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EFFECTS OF CLASS AND HOMEWORK ON STUDENTS' ACHIEVEMENTS IN BIOLOGY IN SECONDARY SCHOOLS IN ENUGU EAST LOCAL GOVERNMENT AREA OF ENUGU STATE OF NIGERIA

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Abstract: *The continuous deteriorating trend of students' achievement in biology had given concern to all facets of the society. Also the method of teaching used by teachers in teaching Biology in Nigerian secondary schools had been implicated. In view of the above problems, the present research work was designed to investigate the effects of class and homework on SS2 students' achievement in Biology. The researcher adopted a non-equivalent quasi-experimental design. A sample of 240 SS2 students was drawn from the three schools in Enugu East L.G.A. of Enugu State. In each of the three school used, two intact classes were randomly drawn, one intact class was then randomly assigned to the experimental groups 1 and II. The two groups were taught using class and homework for experimental group I and experimental group II respectively. A research questions and a hypothesis guided the study. Relevant data for the study were collected using Biology Achievement Test (BAT). Research question was answered using mean and standard deviation while hypothesis was tested using Analysis of Covariance (ANCOVA). The results revealed that the use of homework in teaching Biology in the secondary schools was found to achieve higher than those taught using classwork. Some recommendations were made based on the findings of the study*

Keywords: *Effects, classwork, homework, achievement, Biology*

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Introduction

Biology deals with facts and words associated with reasoning which is essential for technological growth. Maduabum (2019) stated that Biology as a subject of study tools in realizing the nation's objective and technological aspirations. Biology is a subject that encroached into all aspects of human endeavors and further described it as the life wire in the studies of various sciences.Biology is the study of living and non-living things. It is man's most basic tool without which it would be difficult for man and woman to live together, to think, to act, and share ideas together. Biology makes it possible for man to engage in scientific conversation of transfer of ideas, thoughts and feelings through science, and to develop scientific inquires. The usefulness of Biology in every facet of human life is so glaring that there is no school curriculum or a national development planning without emphasis on the use of Biology. In Nigeria for instance, the broad aims of secondary education in her national policy on education (Federal Government of Nigeria, 2004) are as follows:

- Preparation for useful living
- Preparation for higher education. To achieve the above goals the policy includes Biology (science) as a core and compulsory subject.

There exists a wave of indifference, which borders on almost total dislike for Biology (science) among secondary school students. He noted that it is generally assumed erroneously though that biology too voluminous, far. Federal Government of Nigeria (2004) on the bases of the national policy on Education and with particular reference to aims and objectives of secondary education, the Federal Ministry of Education, listed the Biology as enabling the individual to:

- think creatively and consecutively in scientific terms.
- acquire manipulative skills in science (Biology).
- apply Biology skills and relationship.
- comprehend the wide applicability of Biology in other disciplines.
- discover, appreciate and admire the beauty and elegance of nature.

These objectives of the Federal Government can be realized using classwork and homework in teaching Biology in secondary schools. Thomas (2001) defined classwork as the part of a student's work that is done in the classroom. Projector or slide newer is a representation of manageable real events in which the learner is an active observer engaged in learning behaviour or in applying previously acquired skills or knowledge. It can be seen as a working representation of central feaster of reality. Ginsbury (2000) pointed out that homework through selected representation of reality containing only those elements of reality that are relevant to the purpose of the homework.

The uses of class work and homework in classroom teaching and learning situations have been in existence, probably because class work and homework provide fascinating challenges to students' achievement in Biology.Achievement in Biology has worried scholars in the field of Biology. A study carried out on achievement in Biology (science) by Ebuoh, Nnaemeka and Nwosu (1989) with particular reference to the Nigerian population showed that achievement in Biology consistently becomes poor at secondary school level. The West African Examination Council (2008) report on students' performance revealed a progressive decline in Biology achievement. For instance, in the year 1998, 32.81% passed with credit level and above, in 1999 and 2000, they achieved 18.25% and 11.15% respectively. There is an urgent need to arrest this ugly trend.

The achievement of students in Biology is closely related to the use of method of evaluation. For instance, Mcluchan and Flore (1990) pointed out that no real education may take place without appropriate evaluation method. Consequently, the work investigated the level of students' achievement when classwork and homework are used in the teaching of Biology in Secondary Schools in Enugu East Local Government Area.

Several observations have been made by scientists and Biology teachers on the neglect of the use of vital method of teaching such as classwork and homework in our primary and secondary schools inNigeria. This ugly trend has led to the students' poor performance in Biology in senior secondary school certificate examinations in Nigeria. Furthermore, this unfortunate situation of not using class work and homework has contributed to the students dwindling performance in Biology. Consider for instance, in 2019 out of 10, 120 candidates who sat for senior secondary school certificate examinations in Biology in Enugu East Local Government Area of Enugu State only 10% passed at credit level. West African Examination Council (2008).

It appeared that in Nigeria, teachers are more conversant in using classwork than homework in teaching. A question that arises then is: the use of the classwork, better than the use of home work in achieving higher performance in Biology in secondary schools. It appears that there is no empirical study so far that investigated into the relative effectiveness of the various methods in teaching Biology in senior secondary schools in East Local Government Area of Enugu State. Moreover, it is not certain which methods of teaching is associated with student's higher achievement in senior secondary school Biology with particular reference to the use of class and home work.

This study was designed to find out the effects of the class and homework on senior secondary school students' achievement in Biology.

It is hoped that the findings of this study will be beneficial to students, teachers, authors and publishers. The findings

of this study if applied will also be useful to curriculum planners, supervisors and researchers. It will be useful to students because it enhances students' achievement in Biology due to its novelty, which in turn may lead to higher achievement in Biology.

The findings of this study will be useful to Biology teachers especially those in senior secondary schools. It will provide them with additional instructional methods for teaching certain Biology topics for better assimilation which in turn will enhance student's achievement.

It will be useful to authors and publishers because it will serve as an additional instructional material of presenting their Biology skills in Nigerian school Biology text books.

This finding will be beneficial to curriculum planners in drawing up and restructuring Biology curriculum of senior secondary schools by making Biology teaching at this level more resourceful oriented. Classwork and homework as aspect of computer aided instruction in Biology could be used in seminars, conferences and workshops by supervisors and inspectors in Federal and State Ministries of Education to enhance the knowledge of teachers in the use of appropriate instructional method. Lastly, the result of this study could be beneficial to researchers as a point of reference for further studies in other related disciplines.

This study was delimited to ascertain the effects of home and classwork on students' achievement in secondary school two (SS2) in Enugu East Local Government Area of Enugu State. It will find out the level of difference in the mean achievement scores of students taught using class and homework in Biology.

Research Questions

1. What is the difference in the mean achievement scores of students taught Biology using class and without homework on senior secondary school students' achievement?
2. What is difference in the mean achievement scores of students taught with homework and without homework?

Research Hypothesis

Ho. There is no significant difference in the mean achievement scores of students taught using slides, filmstrips and conventional on senior secondary school students' achievement.

The classwork is useful for teaching a small class while homework is useful for a normal classroom presentation.

Thomas (2001) explored the problem of poor achievement in Biology among Nigerian secondary school students. It then became obvious that of all the factors which contributes to students poor achievemnet in Biology, instructional methods of evaluation are probably the most serious contributory factors to poor achievement in Biology.

The problem of low achievement in Biology at secondary school level has always been attributed to the teachers' failure to use appropriate instructional methods in teaching the subject. Sequel to the above, Biology educators and teachers have tried varieties of instructional methods at their disposals. This underscores the need, to explore the effects of classworks and homework in enhanicing achievement in Biology at secondary schools.

Project is another teaching method found efficacious by Frankline (1986) among group of 200 SSS 2 secondary school students in an experimental study. In the study, the students taught with real project performed significantly better than those with homework. However, some of the teaching methods adopted have been criticized and seen not to be effective for the teaching of some aspects of secondary school Biology. Holing (1990) investigated the effect of the use of homework in science (Biology) instruction, at the secondary school level of sophistication of the model, behavioral element in formulation and implementation, and lack of sponsorship act against its utilisation. The question then is, will the use of homework and classwork in Biology instruction help in improving the teaching and learning of Biology? Will the use of classwork and homework make Biology teaching bright, clear, important and also, much menaingful demands on students intelligence, capabilities, talents and improve achievement in Bioloy.

Research Methods:

The design for this stduy is quasi-experimental. The design is specifically a pretest –post-test, non equivalent group design. The choice of this design agrees with Abimbade (2019) who observed that this design is often used in classroom experiments when experimental and non-control groups are naturally assembled groups, such as intact classes will be randomly assigned to experimental groups I, and III respectively.

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Table 1: Diagrammatic representation of pre test – post test control group design:

Group	Pre Test	Research Conditions	Post Test
E_1	O_A	X_1	O_B
E_2	O_A	X_2	O_B

Where

E_1 = Represent experimental treatment group on homework
E_2 = Represent experimental treatment group on classwork
O_A = Represents pre test on achievements
O_B = Represents post test on achievements
X_1 = Represents treatment condition on homework
X_2 = Represents treatment condition on classwork

The area covered by this study is Enugu East Local Government Area of Enugu State. It is made up of about four communities namely: Nike, New Heaven Ugwogo and Emene.

The population for this study comprised all the 958 SS2 biology students in all the eleven secondary schools in Enugu East L.G.A.

Stratified simple random sampling technique was used to draw three schools from the eleven secondary schools in Enugu East Local Government Area. In each of the sampled schools, purposive, simple random sampling was used to pick two intact classes of SS2 in each school. Two intact classes were randomly assigned to the experimental group I and II. In all, a total of 240 students were used in experimental groups while 80 students was in the conventional group, giving a grand total of 240 students that was used as research subjects in the study.

Biology Achievement Test (BAT) developed by the researcher was used for data collection. The number of periods that essentially cover a particular unit and the objectives of the Biology contents guided the development of BAT. This implies that where more time was required to teach a unit, more items were drawn from such a unit. BAT consisted of 30 objective test items.

The choice of objective test items is to allow the researcher to cover more topic areas. Twenty objective test items were at the lower cognitive level (that is knowledge and comprehension) while 10 items were in higher thinking process (that is application). The instrument was used for pre-test and post-test but the serial numbers of the items were rearranged during post testing. The items for the BAT were written to reflect the specification in a test blue print prepared.

The instrument went through both face and content validations. The items of BAT and experimental packages were subjected to face validity by two experts in Biology, one expert in measurement and evaluation. The instrument and experimental packages were reviewed in terms of clarity, appropriateness of the language used and also if any item is ambiguous. Their critical appraisal and comments were useful in modifying the items of the tests, and experimental packages. The surviving items therefore possessed adequate face validity of the instruments for data collection.

Content validity is a measure of the extent to which the instrument is a representative of content and behavior specified by the theoretical concept being measured. The table of specification was validated by the experts to determine how effective it is in selecting questions considering the percentage allocation of the various levels of content. Thirty questions survived out of 47 questions after validation and reflected the table of specification. The number of questions in the category of knowledge and comprehension is 60% while the number of question in the category of application is 40%.

The reliability of BAT was determined using test re-test method. The choice is because it is most suitable and appropriate in determining the correlation between sets of scores from two administrations of the test. To determine the reliability of BAT for this study, the BAT was administered in community secondary school Amasiodo Oghe in Ezeagu L.G.A of Enugu State. The BAT were re-administered to the students and data collected. Then the

two sets of scores from first and second admistrations of BAT were correlated using the Pearson-product moment correlation. A correlation co-efficient value of 0.92 was obtained.

Two Biology teachers from each of the sampled schools receive training for a period of one week from the researcher on the use of home and classwork in teaching Biology respectively. Prior to the treatment, the Biology teachers in the sampled schools who received training on how to use the research instruments administered the BAT respectively to their SS 2 students. At the end of the test, the question papers and the answer scripts will be collected from each student who took the pre test. This is because the same test item is used for post test, except that the serial numbers of the items will be rearranged in the post test. This made the items look different at first glance. After the pre test, the teachers provided treatment to the students for a period of four weeks. At the end of the duration of the treatment, the teachers will re-administer the BAT respectively as post tests. The treatment in the experimental group consisted of the class and homework.

Experimental Control:

There are some extraneous or confounding variables that the researcher feel can constitute potential threats to the validity, reliability and generalization of the results of this study. Such variables include inter-group variables, teacher variables and Hawthorne effect. In seeking to achieve validity, the following measures were made to ensure that these confounding or intervening variables, which might introduce bias into the study, were either minimized or controlled.

Inter Group Variable: To remove the errors of non-equivalence arising from non randomization of the research subjects, analysis of covariance (ANCOVA) was used in data analysis. This is to correct the error of initial difference in the ability levels among the research subjects.

Teacher variable: To minimize the error which may arose due to teacher difference, the researcher gave lesson notes prepared by the researcher on the topics to all the Biology teachers who were used for the study. The lesson notes and procedure for presentation were in large extent discussed with the teachers, each teacher taught on equivalent of students during trial teaching using the lesson notes. After, the trial, teaching, discussion was held on the teachers' presentation of the lessons.

Hawthorne Effects: This is a situation in which the research subjects' behavior is affected not by treatment per se but by their knowledge of participation in the study. This was avoided by the use of regular Biology teachers in the school in administering the treatments. The researcher was not directly involved in the treatment in order to avoid sensitizing the students being used for the research.

BAT was administered respectively as pretests on the first week of treatment by research assistants. Scores of the students on the pretests was recorded and kept for use after the experiment. The posttest data were also generated after re-administration of BAT to the students on the last week of treatment. For each of the groups, data for pretests and post tests were recorded separately. The test item on BAT was scored and two marks were allocated to each member to give a maximum mark of sixty.

Mean (x) and standard deviation were used in analyzing the research questions. Mean was used because it is the most appropriate statistical tool to use for such situation and as such takes all measurement (observations) into consideration. Analysis of covariance was used to test the hypothesis. Analysis of covariance (ANCOVA) is used because intact classes were used and as such corrects the error of initial differences in the ability levels among the students involved in the study.

Reject the null hypothesis (Ho) if the significance of t (value of the test t – calculated is greater than the t – table at 0.05 then fail to reject the null hypotheses at 0.05 if the t-calculated is less than t – table at 0.05.

Results:

What are the differences in the mean achievement scores of students taught Biology using class and homework?

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Table 2: Mean achievement scores and standard deviation of students taught Biology using class and homework.

	Mean (X)		Standard Deviation		N
Groups	**Pretest**	**Posttest**	**Pretest**	**Posttest**	
Experimental Group I (homework)	22.08	63.07	2.06	5.38	120
Experimental Group 2 (classwork)	22.34	54.71	2.60	8.83	120
		Total			240

Table 2 indicated that the experimental group 1 taught Biology using homework obtains 22.08 in pretest and 63.07 in posttest. The group also had standard deviation of 2.06 and 5.38 in pretest and posttest respectively. The table 2 showed that the experimental group 2 taught Biology using classwork obtain mean achievement score of 22.34 and 54.71 in pretest and posttest respectively. The result in table 2 above revealed that the experimental Group I taught Biology using homework achieved higher than those taught Biology using classwork. Okafor, (2000) observed that the quality and method of teaching affects the students performance in Geography.

Table 3: Analysis of Covariance for students overall mean achievement by the use of the instructional methods in teaching Biology

Source of variation	Sum of square	Df	Mean square	F-Cal	Signiflcance	Decision
Covariance variation	7163.867	1	7163.867	107.629	000	
Main effect	16830.993	3	8415.496	252.867	000	
Teaching methods	2698.077	2	2698.077	40.536	000	
Error	19102.931	287	66.561			
Residual	10126.312	4	2531.578	38.034		
Total	55922.18	303	20875.579			

S = Significance at P<.05

From the result of Analysis of covariance in table 3 above, it was observed that <F (40.536) = 0.000; P< 0.05>. This means that the F calculated, F (40.536) is greater than the F critical. Thus, the null hypothesis of no significant difference in the mean achievement scores of SS2 students taught using class and homework in teaching Biology was rejected at 0.05 levels of significance. This implies that the use of teaching method in teaching Biology influence significantly students' achievement in Biology. The researcher therefore concluded that there was a significant difference in the mean achievement scores of students taught with class and homework in favour of homework followed by classwork. The result of the findings showed that experimental group I taught biology using homework achieved higher than those taught biology using classwork. Furthermore, the researcher found out that there was significance difference in the mean achievement scores of students taught with home and classwork in favour of homework followed by classwork.

Recommendations:

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

The serving teachers of Biology in secondary schools should adopt the use of homework in teaching Biology lessons than classwork.

In-service programmes should be made to emphasize the need to teach the subject (Biology) using home and classwork among other things.

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