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INFLUENCE OF LOCALLY AVAILABLE INSTRUCTIONAL MATERIALS ON BIOLOGY STUDENTS' ACADEMIC ACHIEVEMENT IN ABAK LOCAL GOVERNMENT AREA OF AKWA IBOM STATE, NIGERIA.

EKON ESTHER ETOP, SAMBO GODSWISDOM IBORO AND ASHIWERE ISAAC OBOGO

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ABSTRACT

This study examined the influence of locally available instructional materials on biology students' academic achievement in Abak Local Government Area of Akwa Ibom State. To guide the study, 2 research questions and 2 research hypotheses were formulated. A pretest, posttest non-equivalent quasi-experimental research design was used in the study. A sample of 75 senior secondary school two (SS 2) biology students from 2 co-educational public secondary schools in intact classes were used for the study. The instrument for data collection was Senior Secondary School Biology Achievement Test (SSSBAT) with reliability index of 0.81. The data collected were analyzed using Analysis of Covariance (ANCOVA) at .05 level of significance to test the hypotheses. The findings revealed that there is a significant influence of locally available instructional materials on biology students' academic achievement. Also, there was no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. It was recommended amongst other that biology teachers should be encouraged to source for and use locally available instructional materials for effective teaching and learning as it stimulates biology students critical thinking/imaginative skills as well as help in reducing subject abstraction phobia, thus, improving biology students' academic achievement.

KEYWORDS: Biology students, Academic achievement, Locally available instructional materials

INTRODUCTION

Education generally, Science Education in particular is the primary industry for making the needed science professionals such as; technologist, technicians, artisans and craftsmen. These science professionals are whom the nation's much needed economic growth and diversification is dependent upon for the turnaround of the nation's status from 'consumer dependent country' to 'producer independent country'; from 'developing country' to 'developed

Ekon Esther Etop, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria
Sambo Godswisdom Iboro, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria
Ashiwere Isaac Obogo, Department of Science Education Faculty of Vocational and Science Education University of Calabar, Calabar, Nigeria

country' and from 'third world country' to 'first world country'. To achieve this, effective and efficient teaching-learning is necessary as the learners must be able to interact with people and things (both living and non-living) in the world around them.

Also, for better learning, the learner must be able to lay his/her hands on the environment and manipulate it, at the same time providing access to appropriate learning experience made to enhance ideas, skills and knowledge leading to increased and improved productivity of the learners (Onuh, 2022). The importance of science education cannot be overemphasized has it have been accorded a prime position in the context of worldview and particularly biology education been identified as a pivotal subject in scientific and technological advancement of any nation. The importance of biology in the development of the learner and the nation has made biology to be accorded a core subject in science related courses in Nigeria education system. Biology been a pre-requisite subject for undertaking any science related course(s) (such as Medicine, Pharmacy, Dentistry, Microbiology, Biochemistry, Physiotherapy, etc.) in higher or tertiary institutions calls for an urgent need in teaching it effectively owing to its impact on the learners, environment and society.

Similarly, biology is one of the core Science subjects in Nigerian Secondary Schools and teaching it requires creativity and improvisation (Onuh, 2022). To make biology concepts understandable to biology students, biology teachers must employ creative and innovative teaching approach in explaining biology concepts (Sambo, 2022). Sambo (2022) added that the widespread discouraging academic achievement towards biology from secondary school students can be ascribed to lack of proper teaching approaches. Biology teachers who adopt appropriate locally made instructional materials in teaching biology will likely be more successful in imparting the knowledge of biology to novice biologists in their classes.

Therefore, locally available instructional materials are materials and equipment obtainable from the local environment, or designed by the teacher or with the help of local resource personnel to enhance effective teaching and learning activities. Accordingly, Nweze (2021) asserted that local instructional materials are natural materials that are found in the local place or area which are useful for teaching and learning. Kabesa (2019) defines locally available instructional materials as those persons, places, things, materials, activities and experiences in the society considered helpful in educating learners. Locally available instructional materials include: ponds, swamps and rivers, pasture and grazing land, cultivated fields, abandoned land, forest areas, creeks, sand pits, playgrounds, swimming pools, nature trails, bird sanctuaries, objects and specimen, markets and health centres, resource persons, zoos and parks, botanical gardens, farmlands, museums, rocks, and wood, etc.

Kabesa (2019) added the following as the importance of locally available instructional materials: it provides a shared memory of the classroom; it improves students knowledge, retention, skill acquisition and preparation for adult life because students are given opportunities to apply learning in real life settings; it assist the teacher and facilitates students creativity thus making teaching-learning more concrete and interesting, thereby improving academic achievement of the students.

According to Effiong and Igiri (2015), instructional materials are print and non-print items that are intended to facilitate the passing of information to students in the educational process. They can be in the form of kits, textbooks, magazines, newspapers, pictures or videos, maps, audio-players or graphs, etc. instructional materials play a very important role in teaching and learning process, they enhance memory level, retention capacity and recall ability of students; facilitates learning of abstract concepts by helping the students to concretize ideas and stimulate students' imagination (Effiong & Igiri, 2015).

Also, Buba, Gana and Bularafa (2019) assessed the influence of instructional materials on academic performance of students in senior secondary schools in Maiduguri Metropolis of Borno State, Nigeria and found that the use of instructional materials enhanced the comprehension of concepts and retention of taught concepts among learners. Effiong and Igiri (2015) study to determine the impacts of instructional materials in teaching and learning of biology by SS 2 students in Yakurr Local Government Area of Cross River State concluded that learners exposed to instructional materials during lesson delivery had a positive significant academic achievement.

Adeyemi and Ajibade (2011) asserted that there seems to be an agreement among most researchers to explain failure from a multi-causal perspective where several variables are involved in students' academic achievement especially in

science subjects, such factors may include; gender, among other factors.

Gender is the range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (male and female) population (Adeyemi and Ajibade, 2011). The need to examine academic achievement in relation to gender is based primarily on the socio-cultural differences between girls and boys. Okereke and Onwukwe (2011) in their study of gender influence discovered that male students performed better than female students. Nweze (2021) concluded that the gender had no significant effect on students' academic achievement. Ekon and Eni (2015) asserted that gender did not significantly influence the acquisition of science process skills. Many researches had been carried out on gender issues with mixed reports in science education.

However, the use of locally available instructional materials makes teaching and learning easier to present and simpler to understand. Owing to dwindling finances from both the government and teachers, provision of adequate and relevant instructional materials to schools so as to meet up with the requirements of effective instructional delivery is becoming a challenge, with this call for an urgent need in the use of locally available instructional materials for effective instructional delivery in biology.

Statement of the Problem

The problem of academic achievement amongst biology students has been a point of concern for parents, schools and governments. In the past years, the percentage of biology students finishing secondary schools with credit pass to qualify for University admission is less than 25% (Adolphus, 2018). As a result of this, numerous researchers (Effiong & Igiri, 2015; Olugbuye, 2017; Buba et al., 2019; Sambo, 2022) have conducted researches into factors responsible for academic achievement of secondary school biology students. Not the less, other previous research has looked at the effects of instructional materials on academic achievement of secondary school students, such studies did not x-ray the adequacy and availability of instructional materials and their effects on academic achievement as well as the perception of students on teaching and learning. It is from the foregoing that this study was carried out with the aim of examining the influence of locally available instructional materials on biology students' academic achievement in Abak Local Government Area of Akwa Ibom State, Nigeria.

Purpose of the Study

The main purpose of the study was to examine the influence of locally available instructional materials on biology students' academic achievement in Abak Local Government Area of Akwa Ibom State. Specifically, the study sought to determine:

1. The influence of locally available instructional materials on biology students' academic achievement.
2. The influence of gender on the use of locally available instructional materials on biology students' academic achievement.

Research Questions

The following research questions guided the study:

1. How does locally available instructional materials influence biology students' academic achievement?
2. How does gender influence the use of locally available instructional materials on biology students' academic achievement?

Research Hypotheses

The following research hypotheses was formulated for the study:

1. There is no significant influence of locally available instructional materials on biology students' academic achievement.
2. There is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement.

METHODOLOGY

Quasi-experimental research design was used for this study. Specifically, pretest, post-test non-equivalent control group research design was adopted for this study. This design was chosen because it lacks elements of random assignment to experimental or control group, as such, it allowed intact classes to be used for the study (Nworgu, 2004). Also, senior secondary school three (SS 3) biology students who participated in the study received treatment in their usual classes and were used as control in their classes without re-arranging the class setting.

The total population of this study comprised all thirteen public senior secondary school three (SS 3) biology students in Abak Local Government Area of Akwa Ibom State. Two public senior

secondary schools were purposively selected for the study based on the criteria:

- The school must have registered students for West African Examination (WAEC) and National Examination Council (NECO) for at least 20 years.
- The senior secondary schools must be co-educational.

The sample for the study comprised of 75 SS 2 biology students. Only one arm of intact classes secondary school two (SS 2) students were used for the study. Biology students in one arm of intact classes in one of the senior secondary school was assigned to experimental group, while the control group senior secondary school was assigned to the second school. A pretest was administered first in both experimental and control group schools before treatment (those taught with locally available instructional materials) in the experimental group school while the content group school was taught conventionally and it lasted for a period of 4 weeks. Post-test was administered to both groups (experimental and control) at the end of the 4 weeks. The instrument employed for data collection was Senior Secondary School Biology Achievement Test (SSSBAT). The SSSBAT consisted of 25 multiple choice questions drawn from past WAEC and NECO past questions selected from 2006-2021. The questions were standardized, self-validated and reliable, being standard questions already used for external examinations. The reliability coefficient of the SSSBAT was determined with the use of Kuder Richardson Formula 21 (KR-21) and the internal consistency index was 0.81.

Procedure for Data Analysis

The data obtained was analyzed using Analysis of Covariance (ANCOVA). The hypotheses were tested at 0.05 level of significance.

Results

The results of the data analysis are presented in the tables below.

Hypothesis 1

There is no significant influence of locally available instructional materials on biology students' academic achievement. To test this hypothesis, Analysis of Covariance (ANCOVA) was used. The result of the analysis is presented in Table 1.

Table 1: Analysis of Covariance (ANCOVA) on the influence of locally available instructional materials on biology students' academic achievement.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	1668.398	2	834.199	14.992	.000
Intercept	38969.199	1	38969.199	700.348	.000
Pretest	21.517	1	21.517	.387	.536
Instructional* materials	1512.153	1	1512.153	27.176	.000
Error	4006.266	72	55.643		
Total	508336.000	75			
Corrected total	5674.667	74			

R. Squared = .294 (Adjusted R. Squared = .274) *Significant at P < .05

The result of the analysis as presented in Table 1, revealed a significant F-ratio of 27. 176 for instructional materials (use of locally available instructional materials and conventional instructional materials at P. (.000). Since P (.000) is less than P (.05) with 1 degree of freedom, the null hypothesis is rejected while the alternate hypothesis is accepted which implies that there is a significant influence of locally available instructional materials on biology students' academic achievement.

Hypothesis 2

There is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. To test this hypothesis, Analysis of Covariance (ANCOVA) was used. The result of the analysis is presented in Table 2.

Table 2: Analysis of Covariance (ANCOVA) on the influence of gender on the use of locally available instructional materials on biology students' academic achievement.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	1710.048	4	427.512	7.548	.000
Intercept	32570.808	1	32570.808	575.076	.000
Pretest	17.403	1	17.403	.307	.581
Gender	24.581	1	24.581	.434	.512
Instructional materials	951.379	1	951.379	16.798	.000
Gender* Instructional materials	14.202	1	14.202	.251	.618 ^{NS}
Error	3964.619	70	56.637		
Total	508336.000	75			
Corrected total	5674.667	74			

R. Squared = .301 (Adjusted R. Squared = .261) NS = Not Significant at P > .05

The result of the analysis as presented in Table 2, revealed an F-ratio of .251 for gender on instructional materials (use of locally available instructional materials and conventional instructional materials) at P (.618). since P (.618) is greater than P (.05) with 1 degree of freedom, the null hypothesis is retained. Thus, there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement.

DISCUSSION OF FINDINGS

The first hypothesis states that there is no significant influence of locally available instructional materials on biology students' academic achievement. The null hypothesis was rejected on the basis that the F-ratio (27.176) at P (.000) is less than P (.05), which implies that there is a significant influence of locally available instructional materials on biology students' academic achievement. This means that teaching and learning carried out with the use of locally available instructional materials is more effective as well as positively enhancing improved and better academic achievement in biology.

The findings of hypothesis one agrees with earlier findings of Effiong and Igiri (2015) who asserted that Learners exposed to instructional materials during lesson delivery had a positive significant academic achievement. The findings of hypothesis one is also in agreement with Buba et al. (2019) who concluded that the use of instructional materials enhanced the

comprehension of concepts and retention of taught concepts among learners. The findings are in-line with Nanka (2006) who opined that teaching of Science (particularly biology) with innovative approach will further improve the academic achievement of students.

Furthermore, the findings also corroborate with Oladejo et al. (2011) who concluded that instructional materials expose students to range of experiences. The findings support the view of Morontola (2002) who stressed that the teaching of Science (biology in particular) should involve active students' participation to demystify abstract concepts. The findings are in consonance with Kabesa (2019) who maintained that using locally available resources as an instructional aid in secondary schools improves the academic achievement of students positively.

The second hypothesis states that there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. The null hypothesis was retained on the basis that the F-ratio (.251) at P (.618) is greater than P (.05), which implies that there is no significant influence of gender on the use of locally available instructional materials on biology students' academic achievement. The findings of hypothesis two is in consonance with Nweze (2021), who maintained that gender had no significant effect on students' academic achievement.

Furthermore, the findings are in agreement with Oladebo (2011) who found that gender has no significant effect on academic achievement of students. The findings are in-line with Muodumogu and Yisa (2013) who concluded that the use of locally available instructional materials on biology students' academic achievement is not influenced by gender. The findings corroborate with Suraj et al. (2021) who opined that there is no significant effect of gender on students' academic achievement.

CONCLUSION

Based on the result of the findings, it was concluded that academic achievement of senior secondary school (SSS) biology students can be significantly enhanced by the use of locally available instructional materials for improving critical thinking/imaginative skills as well as reducing subject-abstraction phobia.

SUGGESTIONS/RECOMMENDATIONS

In line with the findings of this study and conclusions made herein, the following recommendations were made;

1. Biology teachers should be encouraged to source for and use locally available instructional materials for effective instructional delivery.
2. Education policy makers, curriculum planners as well as Ministry of Education should popularize the relevance of locally available instructional materials in biology curriculum, concept by concept.
3. Professional bodies like Science Teachers Association of Nigeria (STAN) and Teachers Registration Council of Nigeria (TRCN) should help to disseminate the use of local materials for teaching-learning process.
4. There should be training and retraining of biology teachers through seminars, symposiums and workshops on the need to utilize locally available instructional materials for effective teaching/learning.

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