

Identification of Errors Committed by College of Education Biology Students in **Practical Biology**

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Abstract

This study identified practical Biology common errors committed by college of education students in North-west Nigeria. The study employed descriptive survey design. The sample of the study consisted of 150 Nigerian College of Education (NCE) 2 biology students randomlysampled from four federal colleges of Education. Practical Errors Identification Test (BPEIT) was developed and used for data collection. The reliability of BPEIT was established using person product moment coefficient and found to be 0.81. Frequency was used to answer the research question. The hypothesis was tested using chi-square at $p \le 0.05$ level of significance. The result showed that Nigeria Certificate in Education (NCE) 2 Biology students least errors committed they were 4. The least 4 errors include woolly lines, guided lines carrying arrow heads, shading of diagram, label lines crossing each other while the most 9 errors include poor clearity of line or blurred lines in diagram, wrongly labelled line no touching the part, labelled diagram and label lines pointing to empty space, inability to label horizontally, use of free hand to rule guide or label lines, one word answer not correctly spelt, inability to identify and classify specimen correctly. Based on the findings of this study among others, recommended that teachers should be encouraged to find out the errors their students are committing in what they teach so that the errors can be corrected.

Keywords: Identification, Error Committed and Practical Biology.

Introduction

Science is a great enterprise that nations depend on in order to grow forward technically.Raven & Johnson, (2016) defined science as a particular way of investigating the world and of forming general rules about why things happen by observing particular situation. Science is the foundation upon which the bulk of present-day technological breakthrough is built. Biology is one of the science subjects, it is a branch of science and a prerequisite subject for many fields of learning that contributes immensely to the technological growth of a nation and is an interdisciplinary subject required for courses in university or colleges of Education as food nutrition/food technology among others (Oria, uhumuaubi & Agulele, 2010). Biology being a science subject has both theory and practical.

To buttress this fact Lunette, Hotstein & Clough (2007) opined that Practical Biology entails practical work that has to be carried out by the learners. Practical work is seen as learning experiences in which students interact with materials or with secondary sources of data to observe and understand the natural world for example using spectrum to examine the nature of stars and atmospheres. While Iloeje (2012) viewed the nature of practical work in Biology as part of the study of practical Biology that goes hand in hand with the theory Iloeje listed practical biology to consist activities like experimentation, drawing and labeling of diagrams, observation and researching of data amongst others to be carried out practically.

Biology students therefore are, made to observe and draw specimens, carry out experiments, report and collect data, making students find out something on his or her own that can stick better in the student's memory. Several scientific skills like identification, classification among others are learnt during the practical lesson. Practical is such an important aspect that college of Education Examination that students must obtain B grade before the student can be grouped among those having a good pass in Biology Practical Federal College Of Education, (FCE, 2016). Therefore, such great importance is attached to practical lesson in tertiary institution that the National Commission for Colleges of Education (NCCE) made it compulsory in the Nigerian Certificate in Education (NCE) curriculum revised (2008) that any student offering Biology must also offer Biology practical courses such as Bio 114 (Biology practical 1), Bio 216 (Biology practical II) among others. In this practical Biology course, certain rules must be followed, in order to successfully complete these tasks like drawing, the transverse section (TS) of tomato fruit, the student requires the exhibition of certain skills of practical biology to do well in such kind of tasks. The student also requires

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that the drawing reflects the correct proportion and relationship of parts of the specimen drawn. No part of the drawing or diagram should be shaded and cut surface must not be woolly, broken or invisible when drawn. It also demands that the guidelines for labels should be ruled with a ruler and not free hand, Iloje (2012). These are just among the few things that candidates should be able to demonstrate in practical biology. But evidence abounds from FCE (2014) biology chief examiner report that the scripts of NCE students displayed common errors committed in practical Biology like those found in O`level biology student. The implication of this is that since the students transit from secondary school, they now carry the errors such as wrong spelling mistakes, wolly lines, rough diagram among others. Who will now later transfer the errors to secondary school students. In support of this claim, Lederman (2006) investigated types of errors in Biology Practical Diagrams among High School Students. Lederman in his findings discovered that errors were committed by students. The errors committed includes woolly lines, rough diagram and wrong spelling mistakes. Olaniyonu, (2006) & Iloeje, (2012); mentioned that the effect of this errors do results into poor performance in practical biology. In the same vain, Nurudeen (2010) conducted a research on a comparative study of errors committed by Science and Non-Science Biology Students at the Senior Secondary School.

The result of the study revealed that the student are committing errors such as woolly lines, lack of magnification, blurred lines in diagrams among others and there significant was differences in the frequenceies of the errors types committed. Evidence also abound in the works of Abdulkarim, (2011); Omosewo & Akanbi (2013) & Falalu (2015). That science student are committing errors in the Science Practicals and the frequency of these errors differ from one another. The study therefore revealed that the more the errors committed by a student the less is the overall achievement of the learner in the subject leading to poor performance; Thus, it is against this backdrop that this study intends to identify these common errors the NCE students are committing in practical Biology. Therefore, the problem of this study posed as a question is what are the common errors NCE students are committing are in practical biology. Falahu (2015) opined that errors contribute enormously to the poor performance of learners. Unless such a study is made the NCE students would not be aware of the errors they are committing in practical biology that led to poor performance.

Purpose of the Study

The purpose of the study was to identify the frequency of the common errors committed by college of Education biology students in practical biology. This was accomplished by determining this specific objective.

Identify the frequency of each common error committed by NCE Biology students in practical Biology survey.

Research question

One research question was answered during the study. This includes;

1 What is the frequency of each error committed by NCE biology students in practical biology?

Hypothesis

One research hypothesis was tested at 0.05 level of significance:

1. There is no significant difference in each error committed by NCE Biology students in practical Biology

Method

The study employed a descriptive survey design, where biology Practical Error Identification Test (BPEIT) was used to identify the coomon errors Nieger Certificate in Education (NCE) biology student commits in biology practical. The population of the study comprised 456 NCE 2 biology students from five (5) Federal Colleges of Education in North West Nigeria. There were total number of 456 N.C.E 2 biology students enrolled for 2015/2016 academic session in the 5 Federal College of Education and 150 NCE 2 biology students were randomly sampled and used in the survey. The five Federal College of Education are more of less homogenous with similar condition in terms of students enrolment, teaching staff, co-educational in nature, used the same curriculum, run the same academic session and the colleges are being governed by the same National Commision for Colleges of Education (NCCE). The instrument used in the survey was Biology Practical Error Identification Test (BPEIT) to identify the common errors NCE 2 biology were committing in practical biology. The BPEIT comprised 4 main questions with sub-questions. These questions were drawn using topics from Bio216 (biology Practical 3)

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these are; Identification and Classification of Vertebrate (Aquatic and Land), Cell Division (Mitosis) Examination and Drawing of the Transverse (TS) section of Dicotyledonous stem, Structural and Similarities differences in vertebrates.

These topics were used in determing the errors Biology Students Committed in Biology Practical. The data collected from this test was used for research questions and the hypothesis tested in the survey study. The content validation of the Biology Practical Error Identification Test (BPEIT) items were subjected to Validity and reliability before being put to use. The validation was carried out by a panel of experts that comprised lecturers with Minimum of Ph.D qualification and Rank of Senior Lecturer, Two Senior Lecturer with Ph.D holder from department of Biology in two federal colleges of education, one lecturer from test and measurement unit, Faculty of Education, Ahmadu Bello University Zaria, validated the instrument. The instrument Biology practical error identification test (BPEIT) was corrected or modified on the basis of the suggested and recommendation of the experts. To ascertain the reliability of the

instrument (BPEIT) test retest reliability and person product moment coefficient correlation statistics method with the statistical package of social sciences were used for analysis from the result obtained the reliability of the instrument was found to be r=0.81. This value of 0.81 showed that the test were reliable and as such would test what it was out to test. The test adminisatered to the subjects to identify the was common errors committed. The data collected were scored. For analysis the biology students in the four (4) Federal Colleges of Education (FCE) were pooled together and used for computation. Frequency counts and percentage were used in answering the research question and chi-square for testing the null hypothesis at 0.05 level of significance. The result of the research question one and Null hypothesis one are shown in Tables 1 and 2. Respectively.

Result

One research question was answered and hypothesis tested as follows:

survey							
s/N	Errors Committed	Frequency	Percentage (%)				
1	1. Use of free hand to draw lines	140	93.33				
2	2. Wrongly labeled diagram	102	68				
3	3. Poor clarity of line in diagram	149	99.33				
4	4. Shading or painting of diagram	100	66.66				
5	5. Wrong spelling in diagram labeled	144	96				
6	6. Inability to label horizontally	122	81.33				
7	7. Labeled lines not touching the part	131	87.33				
8	8. Guide or labeled lines pointing to an empty space	127	84.66				
9	9. Drawing with wooly, wavy or broken lines	100	66.66				
10	10. Guide lines caring arrowheads	100	66.66				
11	11. Label or guide lines crossing	100	66.66				
12	12. Technical terms/one word answer not correctly spelt	125	88.33				
13	13. Inability to identify and classify specimen correctly	128	85.33				

Fable 1: Frequency and Percentage	of each Error committee	d by NCE 2 Biology	Student in practical Bio	ology
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The result in Table 1 revealed the frequency and the percentage of the common errors committed in biology practical by NCE biology students. Thirteen errors (13) were identified from the students scripts. The most prominent common errors committed was poor clarity or blurred lines in diagram with the highest frequency of 149 or 99.33 percent, wrong spelling in diagram

with frequency of 144 or 96 percent, among others as shown in Table 1 while the least committed errors are shading of diagrams, label or guidelines, crossing each other and the guidelines were carrying arrow heads, with frequency of 100 or 66.66 percent respectively. This means the biology NCE students are communiting errors in biology practical.



Errors Committed (13)	Ν	%Freq	df	P -value	Remark
Use of free hand to draw lines	140	93.33			
Wrongly labeled diagram	102	68			
Poor clarity of line in diagram	149	99.33			
Shading or painting of diagram	100	66.66			
wrong spellings in diagram labeled	144	96			
Inability to label horizontally	122	81.33			
			12	0.001	0.05 Sig.
Labeled lines not touching the part	131	87.33			
Guide or labeled lines	100	66.66			
Drawing with wooly, wavy or broken lines	100	66.66			
Guide lines carrying arrow heads	100	66.66			
Label or guide line crossing	100	66.66			
Technical terms/one word answer not	125	88.33			
correctly spelt					
Inability to identify and classify specimen	128	85.33			
correctly					

Table 2. Chi-square analysis frequency on errors committed in practical biology survey

The result in Table 2 shows 13 errors were committed and the degree of freedom for 13 cells data was 12 and the p-value was 0.001 which is lower than the level of significance at $\alpha = 0.05$ with df =12. This indicate that the difference between the frequencies of the common errors was significant, thus the hypothesis is rejected.

Discussion

This study investigated the identification of practical Biology Errors committed by college of Education students in North-west Nigeria. The result of statistical analysis relating to research question one and null hypothesis one showed that 13 different errors like wooly lines, wrong spelling in diagram shaded diagrams, one word answer wrongly spelt among others were committed. This proved the fact that the errors committed by NCE Biology students are very significant. The frequencies of error showed that poor clarity (blurred) of lines in diagram has the highest frequency among others and shading of diagram, drawing with wooly, wavy, or broken lines, guidelines carrying arrowheads and label or guidelines crossing each other having the least. Thefindings is in agreement with the findings of Lederman (2006); Nurudeen (2010); Abdulkarim (2011); Omosewo & Akanbi (2013) & Falalu (2015). That mentioned in their studies that students commit errors in practical subjects. In this respect Wyatt (2003) is of the view that the knowledge of the frequency with which learners commit errors, resulting in poor performance, thus it can be concluded that frequency of errors has depressing effect on performance in practical biology. Likewise this findings is in agreement with the findings of Iloeje (2012) and the Biology chief Examiner Federal College of Education FCE (2014). who stated that the performance of a student in biology practiceal is directly related to how well the learners can represent his observations correctly.

Errors reduce students scores and affect their performance. As students progress in learning the errors number and its effect has a negative impact on students performance. The findings is also in line with the findings of Falalu (2015). Therefore it can be ascertained that the frequency of errors has a discouraging effect on achievement in practical. The result indicated in Tables 1 and 2 were presented to answer research question one and the result of testing of null Hypothesis one respectively. The results of the analysis revealed that there was significant difference in frequency of occurrience between different errors identified as indicated in the test of significance of null hypothesis one. The differences in the frequencies of the errors were due to level of difficulty of tasks. This finding is in agreement with the findings of lawan (1996); Mohammed (2000) and Ekwueme & Ali (2013) but in disagreement with the findings of Aderemi, et. al (2014) who found significant differences between the error types they identified in their separate studies.

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Conclusion

Based on the finding from the study, the following conclusions were drawn.

- 1 The subjects of the study committed thirteen common errors in practical Biology. Errors like using a free hand to rule label line, wrong spelling of technical terms among others.
- 2 The frequency of each error NCE student varies because poor clarity of line in diagram had the highest frequency while shading or painting of diagram, drawing with wooly, wavy, or broken line, guidelines carrying arrowheads and label or guidelines crossing each other.

Recommedations

Based on the findings of the study, the following recommendations were made:

- 1 The teachers are encouraged to find out the errors their students are committing in what they teach so that it can be corrected.
- 2 Conducting practical regularly, marking the practical book regularly and well, pointing out to the student the errors, for example use of free hand to rule label lines, inability to label horizontally among others the student would commit less errors.

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