

Students' Attitude and Gender as Correlates of Students' Academic Performance in Biology in Senior Secondary School

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ABSTRACT

The study examined the relationship in the students' attitude to Biology and students' interest and academic performance of student in Biology in Ekiti State, Nigeria. Students for the study were one hundred and eighty (180) SS II Biology students randomly drawn from six secondary schools in Ikere Local Government Area of Ekiti State. The research design adopted was a descriptive survey research which was questionnaire based and past terminal continuous assessment results of the students involved in the study. The instruments used to collect relevant data from the students were questionnaire (tagged: "Biology Attitudinal Scale, BAS" and "Gender and academic performance in Biology, GAPB") and terminal continuous assessment results. The instruments were subjected to validity and reliability mechanism. Pearson Product Moment correlation(r) statistical analysis was used to analysed the two null hypotheses formulated for the study. The findings showed that there is significant relationship in the students' attitude to Biology and students' academic performance in Biology, and the findings also revealed that there is significant relationship in the students' interest in Biology and students' academic performance in Biology. Conclusion and recommendations were also made in this paper.

Key words: Attitude, student's attitude, gender and academic performance.

Introduction

Biology is a natural science subject consisting of contents from microscopic organisms to the biosphere general, encompassing the earth's surface and all living things (Okwo and Tartiyus, 2004). Considering its characteristics and importance, Biology is a standard subject of instruction at all levels of our educational system, from primary to tertiary levels. It is one of the core subjects at Secondary School Certificate Examination (SSCE) whose study is very relevant to man's successful living (Akindele, 2009).

Araoye (2009) opined that, exposure to Biology education offers the learners a wide range of relevance to all aspects of life. Most of the students in the senior secondary schools in Nigeria opt for Biology in their senior secondary schools. Biology is quite popular at all levels of Nigerian education. It also has a large students' enrolment than any other science subject especially at the tertiary levels of the Nigerian

education (Ofoegbu, 2003). In spite of the importance of Biology, it is pertinent to note that most students still see and learn Biology as an abstract subject. In particular, reports on WAEC results (2008-2013) of Senior School Certificate Examination in Ekiti State, Nigeria over the years often revealed low performance of students in Biology.

The analysis of students' performance in Biology between 2008 -2013 revealed that: in 2008, out of 12,844 candidates examined for Biology in MAY/JUNE WASSCE, only 2,771 (21.57%) scored A1 to C6 grade, 4,021 (31.30%) got pass and 6,052 (47.10%) candidates failed. In 2009, 12,345 candidates were examined for Biology, only 3,851(31.20%) recorded A1 to C6 grade, 4,144 (33.60%) scored pass and 4350 (35.20%) failed. Also, in 2010, out of 14,588 candidates that were examined for Biology, only 7,692 (52.70%) had A1 to C6 grade, 3,762

(25.80%) scored pass and 3,134 (21.50%) failed. In 2011, out of 17,132 candidates that were examined for Biology, only 7453 (42.50%) had A1 to C6 grade, 6,126 (35.80%) scored pass and 3553 (20.70%) failed. In 2012, 11,527 candidates were examined, 2461 (21.35%) recorded A1 to C6 grade, 4,175 (36.20%) scored pass and 4891 (42.40%) failed. Finally, in 2013, 7,339 candidates were examined, 385 (5.25%) recorded A1 to C6 grade, 4,636 (63.17%) scored pass and 2318 (31.60%) failed.

The analysis further revealed that not very many of the candidates had credit pass in Biology over the period of observation. In addition, over 40% of the candidates that were examined over the period of observation scored below passes level (i.e. A1 to C6) grade required for admission purpose to read Biology based courses in the tertiary institutions. This situation is disturbing and not in the best interest of the science and technological growth and development of the country.

This poor result calls for serious concern and this concern has been expressed by parents, teachers, employers of labour and the entire society. Several researchers have also pointed out different reasons for students' poor performance, some of which are due to the abstractness of certain aspects of Biology, lack of understanding on the students' part of certain biological concepts such as ecology (Nzelum, 2010) as cited by Owoeye, (2016). As a result of failure experiences, some students begin to doubt their intellectual abilities and come to believe that their efforts to achieve are futile. Hence, there is a great need for students to be motivated to develop positive attitude which is crucial to performance in any subject most importantly Biology.

Attitude is an opinion or general feeling about something (Encarta Dictionary, 2004). Also, Oxford Advance Learner's Dictionary (7th Edition) defines attitude as "the way that you think and feel about somebody or something". Muellerleile (2005) defined attitude as an approach, temperament, sensation, situation etc. with regards to a person or thing; inclination or course, especially of the mind. Similarly, Gul and Arshad (2012) asserted that attitude is a hypothetical

construct that indicates an individual's likes and dislikes towards an item. It may be positive, negative or neutral.

Furthermore, Yara (2009), in a study to determine the relationship between teachers' attitude and students' academic achievement in Mathematics in some selected senior secondary schools in Southwestern Nigeria, affirmed that attitude is a concept that is concerned with an individual's way of life, i.e. a way of thinking, acting and behaving. It has very serious implications for the learner, the teacher, the immediate social group with which the individual learner relates and the entire school system. Kagitebasi (2004) contended that attitude is a tendency for an individual to organize thoughts, emotions and behaviours towards a psychological object. He stressed further that human beings are not born with attitude; they learn them afterwards. Some attitudes are based on people's own experiences, knowledge and skills while some others are gained from other sources. However, attitude is not static; it changes in the course of time (Erdermir, 2009).

Adesoji (2002) defined attitude as cognitive, emotional, and action tendency to a particular behavioural intent. He ascertained that attitude is an important factor that determined achievement of students in sciences. Akinyemi (2009) stated that attitude are required through learning and can be changed through persuasion using variety of techniques. Attitude, once established, helps to shape the experiences the individual has with an object, subject or person. Although attitude changes gradually, people constantly form new attitudes and modify old ones when they are exposed to new information and new experiences (Adesina and Akinbobola, 2005).

Festus (2007) contended that performance appears generally to be the fundamental goals behind every life struggle, but the positive platform has consequential effects on improving the worth of the students and can only be achieved through acquisition of positive learning attitudes. According to Festus and Ekpete (2012), the attitude of a student triggers his behavior. Attitudes are antecedents which serve

as inputs or stimuli that trigger actions. However, Rosemond (2006), opined that attitude implies a favourable or disfavourable evaluative reaction towards something, events, programmes, etc exhibited in an individual's beliefs, feelings, emotions or intended behaviours. In the studies of Wilson and Soyibo (1987) as reported by Festus and Ekpete (2012), students' positive attitudes to science correlate highly with their science achievement. Similar reports were recorded by Udousoro (2000) and Popoola (2002), that students show more positive attitudes after been exposed to self-learning strategy such as computer and text-assisted programmed instruction, self-learning device, self- instructed and problem- based instruction.

Moreover, in a study to determine the prediction of attitude and interest of science students of different ability on their academic performance in basic science, Adodo and Gbore (2012) concluded that the solution to changes in student's attitude lies in the hands of teachers. That teachers should use interesting teaching methods in the teaching of science, as this innovation will not only bring about an improvement in students' performance in science but will also bring about lasting and permanent positive attitude towards science. Agogo (2002) in his study of the attitudes of students as a factor in the learning of Integrated Science affirmed that learning of Integrated Science as a science subject has to do with the attitudes of the students in order to generate interest in its study. He confirms that there is correlation between attitudes that the integrated science students bring to the integrated science class and their achievements in the subject.

Students' attitude towards science is more likely to influence achievement in science courses than achievement influencing attitude (O'Connel, 2000). Similar results were stated by Craker (2006), who found that students need to have a positive attitude towards problem-solving to be successful, and this problem-solving requires students' knowledge and problem-solving skills to overcome risks. Edermir (2009) affirmed that attitude, whether positive or

negative, affect learning in science. However, it is well known that a negative attitude towards a certain subject makes learning or future-learning difficult. Therefore, helping students develop positive attitude towards Biology course should be considered an important step in science education.

Gender differences have become critical issues of concern around the world most especially to educators and researchers. Hansman, Tyson and Zahidi (2009) reported that there is no country in the world that has yet reached equality between women and men in different critical areas such as in economic participation or education. This is also evident from the reports of Okebukola (2002) in a study titled "beyond the stereotype to new trajectories in science teaching", Longe and Adedeji (2003) in their study on increasing girls access to technical and vocational education in Nigeria, Yoloye (2004) in the study on increasing female participation in science and Ezirim (2006) in the study on "scaling up girls participation in science education: towards a score card on quality education" asserted that gender has impact on science education.

Gender role differentiations are also encouraged in pictorial illustrations in textbooks which usually portray males as doctors, lawyers, engineers, professors while the females are seen as nurses, cooks, mothers etc. This creates mental picture in the mind of the readers of the role expectation from the society (Umoh, 2003 and Babajide, 2010). Parents at home are not left out in this gender stereotype; parents buy ball for the male child and "teddy bear" for the female child. Teachers also encourage gender stereotype by giving different treatment to males and females in class. Teachers often go further to give different career guidance to males and females. The society also frowns at seeing a male cooking or female climbing a tree. The males are also assigned leadership positions and females are to assist or to follow, since Nigeria gained her independence, she had never produced a female president or governor (Ezendu and Obi, 2013).

Babajide (2010) admitted that science subjects such as Physics and Chemistry are given masculine outlook by education practitioners. Longe and Adedeji (2003) were of the opinion that science and technology are male- dominated subjects and that female tends to shy away from scientific and technological fields. Boys, therefore appear to have a natural positive attitude to technical and science subjects while girls show negative attitude. This negative attitude appears to be due to the acceptance of the myth that boys are better in science subjects than girls (Ogunleye and Babajide, 2011).

In a study to investigate sex difference in Mathematics performance among secondary school students, Asante (2010) affirmed that gender issues is predicated on the current world trend and research emphasis on gender issues following the millennium declaration of September, 2000 (United Nations, 2000) which has as its goal, the promotion of gender equality, the empowerment of women and the elimination of gender inequality in basic and secondary education by 2005 and at all levels by 2015.

The phenomenon of gender differences is not only observed in the daily life matters, but also in textbooks and teachers' attitudes (the World Bank, 2005). Owuamanam and Babatunde (2007) in their study "gender-role stereotypes and career choice of secondary school students in Ekiti State" observed that girls tend to go for courses that do not require more energy and brain tasking such as home making while boys look for jobs in management, engineering, banking and other brain-tasking professions. Similarly, while we see males dealing with complex and difficult tasks of life matters inside and outside the house, we see, on the other hand, girls handling the relative easy and less demanding tasks or things at home (Khwaileh and Zaza, 2011).

Esan (2002) in the study of gender differences in mathematical problem-solving amongst Nigerian students observed that the level of participation of girls in science, technology and Mathematics activities is low. Similarly, the findings of Ariyo (2006) revealed significant gender difference achievement in favour of boys.

Also, Onah and Ugwu (2010) in their study to determine the factors which predict performance in secondary school Physics asserted that sex is a very good predictor of performance in Physics at secondary school level. In addition, Ogunleye and Adepoju (2011) also observed that there is gender inequality in science, technology and mathematics.

Conversely, Igboke (2004) in a study of comparative analysis of SSCE and NECO results in Ohaukwu local government area of Ebonyin State reported that there is no significant effect of gender. Similarly, Ma (2007) in a study of gender differences in learning outcomes also reported that there is no significant effect of gender on the achievement of students. Also, Coley (2010) in a study of differences in gender gap comparisons across racial/ethnic groups in education and work reported that there is no significant effect of gender on the achievement of students in Physics. In the same way, Kolawole and Popoola (2011) in their study maintained that academic achievement is free of gender influence.

Similarly, Abiam and Odok (2006) in their study of "factors in Students' Achievement in different branches of Secondary School Mathematics" found no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. Udousoro (2003), in the study on gender differences in computing participation, stated that there is no significance difference in the academic achievement of male and female students. But, Jegede (2007) found that students showed higher anxiety towards the learning of Chemistry in secondary schools than male students. In another study, Okereke and Onwukwe (2011) showed that male students achieved better than female students in the study of influence of gender on school achievement.

It is against this background that this study therefore intends to examine the student's attitude and gender as correlates of student academic performance in Biology in Secondary Schools in Ikere Local Government Area, Ekiti State, Nigeria.

Research Hypotheses

The following null hypotheses were formulated and tested at $p < 0.05$:

1. There is no significant relationship in the student's attitude to Biology and student's academic performance in Biology.
2. There is no significant relationship in the student's gender and student's academic performance in Biology.

Methodology

This was a descriptive survey research which was questionnaire based and past terminal continuous assessment results of the students involved in the study. The population of the study was all Senior Secondary class two (SS II) Biology students in all the public senior secondary schools in Ikere Local Government Area of Ekiti State.

A total of two hundred (180) SS II Biology students, which were randomly selected from six (6) public secondary schools in Ikere Local Government Area of Ekiti State, formed the

sample (i.e. 30 Biology Students from each school). The sample comprises of ninety five (95) male and eighty five (85) female. The researchers made personal contact with all the selected schools and collected the following:

- (1) Terminal continuous assessment scores of SS II Biology students, and
- (2) The responses of the students involved in the study to the: Biology Attitudinal Scale (BAS) and gender and academic performance in Biology (GAPB).

The instruments were subjected to validity and reliability mechanism and they were found appropriate for the study. The researchers administered BAS and GAPB on the respondents and the terminal continuous assessment scores of the respondent were also collected from their school authorities. Pearson Product Moment correlation(r) statistical analysis was used to analysed the two null hypotheses formulated for the study.

Results and Discussion

Hypothesis 1

There is no significant relationship in the students' attitude to Biology and students' academic performance in Biology.

Table 1: Pearson Product Moment Correlation of Students' Attitude to Biology and Students' Academic Performance in Biology

VARIABLE	N	X	SD	df	r-cal	r-tab	Remark
Students' Attitude to Biology	180	14.67	0.471	118	0.322	0.195	*
Students' Academic Performance	180	12.32	0.652				

$P < 0.05$ (* = Result is Significant at 0.05 level)

The result in table 1 showed that 'r' value, r_{cal} (0.322) with a P value < 0.05 alpha level is greater than the critical r_{tab} (0.195). The null hypothesis is therefore rejected, which means that there is significant relationship in the students' attitude to Biology and students' academic performance in Biology. The study also revealed that students' attitude to Biology ($X = 14.67$) have higher disposition towards academic performance in Biology.

Hypothesis 2

There is no significant relationship in the student's gender and student's academic performance in Biology.

Table 2: Pearson Product Moment Correlation of Students' gender and Students' Academic Performance in Biology

VARIABLE	N	X	SD	df	r-cal	r-tab	Remark
Students' Gender in Biology	180	9.37	0.532	178	0.098	0.195	**
Students' Academic Performance	180	11.21	0.432				

$P < 0.05$ (** = Result Not Significant at 0.05 level)

The result in table 2 showed that 'r' value, $r_{\text{-cal}}$ (0.098) with a P value > 0.05 alpha level is greater than the critical $r_{\text{-tab}}$ (0.195). The null hypothesis is therefore accepted, which means that there is no significant relationship in the students' gender in Biology and students' academic performance in Biology. —

Discussion

As shown in table 1, there is significant relationship in the students' attitude to Biology and students' academic performance in Biology. The findings agreed with that of O'Connell (2000) that students' attitude towards science is more likely to influence achievement in science courses than achievement influencing attitude. It also agreed with the finding of Akinyemi (2009) that improved students' attitude toward Biology will enhance students' performance in the subject.

Similarly, as shown in table 2, there is no significant relationship in the student's gender and student's academic performance in Biology. The findings agreed with that of Abiam and Odok (2006) in their study of "factors in Students' Achievement in different branches of Secondary School Mathematics" found no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. The findings also agreed with that of Udousoro (2003), in the study on gender differences in computing participation, stated that there is no significance difference in the academic achievement of male and female students.

Conclusion

Based on the results of this study, the findings revealed that there was statistical significant relationship in the students' attitude to Biology and students' academic performance in Biology. Findings also revealed that there was no statistical significant relationship in the students' gender in Biology and students' academic performance in Biology.

Recommendations

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

- Science educators (in particular, Biology educators), should encourage the use of better teaching method that would stimulate students' positive attitude towards Biology.
- Science educators (in particular, Biology educators), should not encourage gender

disparity in the teaching and learning of Biology.

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What the mind can conceive, it can achieve.

~ Napoleon Hill