EFFECTS OF LEARNING ACTIVITY PACKAGE (LAP) ON STUDENTS' ACHIEVEMENT IN BIOLOGY IN ENUGU EDUCATION ZONE

BY

NEBOH OLIVE IFEYINWA
DEPARTMENT OF SCIENCE AND COMPUTER EDUCATION
FACULTY OF EDUCATION, ENUGU STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY (ESUT) ENUGU
08034096427, Neboholive@yahoo.com.

Abstract

The study was conducted to determine the effectiveness of Learning Activity Package (LAP) in influencing students' achievement in senior secondary school biology. Two research questions guided the study and two null hypotheses were tested. A Quasi-Experimental Pre-test, Post-test, Non-equivalent Control Group Design was adopted for the study. A sample of 317 SS II Biology students, drawn by purposive and simple random sampling technique from four co-educational secondary schools in Enugu Education Zone was used for the study. The four schools were assigned to experimental and control groups respectively using simple random sampling. Two intact classes in each school – (one as experimental and the other as control group) were randomly selected. Two parallel instruments (Pre-BAT and Post-BAT) were developed, validated and reliability duly established before using them to collect data. The research questions were answered using mean and standard deviation while the hypothesis were tested at (P <0.05) using analysis of co-variance (ANCOVA). The result of data analysis showed that there was a significant difference between the experimental and control group, with the mean achievement score of the LAP group being significant more than the control group. There was no significant difference in the mean achievement scores of male and female students taught using LAP. Based on these findings educational implication and some recommendations were made.

Introduction

It is known that science and technology play vital role in development and productivity of any nation. This is because science and technology provide the basic tools for industrialization and economic development in so many areas. That is why the major aim of science education as contained in the National Policy on Education (FRN 2004) is to equip the students to live effectively in this modern age. This can only be achieved by sound scientific teaching. Science subjects like biology when properly taught will help the students to solve personal and societal problems. The importance of Biology as a secondary school subject is further illustrated by the fact that a candidate must obtain a credit pass in it, for admission into any Nigerian university to study any science related course.

Despite the importance of science subjects, students still performed poorly in Biology, for it this was reported by the Chief Registrar, Joint Admission and Matriculation Board (2004) and Chief Examiner of West African Examination Council (2008). This gives an impression that there may be students low desire for Biology as one of the science subjects. This might also be an indication that meaningful learning had not taken place. The overall achievement in biology and other sciences are very much related to many other variables which are evident in the studies carried out by other researchers. These include – gender, teaching methods, location, student backgrounds, etc (Ogunleye, 2002; Eccles, 2002).

Various methods are used by teachers in the teaching of Biology in order to bring about a meaningful learning. These include lecture method, demonstration method, discovery,

project, inquiry etc. The most commonly used is the lecture method. This method is employed by many biology teachers because of its many advantages which include the fact that it enables the teacher to cover a large content area at a time and the students are given the same content at a time. It also enables the teacher to teach a large class which is a prominent feature in most Nigerian public secondary schools. Despite these advantages, this method had failed to recognize the uniqueness of the inquiry-base nature of science and the learner's individuality thus failed to encourage creative thinking in the learner leading to poor achievement of the students. (Awotua-Efebo 2001) evidence from literature showed that most science teachers in Nigerian secondary schools predominantly use lecture method in teaching due to poor knowledge and none exposure to other learner centered method leading to poor achievement (Freedman, 2002; Omoniyi, 2006). Separate studies by various researchers showed that there is no consensus on the effect of method on students' achievement. There is then the need to investigate the effect of learner-centered activity oriented method and its effect on students' achievement. This calls for individualization of instruction, the individualized instruction can be approached through different methods such as Programmed Instruction (P1), Computer Assisted Instruction (CAI), Independent Study (IS), Learning Activity Package (LAP), among others.

Computer Assisted Instruction (CAI) had been so much advocated and had been established by research findings to be good for individualized instruction. Its use in Nigerian secondary schools had been hampered by its non-availability in most public schools (Eze, 2004). Based on this, the researcher advocates for the trial of another individualized method of instruction which can be readily available and affordable. Some other methods like the Learning Activity Package (LAP) has not been fully explored to determine its potential in learning.

A Learning Activity Package (LAP) is a student-centered activity-oriented teaching strategy where the teacher acts as a facilitator of learning, guiding the students through a series of activities and problems which may help learners to achieve highly. In LAP learning materials are broken into small steps that are arranged sequentially from known to the unknown and in an increasing order of difficulty. Each student is expected to work at his own pace thus accommodating both the fast and slow learners (Abu, 2001).

The LAP consist of the following components –

- Topic and sub-topics
- Rationale
- Behavioural objectives
- Pretest
- Learning Activity
- Quizzes/Unit Activities
- Posttest (Abu, 2001)

One related factor that is confronting the use of learner centered method of teaching is its ability to have the same impact on both male and female students equally. It is worthy of note that opinions and findings about the issue on gender have been diverse (Omekutu and Onekutu 2002; Eriba and Sesugh, 2006). Against this background therefore, the need arose to determine the effect of Learning Activity Package (LAP) on students' achievement in Biology in Enugu Education Zone in Enugu State.

Statement of the Problem

The persistent poor achievement of students in Biology as revealed by both research findings and WAEC Chief Examiners' reports call for concern. The problem has to a large extent been attributed to ineffective teaching method employed by the teachers and especially lecture method which is teacher centered.

Consequently, there is a felt need to improve the teaching and learning of Biology by exploring the use of some innovative learner-centered teaching methods, since meaningful learning may be as a result of active participation by students. There are many methods that involve active participation of the students but the large nature of Nigerian classes had made their practicability nearly impossible. Moreover, the lecture method has failed to recognize the inquiry based of science subjects. This calls for the trial of another learner centered activity oriented method. The problem of the study therefore is, what are the effects of Learning Activity Package (LAP) on students' achievement in Biology in Enugu Education Zone.

Purpose of the Study

The purpose of this study was to determine the effect of the use of Learning Activity Package on students' achievement in Biology. Specifically, the study sought to:

1. determine the effect of the LAP on students' achievement in Biology when taught the 'Unit of Life'.
2. find out the extent gender exerts influence on students' achievement in Biology when taught the 'Unit of Life using LAP.

Research Questions

The following research questions guided the study:-

1. What are the mean and standard deviation scores of SS II Biology students taught the 'Unit of Life' with Learning Activity Package (LAP) and those taught the same topic using lecture method.
2. What are the differences in the mean achievement and standard deviation scores of male and female SS II students in Biology Achievement Test (BAT) when taught the 'Unit of Life' with LAP.

Hypotheses

The following hypotheses were tested at 0.05 level of significance.

Ho_1: There is no significant difference between the mean achievement scores of SS II Biology students taught the 'Unit of Life' using LAP and those taught using the lecture method.

Ho_2: There is no significant difference between the mean achievement scores of SS II male and female students in Biology Achievement Test (BAT) using LAP.

Research Method

The design of the study was Quasi-Experimental Design of the Pretest Posttest Non-equivalent Group Design, using intact classes without randomization. The study was conducted in the three Local Government Areas of Enugu Education Zone. The population of the study comprised of all public co-educational Senior Secondary School Class Two (SS II) students who were offering biology, numbering 2022. The sample used for the study consisted of a total of 317 SS II Biology students (157 males and 160 females) drawn from 18 co-educational secondary schools n the zone. Purposive sampling method was used to select the 18 schools from the 29 secondary schools and was also used to select four schools that had up to two or more SS II classes. Simple random sampling was used to select two intact SS II classes in each of the four schools and for assigning the intact classes to experimental and control groups.

The instrument used for data collection was the Biology Achievement Test(BAT) developed by the researcher. There are two BAT (Pre-BAT and Post-BAT), each with forty multiple choice items that are parallel. The items were developed from 'Unit of Life' as contained in the SS II Biology curriculum. The BATs were subjected to both face and content validation. The content validity was ensured using the table of specifications for both the pre-

and post BATs. The reliability of the instruments was established through trial testing of the instrument on a group of SS II students not used in the study. Two forms of reliability were established – coefficient equivalence, correlated using Pearson's Product Moment Correlation coefficient with a correlation coefficient of 0.79 was obtained and the internal consistency for both Pre-BAT and Post BAT was determined using Kuder-Richardson formular 20 (K – R 20) with internal consistency co-efficient of 0.83 and 0.73 respectively.

The following procedures were adopted in the administration of the instrument – before the treatment, the research subjects were given a pre test. The main treatment for the study was the teaching of the three sub-units of the Unit of Life to Senior Secondary II Biology students using the two teaching methods (the LAP and the Lecture Method). The experimental group was taught using the LAP while the control group was taught using Lecture Method. This lasted for five weeks. After the treatment, the post BAT was administered to the subjects in both the experimental and control groups. The scripts for both the pre and post tests were marked by the researcher and the students' scores were recorded. Mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of significance.

Results

Research Questions

Table I

Mean achievement and standard deviation scores of students taught unit of life with LAP and lecture method.

N - 317

Group		Mean	SD	N
LAP	Pre test	12.05	7.15	
	Post test	22.21	5.91	160
	Gain Score	10.16		
Lecture Method	Pre test	9.45	5.63	
	Post test	16.37	5.23	157
	Gain Score	6.92		

From the table above, the LAP group achieved higher than the students taught with lecture method with a gain score of 10.16 and 6.92 respectively even though the standard deviation scores of 5.91 for the LAP group and 5.23 for the lecture group indicate that the students individual scores clustered more around the mean with lecture method than with the LAP.

Table 2

Mean achievement and standard deviation scores of male and female students in Post-BAT with LAP.

N - 317

Sex	Mean	SD	n(cases)
Male	20.11	5.60	157
Female	18.53	6.84	160

The table above shows that the male students achieved higher than the female students in the posttest with the mean score of 20.11 and 18.53 respectively. Similarly the standard deviation scores of the male students are more clustered around the mean than those of their female counterpart that had more extreme scores.

Hypotheses

Table 3

Analysis of covariance of students mean achievement scores in BAT.

Source of Variation	Type III Sum of Squares	df	Mean Square	F-cal	Sign	Decision
Corrected Model	6294.81	11	572.26	27.99	0.00	S
Intercept	1739.56	1	1737.56	85.00	0.00	S
Pretest	466.57	1	466.57	22.82	0.00	S
Covariate						
Method	86.98	1	86.98	4.26	0.04	S
Gender	42.16	1	42.16	2.06	0.16	NS

Ho_1: There is no significant difference in the mean achievement scores of SS II Biology students taught the unit of life using LAP and those taught using lecture method.

Table 3 shows that the calculated F-value for the effect of treatment (methods) on students' achievement in BAT is 4.26 significant at 0.04 level of significance, which is less than 0.05 set for the study. The null hypothesis is therefore rejected. This means that a significant difference exists in the mean of achievement scores of Biology students taught with LAP and those taught with lecture method.

Ho_2: There is no significant difference between the mean achievement scores of male and female students in post Biology Achievement Test (Post-BAT).

Table 3 shows that the calculated F-value for the effect of gender on students achievement is 2.06 significant at 0.15 level of significance which is greater than 0.05 level set for the study. The null hypothesis is not rejected. This means there is no significant difference in the mean achievement scores of male and female students in Post Biology Achievement Test.

Findings:

The result of data analysis revealed that:

1. There was a significant difference between treatment and control groups in their mean achievement scores. The LAP group scored significantly higher than the lecture group.
2. Male students mean achievement score was slightly higher than their female counterpart. So there was no significant difference in the achievement of male and female students in their mean achievement score.

Discussion

Result of data analysis on table I showed that students taught with LAP performed significantly better in Biology achievement test than their counterparts who were taught using the lecture method. This result was in agreement with the result of earlier studies carried out by Abu (2001), who found that Learning Activity Package (LAP) was more effective than the conventional methods in fostering students' achievement. The relative superiority of LAP over the lecture method in enhancing students' achievement in Biology units could be attributed to the fact that, the LAP is student-centered and enhance self learning, that ensured for active participation of students in the teaching-learning process more than the lecture method. The lecture method often subjected the learner to the position of the passive recipient of the facts as handed down to him by the teacher. The active participation of the students involving the use of several sense organs, invariably should arouse greater students interest and motivation for effective learning. Given, these prevailing circumstances under which the LAP and the lecture method were employed in the classroom instruction, it was not surprising that the treatment group (LAP) out-performed the control group in BAT.

As indicated in table 2, the mean achievement score of male student was found to be slightly better than their female counterparts, even though the differences were not significant. The findings of the study with regards to gender agrees with the finding of Awariele (2006), that there was no significant difference between the achievement of boys and those of girls. Nevertheless, the finding of this study disagreed with the findings of Erinsho (2005) and Ugwu (2007) who found significant difference in the achievement of male and female students in their independent studies. That could be attributed to the fact that the activities in the Learning Activity Package are carried out by the students themselves, at their own pace during and after the school period, so that gave both the male and female students chances of performing equally. On the other hand, the mean achievement scores of male students being slightly better than their female counterpart can be associated with social attachment that males are more science incline than females.

Conclusion

In conclusion therefore, Learning Activity Package was found to be more effective than the lecture method on students' achievement in Biology. There is a significant difference between the treatment and the control groups in their mean achievement scores, while the mean achievement score of the male students was found to be slightly greater than their female counterparts with no significant difference in their mean achievement scores.

Recommendations

Based on the findings the following recommendations were made:-

1. Since the use of LAP has been found effective in promoting achievement in Senior Secondary School Biology and as the teaching method is relatively new in Nigeria, it should be included in the Biology curriculum for teachers' training in tertiary institution, so as to popularize its use among the teachers and hence brings about more effective learning of Biology in our secondary schools.
2. Seminars and workshops should be organized by government and relevant professional bodies like Science Teachers Association of Nigeria (STAN) to educate and sensitize the teachers on the use of the LAP in Biology teaching and learning.

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