory technicians in all science secondary schools for them to handle physics practical lesson in order to ensure the proper understanding of the concept.

Table 4: What is the number of Physics Practical Taken per Week?

Responses	Frequency	Percentage (%)
1	98	65.3
2	52	34.3
Total	150	100

Source: Survey Results, 2016

Table 4 revealed that 98 (65.3 %) of the respondents completed one single practical per week and 52 (34.7 %) of the respondents completed two practical per week. This shows that the number of practical accomplished by the students is inadequate. However, practical lesson need to be increase to two per week.

Table 5: What is the level of your understanding of learning Physics concept?

Responses	Frequency	Percentage (%)
Above average	28	18.7
Average	107	71.3
Below average	15	10
Total	150	100

Source: Survey Results, 2016

Table 5 present data pertaining the level of understanding of learning physics concept by Students indicates that 28 (18.7 %) and majority of the Students 107 (71.3 %) understand averagely what the teachers teaches in the class. Only 15 (10%) did not understand what the teacher teaches in the class. This shows that their IQ is average. But it is clear that there are qualified teachers in the Schools.

Table 6: What is the level of students' performance in physics subject?

Responses	Frequency	Percentage (%)
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Above Average	42	28
Average	72	48
Below Average	36	24
Total	150	100

Source: Survey Results, 2016

Table 6 showed that 42 (28 %) of the respondents performance is above average, while 72 (48 %) and 36 (24 %) performed average and below average respectively. This indicates that students performed excellently well in physics subject and credit goes to their teachers for teaching the subject very well. This is at variance with their performance in WAEC and NECO examinations.

4.2.2. Teachers Responses

Section 4.2.2 presents Teachers responses regarding teaching practicals, assignments and tests conducted in physics. About 10 respondents were responded to the questionnaire, the results are presented as follows: -

Table 7: Are students regular in Attending Physics Class?

Responses	Frequency	Percentage (%)
Good	6	60
Average	4	40
Poor	0	0
Total	10	100

Source: Survey Results, 2016

Table 7 Perception of respondents regarding regularity in attending physics class is presented in Table 12 results showed that 6 (60 %) of the respondents are of the opinion that students are regular in attending physics class, while 4 (40 %) are of the view that there is irregularity in students attendance to physics class. Since majority of the student are regular this shows that they have interest in the subject.

Table 8: Are mathematical aspect of learning physics difficult?

Responses	Frequency	Percentage (%)
Difficult	2	20
Not difficult	8	80
Total	10	100

Source: Survey Results, 2016

Table 8 revealed that 2 (20 %) of the respondents have difficulty in the mathematical aspects of physics, while 8 (80 %) did not have difficulty in mathematical aspects of physics. The results showed that majority of the students have sufficient mathematical background to understand physics classes. But does not tally with the result obtained in their WAEC and NECO examination over the years.

Table 9: Is there availability of sufficient teaching materials for teaching physics in your school?

Responses	Frequency	Percentage (%)
Sufficient	8	80
Insufficient	2	20
Total	10	100

Source: Survey Results, 2016

Table 9 indicates that 8 (80 %) of the respondents have sufficient teaching materials, while 2 (20 %) of them have no sufficient teaching materials. The results have shown that there are sufficient teaching materials in their schools. Despite the availability materials for teaching physics but there still massive failure of students in WAEC and NECO to this end this failure may be referred to inadequacy of teachers in the entire schools.

4.3. Summary of Research Findings

- a. It observed that there are no sufficient physics teachers in the sampled schools but the few that are available are qualified because they obtained the necessary requirement.
- b. It also revealed that majority of the respondents (79.3 %) opined that they are having more than three physics lesson per week. Which means the time allocated for the subject is adequately enough.
- c. It is discovered that majority of the respondents (68 %) indicates poor background of mathematics as their major problem encountered in learning physics.
- d. Research revealed that (34.7 %) of the respondents opined that they are completing more than two assignment per week. It clear that self learning and discovery is encouraged by the teachers but still comparing with students performances in WAEC and NECO there are discrepancies.
- e. Majority of the respondents (65.3 %) opined that they are offering one physics practical per week. Ideally one practical per week is adequate for learning physics.
- f. Also (71.3 %) of the respondents opined that they averagely understand physics but comparatively their performance in an external examination (WAEC and NECO) is in the contrary.
- g. It was discovered that majority (48 %) of the respondents are of the opinion that their understanding of physics subject is on the average.
- h. Research revealed that (60 %) teachers responded that students are regular in attending physics classes.

- i. It is discovered that majority (70 %) of the teachers do not possess the required qualifications to teach physics.

4.4. Conclusions

Based of the findings of this study we wish to concude as follows:

- a) The study revealed that 7 (4.7 %) of the respondents opined that one physics lesson were taught per week and 24 (16 %) of them are of the opinion that two physics lessons were delivered per week and 119 (97.3 %) of them confirmed that they have more than three Physics lessons delivered per week.
- b) Also 92 % agreed that students undertake physics as a course in a tertiary institutions while 27 (18 %) did not agree and 18 (12 %) of the respondent are not interested.
- c) 55.3 % of the respondents opined that teachers supervises physics practicals while minority 44.7 % of the respondents are of the view that the Laboratory Assistants who supervise physics practicals lesson.
- d) 65.3 % of the respondents completes one practical per week and 34.7 % of the respondents completes two practicals per week.
- e) Results on the level of students' performance in physics subject shows that 28 % of the respondents performance is above average, while 48 % and 24 % performed average and below average respectively.
- f) Perception of respondents regarding regularity in attending physics classes shows that 60 % of the respondents are of the opinion that students are regular in attending physics classes, while 40 % are of the view that there is irregularity in students attendance to physics lessons.

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