

Assessing Students' Performance in Senior School Certificate Multiple Choice Test in Biology

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Abstract: This study investigated the assessment of students' performance in Senior School Certificate (SSC) multiple-choice test in biology. The survey research design was employed for the study. Sample for the study consisted of 1450 Senior Secondary Three (SSIII) students drawn from 20 randomly selected secondary schools in Ekiti State, Nigeria. The instruments used for the study were 2008 SSC National Examination Council (NECO) multiple-choice Biology test paper. Findings from the study showed that significant difference existed between students' performance in NECO SSCE multiple choice test in biology on the basis of senatorial districts ($F = 55.556, P < 0.05$), school location ($t = 6.89, P < 0.05$), gender ($t = 5.03, P < 0.05$), and school type ($F = 75.126, P < 0.05$). Based on the findings of this study, it was recommended that Government and other stakeholders in education should equip rural schools with facilities that are available in urban schools to improve students' performance in Biology in rural schools.

Keywords: Biology; Multiple Choice Test; NECO; Students' Performance; Senior School Certificate

1. INTRODUCTION

Teachers' carry out a routine evaluation of school learning to achieve various objectives, but this is essentially internal. These internal evaluations go by such names as teacher made tests, Continuous Assessment, School Based Assessment and local tests. For the conduct of external examinations however, there are recognized bodies that carry this assignment out for the whole country

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Olutola, A.T.

and award certificates to candidates at different levels. The essence of using tests and other evaluation instruments during the instructional process is to guide, direct and monitor students' learning and progress towards attainment of course objectives [3, 6].

In view of this, National Examinations Council (NECO) and the West African Examinations Council (WAEC) and National Business and Technical Examination Board (NABTEB) are the bodies authorized by the Nigeria law to conduct the Senior School Certificate Examinations (SSCE), General Certificate Examinations (GCE) and other examinations. NECO, NABTEB and WAEC carry out summative evaluation of the Criterion Referenced Tests.

The birth of the National Examination Council (NECO) can be regarded as a climax of an evolution process. NECO was to take over the responsibilities of the National Board for Educational Measurement (NBEM) which was created, in 1992, by the Ibrahim Babangida administration, although its enabling decree was promulgated in 1993. However, the conduct of the Senior School Certificate Examinations (SSCE) which had, hitherto, been the exclusive preserve of the West African Examinations Council (WAEC) was made an additional responsibility of the new examination outfit. NECO was to conduct its maiden SSCE in mid 2000. The introduction of NECO into the arena of public examination has impacted positively on the overall development of the system. The body is the first examination body in Africa to load its result in the on-line service / internet where candidates can now check their results by purchasing search cards [8]. NECO make use of essay and objectives types of tests in all their examination questions especially multiple choice tests.

In addition, the common form of test used for both formative and summative evaluation by teachers for internally conducted assessments and statutory examining bodies for external assessment are of the objective, essay and practical variants. The multiple choice test type is regarded as the most applicable, flexible and useful type of objective test items. It can be used to measure the level of achievement of all the kinds of objectives that are measured by paper and pencil test. Multiple choice tests are widely acclaimed as most reliable because of consistency in scoring the test as well as its fairness to all students [12]. Multiple choice tests discourage the learner's tendency to anticipate likely questions but encourage them to cover the whole contents taught in their preparations. They are also useful in assessing learners' mastery of specific facts, concepts, terms, laws and principles [7]. Multiple choice tests are the most popular type of test used by NECO and WAEC to set their questions in science subjects such as Chemistry, Physics and Biology.

Science and technology which are often recognized as the basic tools for industrialization and national development could bring economic and social

happiness by providing employment and improving the welfare of the citizenry [13]. Biology has come to take an important place among the three basic science subjects in Nigerian schools. Biology is one of the science subjects that deal with life or the study of living things (both the plants and animals) and their vital processes. Also, Biology is one of the natural sciences offered by secondary school students in Nigeria. It takes into account interaction between living and non-living things and many other activities such as theoretical and experimental activities by which a human being tries to find solutions to his every day's problems [11]. It is the general field of knowledge concerned with the study of all aspects of living organisms. It is also the bedrock upon which some science subjects derive their being (origin). In the study of Biology, learners have the opportunity to be aware of living things around them without which they cannot exist as human beings rely on the living things for their food and often the materials for clothing and shelter.

The status of Biology among the school subjects in general and the science subjects in particular in our secondary educational system warrant looking into the factors affecting students' performance in the subject. Despite the popularity of this subject, however, results of research studies revealed the poor performance of students in Biology. The performance of students in Senior Secondary Sciences in Nigeria has remained an issue of concern to all stake holders [1]. Teachers attitude and students lack of interest have been reported to be a major factors responsible for students perceived difficulty in sciences including Biology [9, 15].

The desire to know the causes of the students' poor performance in Biology has been the focus of researchers. There is need for researchers to empirically analysis variables that may influence students' performance in senior school certificate multiple choice test in Biology. Thus, this study empirically analyzed the students' performance in Senior School Certificate multiple choice tests in Biology. Specifically, the study sought information on students' performance in NECO SSCE multiple choice Biology tests on the basis of: (a) senatorial districts (b) school location (c) gender and (d) school type.

2.1 Research Questions

This research work investigated the analysis of item parameters of Senior School Certificate Multiple Choice tests in Biology in Ekiti State, Nigeria with view to find the answers to the following research questions:

(1) To what extent does (i) senatorial district, (ii) school location (iii) gender and (iv) school type account for differences in students' performance in NECO SSCE multiple choice Biology items?

2.2 Research Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference in the students' performance in NECO SSCE multiple choice Biology tests on the basis of senatorial districts.
2. There is no significant difference in the performance of rural and urban students' in NECO SSCE multiple choice Biology tests.
3. There is no significant difference in the performance of male and female students in NECO SSCE multiple choice Biology tests.
4. There is no significant difference in the students' performance in NECO SSCE multiple choice Biology tests on the basis of school type.

3.1 Methodology

This study adopted a descriptive survey research design. The population for this study consisted of all senior secondary school students in Ekiti State. Survey research design was chosen for this study because the data were collected through the tests and no variable was manipulated during the conduct of the study.

The target population for this study consists of senior secondary school three (SS3) students in Ekiti State, public school. Stratified random sampling technique was adopted for the study. The schools were stratified along three Senatorial Districts in Ekiti State namely: Ekiti Central, Ekiti North and Ekiti South senatorial districts. Thus, a total of twenty senior (20) senior secondary schools (SS 3) were selected from the three senatorial districts listed above. One thousand four hundred and fifty (1450) students were randomly selected to take part in the study.

The instruments for this study was 2008 NECO SSCE multiple choice Biology paper. The instrument was adopted for the study. The instrument was standardized test used by the examination body in Nigeria. These instruments were considered to be accurate and reliable by the public examination body.

For data analysis of the study, Analysis of Variance (ANOVA) was used to analyse hypotheses one and four while t-test was used to analyzed hypotheses two and three.

3.2 Results

Hypothesis One: There is no significant difference in the students' performance in NECO SSCE multiple choice Biology tests on the basis of senatorial districts.

The hypothesis therefore tests in specific terms whether significant differences exist in the performance of students from the three senatorial districts of Ekiti State. The result is presented in table 1.

Table 1: ANOVA Summary Table of NECO SSCE Performance of Students based on Senatorial Districts.

Source	Sum of Square	Df	Mean Square	Calculated F-Value	Sig of F-Value
Between Groups	13420.366	2	6710.183		
Within Groups	174771.8	1447	120.782	55.556	.000 (s)
Total	188192.17	1449			

Table 1 reveals an F-value of 55.556, which is significant at 0.05 alpha level. Thus the null hypothesis that there is no significant difference in the students' performance in NECO SSCE multiple choice Biology test across the senatorial districts was rejected. This implies that, there is significant difference in the students' performance in NECO SSCE multiple choice Biology test across the three senatorial districts in Ekiti State.

Hypothesis Two: There is no significant difference in the performance of rural and urban students' in NECO SSCE multiple choice Biology tests.

The hypothesis therefore tests in specific terms whether significant differences exist in the performance of students from the urban and rural schools of Ekiti State. The result is presented in table 2.

Table 2: t-test Summary of Rural and Urban Students' Performance in NECO SSCE Multiple Choice Biology Test.

Variable	N	Mean	SD	DF	Calculated t-value	Sig of t-value
Urban	979	24.92	11.80			
Rural	471	20.59	9.89	1448	6.89	.000

The t-test analysis was used to determine students' performance in NECO SSCE multiple choice Biology test on the basis of school location (rural and urban) from the sampled schools.

Table 2 shows that calculated t-value of 6.89 which is significant at 0.05 alpha level. As shown in the table, urban students' had a higher mean of (24.92) and higher standard deviation (11.80) than the mean (20.59) and standard deviation (9.89) for the rural students'. These results indicate that students from urban schools performed better than students' from rural schools in

Olutola, A.T.

NECO SSCE multiple choice Biology test. Thus, the null hypothesis two was rejected because there is a significant difference in the students' performance in NECO SSCE multiple choice Biology test on the basis of school location.

Hypothesis Three: There is no significant difference in the performance of male and female students in NECO SSCE multiple choice Biology tests.

The t-test analysis was used to determine the performance of male and female (Gender) students' in NECO SSCE multiple choice Biology test from the sampled schools.

Table 3: t-test Summary of Male and Female Students' Performance in NECO SSCE Multiple Choice Biology Test.

Variable	N	X	SD	Df	Calculated t-Value	Sig. of t-Value
Male	758	22.09	10.50	1448	5.03	.000 (S)
Female	692	25.08	12.15			

Table 3 indicates that calculated t-value was 5.03 and this was significant at 0.05 alpha level. Thus, the null hypothesis which states that no significant difference exists in the performances of male and female secondary school students in the NECO multiple choice Biology test was rejected. As shown in the table, female students had a higher mean (25.08) and a higher standard deviation (12.15) than the mean (22.09) and standard deviation (10.50) for the male students. These results indicate that female students performed significant better than male students in NECO SSCE multiple choice Biology test.

Hypothesis Four: There is no significant difference in the students' performance in NECO SSCE multiple choice Biology tests on the basis of school type.

Analysis of Variance (ANOVA) was used by researcher to determine students' performance in NECO SSCE multiple choice Biology test on the basis of school type i.e mixed schools and single sex schools.

Table 4: ANOVA Summary Table of NECO SSCE Performance of Students in Multiple Choice Biology Test on the Basis of School Type.

Source	Sum of Square	DF	Mean Square (MS)	Calculated F-Value	Sig of F Value
Between Groups	17703.008	2	8851.504		
Within Groups	170489.2	1447	117.823	75.126	.000 (s)
Total	188192.21	1449			

Table 5 shows an F-value of 75.126, which is significant at 0.05 alpha level. This means that, there is a significant difference in the students' performance in NECO SSCE multiple choice Biology test on basis of school type. Therefore, hypothesis four on school type was rejected.

4.1 Discussion of Findings

Findings from this study further revealed that students from Ekiti South senatorial district had the highest mean score of 26.87 in NECO. This was followed by Ekiti Central senatorial district with mean score of 23.95 while Ekiti North senatorial district had the lowest mean score of 19.07. Based on this finding, the researcher concluded that senatorial districts of students have influence in their performance in NECO multiple choice Biology tests.

The study supports the findings of [10] which discovered that discovered that students from Delta South had the highest percentage of 68.4% followed by Delta North with percentage of 65.97% while Delta Central had the lowest percentage of 63.94%. From this result, students' attendance influences their academic performance to some extent. Also, senatorial district of individual students has little influence on the relationship between attendance and performance of secondary school students in Delta State, Nigeria.

Also, the findings of this study revealed that, students from urban schools performed better in NECO multiple choice Biology items with the mean scores of 24.92 than students from rural schools with mean scores of 20.59. The findings of [2] indicating that students from rural schools performed better than students from urban schools in Mathematics examination is not in agreement with the findings of this study. The significant difference discovered in the performance of urban and rural students may be because the urban students were exposed to different social amenities and instructional materials which make them to perform better than students from rural areas where the social amenities and instructional materials may not be available or inadequate.

In addition, female students were found to have performed better in NECO multiple choice Biology tests with mean scores of 25.08 than male students with mean scores of 22.09. It found that gender difference do not affect students' academic achievement in the sciences [5] but disagreed with the researcher who found that male students perform better than female in sciences [4]. This study supports the findings of [14] who found that gender difference influence perception of science concepts.

Moreover, the findings of this study revealed that, students from Girls' schools performed excellently with highest mean scores of 32.602 in NECO. This shows that students from Girls' schools performed better than students from Boys' and mixed schools in NECO SSCE multiple choice Biology tests.

Olutola, A.T.

Students from Boys' schools performed better than students from mixed schools in NECO with mean score of 22.983. The excellent performance of students in Girls' schools in NECO SSCE may base on the type of school i.e. single sex school. This may assist them to interact with one another freely especially when they have problems in their studies than the mixed schools.

4.2 Conclusion and Recommendations

The researcher found from this study that there is significant difference in the NECO SSCE multiple choice Biology tests on the basis of school location (senatorial districts, urban and rural), gender and school type. Ekiti South secondary school students performed best in the 2008 NECO SSCE Biology items and urban school students performed better than rural school students. Also, female students performed better than their male counterpart and Girls' school students performed better than Boys' and mixed schools. School location, gender and school type affect students' performance in NECO SSCE Biology tests. Based on the findings and conclusions drawn in this study, the researcher recommended that students' performance in NECO multiple choice Biology tests on the basis of gender, school type and senatorial districts should be given adequate attention in order to improve students' performance in Biology.

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