Student-Lecturer Variables and Low Performance of Students' in Genetics: A Case Study of Course in Adeyemi College of Education, Ondo State, Nigeria

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ABSTRACT

This study examined the causes of students' low performance in genetics as a course in Adeyemi College of Education, Ondo. A total of 100 students was drawn using stratified random sampling technique from different levels in the Department of Biology. The reliability estimate through test-retest method was 0.86. The results confirm that the performance of students in other biological courses was better than genetics courses. However, it was observed among others that the causes of students' low performance in genetics as a course in Adeyemi College of Education, Ondo is as a result of abstractive presentation of lessons, verbose terminologies and lack of simplification of concepts. It was therefore concluded that enough time should be allocated for practicals than thoeries in genetics to enable the students' gain courage and better understanding, which can improve the low performance of students in genetics courses, especially in institutions of higher learning.
Keywords: *Genetics, Chromosome, learning, Teaching*

INTRODUCTION

Genetics as an aspect of Biology is concerned with the study of nature and mechanism of heredity. Anderson, Fisher and Norman (2002) have defined genetics as the transfer of characteristics of an organism. Therefore, genetics is the biology of heredity. Genetics which is concerned with how characteristics of individuals are passed on to it from its parents is an important course at both secondary and tertiary levels of education. This course is studied in secondary schools, Colleges of Education, Polytechnics and Universities. It is included in the Biology related curriculum. The difficulty of a topic or concept either in teaching or learning is a familiar issue to early researchers. Some research results have shown that teachers/students perceived some branches of science as difficult.

Abimbola (1998) investigated the Biology content areas that Biology teachers perceived as important but difficult for them to teach and reasons they gave for their perceptions. Some teachers' see some Biology concepts as being too complex for students understanding; most especially genetics concepts (Abimbola, 1998). Soyibo (1988a) also researched into the teaching of genetics. In his work on conceptual and instructional difficulties in 'O' level genetics, the researcher reports that the teaching of genetics and ecology have

been neglected in most secondary schools in Nigeria. He goes further to remark that only objective questions were set on genetics between 1973 and 1983 WASC 'O' Level Biology Examination. The non-chalant attitude of all the parties concerned with the teaching and learning of genetics particularly, the teachers could be attributed to the nature and type of genetic questions answered by students from time to time (Soyibo, 1988a). Soyibo (1988a) stresses the need for Biology teachers to develop positive attitude towards the teaching of genetics concepts because these concepts are important to everyday life.

Other attributable reasons for low performances of students in genetics concepts at the tertiary level involve lack of instructional aids, abstractness, complexity, sophistication of concept, short allocation of hours of practical, insufficient teaching experience, genetics concepts not studied in university (Skryabina, 2000), poor background of student, lack of Biology lecturers' interest, lack of students' interest, lack of training and retraining programs for lecturers, lack of motivation to lecturers, inadequate text books for genetics, inadequate fund for maintenance of laboratory, genetics materials, lack of practical in genetics, problem of handling large classroom, lack of good text books from local authors, variation of genetics concepts in various textbooks, and insufficient postgraduate courses in genetics (Soyibo, 1988b).

The main thrust of this study is to critically examine the causes of students' low performance in genetics as a course in Adeyemi College of Education, Ondo. Several studies have shown that there are many factors which contribute to students' low performances in Science courses and some of these factors have been identified while some are yet to be considered (Ahmed, 2003, 2007; Chattopadhyay, 2005; Sadler and Zeidler, 2005). To achieve the objectives of this study, four research questions and corresponding propositions were formulated to set the direction for this study.

Research Questions

1   Is there any significant correlation between the performance of students in genetics and other biological courses?
2   How does gender influence the performance of students in genetics as a course?
3   How does lecturers' attitude influence the academic performance of students in genetics as a course?
4   How does Students' attitude influence their academic performance in genetics as a course?

Research Proposition

1.   There is no significant correlation between the performance of students in genetics and other biological courses.
2.   Gender does not significantly influence the performance of students in genetics as a course.
3.   Lecturers' attitude does not significantly influence the academic performance of students in genetics as a course.
4.   Students' attitude does not significantly influence their academic performance in genetics as a course.

METHOD

The study was conducted in Adeyemi College of Education, Ondo. The survey design was adopted for the study. The population employed for the study comprising students from the Department of Biology. A sample of 50% of the students was drawn from a total of 200 students of the department using stratified random sampling technique from different levels. Due consideration was given to give equal representation on the basis of sex. The instruments for data collection were a 20-item structured questionnaire and raw scores of students in related courses obtained from the department records. The validity of the questionnaire was ensured through the use of reliable tool. The reliability estimate through test-retest method was 0.86. This figure confirmed that the instrument was reliable in achieving the study objective. Data obtained were subjected to statistical analysis using the t-test and analysis of variance regression to test the goodness of the various relationships between the hypothesized variables.

RESULTS AND DISCUSSION

In testing the hypothesis, the results on table 1 show that the t-cal value was found to be higher than that of the t-tab value of 1.96 at 5% level of significance and 100 degree of freedom. Thus the null hypothesis that there is no significant correlation between the performance of students in genetics and other biological courses is therefore rejected. Hence, it can be empirically established that there is a significant correlation between the performance of students in genetics and other biological courses. The results also confirm that the performance of students in other biological courses was better than genetics courses. This implies that many of the respondents agreed that other biological courses are comparatively easier to study than genetics. From table 2, the t-cal value was greater that the t-tab value at 5% level of significance. Hence, the null hypothesis that gender does not influence the performance of students in genetics as a course is hereby accepted. This implies that there was significant difference between the performance of male and female students in genetics. It was equally obvious that the performance of female student was better than male students in genetics as a course. Table 3 shows the F-cal value that is greater that the F-tab values. This implies that there was significant influence of lecturer's attitude on the academic performance of students in genetics as a course. This indicates that the null hypothesis which states that lecturers' attitude does not influence the academic performance of students in genetics as a course is rejected. Hence, the lecturers' attitude has a profound significance on the performance of students' in genetics as a course.

Hypothesis four drawn from table 4 was also analyzed using ANOVA regression and shows that calculated F-cal value of was greater than the F-tab value. Thus, the null hypothesis that students' attitude does not influence their academic performance in genetics as a course is rejected. This implies that the attitude of students does have a quantifiable significance on their performances in genetics courses. Majority of the respondents agreed that lack of motivation influences their comprehension in the classroom. Curiously, respondents' perception of a relationship between students' attitude to genetics and their performance was low (table 4). The results determining the low performance of students

in genetics relative to other biological courses is in tandem with earlier studies by Marbach and Stavy (2000) who observed similar performance in students cellular and molecular explanations of genetics phenomenon. Genetics is a core concept in general biology study, but it has always been seen as a distinct field of study with its own conceptual parameters (Lewis, Leach and Wood-Robinson, 2000). The findings also confirmed that female students are usually seen to have better and quicker understanding of science concepts than their male counterparts. This is consistent with the findings by Bowling et al. (2008), whose results showed that Biology teachers often neglect some areas which they perceived as difficult as well as the distribution of performances of students according to gender in genetics concepts in Biology.

However, in the Nigerian higher education setting the causes of students' low performance in genetics courses are as a result of many prevailing factors such as lack of qualified teaching personnel, abstractive presentation of lessons, verbose terminologies and lack of simplification of concepts among others. It is therefore not out of place to say that Biology students rated most, if not all the concepts taught in genetics as difficult, which bring about their low performance in genetics courses in institutions of higher learning. This is in agreement with Abimbola (1998) who reports that teachers perceived concepts like chromosomes, growth mitosis, probability in genetics, neurone coordination and evolution theories as difficult concepts to teach. It also agrees with Okebukola (2005)'s assertion that even at the secondary school level, about 13 Biology topics are difficult to teach. Furthermore, it agrees with Oyeyemi (1991)'s assertion that students' conception of genetics is generally poor, which brings about low performance in examinations.

Table 1: t-test analysis of the correlation between the performance of students in genetics and other biological courses

Variables	Mean	Std Dev	Df	t-cal	Critical value	Remark
Genetics	17.7576	13.06721	100	7.807	1.96	Signicant
Other biological	20.2121	13.23999	100			

Table 2: t-test analysis of the difference between the performances of male and female students in genetics

Variables	Mean	Std Dev	Df	t-cal	Critical value	Remark
Male	18.5893	15.73159	100	8.843	1.960	Significant
Female	21.0179	12.67853	100			

Table 3: ANOVA Analysis on lecturer attitude on on the academic performance of students in genetics as a course.

ANOVA	Sum of Square	Df	Mean Square	F-cal	F-tab
Regression	1086.359	100	1086.359	25.697	2.15
Residual	1310.550	100	42.276		
Total	2396.909				

Table 4: ANOVA Analysis on students' attitude on the academic performance.

ANOVA	Sum of Square	Df	Mean Square	Fcal	F-tab
Regression	13.982	10	13.982	10.056	2.09
Residual	13597.572	17	251.807		
Total	13611.554	27			

CONCLUSION

From the study, it could also be specifically concluded that teachers' (lecturers) attitude is inseparable to the other factors outlined if objective teaching and learning of genetics is to be achieved. And some concepts are identified as difficult concepts and female students have a propensity to perform better in genetics courses than their male counterparts. Curriculum developers should help to design courses in genetics that will be simple enough for students of genetics to understand so as to increase their performance in examination. And enough time should be allocated for practical teaching and laborary study in genetics to enable students' courage and better understanding, which can improve their low performance in genetics courses, especially in institutions of higher learning.

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