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Correlates Of Use Of Chalkboard, Use Of Chartsand On Students Academic Achievement In Biology In Ibiono Ibom Local Government Area, Akwa Ibom State, Nigeria

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ABSTRACT
The purpose of this study was to assess the use of chalkboard, charts and students' academic achievement in Biology in Ibiono Ibom Local Government Area of Akwa Ibom State, Nigeria. To achieve the purpose, four research questions were posed and translated into four null hypotheses. The literature reviewed was done based on the sub-variables of the study with gap identified and filled. The design adopted for the study was Ex-post facto area. A sample of 238 was drawn from four public secondary schools selected randomly from the population. Questionnaire was the only instrument used for data collection. The instrument was tagged correlates of the use of chalkboard, use of charts and students' academic achievement questionnaire (CUCCASAAQ). The instrument was validated and tested for reliability before it was used in the work. Data obtained from respondents were analyzed using Pearson product moment correlation analysis (r). The results obtained revealed that, there is a significant relationship between the use of chalkboard, use of charts and students' academic achievements. Based on the results obtained, conclusion and recommendations were made. One of the recommendations is that, teachers in the study area should be motivated to improvise instrumental material when necessary.
Keywords: Use of chalkboard, use of charts, students' academic achievement, Biology,

INTRODUCTION

Instructional materials serve as a channel between the teacher and the students in delivering instructions. They may also serve as the motivation on the teaching-learning process. It is use to get the attention of the students and eliminate boredom. Instructional materials are highly important for teaching; especially for inexperienced teachers. Teachers rely on instructional materials in every aspect of teaching. They need material for background information on the subject they are teaching. Young teachers usually have not built upon their expertise whenever they enter into the field. Teachers often use instructional materials for lesson planning. These materials are also needed by the teachers to assess the knowledge of their students. Teachers often assess students by assigning tasks, creating projects, and administering exams. Instructional materials are essential for all of these activities. Biology can be conveniently taught in a laboratory which is a place designed and equipped with materials for teaching and learning. It is obvious that most secondary schools lack physical laboratories and where they exist, there are inadequate or lack of equipment.

There are still some biology concepts and phenomena that require indoor laboratory attention such as chemical reactions in Biology (Physiology) e.g. osmosis, turgidity, etc. in plants and some physiological activities in animals. It is necessary therefore to introduce the use of materials in teaching and illustration of biology concepts for a meaningful study to take place. These materials include; concrete objects, charts, stored specimens and other teaching materials. It is on this background that the study is focused, finding out the effect of instructional materials on academic achievements of Biology Students. Instructional materials are teaching aids or materials used to illustrate the teaching process and make instruction more compressive to the learner. According to Franzer, Okebukola, and Jegede (2012) professionally qualified science teacher no matter how well trained would not be able to put his ideas into practice if the school setting lacks the equipment and materials necessary to translate potentials into reality. The use of teaching aids or instructional materials is an important tool in the teaching of Biology. The objective of any educational process determines the content, methods and materials needed for achieving such objectives. Different instructional materials are used for different concepts in Biology. Yero, (2020) mentioned four types of instructional aids or materials, which are essential in teaching and learning Biology to include the following: -

i. Visual Aids:These are instructional materials that make visual impression–that is, it interprets the vision of the eyes. They include chalk board, posters, models, motion pictures, projected transparences.
ii. Auditory Aids: These appeal to the sense of hearing and include record players, tape recorders and language laboratories.
iii. Audio – visual Aids: These involve both hearing and visual senses e.g. based on sound and vision. Advancement in modern technology has led to the production of devices known as Information Communication Technology (ICT), which is also used in teaching.
iv. Stimulation Devices: These include devices built to stimulate the actions and function of real thing or object. Instructional materials according to Oriade (2000) have the characteristics of holding attention of almost all the students because they reinforce verbal messages by providing a multi-media approach.

The importance of instructional materials according to Oriade (2019) emphasized that no matter how good a curriculum maybe, absence of the use of instructional materials can jeopardize its effective implementation. The selection and use of instructional materials depend on the teachers, if the science or biology teacher does not have the skills to manipulate the materials, learning becomes difficult. Teachers should be committed and enthusiastic to use instructional materials in teaching biology concepts. The provision and application of instructional materials should be reinforced in the school system, for it is on this note that the effect of instructional materials on academic achievements of Biology students, could be determined by their interactive and participation in class which is based on the teacher's presentation of the biology concepts or subject matter. Both achievements and long term achievement could be measured by test analysis designed. An instructional material stimulates student's participation in class, increase knowledge and affects the achievement of biology students. The use of inappropriate teaching materials results such as wrongly labeled charts results in several academic problems which according to Josiah and Okaoboh (2001) ranges from mass failure or under achievement in public examination to the gradual deteriorating situation in educational institution at all levels. Instructional materials are seen as an improvement and great relief for teachers in impacting knowledge and making the message clearer, more interesting and easier for the learners to assimilate (Onasanga and Adegbija 2018). In their view, there is no need teaching if what is learnt cannot be recalled.

Biology as a science subject is activity oriented and the suggested method for teaching it which is guided discovering method is resource based (Adamu, 2017). This suggests that mastery of biology concepts cannot be fully achieved without the use of instructional materials. The teaching of chemistry without instructional materials will certainly result to poor performance in the course. Franzer (2012) stressed that; a professionally qualified science teacher no matter how well trained would be unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to

translate his competence into reality. Instructional materials media are system component that may be used as part of instructional processes which are used to disseminate informative message and ideas or which make possible communication in the teaching-learning process.

Experience over the years has shown that teachers have been depending on excessive use of words to express, convey ideas or facts in the teaching-learning process. This process is termed the 'chalk-talk' method. Today advances in technology have made it possible to produce materials and devices that could be used to minimize the teachers' talking and at the same time, make the message clearer, more interesting and easier for the learner to assimilate. According to Soetan (2010), graphics including charts, posters, sketches, cartoons, graphs and drawings are essential instructional materials that may influence students' academic achievement in Biology in secondary schools. Graphics communicate facts and ideas clearly through combination of drawings, words and pictures. The use of graphics in teaching creates definitiveness to the materials being studied. They help to visualize the whole concepts learned and their relationships with one another.

The importance of Biology is so much that it needs to be taught with instructional materials to arouse students' interest. Tabotndip (2014) lamented that abstract teaching goes on today where teachers do not use apparatus and students are not using textbooks. It is obvious that most secondary schools do not have biology laboratory, the few existing ones have been converted into classrooms to create space for the overwhelming population of students arising from the Universal Basic Education (UBE) and Universal Primary Education (UPE). As a result of WAEC/ NECO specifications on SSCE examinations, some schools resorts to multipurpose laboratory. There is need for a single laboratory for each of physics, chemistry as well as biology practicals. This ought not to be so for they have their disadvantages such as fire or chemical outbreak or accidents. In case of biology, the charts, specimen and models may not be displayed for recognition and observation. Learning occurs when all the facilities for study are harnessed for work during a teaching and learning experience. Visual imaginary e.g. pictures charts etc has become the most powerful means of communication in the society today and the use of this materials have significant effect on the academic achievement of students in Biology.

Enohuean(2015) carried out a study on the effects of instructional materials on achievement and retention of biology concepts among secondary school students in Delta State, Nigeria. This study investigated effects of instructional materials on the academic achievement and retention of SS 2 biology students in Delta State. The study sample consisted of eighty six (86) SS2 Biology students randomly selected from a population of 5,626 students drawn from 18 public schools. An instrument designed and developed from past WAEC questions by the researcher known as Biology Achievement Test (BAT) was validated by some senior lecturers in science, English and statistic from Ahmadu Bello University and senior biology teachers in Delta State. The instrument used was tested and certified to be reliable at 0.65 coefficient. Quasi-experimental design was adopted which involves two groups: experimental and control groups. The experimental group was subjected to treatment using instructional materials but the control group was taught without any instructional materials. Four null hypotheses were tested using t-test statistics. The following major findings were made: There is a significant difference between the mean academic achievement scores of students taught using instructional materials (EG) and those taught without the use of instructional materials (CG).There is no significant difference in the mean achievement scores of male and female students taught biology concepts using instructional materials. There is significant difference in the mean retention scores of students taught with instructional materials and those taught without instructional materials. There is significant difference in the retention ability of male and female students exposed to the use of instructional materials. On the basis of these findings some recommendations were made, one of which is teachers should make use of instructional materials to facilitate the teaching of biology at secondary school level.

Moses (2020) carried out a study on the influence of instructional materials on students' academic performance in Biology in Calabar South Local Government Area, Cross River State, Nigeria. The independent variables examine were; availability of instructional materials, accessibility of instructional materials and utilization of instructional materials (textbooks) while dependent variable is students'

academic performance in Biology. To achieve the purpose of the study, three research questions and three research hypotheses were posed and formulated respectively to guide the study. Literature was reviewed based on the variables in the study. The research design was adopted for this study was Ex-post facto design. Two hundred (200) SS2 students who offered Biology in public secondary schools were randomly selected for this study. The instrument used for data collection was a 15-item questionnaire named influence of instructional materials on students' academic performance in Biology Questionnaire (IISAPB) constructed by the researcher. Pearson Product Moment Correlation Co-efficient-test statistic was used as statistical tool for data analysis. Each of the hypotheses was tested at 0.5 level of significance. The findings of the study revealed that there is a significant relationship between availability of instructional materials, accessibility of instructional materials, utilization of instructional materials and academic performance of students in Biology, the academic performance of SS2 students in Biology in Calabar South Local Government Area of Cross River State. Based on the findings of the study, it was recommended among others that, there is the need for the development of positive attitudes by the teacher toward the use of instructional materials for their students. This will encourage the development of their proficiency.

Charts are important resource materials for effective teaching and learning of Biology at the post primary education level. Biology as a science subject taught in secondary schools will require a somewhat participatory approach for better understanding by the learners. To make teaching and learning in the subject more participatory, the use of charts, pictures and specimens may promote friendly interaction between the teacher and the learners in a conducive learning atmosphere.

Ebulem (2019) carried out a study on the effect of teaching aids on students' academic performance in Biology in Port Harcourt, Rivers State, Nigeria. This study was designed to examine the effects of teaching aids on students' academic performance in Biology. The study was carried out in Port Harcourt, Rivers State. Three secondary schools in Port Harcourt, Rivers State were randomly selected. These include a male school, a female school and a co-educational school in the area. A total number of hundred (100) students were used altogether for this study. Some (50) of the students were taught biology lesson (physical biology) using improvised Teaching aids. This was referred to as the treatment group. The group taught without the use of teaching aids was used as the conventional group. The effect of gender difference on the academic performance of students in biology was also determined. Both groups were tested on the lesson taught. A pre-test, post-test, and observation techniques were used as instruments for data collection. Both the pre-test and the post-test were written by the treatment groups respectively and conventional. The findings revealed that there was significant difference between the academic performance of student taught using teaching aids and those taught without teaching aids, thus showing the significant impact of teaching aids in enhancing students' academic performance on the learning teaching process of Biology. It was also revealed that gender difference can affect the academic performance of students in Biology, as it was observed from the comparison in favour of the male students in the experimental or treatment group. On the basis of the findings, a few recommendations were made some of which include: The need for release of more funds by the government for the purchase of teaching aids for use during Biology lessons or classes. The establishment of resource centers to enable teachers makes use of local materials, organizing workshops and seminars for various categories of teachers teaching Biology to mention but a few.

Udoh and Ekon (2018) conducted a study on the influence of virtual reality and flow chart on Biology students' academic achievement on circulatory system in Uyo Municipality, AkwaIbom State, Nigeria. This study investigated the influence of virtual reality and flow chart on biology students' academic achievement on circulatory system. Non- randomized pre-test, post-test control group design was used for the study. Study sample was 121 in SS3 Biology students drawn from Uyo Municipality of Akwalbom State, Nigeria. Simple random sampling technique was used for the study. Two research questions and two hypotheses were tested. The instrument for data collection was Biology Achievement Test (BAT). A reliability index of 0.87 was determined using test-retest approach. The results showed that gender was not a strong determinant of students' achievement in Biology. It was recommended among others that,

parents and biology teachers should encourage both male and female students towards excellence in biology. The researchers recommended the use of charts for the teaching and learning of Biology in secondary schools to promote effective learning and retention.

Statement of Problem

One of the main problems facing most secondary schools in the Nigerian society today is the relative decline in the academic achievements of the students especially in Biology. The secondary schools in Ibiono Ibom, AkwaIbom State are no exception. The academic achievements of students in the sciences particularly Biology has been on the decline and below what could be termed achievement. Most research findings in academic achievement in sciences are applicable to Biology as a science subject. "The poor achievements in biology could be attributed to some factors such as: -lack of use of apparatus, lack of fund to purchase material". Other factors that contribute to poor achievement in biology include: -lack of facility for imparting knowledge, inadequate equipment in laboratories where they exist, lack of teacher's zeal to make use of instructional materials or improvise in the absence of standard materials, lack of students' exposure to practical lessons and insufficient time for practical activities, lack of interest in creativity in the part of teachers and poor teaching strategies, large size of the classes, leading to inadequate or poor management of classes and unqualified or inexperience teachers handling biology classes.

Analysis of students' poor achievements in recent WAEC and NECO examinations and results poses a great concern to the nation. Biology educationists are of the view that biology stands out distinctly to be taught and learnt among other science subjects by making use of available materials. More collection of specimens taken to the laboratory does not give room for active participation of students and thus, does not contribute to scientific attitude of students and the general academic achievement of students. The transfer of knowledge from school to life situations, to the development of decision making skills and values, cannot be nurture through the conventional chalk and board nor can it be effective through traditional laboratory experiments but the use of more interactive strategies such as use of charts and printed materials like textbooks that can facilitate participatory learning and independent enquiry. Biology is developing more rapidly today than in past and so, the skill and techniques of imparting useful biological knowledge, lecture and text book as a sole source of knowledge should give way to newer educational techniques that require the use of instructional materials. Available literature shows that most biology teaching in the public post primary schools is carried out through chalk and board with little or no emphasis on the use of other instructional materials that can promote participatory teaching and learning. This study therefore is an attempt to investigate the relationship between the use of chalkboard, use of charts and students' academic achievements in Biology in Ibiono Ibom Local Government Area, Akwa Ibom State, Nigeria.

Purpose of the study

The general objective of this study is to examine the correlates of the use of chalkboard, use of charts and students' academic achievement in Biology. Specifically, this study seeks to;

1. Examine the relationship between the use of chalkboard and students' academic achievement in Biology
2. Ascertain the relationship between the use of chart and students' academic achievement in Biology.

Research questions

The following research questions were posed to direct this study.

1. To what extent does the use of chalkboard relate with students' academic achievement in Biology?
2. How does the use of chart relate with students' academic achievement in Biology?

Statement of hypotheses

The research hypotheses were posed to guide this study;

1. There is no significant relationship between the use of chalkboard and students' academic achievement in Biology

2. The use of chart does not relate with students' academic achievement in Biology

METHODOLOGY

The research design adopted for this study is Ex-post Facto research design. It as a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable.The research area for this study is Ibiono Ibom Local Government Area of AkwaIbom State, Nigeria. Ibiono Ibom is a Local Government Area of AkwaIbom State in the south-south region of Nigeria.The target population of this study consisted of all the SS2 students in the public secondary schools in the study area. The population of people considered for this study includes all the SS2 students taking Biology in public secondary schools in the study area. The population of SS2 students in the nine (9) public secondary schools in the study area was two thousand five hundred and seventy-four (2574) Ibiono Ibom Area Education Authority (IIAEA, 2020).

The sampling procedure adopted for the study is multi-stage sampling procedure comprising purposive, simple random sampling and proportional sampling technique respectively. To select the respondent used for the study, the proportional simple random sampling technique was adopted for the study. In each of the school selected for the study, the researcher will select 20% of respondents for the study. The sample for this study consisted two hundred and thirty eight (238) respondents drawn from four (4) public secondary schools in the study area. They comprised both male and female students who are currently SS2 students in the selected schools in the study area .The instrument used for data collection in the study was questionnaire. It was tagged: correlates of the use of chalkboard, use of charts and students' academic achievement questionnaire (CUCCASAAQ). The instrument had ten (20); that is five item each for the independent variables and ten items for the dependent variable. It was structured using four point Liker scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The research instrument was constructed by the researcher and validated by two research experts before it was used in the study. The Cranach Alpha reliability method will be used to ensure reliability of the research instrument. The researcher administered thirty (30) questionnaires to respondents in two public secondary schools that are not part of the actual study. The researcher administered the instrument once to the respondents. Scores obtained by the researcher from the field were coded and tested using Cranach Alpha reliability estimate to determine the internal consistency of the questionnaire item. The result showed a reliability range of 0.75 to 0.83 which is an indication that the instrument is reliable enough to measure what is meant to measure. Data obtained from respondents was analyzed using Pearson product moment correlation analysis (r)

RESULTS

Hypothesis one: There is no significant relationship between the use of chalkboard and students' academic achievement in Biology. Pearson Product Moment Correlation Analysis was employed to test data collected in respect to this hypothesis. This is because both the dependent and independent variables that form this hypothesis were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in Table 1.

Table 1 Pearson product moment correlation coefficient analysis of the relationship between chalkboard and students' academic achievement in Biology

N = 238

Variable	$\sum X$ $\sum Y$	$\sum x^2$ $\sum Y^2$	$\sum xy$	r-cal.
Chalkboard	3526	6352	5362	0.67
Students' academic achievement in Biology	3452	7221		

X = 0.05, critical r = 0.198, df = 236.

The summary of results presented in Table 1 shows that the calculated r-value of 0.67 is greater than the tabulated r-value of 0.196 at 0.05 level of significance with 236 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, there is a significant relationship between the use of chalkboard and students' academic achievement in Biology in the study area.

Hypothesis two: The use of chart does not relate with students' academic achievement in Biology. Pearson Product Moment Correlation Analysis was employed to test data collected in respect to this hypothesis. This is because both the dependent and independent variables that form this hypothesis were measured continuously. The hypothesis was tested at 0.05 level of significant. The summary of result is as presented in Table 2.

TABLE 2 Pearson product moment correlation coefficient analysis of the relationship between use of chart and students' academic achievement in Biology

N = 238

Variable	$\sum X$ $\sum Y$	$\sum x^2$ $\sum Y^2$	$\sum xy$	r-cal.
Use of chart	2516	7832	8632	0.72
Students academic achievement	3452	7221		

X = 0.05, critical r = 0.198, df = 236

The summary of results presented in Table 2 shows that the calculated r-value of 0.72 is greater than the tabulated r-value of 0.196 at 0.05 level of significance with 236 degrees of freedom. On this note, the null hypothesis was rejected while the alternate hypothesis was upheld. This means that, the use of chart does relate with students' academic achievement in Biology in the study area.

DISCUSSION OF FINDINGS

The first hypothesis states that there is no significant relationship between the use of chalkboard and students' academic achievement in Biology. This null hypothesis was however rejected on the ground that the calculated r-value obtained from the analysis of data was statistically greater than the critical r-value. The implication of this result is that there is no significant relationship between the use of chalkboard and students' academic achievement in Biology in the study area.

The finding of this hypothesis is in line with the earlier finding of Moses (2020) carried out a study on the influence of instructional materials on students' academic performance in Biology in Calabar South Local Government Area, Cross River State, Nigeria. The independent variables examine were; availability of instructional materials, accessibility of instructional materials and utilization of instructional materials (textbooks) while dependent variable is students' academic performance in Biology. To achieve the purpose of the study, three research questions and three research hypotheses were posed and formulated respectively to guide the study. The finding also agrees with the position of Landa (2010) improvisation could be seen from two sides; as a substitute; when equipment is prepared in place of the expected and as a simulation.

The second hypothesis states that The use of chart does not relate with students' academic achievement in Biology. This null hypothesis was however rejected on the ground that the calculated r-value obtained from the analysis of data was statistically greater than the critical r-value. The implication of this result is that the use of chart does relate with students' academic achievement in Biology in the study area.

The finding of this hypothesis is in line with the position of Ebulem (2019) carried out a study on the effect of teaching aids on students' academic performance in Biology in Port Harcourt, Rivers State, Nigeria. This study was designed to examine the effects of teaching aids on students' academic performance in Biology. The finding also agrees with the finding of Udohand Ekon (2018) conducted a study on the influence of virtual reality and flow chart on biology students' academic achievement on

circulatory system in Uyo Municipality, Akwa Ibom State, Nigeria. This study investigated the influence of virtual reality and flow chart on biology students' academic achievement on circulatory system. Non-randomized pre-test, post-test control group design was used for the study. Study sample was 121 SS3 biology students drawn from Uyo Municipality of Akwa lbom State, Nigeria. Simple random sampling technique was used for the study. Two research questions and two hypotheses were tested. The instrument for data collection was Biology Achievement Test (BAT). A reliability index of 0.87 was determined using test-retest approach. The results showed that gender was not a strong determinant of students' achievement in biology. It was recommended among others that, parents and biology teachers should encourage both male and female students towards excellence in biology.

CONCLUSION

Based on the findings of this study, the following conclusions were made; there is a significant relationship between the use of chalkboard and students' academic achievement in Biology in the research area, the use of chart does relate with students' academic achievement in Biology in the research area, there is a significant relationship between the use of laboratory and students' academic achievement in Biology in the research area, there is a significant relationship between the use of textbook and students' academic achievement in Biology in the research area.

RECOMMENDATIONS

In line with the finding of this study and conclusion made therein, the following recommendations were made:

1. Government should award special grants to poor students with very low purchasing power to improve their assessment of study materials and improve their academic performance in the study area.
2. Teachers in the study area should be motivated to improvise instructional material when necessary.

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