

# Aptitude Tests as A Co-Relate Of Students' Performance In Achievement Tests In Senior Secondary School Biology

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## Abstract

Literature revealed that there was poor enrolment of students in Biology related courses such as medicine, pharmacy, radiography, nursing, medical laboratory science, dentistry as a result of poor performance of students in Biology and consequence of inadequate method of evaluation. The purpose of the study was to find out the relationship between the students performance in achievement and aptitude test scores in biology. The design of the study was correlation and the population was all the 1056 students that wrote the SS1 biology and entrance examination into senior secondary II examinations in biology in the 2012/2013 academic session. Simple random sampling (batting without replacement) was used to sample 650 students from 14 secondary schools in Enugu East Local Government area of Enugu Slate. The method of data collection was documentary information of students' scores on achievement and aptitude in biology examinations. Pearson 'r' and t-test were used to correlate and test the hypothesis at 5% level of confidence. Based on the analyzed data, it was found out that out of the 10 schools studied, the relationship between achievement and aptitude scores was positive, high and significant.

**Key words:** Relationship, students' performance, achievement and aptitude, senior secondary and Biology examination.

## Introduction

The process of finding out the students' performance and the extent to which the behavioural objective are achieved is called evaluation. Nworgu (1992) noted that evaluation is a process of assessing the effectiveness of a programme of study in order to bring about desired behavioural changes in the learners. These processes take into account all the skills, attitudes, abilities, behavioural changes and knowledge, in subject acquired by the students in a particular programme. The reasons for evaluation could be to judge the level of achievement. Teachers need to know the successes of their students and in doing so, weakness in learning is revealed. To enable students realize their changes and how they improve by their efforts.

Therefore, for evaluation to be effective, the teacher must ensure the success of his students' learning and to receive feedback from them in order to enable the teachers to be sensitive to their needs. Some of the Evaluation techniques include aptitude, achievement, essay, practical, projects, questioning, and objectives tests. These different methods of assessment or evaluation are useful in the science in general and Biology in particular. It has been observed that the type of examination taking places in our schools strongly influence the type of study procedure used by students preparing for them.

Experience has shown that inadequate use / lack of aptitude and achievement techniques in the evaluation of students' performance in Biology particularly has ultimately denied the students the feeling of participation and reality. What makes a Biologist is not only how much information he/she has stored in his memory but the actual practice he receives rigorous in biological rigorous process, how he wonders, sets up a controlled experiment, his willingness to withhold judgments and how he realized the limitations of Biology. These are affected by the use of aptitude and achievement test in evaluating Biology.

Abudllahi (1982) summarized some of the importance of achievement and aptitude tests in evaluation of Biology as the provision of opportunity to promote the scientific method of thought. The scientific method entails inculcating into the learners, the habit of drawing conclusions on basis of observation, experimental and mental development. He also mentioned that achievement and aptitude tests promote problem solving and self-reliance in real life situation. Getting involved in achievement and aptitude tests can also enable students to learn much about the interrelationship between biology and other science subjects.

Achievement and aptitude tests are similar in the sense that each of them measures ability. That is, each of them is used to find out what a person can do. It is easy to differentiate one of them from the other. In view of the fact that aptitude test is used to predict the future, one might be tempted to consider that as a factor that distinguishes it from the achievement test. However, the differentiation of these tests by this criterion does not apply since achievement test can also be used to predict the future. For example if a child does well in School Certificate Physics, it is predicted that the child will succeed in engineering course.

One major criterion for differentiating the two tests is in the terms of the content (Margaret 1990). Items for achievement tests are derived from defined course content. On the other hand, aptitude tests are derived from defined course content. On the other hand, aptitude test is not derived from any defined syllables or course content. Questions included in it are such that a person can answer them without necessarily undergoing any course. It is difficult for one to take an achievement test when he had not been exposed to content domain covered by the test.

Another criterion for differentiating the two tests is in terms of the intention of the test developer. When developing an aptitude test, one is interested in what will happen in future while developing an achievement test; one is interested in what one has acquired. Thus aptitude test is said to be future oriented while achievement test is past oriented.

Achievement test can be said to measure what a person can do at the time of measurement (present ability) while aptitude test measures what a person is capable of doing (potential ability). However, as it has been said earlier, present ability can be used to predict potential ability (Margaret 1990).

The evaluation techniques (achievement and aptitude) employed in the evaluation of Biology are designed ultimately to produce educated individuals. Some of whom may or may not take to biological studies in their professional pursuits. However, in whatever professional they finally find themselves, it is hoped that the Biology education they have acquired in school will be of value to the totality of their education.

Correlation study is highly useful in studying problems in education or in other behavioural sciences. This permits one to measure a great number of variables and their interrelationships simultaneously. In behavioural science, we are frequently confronted with situation in which a large number of variables are contributory cause of a particular pattern of behaviour.

The classical experimental method which manipulates one variable and attempts to hold others constant often introduces a high level of artificiality into research situation encountered in the behavioural science. The correlation however, is often preferable to experimental design in situations where control is necessary as it permits the statistical control of variable that we wish to hold constant and does so without changing the field situation.

### **Purpose of the study**

The purpose of the study was to find out the relationship between students' performance in achievement test scores in SSI third term and aptitude test scores in SSII entrance examination.

The study was carried out in all the senior secondary schools in Enugu East local government area of Enugu state.

The population for the study comprised all the senior secondary one Biology students in the 18 senior secondary schools in the Enugu East L.G.A in 2012/2013 session. The students were made up of 1,056 senior secondary school Biology students.

The study did not use all the 1,056 Biology students in the 14 senior secondary school in the Local Government Area, 10 (about 80%) school were randomly sampled. The schools were stratified using type variable to ensure appropriate representation. Simple balloting without replacement was used to sample 4 co-educational 3 boys and 3 girls' schools and at least 80% of each type was composed.

A proportionate random sampling based on about 40% was used to sample the representatives of the schools. These were drawn by simple balloting without replacement and the sample size was 635 senior secondary school (SS3) Biology students.

The scores from the 635 senior secondary one Biology students of the 10 sampled senior secondary schools were extracted from their achievement test scores in SSI third term and aptitude test scores in SSII entrance examination.

These data were collected by the researcher with the authority of the principals of the various schools.

In order to analyze the data, various tools were employed. Firstly, the Pearson's product moment correlation co-efficient was used to analyze the interval data and to find out the relationship between the two variables.

The calculated Pearson's 'r' was tested for significance with t-test statistics at five percent confidence level. The correlation coefficient were given qualitative interpretation based on the table 1 below

**Table 1:** Quantitative interpretation to correlation co-efficient

Correlation coefficient value	Interpretations
0.00-0.20	Very low/virtually no relationship
0.20-0.40	Low/ definite positive relationship
0.40 - 0.60	Medium relationship
0.60-0.80	High relationship
0.80-1.00	Very high/ near perfect relationship

Source :(Nworgu, 1992)

**Results:**

**Research Question:**

What is the relationship between students' performance in achievement test scores in SSI third term and aptitude test scores in SSII entrance examination.

Results of the analysis of relationship and t-test obtained from variance school types were presented in the table 2 below

**Table 2: Overall of the Pearson's 'r' and t-test of students' performance in achievement and aptitude tests scores**

Schools	Pearson's	Calculated -t	Table -t
Co-educational (Overall)	0.53*	4.25	2.06
Girls (Overall)	0.76*	5.80	2.02
Boys (Overall)	0.58*	11.29	2.10

\* Significant correlation co-efficient

It is discernable from table 2 above that the overall relationship between students' performance in achievement and aptitude tests in senior secondary school (SSI) one third terms and entrance examination into SS II was positive in the various school types. There was high relationship in the three overall girls' schools. In schools where there was high and positive relationship, the magnitude was 0.76

**Hypothesis:**

There is no significant relationship between students' performance in achievement test scores in SSI third term and aptitude test scores in SSII entrance examination.

Out of the 10 schools studied, the relationship between achievement and aptitude test scores was significant at five percent confidence level in all the schools. The relationship was significant in the co-educational, boys' and in the girls' schools

**Discussion of results**

From the analysis of the results, it was observed that the students' performance in achievement in relation to their scores in aptitude was positive and significant in all the schools types including girls' schools (see table 2 above).

Out of the 10 schools studied, relationship was significant in all the schools. The schools included Community secondary school Ugwogo, Annonciation Community secondary Nike, National Grammar School Nike, Community High school Emene, St. Patrick secondary school Emene, Community secondary school Nkwo Nike and Community secondary school Idodo.

The variation in the magnitude of the correlation coefficients among the various schools is comparable to-Daniel's (1984) in- which project scores were correlated with practical scores in mock-WASC with WASC O'Level results. The

Finding were quite significant for they have revealed some degrees of reliability and validity that existed especially in the practical and project tests. The variation in relationship between achievement and aptitude test scores which ranged from medium to high relationship could be attributed to certain factors.

The medium and high relationship could be as a result of adequate staffing, both qualitatively and quantitatively in the different schools and in Biology. Qualitative staffing involves the handling of the subjects by teachers who were adequately informed in the course of measurement and evaluation and in the subject matter. Quantitative aspect implies appropriate teacher-student ratio. Similarly, Ali (1986) observed that the

quality of staff affects students' performance in Biology subjects. The existence of qualitative and quantitative staff attributes lead to high quality instructions and evaluation.

In a situation where there was very low/virtually no relationship and low/definite positive values of relationship might be that the schools lack qualitative and quantitative teachers in Biology. Thus the available teachers would be engulfed in heavy workloads which reduce adequate teaching and evaluation processes. Inappropriate teacher-student ratio results to excessive workload. It could as well be attributed to lack of regular seminar and workshops to acquaint the teachers-with necessary skills needed for construction, administration and scoring of tests; and the use of other evaluation techniques. These were highlighted in the work of Azikiwe (1989) and Okure (1989).

Significant relationship was observed in four co-educational schools. The schools were Community Secondary School, Ugwuogo, Annociation Community Secondary School Nkwo Nike, and Community High School. Emene, and Community Secondary School, Idodo while there was significant relationship in three Girls' schools namely Girls secondary school Abakpa Nike, Trans Ekulu Girls Secondary School Enugu and Girls' Secondary school Emene. The Boy's schools have significant relationship. They included National Grammar School Nike, St. Patrick secondary school Emene, and New Heaven Boys Enugu. However, the magnitude in the relationship between students' achievement and aptitude scores varied from school to school and sex to sex. Udigwe (1985) agreed with this. He found out that none of the tests seems to discriminate in favour of any particular sex. The factors which accounted for variations in the magnitude of relationship as emphasized earlier were accountable for the variations in various school types.

### Conclusion

1. The relationship in the students' performance in achievement and aptitude test scores in biology were positive and moderate in all the school types including girls' secondary schools.
2. There was significant relationship between students' performance in achievement and aptitude test scores in biology in all the school types including girls' secondary schools.

### Recommendations

1. In a situation where a student is transferred from one secondary school to another the achievement test obtained in his/her previous school could be used to make decision on student's performance.
2. School could be used to concede the students for admission and vice verse.

### References:

- Abudllahi, A. (1982). Science teaching in Nigeria, Ilorin: Atoto Press Ltd.
- Agusiobo, N.O. and Olaitan, O.S. (1981). Principles of practical teaching. New York: John Wiley and Sons.
- Azikiwe, U. (1989). Continuous assessment in the post- primary institution: Constraints and strategies for implementation. Implementation of National Policy on education: Theoretical and empirical analysis. Nigeria Educational Research Association.4 [2] 13
- Daniels, U.C. (1984). 'Testing Geography at O/L of the GCE. "The British Journal of Education Psychology,5(8) 24.
- Ebuoh, C.N., Nnaemeka, A. O. and Nwosu, V.C. (1989). An investigation into the extent of use of laboratory method in teaching Biology in Senior Secondary Schools in Enugu urban of Anambra State Unpublished Project Report. Nsukka: University of Nigeria.
- Ewuzie, A.R. (1985). Academic performance at Senior Secondary Biology: Impact of activity and essay question methods. Unpublished Project Report: Nsukka: University of Nigeria.
- Ibekwe, A (1995) A comparative study of two evaluation methods in the evaluation of integrated science to JSSII students. Unpublished project Report. Nsukka: University of Nigeria.
- Maduabum, M. A. (1984). Teaching biology effectively Jos: Jos University press limited.
- Magraret J S (1990) Introduction to measurement in physical education and Sscience (2nd ed) Missouri:MonboyCollege Publishers.
- Mkpa, M.A. (1988). Population and Sample. In Olaitan, S.O. and Nwoke, G.I. (eds.). Practical research methods in Education. Onitsha: Summer Educational Publisher.
- Ndu, F.O.C. (1980). Planning and organization of Practical work in Biology in Secondary Schools, Journal of Science Teachers' Association of Nigeria, 18 (2) 28.
- Nworgu, B.G. (1992). Educational measurement and evaluation: Theory and practice. Awka: Haliman Publishers.

- Okeke, F.N. (1985). Students' Mock-WASC/GCE success in science subjects as a prediction of their achievements in WASC/GCU O/L in Anambra State. Unpublished Master's Project Report. Nsukka: University of Nigeria.
- Okure, S.J. (1989). A case study of current concept and implementation of continuous assessment in primary and secondary schools in Cross River State. Implementation of National Policy on education. Theoretical and "empirical analysis. Nigeria Educational Research Association. 8 [3] 16.
- Omelewa, M. (1997). Some Earliest Problems of Science education in Nigeria (1 859-1932). Journal of Science Teachers Association of Nigeria. 1 5 [1] 22.
- Udeigwe, (1992). Relationship between continuous assessment scores and students' performance in SS2 in Awgu L.G.A of Enugu state. Unpublished Masters dissertation Report. Nsukka: University of Nigeria.

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