CHALLENGES OF REPORTING PHYSICS PRACTICAL IN SENIOR SECONDARY SCHOOLS: IBADAN SOUTH-WEST LOCAL GOVERNMENT AREA OF OYO STATE EXPERIENCE

ADEGBOYEGA Oludele Ph.D
Department of Physics, Emmanuel Alayande College of Education, Oyo, Oyo State

Abstract
Reporting practical work in Physics is an important aspect that should be considered in the teaching and learning of physics This research was carried out to identify the challenges that are facing students in reporting physics practical at selected senior secondary schools in Ibadan south-west local government area of Oyo state. The research adopted a descriptive survey research design. Four hundred (400) SSS3 students were respondents from public and private Secondary schools which were randomly selected. Student questionnaire was used as instruments for the research and simple percentage as statistical techniques in analyzing the data. Four group of research question was generated to guide the studies. During the course of the study, a lot of problems have been identified, which include identifying physics apparatuses, setting the apparatuses, making observations, taking readings, plotting of graph, finding of slope, relating equation with graph, and stating of precaution. It was concluded that emphasis should be on good grade in sciences related subject before admitting any students into physics class, physics teachers should make sure that all the course contents of Physics practical are well taught, among others.

Keywords: Challenges, Physics practical, Reporting, Observation, Graph, Slope and Precaution

Introduction

Physics as one of the science subjects for understanding the complexities of modern technology and essential for technological advancement of a nation. This aspect of science is making significant contributions to many of the inventions that are shaping modern day and has helped to explain many of the events being encountered in everyday life. Physics is one of the pre-requisite subjects for the study of engineering, medical and other applied science courses, in the Tertiary institution. Physics provide training for a vast range of carriers where it is either employed directly or where the skills developed can be applied in innovative ways in other fields. Despite its importance, Physics remain the least favoured science subject among students generally, only a few students choose to study Physics at 'O' Level and subsequently at higher degree. Students performs poorly in Physics, and inadequate of practical work may be an important reason for students' poor performance and understanding of physics at secondary school level in Nigeria (Millar, 2004). There is a serious shortage of students and teachers of Physics in Nigerian secondary schools, this is generating concern among science educators, and researchers are increasingly exploring why students avoid the subject, over the years, students of Physics in secondary school have found it extremely difficult to perform well in the subject (Nelkon & Ogbon, 1988). Studies have been carried out to find out the cause of such poor performance. Poor performance of students in Physics could be linked to students' practical ability (Olabanji,1997), supported by Akanbi (2003) that poor performance in Physics may be due to inadequate laboratory equipment and facilities which make the present study essential. Physics as a course of study is generally recognized to be experimental, the understanding of practical aspect may help students to learn physics concepts. The educational objectives of

physics education cannot be fully realized if student's performance in both physics theory and practical are not balanced (Aina, 2011). For the mere fact that Physics has been severally labeled as the most conceptually difficult subject, particularly the practical aspect of the subject, it is important to explore the underlying difficulties that might impede quality learning in the subject, in the context of Nigerian school environment.

Graph is very important in Physics because it is the easiest and shortest way of communicating findings in Physics to the world. Students in physics should be able to plot good graph and correctly interpret graphical information. Essentially physics students should be able to draw and label axes of the graph, plot points accurately, choose good scale, identify and join best points, and be able to interpret any information on the graph. Calculation is an integral part of Physics and therefore physics students must be very good in calculation. Meltzer, (2002) is of the opinion that there is a positive correlation between student's mathematical skills and their exams grade in Physics.

Every experiment must have conclusion and report, that is why students should be able to infer correctly from all the experimental activities carried out in physics laboratory. There should be good inference showing that students understood the title of the experiment he performed.

Statement of the Problem

To acquire appropriate skills needed for the development of our society, effective practical work and laboratory activity should be organized. But several research reports (Olariwaju, 1986; Okoli, 2006, Nwagbo, 2001) opined that students achieve poorly in secondary school science subjects. Available statistics from the west African examination council (WAEC) on senior secondary school students' performance in science (physics included) revealed that, there is a very poor performance of science subject (physics, chemistry, biology) at senior secondary school certificate examination, especially in the practical examination where students exhibit very poor science skills acquisition (WAEC chief examiner report, 2004).

The researcher as a Physics Practical WAEC and NECO examiner for the past eighteen years shows that majority of the candidate are not doing well in practical aspect of Physics. Problems encountered by students in writing physics practical report in senior secondary school examination include: taking of readings, preparing table of values, plotting of graph, calculating of the slope, finding of intercept, relating physics equation with graph for calculation and stating of precautions. This study is to make a critical appraisal of the problems that are facing students in reporting physics practical at the senior secondary schools in Ibadan South-West Local Government Area of Oyo State.

Objectives of the Study

The following are the objective of the study

1. To identify problems in making observation facing students in reporting physics practical
2. To identify problems in plotting graph in reporting of physics practical
3. To identify problems in calculating slope in reporting of physics practical
4. To identify other related problems facing students in reporting physics practical e.g. intercept, precaution etc.

Research Questions

In line with stated objectives, the following research questions were generated to guide the study.

1. What are the problems faced by students in making observations in physics practical?
2. What are the problems faced by students in plotting graph of physics practical?
3. What are the problems faced by students

in calculating slope in physics practical reporting?

4. What are the other related problems faced by students in reporting physics practical?

Significance of the Study

The outcome of this research may possibly help in enhancing successful reporting of physics practical by students and to yield good academic performance in Practical aspect of Physics examination. The study will also provide the basis for further findings of research in the area.

Scope of the Study

This study is strictly limited to the problems of reporting physics practical in selected senior secondary schools in Ibadan South-West Local Government Area of Oyo State, Nigeria. In order to obtain useful and relevant information about the findings, only senior secondary schools three (SSS3) students that offered Physics subjects were respondents. The research covered ten selected senior secondary schools, five publics and five privates within the area.

Research Methodology

Research Design

The design used in this research was a descriptive survey research design whereby data were collected, analyzed, and interpreted based on the prevailing circumstances.

Sample and Sampling Technique

The sampling procedure was based on random sample of different students among the ten (10) selected secondary schools in Ibadan South-West Local Government Area of Oyo State. Forty (40) physics students were selected from SSS3 science class of each school. This means that a total of (400) students were selected to represent the entire physics students in Ibadan South-West Local Government Area of Oyo State.

Instrumentation

The instrument used for the data collection in this research study was a four set of structured questionnaire for senior secondary school three students. The questionnaire consists of twenty (20) questions. Eight (8) questions on problems in making observation, five (5) questions on problems in plotting graph, three (3) questions on problems in calculating slope and four (4) questions on others related problems.

Validity of the Instrument

To ensure validity and reliability of the instrument the questionnaire was subjected to peer-review by professionals in the subject.

Pilot Study

This is a preliminary studies conducted on a small scale portion of the population in order to test whether the instrument designed for the conduct of a research will be valid and reliable. With regard to this, questionnaires were administered in two secondary schools which are in the population of these studies but not in the sample and the reliability index was found to be 0.82.

Reliability of the Instrument

The data collection technique and rules for this research are relevant and correct, thus, the instrument used produced required information because people who are experienced in the area of the study were selected. The reliability index after pilot study was found to be 0.82.

Procedure for Data Collection

Compilation of data was done through the administration of questionnaires to the selected senior secondary schools. In order to make the study quicker, and easier, the researcher personally visited the area of the study and administered the questionnaires.

Results and Discussion

Simple percentage was used to analysis the responses to the questionnaire of students.

Research Question One: What are the problems faced by students in making observations in physics practical?

Table 1.0: Problems in making observation

Item	Questionnaires Statement	Number of YES	Number of NO	% YES	% NO	TOTAL %
1	Do you have problem in identifying physics apparatuses?	296	104	74.00	26.00	100
2	Do you have problem in setting the apparatuses?	336	64	84.00	16.00	100
3	Do you have problem in identifying systematic error?	250	150	62.50	37.50	100
4	Do you have problem in taking readings and recording table of values?	294	106	73.50	26.50	100
5	Do you have problem in stating correct unit with the appropriate quantity?	336	64	84.00	16.00	100
6	Do you have problem in evaluating a value from the recorded value	245	155	61.25	38.75	100
7	Do you have problem in recording values with consistent significant figure and decimal place of value	230	170	57.50	42.50	100
8	Do you have problems in making composite table?	336	64	84.00	16.00	100
	Total	**2323**	**877**	**72.59**	**27.41**	**100**

Table 1.0 indicates that out of four hundred (400) respondents, 72.59% have problem in making good observation in physics practical.

Research Question Two: What are the problems faced by students in plotting graph of physics practical?

Table 2.0: Problems in plotting graph

Item	Questionnaires Statement	Number of YES	Number of NO	% YES	% NO	TOTAL %
1	Do you have problem in writing title of the graph?	150	250	37.50	62.50	100
2	Do you have problem in labeling of axes?	200	200	50.00	50.00	100
3	Do you have problem in choosing a reasonable scale ?	343	57	85.60	14.40	100
4	Do you have problem in plotting of points?	305	95	76.25	23.75	100
5	Do you have problem in obtaining suitable line of best fit?	300	100	75.0	25.00	100
	Total	**1298**	**700**	**64.87**	**35.13**	**100**

Table 2.0 shows that out of four hundred (400) respondents, 64.87% find it difficult to plot graph of physics practical.

Research Question Three: What are the problems faced by students in calculating slope in physics practical reporting?

Table 3.0: Problems in Calculating Slope

Item	Questionnaires Statement	Number of YES	Number of NO	% YES	% NO	TOTAL %
1	Do you have problem in drawing large right-angle triangle to find slope?	300	100	75.00	25.00	100
2	Do you have problem in determining change of quantity in vertical and horizontal axes	210	190	52.50	47.50	100
3	Do you have problem in dividing change of quantity in vertical axis by change of quantity in horizontal axis	215	185	53.75	46.25	100
	Total	**725**	**475**	**60.42**	**39.58**	**100**

Table 3.0 shows that out of four hundred (400) respondents, 60.42% have problem in calculating slope while reporting physics practical.

Research Question Four: What are the other related problems faced by students in reporting physics practical?

Table 4.0: Others related problems

Item	Questionnaires Statement	Number of YES	Number of NO	% YES	% NO	TOTAL %
1	Do you have problem in relating physics equation with graph for calculation?	350	50	87.5	12.5	100
2	Do you have problems in finding of intercept?	336	64	84.0	16.0	100
3	Do you have problems in taking of precautions?	300	100	75.0	25.0	100
4	Do you have problems in writing conclusions and practical report?	232	168	58.0	42.0	100
	Total	**1218**	**382**	**76.12**	**23.88**	**100**

Table 4.0 shows that out of four hundred (400) respondents, 76.12% have other related problems while reporting physics practical apart from aforementioned.

Discussion of the Result

Table 1.0 shows that 74.00% of respondents have problem in identifying physics apparatuses which may be due to lack of pre-requisite knowledge and vision impairment. 84.00% of respondents have problems in setting the physics apparatuses which may be due to lack of proper instruction by the teachers and truancy of students. This table also illustrated that 73.50% of respondents have problem in taking readings and preparing table of values in reporting physics practical. This may be due lack of adequate knowledge of approximation in mathematics. Generally, 72.59% of respondents have problems in making observations during experiment which may be due to lack of proper instruction, vision impairment, and inadequate lightening in the laboratory.

Plotting graph which is very important in physics practical is another problem facing student in the conduct of physics practical. 64.87% of respondents find it difficult to plot graph of physics practical as shown in table 2.0 which may be due to inability to select appropriate scales and locating appropriate points in the graph. This may be due to lack of adequate knowledge of graph in mathematics

Table 3.0 shows that 60.42% of respondents have problem in calculating slope while reporting physics practical. This may be due to lack of adequate knowledge of differential calculus in Further Mathematics.

Table 4.0 indicates that relating physics equation to graph for calculation and finding of intercept are also problems. 76.12% of respondents have other related problems while reporting physics practical apart from aforementioned. This may be due to lack of adequate knowledge of equation and graph in Mathematics. Students also have problem in taking of precautions, in writing conclusion and a good practical report based on the experiment they have carried out in physics practical. These may be due to language problem. The results of these findings are in consonant with the results obtained by Rukayya, Nura, Mujittafa, Buhari and Rukayya (2015) who studied problems of students in conducting effective physics practical in senior secondary schools in Sokoto metropolis and

also corroborate with the findings of Adolphus and Aderonmu (2013) who studied difficulties students encounter in reporting physics practical at the Senior Secondary School level in Rivers State,

Conclusions

This study has revealed that there are problems militating reporting of physics practical in selected senior secondary schools in Ibadan South-West Local Government Area of Oyo state. Having collected and critically analyzed the information gathered, a lot of problem have been identified, which include: problem in identifying physics apparatuses, setting the apparatuses, making observations, taking readings, plotting of graph, finding of slope, relating equation with graph, and stating of precautions.

Recommendations

In the light of the above conclusions the following recommendations are hereby suggested:

1. Emphasis should be on good grade in Physics/Sciences related subjects before admitting any students into physics class.
2. Physics teachers should make sure that all theory course contents of Physics are well taught to students.
3. Management should mandate all physics students to offer Further Mathematics for the better understanding of differential calculus.
4. Physics teachers should make sure that all physics students are well taught in the area of equation and graph
5. There should be proper instruction by the teachers during the conduct of physics practical
6. Enough illumination in the Laboratory is also important to avoid problem of vision.
7. Students need to improve their English grammar for better stating of precautions, and writing of conclusions in practical reportage.

References

Adolphus, T. & Aderonmu, T. S. B. (2013). Difficulties Students Encounter in Reporting Physics Practical at the Senior Secondary School level in Rivers State, Nigeria. *Asian Journal of Education and e-Learning,1(1) Pp 29-33.*

Aina, J. K. (2011). *Relationship between student's Academic performance in theory and practical Physics in colleges of education in Kwara State, Nigeria*. (unpublished master's thesis) University of Ilorin, Ilorin Nigeria.

Akanbi A. O. (2003). An investigation into student's performance in Senior Secondary School Physics. *Journal of Teacher Education Trends* 1 (1), 58-64.

Meltzer, D. E. (2002). *The relationship between mathematics preparation and conceptual learning gain in physics: A possible "hidden variable" in pre-test scores*. Publication of Department of Physics and Astronomy, Iowa State University, Ames, Iowa, U.S.A.

Millar, R. (2004). *The role of practical work in the teaching and learning of science*. University of York. Available at: www7.national academics.org/bose/millar_draft

Nelkon, M. & Ogborn, J. (1998). *Advance level practical physics*. Ibadan: Heinemann Educational Books (Nig) Ltd.

Nwagbo, C. (2001). The Relative efficacy of guided inquiry and Expository methods on the achievements in Biology of students of different levels of Scientific literacy, *Journal of the Science Teachers' Association of Nigeria*, 36 (1 & 2), Pp. 43-51.

Okoli, J. N. (2006). Effect of investigative approach and expository method as acquisition of science process skills by Biology Students of different levels of scientific literacy, *Journal of the Science Teachers' Association of Nigeria*, 41 (1 & 2) Pp. 79-88.

Olabanji, S. S. (1997). The effect of laboratory practical on student's performance in Physics. *Lafiagi Journal of Education, Science and Technology*. 1 (1) 110.

Olariwaju, A. O. (1986). Causes of students' under achievement. *27th Annual Conference Proceedings of Science Teachers' Association of Nigeria*.

Rukayya, M., Nura, M., Mujittafa, S., Buhari, B. and Rukayya, L. M., (2015). Problems of students in conducting effective Physics Practical in senior secondary schools in Sokoto metropolis. (Unpublished undergraduate's thesis), Usmanu Danfodiyo University, Sokoto, Nigeria.

West African Examinations Council (WAEC), WAEC Chief Examiners' Reports, 2004 on Physics