

Efficacy of Learning Activity Package on Academic Achievement and Retention among Biology Students in Federal College of Education, Zaria

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Abstract

This study assessed the efficacy of the Learning Activity Package (LAP) on academic achievement and retention among N.C.E. Biology students at the Federal College of Education in Zaria, Kaduna State." The study was designed with two aims and two research questions. A quasi-experimental design was implemented. The population consisted entirely of N.C.E. Biology students from the Federal College of Education in Zaria, Kaduna State. The sample size was based on an entire class of 200 pupils. This research employed the Biology Achievement Test (BAT), which consisted of 25 multiple-choice questions with four alternatives and one right answer. Students completed an achievement exam to collect data, which was then analyzed using statistical methods such as the t-test, standard deviation, and mean analysis. The findings show a substantial difference between students taught biology using the Learning Activity Package and those taught using the lecture technique. It was found that teachers at the Federal College of Education in Zaria, Kaduna State, should enhance their techniques of teaching and studying biology. However, it was advised that biology instructors use learning activity packages at all levels of education in Nigeria.

Keywords: Learning Activity Package (LAP), Academic, Achievement, Biology, Student's.

Introduction

According to Njoku and Akamobi (2015), the Learning Activity Package (LAP) is a student-centered, activity-oriented teaching method. In this technique, the teacher takes on the role of a learning implementer, taking students through a series of activities and challenges that can help them achieve high success rates. The learning activity package may include a range of instructional approaches, depending on the instructional goals of the unit or module to which it belongs. Because a wide range of teaching approaches may be merged into a website or webpage, educators can

effectively employ these resources when creating learning activity packages for students. According to Njoku and Akamobi (2015), the website or webpage in issue may include instructional information (text, audio, and video), links to other websites, interactive activities, assignments, assessment guidelines, and any other necessary content.

Science and technology are critical elements for every country's economic progress and increase in worker productivity. Any nation that wishes to secure progress, preserve its position of honor among civilized countries, and maintain its independence, authority, and self-sufficiency must aggressively seek knowledge. This is because, among other things, science and technology provide important tools for industrialization and economic growth in areas such as communication, transportation, energy, knowledge, pollution control, and waste management. Science education has gotten a lot of attention in Nigeria since it is seen as so important. According to the National Policy on Education, the primary goal of scientific education is to equip students to live successfully in the modern world (FME 2014). Science education has garnered a lot of attention since it is seen as so essential in Nigeria. To do this, students can be taught the necessary knowledge, abilities, and attitudes for the scientific community.

The only way for students to get the information, skills, and attitudes required for success in science is via effective education in the many scientific disciplines. This domain encompasses biology, chemistry, and physics, as well as mathematics, health science, and agriculture. Biology, being a scientific discipline, may help students identify solutions to both internal and external issues if taught correctly. Understanding biology allows one to maintain appropriate health practices such as the usage of clean water, adequate sanitation, balanced nutrition, and the importance of immunization, among other things. It also aids in the questioning of superstitions, understanding the functions of the various bodily parts, and self-awareness (Maduabum, 2008). To get admitted to any Nigerian institution and pursue important science-based programs such as medicine, pharmacy, biochemistry, microbiology, food technology, and others, a candidate must have a credit pass in biology. This emphasizes the relevance of biology as a secondary education topic.

Research findings from Colleges of Education and WAEC Chief Examiners' Reports both suggest that students continue to do badly in biology, which is concerning, particularly for biology teachers who enroll more students. Teachers' inadequate teaching techniques, notably the lecture-

based, teacher-centered approach, have been linked to the problem in large part. Because it is considered that students participation may lead to meaningful learning, it is deemed vital to improve the biology teaching and learning process by investigating the use of various novel learner-centered teaching methodologies. Despite the fact that numerous studies on a variety of novel approaches, including computer-assisted instruction and programmed instruction, have shown that they are student-centered and can promote learning and achievement, the issue of large classes and a lack of computer equipment in the majority of Nigerian courses has made their implementation practically impossible. There is still a need to examine diverse kid-centered techniques that are inexpensive, accessible, and flexible, as well as those that combine packaged learning with hands-on activities. Using such an approach, the instructor should be able to swiftly identify the challenges that a specific student is experiencing while also allowing the students to analyze themselves and receive the findings immediately. Biology, a topic with a strong emphasis on hands-on experience, must be given to students in a way that encourages them to participate actively in their education (Olojo, Akinwumi, and Olofin, 2022). Olojo, Akinwumi, and Olofin 2022 explained that the study of biology encompasses not only the investigation of life, but also its structures, functions, growth, origins, evolutions, distributions, interrelationships, diseases, and adaptations.

According to Falebita and Olofin 2020, the lecture technique, which is used in the teaching of biology ideas, may offer the advantage of delivering vast amounts of material, which can be used to cover the extensive curriculum. Students must actively engage in the learning process. It appears that the usual strategy fails to account for each individual's unique traits. This demands experimenting with a new customized method, such as the Learning Activity Package. As a result, the study was designed to address the following question: "What effect does LAP have on students' academic achievement and retention among Nigeria Certificate of Education (NCE) students?" Biology at the Federal College of Education in Zaria, Kaduna State, Nigeria.

The results of this study are important from both theoretical and practical points of view. Theoretically, this study is supported by the idea that children actively engage their surroundings as they develop their cognitive abilities. Accordingly, the cornerstone of learning is the child's ability to engage with his physical and social environment. According to Piaget's theory of intellectual development, a child's environment actively influences how they develop cognitively.

This is closely related to the learner-focused Learning Activity Package (LAP). In other words, LAP as an instructional technique is consistent with a theory that emphasizes the active connection of the learner with his environment, while the instructor directs or encourages the interaction; consequently, the findings of this study will contribute to the validation of Piaget's theory.

Purpose of the Study

The objective of this study was to:-

- i. Assess the effect of LAP on biology students' academic achievement at the Federal College of Education in Zaria, Kaduna State.
- ii. Examine the LAP effects on students' retention among biology students at the Federal College of Education in Zaria, Kaduna State.

Research Questions

The following research questions were formulated:

- i. What effect does the LAP have on students' biology academic achievement at the Federal College of Education in Zaria, Kaduna State?
- ii. What effect does the LAP have on Biology students' retention at the Federal College of Education in Zaria, Kaduna State?

Research Hypotheses

The following hypotheses were created and tested at the 0.05 level of significance to guide the study:

- i. There are no appreciable differences in the mean academic achievement scores of students taught biology using the LAP and those taught using the Lecture Method.
- ii. There is no significant difference between students taught biology using the LAP and those taught using the Lecture Method in terms of their level of retention.

Methodology

The study design was a non-equivalent group design with a quasi-experimental pre-test and post-test. This approach is often used in classroom-based tests where the experimental and control groups are set up as intact classrooms with no chance of randomization. As a result, intact classrooms were used and research subjects were not randomly selected. All N.C.E. The population consisted of biology students at the Federal College of Education, Zaria, Kaduna State. Using the Krejcie and Morgan (1970) sample size chart, the study sampled 200 biology students.

The researchers' Biology Achievement Test (BAT) is the instrument used to collect data. The BAT is a twenty-item test with four response options (A–D) for multiple-choice questions. The researchers pre-tested two groups that made up the sample: control school A and experimental school B. Here, the control school will receive a package of learning activities, while the experimental school will receive lectures as the teaching style. The follow-up test was again

conducted one week after the pre-test. A post-test (also known as a retention test) was then given to see if the students had retained the material after about two weeks.

The Circulatory System Performance Test (CSPT) was the tool utilized to gather information for this study. The test was created to assess the student's academic performance and comprehension of the material covered. The information acquired from the offered test was examined using statistical analyses such as the mean, standard deviation, and t-test. Based on the findings of the performance test, an analysis was conducted.

Results

Descriptive statistics, such as mean and standard deviation, were used to analyze the data and reply to research questions. The study's research hypotheses were evaluated using the t-test procedure.

Research Question 1: What effect does the LAP have on academic achievement of N.C.E. Biology Students at the Federal College of Education in Zaria, Kaduna State?

Table 1: Students Mean Score between Teaching Strategy and Ability Levels on students' Achievement in Biology using LAP and Lecture Method

Method of teaching	No. of students	Mean score	Mean difference
LAP (Experimental group)	110	26.7	
Lecture Method (control)	90	18.4	08.3

Table 1 shows the mean score of students in the experimental and control groups. Students in the experimental group obtained an average grade of 26.7, but those in the control group received an average of 18.4. The Experimental group benefited from the mean difference between the groups, which was determined to be 8.3 marks. The average discrepancy is considerable. Thus, we may conclude that biology students taught via LAP performed better than those taught using the lecture technique.

Research Question 2: What effect does the LAP have on N.C.E. Biology students' Retention at the Federal College of Education in Zaria, Kaduna State?

Table 2: Level of Retention of Students taught using LAP and those taught using Lecture Method

Method of teaching	No. of students	Mean score	Mean difference
LAP (Experimental Group)	110	24.6	07.3
Lecture (Control)	90	17.3	

Students who were taught biology using the LAP method retained more information than students who were taught biology using the lecture strategy. This was seen in Table 2 above. The study found that the control group's mean score was 17.3, whereas the experimental group's mean score was 24.6. The Experimental group received a 7.3-point edge in the mean difference between groups. The average discrepancy is considerable. As a consequence, we may conclude that students who are taught biology utilizing LAP outperform those who are taught in lectures.

Hypothesis Testing

H₀₁: There are no appreciable differences in the mean academic achievement scores of students taught biology using the LAP and those taught using the Lecture Method.

The above null hypothesis was t-tested and the result is presented in table 3.

Table 3: t-test analysis of mean academic achievement score experimental and control groups

Variables	N	Mean	SD	SE	df	t-value	P-Value	Conclusion
Experimental	110	24.6	3.633	0.672				
					40	6.314	0.003	Significant
Control	90	18.4	4.037	0.740				

Table 3 displays the t-test results for the experimental and control groups in terms of student academic success. The final P-value was 0.003, which was below than the 0.05 level of significance. This shows that utilizing LAP to teach biology benefits students more in the experimental group than in the control group. As a consequence, we reject the null hypothesis and support the alternative hypothesis, indicating that there are significant differences between students who were taught biology using LAP and those who were not.

H₀₂: There is no significant difference between students taught biology using the LAP and those taught using the Lecture Method in terms of their level of retention.

Table 4: t-test Analysis of Mean Level of Retention Score of Experimental and Control groups

Variables	N	Mean	SD	SE	df	t-value	P-Value	Conclusion
Experimental	110	26.7	2.313	0.612	32	3.622	0.002	Significant
Control	90	17.3	3.377	1.524				

Table 4 shows the t-test findings for the level of retention score in the experimental and control groups. The results reveal that the P-value is 0.002, which is less significant than 0.05. The null hypothesis is thus rejected, indicating that there is a difference in academic retention between students who were taught biology with LAP and those who were not.

Discussion of Findings

The findings of this study showed that students who are taught biology via LAP retain more material than those taught using lecture techniques. This is consistent with Ugbe and Dike's (2012) findings on the comparative impact of deploying student learning packages on student retention. Furthermore, it is congruent with Ndukwe's (2000) findings on SSI students' initial achievement and retention in biology expository versus project-centered education.

Also, the findings revealed no noticeable difference in the pre-test performance of biology students who utilized the Learning Activity Package (LAP) vs those who followed the traditional strategy. At the beginning of this study, the students in the experimental and control groups were similar. Neboh (2012) found a significant difference in academic achievement between students who learnt biology through lectures and LAP; LAP students outperformed lecture-taught students. He concluded that incorporating cutting-edge strategies such as the Learning Activity Package into the teaching and learning of science topics will considerably boost students' academic success. Abu (2018) observed that LAP increased students' biology achievement independent of their previous academic standing. Furthermore, Njoku and Akamobi (2015) and Ifeyinwa (2019) discovered a significant difference in retention test scores among biology students who utilized the Learning Activity Package (LAP) against those who used the conventional technique. They conclude that LAP was successful in sustaining students' biology knowledge.

Moreover, it was revealed that students who were taught biology using the LAP and those who were taught using the lecture approach performed similarly. This is congruent with Abu's (2018) study, which investigated the effectiveness of customized and lecture instructional strategies for teaching biology at the senior secondary level in two schools in the Nigerian state of Kaduna's Zaria township. Mukalia (2000) investigated the association between students' cognitive preference types and computer- and text-assisted programmed teaching as predictors of secondary school competence in heat-related courses in physics.

It is also consistent with Mbajorgu's (2013) study, which examined students' acquisition and retention of science process abilities and discovered the effects of the direct discovery

technique and the demonstration method, revealing that motivation and allowing students to reach their own conclusions aid retention. According to Njoku and Akamobi (2015), the LAP has the following components: subject and sub-topics, reasoning, behavioral targets, pre-test, learning activity, unit activities, and post-test. LAP is a learner-centered activity that results in individualized education and greater academic attainment. According to Akpokiniovo (2020), LAP is a learner-centered activity that results in individualized teaching and greater academic attainment. Learning activity packets are a relatively new invention in programmed education. A Learning Assistant Program (LAP) is a "modular instructional unit designed to facilitate the individualization of instruction". The LAP has the distinct benefit of providing the learner with a wide range of options for achieving the behavioral objectives, accounting for variances in prior success and learning style. Learning Activity Package is a novel strategy that serves as a medium for individualization in learning. It is an adaption to instructional programming.

According to Neboh (2012), the components of LAP are the topic or title, objectives, pre-test, activities, quizzes, and post-test. Akpokiniovo (2020) discovered that the LAP group outperformed the lecture technique group on both the Pre-test and Post-test scores. Abu (2018) concluded that LAP improved students' Biology performance regardless of their previous academic status. Njoku and Akamobi (2015) discovered that the LAP was more successful than conventional methods. The results also indicated that the kids enjoyed autonomous study. Njoku and Akamobi (2015), as well as Ifeyinwa (2019), discovered that LAP was helpful in helping students maintain their Biology knowledge.

According to Suchanya (2021), learning activities are a tool for students to gain direct experience through hands-on practice, which allows learners to know their progress, receive immediate feedback to stimulate interest and accelerate learning, practice thinking, analyzing, practicing, and being eager to learn, so seek knowledge on one's own and be responsible for oneself. It will help learners put their newly acquired information into practice; those with greater comprehension will be able to apply their knowledge to problem solving. It can improve learning results (Wannaphan, 2013). This style of learning will facilitate the successful transition from theory to practice (Khanchai and Thanarak, 2017).

Conclusion

Based on the findings of this study, it was stated that teaching and learning became genuine and practical in the experimental group, allowing students to achieve self-confidence, self-esteem, memory retention, and improved performance after being taught using LAP. When taught using LAP, students learn and absorb the information more quickly and efficiently, and the level of performance among Biology N.C.E III students at the Federal College of Education Zaria in Kaduna State improves.

Recommendations

The following suggestions were offered in light of the research's findings:

- i. All Federal and State Colleges of Education in Nigeria should use LAP to teach biology.
- ii. LAP-based instruction is crucial in all Federal and State Colleges of Education in Nigeria because it increases student retention.
- iii. Instructors should be encouraged by management and school authorities to use LAP in all Federal and State Colleges of Education in Nigeria.

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