

# Challenges of Students in Practical Physics among Students of Federal College of Education (Special) Oyo

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## ABSTRACT

The study identify the challenges of physics students in conducting and reporting practical physics in Federal College of Education (Special) Oyo. The research design is a descriptive survey. Two research questions and a null hypothesis was formulated to guide the study. The population of the study is all the NCE I, II and III students in the department of physics Federal College of Education (Special) Oyo, there are 31 students (Male=19, Female=12). An intact class of all the 31 students is considered to be the sample of the study since the number is manageable. The instrument used for data collection developed by the researcher is the Reporting and Conducting Practical Physics Students Challenges Questionnaire (RCPSCQ) with ten (10) items concerning reporting and conducting skills of practical physics. The Questionnaires was rated on four likert-scales of Strongly Agreed (SA)=4, Agreed (A)=3, Disagreed (D)=2 and Strongly Disagreed (SD)=1, a criterion mean of 2.5 is set for decision making where the items with mean values above the criterion mean is considered as not a challenge to the students. The research questions and the hypotheses were tested using the appropriate statistics of mean, standard deviation and Mann-whitney U test for final decision. The findings indicate that Mann-Whitney ( $U=104$ ,  $p=0.7>0.05$ ) for male and female challenges in conducting practical physics has no significant difference among them also ( $U=103$ ,  $p=0.655>0.05$ ) for male and female challenges in reporting practical physics also indicate there is no significant difference among them.

**Keywords:** Challenges, Conducting, Reporting, Practical Physics

## INTRODUCTION

Physics is a branch of natural science that deals with the study of matter, energy & motion and their inter-relationship with space and time. Physics is one of the pre-requisite subjects for studying medical science courses, technological engineering and many other science related courses in our tertiary institutions (Tindan & Joshua, 2024), it provides training and develops the skills of individuals to be applied in innovative ways in other fields as well, the rationale of teaching and learning physics is to equip learners with basic knowledge on scientific enquiry methods and to foster problem solving skills through practical work (Okokon, et al, 2022). Physics is a subject taught primarily by the lecture method at high school and college level, but the lecture is supported with laboratory exercises in-order to verify the concepts taught in the lecture method (Ayeshung, 2024). Physics is learnt through practical work, where students are able to observe, manipulate and demonstrate certain aspects of the subject matter which has been learnt in class using laboratory materials (Adeogun & Osifila, 2008).

The physical actions performs by students influence their mental experience and understanding (Sullivan, 2018), and since experimental laboratory work is a way of including the students' sensory-motor system this should prove beneficial for the student's learning, according to the theory of cognition as embodied. Educational research about practical teaching often deals with challenges, and the research is based on identifying these difficulties to then analyze (Nygren, 2021). The failure rate among physics students in terms of practical courses is alarming which attracts the attention of the researcher to identify the possible challenges among the students and to find out if gender contributes to the challenges. However the researcher try to identify the challenges in both conducting and reporting practical physics which other researchers fail to categorize them.

## Objectives of the study

Objectives of the study is to identify the challenges of students in practical physics in Federal College of Education (Special) Oyo, however the specific objectives are to determine the:

- i. Challenges of students in conducting and reporting physics practical in Federal College of Education (Special) Oyo
- ii. Differences in the challenges of male and female students in conducting and reporting physics practical in Federal College of Education (Special) Oyo

## Research Questions

1. What are the challenges of students in conducting and reporting physics practical in Federal College of Education (Special) Oyo?
2. What is the differences in the challenges of male and female students in conducting and reporting physics practical in Federal College of Education (Special) Oyo?

## Research Hypotheses

The following null hypothesis was tested at 0.05 level of significant

Ho: There is no significant difference in the challenges of male and female students in conducting and reporting physics practical in Federal College of Education (Special) Oyo

## METHODOLOGY

The research design is a descriptive survey where data is collected in order to gather standardized information about a particular situation. The population of the study is all the NCE I, II and III students in the department of physics, Federal College of Education (Special) Oyo, there are 31 students (Male=19, Female=12). An intact class of all the 31 students is considered to be the sample of the study since the number is manageable. The instrument used for data collection is the researcher developed Questionnaire called Reporting and Conducting Practical Physics Students Challenges Questionnaire (RCPPSCQ) with ten (10) items concerning reporting and conducting skills of practical physics. The Questionnaires was rated on four likert-scales of Strongly Agreed (SA)=4, Agreed (A)=3, Disagreed (D)=2 and Strongly Disagreed (SD)=1. The instrument was validated and a reliability coefficient was obtained as 0.87 using Cronch bach alpha method, criterion mean of 2.5 is set for decision making where positive statements among the items with mean values above the criterion mean is considered as not a challenge to the students while negative statements among the items with mean values above the criterion mean is considered as not a challenge to the students while negative and vice-versa. The research questions and the hypotheses were tested using the appropriate statistics of mean, standard deviation and Mann-whitney U test for final decision.

## RESULTS

**Research Question 1:** What are the challenges of students in conducting and reporting physics practical in Federal College of Education (Special) Oyo?

Table 1: Mean and Standard deviation for the challenges of students in conducting and reporting physics practical in Federal College of Education (Special) Oyo

SN	Items	Mean( $\bar{x}$ )	Std dev (SD)
1	It is easy to identify apparatus for physics practical	2.16	1.21
2	It is very difficult to set up the apparatus for physics practical	2.74	1.09
3	Students always record their observation without any difficulty	3.09	1.04
4	It is easy to handle the laboratory apparatus	1.90	0.83
5	Completing table of values is easy in reporting physics practical	2.45	1.12

6	Taking acceptable scale for plotting graph is a great challenge for students in reporting physics practical	2.19	0.98
7	Students finds it easy to plot points on the graph while reporting physics practical	2.48	0.99
8	Slope is easy to evaluate on the graph while reporting practical physics	2.39	1.20
9	It is difficult to relate theoretical concepts with practical in reporting practical physics	3.06	1.03
10	Statement of acceptable precautions is a great challenge for students	2.32	1.11

In table 1, items 1, 2, 3 and 4 provide information about the conduct of practical physics, it reveals that handling of laboratory apparatus is extremely difficult for students, it has a mean value of 1.90 and standard deviation of 0.83, also identification of apparatus is another challenge with a mean value of 2.16 and standard deviation of 1.21, setting up the apparatus is also identified as a challenge having mean of 2.74 and standard deviation of 1.09, but it shows that students does not usually encountered challenge in record of observation from the apparatus in conducting physics practical, this is revealed in item with mean of 3.09 and standard deviation of 1.04.

However, items 5, 6, 7, 8, 9 and 10, provides information about reporting practical in physics, where it shows that students major challenges are: relating theoretical concepts with practical in reporting practical physics, taking acceptable scale for plotting graph, other like completing table of values, plotting of points on the graph evaluation of slope and statement of acceptable precautions are rarely challenging among the students,

**Research Question 2:** What is the differences in the challenges of male and female students in conducting and reporting physics practical in Federal College of Education (Special) Oyo?

Table 2: Mean and mean difference for male and female students challenges in conducting and reporting practical physics

SN	Items	Mean ( $\bar{x}$ )	MF	Mean diff
1	It is easy to identify apparatus for physics practical	2.21	2.08	0.13
2	It is very difficult to set up the apparatus for physics practical	2.26	1.92	0.30
3	Students always record their observation without any difficulty	2.16	2.08	0.08
4	It is easy to handle the laboratory apparatus	3.37	2.75	0.62
5	Completing table of values is easy in reporting physics practical	2.37	2.58	-0.21
6	Taking acceptable scale for plotting graph is a great challenge for students in reporting physics practical	2.32	2.00	0.32
7	Students finds it easy to plot points on the graph while reporting physics practical	2.42	2.58	-0.16
8	Slope is easy to evaluate on the graph while reporting practical physics	2.37	2.42	-0.05
9	It is difficult to relate theoretical concepts with practical in reporting practical physics	3.11	3.00	0.11
10	Statement of acceptable precautions is a great challenge for students	2.32	2.33	-0.01
	<b>Grand Mean</b>	<b>2.49</b>	<b>2.37</b>	
	<b>Grand Mean Difference</b>	<b>0.12</b>		

Table 2, showed the differences in challenges of male and female students in conducting and reporting practical physics. The mean differences of the responses in the items that concerns the conduct of practical, that items 1, 2, 3 and 4 indicate that the male had less challenges than their female counterpart where the mean for male is greater than that of females by some fractions like in item 4 with difference of 0.62, then item 2 with difference of 0.3. This clearly shows that the female have much challenges in conducting the practical than male.

In terms of reporting the practical, it does not clearly indicate differences in the challenges by gender, however some mean values like items 6 and 9 shows some differences indicating the females facing more challenges than the male in terms of reporting practical physics.

## Hypothesis Testing

The null hypothesis: There is no significant difference in the challenges of male and female students in conducting and reporting physics practical in Federal College of Education (Special) Oyo

Table 3: Mann-Whitney U-test for the challenges of male and female students in conducting and reporting practical physics. Conducting Experiment

Gender		N	Mean Rank	Sum of Rank	Mann-Whitney U	Asymp. Sig	Dec
Conduct	Male	19	16.50	313.50	104.50	0.70	Not sig
	Female	12	15.21	182.50			
Report	Male	19	16.58	315.00	103.50	0.66	Not sig
	Female	12	15.08	181.00			

Table 3 showed that the Mann-Whitney ( $U=104$ ,  $p=0.70>0.05$ ) for male and female challenges in conducting practical physics indicate no significant difference among them while the Mann-Whitney ( $U=103$ ,  $p=0.66>0.05$ ) for male and female challenges in reporting practical physics also indicate there is no significant difference among them.

Therefore, the null hypothesis which state there is no significant difference in the challenges of both male and female in conducting and reporting practical physics is retained.

## DISCUSSION OF FINDINGS

The findings of this study revealed, that students experiences challenges in conducting physics practical, these challenges are: identifying and proper handling of apparatus, setting up of apparatus for experiment, and proper record of observations. These findings agreed with the findings of Soderstrom (2022) which showed the difficulties are because of students' unfamiliarity with working experimentally. The findings of Mamuda & Abubakar, (2022) also reveals that there is problem in identifying physics apparatuses which may be due to lack of pre-requisite knowledge and vision impairment and students have problems in making observations during experiment which may be due to lack of proper supervision, vision impairment, and inadequate lightning in the laboratory. Tindan & Joshua (2024) also identified that finding physics apparatuses is a challenge and students struggle to record observations during the experiment.

It is also revealed that students encountered challenges like relating theoretical concepts with practical, taking acceptable scale for plotting graph, completing table of values, plotting of points on the graph evaluation of slope and statement of acceptable precautions are rarely challenging among the students, this finding agreed with the one obtained by Adolphus & Aderomu, (2013), which shows that students are not able to tabulate obtained value appropriately, units are not properly included on the table of values, record readings to approximate number of decimals and find it difficult to write symbols used for physics parameters. Also Okafor (2017) showed that the most difficult practical physics skill encountered by students is Observation. Apart from measurement skill which both male and female SS3 physics students find easy, the other skills are difficult for both male and female physics students but female physics students find them more difficult to acquire than their physics male counterparts.

## CONCLUSION

From the findings of the study it is concluded that, students encountered challenges in the conduct and report of practical physics such as identification of apparatus, carrying out the experiment, and proper handling of apparatus, others are taking convenient and acceptable scales for plotting graph and tracing of points on the graph. Also students faces challenges in stating acceptable precautions.

## RECOMMENDATIONS

From the findings of the study, it was recommended that:

1. Pre-practical familiarization period should be organized for students at the beginning of the each practical course in a semester for students to acquainted with apparatus in the laboratory
2. Laboratory technologies and technicians should monitor and guide students appropriately during the practical lesson to avoid misconceptions instructions
3. Students should be guided on the skills for reporting practical like scales taking and plotting of points on the graph.

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