



Learning Activity Package, Think-Pair Share and Secondary School Biology Students' Achievement and Interest in Akwa Ibom State, Nigeria

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ABSTRACT

To investigate Learning activity package, Think-pair-share on secondary school Biology students' interest and Achievement in Akwa Ibom State. Two null hypotheses were formulated. Quasi-experimental design. A population of 7,416 SS1 Biology students. A sample size of 207 SS1 Biology students drawn purposively. Biology interest scale (BIS) and Biology Achievement Test (BAT) were the instruments. Reliability coefficients of .79 and .84 were obtained through Cronbach alpha (A) and Kuder-Richardson's formula 20 (KR-20) for BIS and BAT respectively. Descriptive statistics answered the research questions while Analysis of Covariance (ANCOVA) tested the hypotheses at 0.05 level of significance. Results showed that Biology students taught with Learning activity' package had significantly higher interest and achievement than students taught with Think-pair-share and conventional method. Based on the findings, it was recommended among others that Biology teachers in Akwa Ibom State adopt learning activity package (LAP) strategy since LAP enhances achievement and interest of the students.

Keywords: Learning Activities package, Think-Pair-Share, Biology Interest and Achievement

INTRODUCTION

Science Education occupies the central position in production resources needed for socio-economic, scientific and technological development and growth of any nation. Recognizing the importance of Science Education, the Federal Government of Nigeria (FGN, 2016) included science programs in her Secondary Education in Nigeria is the preparation for useful living within the society and for higher Education. To achieve this aim, the Federal Government made biology as one of important science subjects taught at senior secondary school. Biology is a branch of natural science that deals with the study of living organisms, including their structures, functioning, evolution, distribution and interrelationships (institute of Biology, 2016). Supporting these definition, Obikezie, et.al. (2022) explained that Biologists study the structure, function, growth, origin, evolution and distribution of living organisms. It is understood today that all organism survive by consuming and transforming energy and by regulating their internal environment to maintain a stable and vital condition. In order to realize the importance of biology the Nigerian Secondary School Biology Curriculum is designed to continue students investigation into natural phenomena, to deepen students ability to apply scientific knowledge to everyday life in matters of personal, community, health and Agriculture among others (Federal Ministry of Education,2016). In spite of the importance and well set out learning experiences to encourage learning of biology among students, the academic achievement of students in biology has been fluctuating between credit level and high failure rate. One of the content areas of students' weakness and one of the likely causes of poor achievement in biology is difficulty in understanding Micro-organism by the students and this has implication for the current study as this study will focus on content area of Micro-organism. This poor performance and weaknesses in some content areas in biology may affect students' interest in biology and poor students' interest in biology could equally lead to poor performance.

Interest is described as a person's relatively enduring predisposition to reengage particular content over time. Interest is a feeling of either 'like' or 'dislike' towards a particular type of activity over the other (Amedu, 2015). According to Derek (2018), there are several factors that usually influence the interest of students. Such factors include inappropriate (uninspiring teaching methods adopted by the teachers), teachers' negative attitudes towards the students, and the influence of students' attitudes towards a subject. On the other hand, the interests of students can be generated and sustained through several means which include motivation, relevant set-induction, effective use of instructional materials, teachers' adoption of inspiring teaching strategies, which is the concern of the present study. Various efforts such as more time allocation to the teaching of biology, organizing extra mural lessons by various schools in biology, yet the problem of poor performance and lack of interest still persist. According to Frydenberg et, al (2017), some of the factors responsible for the underperformance of biology students include unavailability of adequate instructional materials, incompetency on the part of

biology teachers, uninspiring instructional strategies and poor or wrong approach to teaching among others. Specifically, Njoku and Akwali (2016) attributed the poor performance of students in sciences at WASSCE and NECO examinations to inappropriate teaching strategies adopted by many practicing classroom teachers in school. Consequently, to make the teaching and learning of micro-organism concepts taught at school become very interesting, effective and probably yield the expected or desired results, STAN (2022) observed that; (i) the use appropriate methods and innovative strategies by teachers necessitates meaningful learning, (ii) teaching-learning environment and learning materials should be more student-centered than teacher-centered in order to enhance quick understanding of concepts taught and (iii) encouraging students' full participation in active classroom discussions and brain storming based activities through innovative strategy enhances positive result. Therefore, the need for adopting learning activity package and Think-Pair-Share instructional strategies.

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. Each student is expected to work at his own pace thus accommodating both the fast and slow learners (Okunade, et. al. 2022). Neboh (2012) opines that Learning Activity Package is an innovative approach that acts as a vehicle that makes for individualization in learning. LAP is basically a booklet on a given topic containing objectives related to this topic, diverse activities to reach these objectives, and evaluations to determine if the objectives have been met. Likewise, Udu, (2018) stated that LAP is a booklet containing sets of learning assignments organized sequentially to achieve the specified objectives. In addition, it contains evaluation techniques to determine whether the objectives have been achieved or not (Galos and Gustilo, 2022).

On the other hand, think-pair-share instructional strategy has been defined by many educationists in various ways with regard to its philosophical and psychological backgrounds. According to Akanmu, (2019) think-pair-share is a cooperative learning strategy that gets its name from the three stages of student action, with emphasis on what students are to be doing at each of those stages. Think-pair-share (TPS) is a collaborative learning strategy where students work together to solve a problem or answer a question about an assigned reading. This strategy requires students to think individually about a topic or answer to a question; and share ideas with classmates. Jumanta (2014) stated that think-pair-share is a simple technique with great advantages. Think-pair-share can improve students' ability to recall information and a student can also learn from other students and convey to each other ideas for discussion before being submitted to the class. Neboh (2009) conducted a study to determine the effectiveness of the learning activity package (LAP) in influencing students' achievement and retention in Senior Secondary School Biology. The result showed that there is a significant difference between the experimental and control group, with the mean achievement and retention scores of the LAP group being significant more than the control group. However, the study did not examine the effect of learning activity package on students' interest which this study investigates. In addition, the present study also compared think-pair-share along with learning activity package and lecture method on students' interest and academic achievement. Okunade, Akinwumi and Okeya (2022) examined the effectiveness of learning activity package (LAP) on students' performance in Biology in Ekiti state secondary schools. The study specifically examined the difference between the pre-test, post-test and retention performance of students in Biology exposed to Learning Activity Package (LAP) and the conventional method. The study showed that LAP strategy is effective in improving performance and retention of Ekiti State secondary school students in Biology. This study again did not include the interest of students when exposed to learning activity package which the present study investigate. Also, a second experimental group, the think-pair-share group was studied to compare with the learning activity package. Koocharoenpisa, Mankaew and Lieagwanjarean (2023) research was to develop the learning activity package that enhance science experimental skills on the electrochemical cell from fruit juice for 9th grade students and study implementation of the learning activity package consisting of comparing the students' science experimental skills between before and after learning. The result showed that the quality of learning package verified by experts was at level of very good. However, the effect of LAP on interest on interest of students was not captured. Moreover, LAP was not compared with think-pair-share strategy as done in the present study. Galos and Gustilo (2022) examined the effectiveness of Science Learning Activity Packets (SciLAPs) as an approach to instruction. Results of the study revealed that the experimental group has a higher mean score than the control group in the post-test conducted and the students who successfully completed the tasks in the SciLAPs have shown positive results in their post-test that are significantly above compared to those students who did not go through the activity packets. However, the study did not determine the effect of learning activity package on students' interest and no second experimental group was studied which this study investigates. Enebechi, Anazodo and Mbaegbu (2023) investigated on effect of deep conceptual and think-pair-share strategies on students' academic achievement in biological concept of blood circulation in Awka metropolis. The study revealed that there are significant differences in the mean academic achievement scores of Biology students taught blood circulation using three instructional strategies in favour of the treatment groups. However, the effect of think-pair-share on students' interest was not captured. Moreover, think-pair-share strategy was not compared with learning activity package as observed in the present study. Hamdan (2017) conducted a research aiming at knowing the impact of Think-Pair-Share strategy on the achievement of third grade student in sciences in the educational district of Irbid. The findings of the study showed that there were statistical differences in grades of students due to group variable at the significant level of (0.05) in favor of the experimental group and there was statistical difference due to gender at the significant level of (0.05) in favor of females. However, the study did not examine think-pair-share instructional strategy on students' interest in Biology. In addition, the present study also compared think-pair-share along with learning activity package and lecture method on students' interest and academic achievement. Ogbaga and Osuafor (2022) conducted a study to investigate the effects of brainstorming and Think-pair-share instructional strategies on secondary school students' achievement in Biology in Awka Education Zone. Findings of the study revealed that there was significant differences in the mean academic achievement scores of students taught using brainstorming and think-pair-share strategies than those taught using conventional strategy. However, the study did not examine think-pair-share instructional strategy on students' interest in Biology. In addition, the present study also compared think-pair-share along with learning activity package and lecture method on students' interest and academic achievement. Uzoma and Okoli (2019) conducted a study to investigate the effect of think pair-share instructional strategy on secondary school students' academic achievement in Biology in Anambra East Local Government Area, Anambra State. Three research questions and three hypotheses guided the study. The study adopted a quasi-experimental design. The result showed that a significant difference exists in the mean academic achievement scores of students in Biology in favour of the experimental group. However, the study did not examine think-pair-share

instructional strategy on students' interest in Biology. In addition, the present study also compared think-pair-share along with learning activity package and lecture method on students' interest and academic achievement.

Biology as a science subject offered in the Senior Secondary School is a pre-requisite for pursuing a number of careers in sciences which include Medicine, Pharmacy, Botany, Nursing, Zoology among others, and the underscores the need for students to perform very well especially in the external examinations. Yet, there has been a consistent poor academic achievement of students and declining interest in the subject as observed by WAEC Chief Examiners' Report (2019). This poor achievement and students' weaknesses are more in the content area of Micro-organisms where students view as difficult (WAEC, 2019). Various efforts such as more time allocation to the teaching of biology, organizing extra mural lessons by various schools in biology, yet the problem of poor performance and lack of interest still persists. As such, this has become a major concern to Educators, Parents and other Stakeholders. This poor achievement has been attributed to the use of conventional method (Lecture method) and inadequate use of instructional resources. This situation creates the need to explore the efficacy of alternative teaching methods. It is on the bases of these observations that the researcher poses the question, to what extent are the Learning activity package and think-pair-share instructional strategies effective in improving students' achievement and interest in biology? Based on the foregoing the present study examined the effect of Learning activity package and Think-pair-share instructional strategies on students' achievement and interest in biology. This study investigate the effect of learning activity package and think-pair-share instructional strategies on secondary school Biology students' achievement and interest in Akwa Ibom state, Nigeria. Specifically the study was designed to:

1. Find out the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies, and conventional lecture method.
2. Ascertain the mean interest scores of Biology students taught using learning activity package, think-pair-share instructional strategies and conventional lecture method.

In order to guide the researcher in the study, the following research questions have been formulated:

1. What are the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies and conventional lecture method?
2. What are the mean interest scores of Biology students taught using learning activity package, think-pair-share instructional strategies and conventional lecture method?

To further guide the researcher in the conduct of this study, the following null hypotheses were tested at 0.05 level of significance.

H_{01} : There is no significant difference in the mean achievement scores of Biology students taught biology using learning activity package, think-pair-share instructional strategies, and conventional lecture method.

H_{02} : There is no significant difference in the mean interest scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies and conventional lecture method.

This study employed a pretest-posttest non-randomized quasi-experimental research design. The population comprises all the 7,416 senior secondary one (SS1) Biology students in coeducational public secondary schools in the 2023/2024 academic session from three senatorial Education Board of Akwa Ibom State, Nigeria. The study comprised 207 senior secondary one (SS1) Biology students (male and female). Simple random sampling and purposive sampling technique were used for the study. Simple random sampling technique was used to select three Local Education Committee (LEC) out of twenty five in Akwa Ibom State through balloting. Purposive sampling technique was used to sample one secondary school each from the sampled three secondary schools in each local education committee respectively using the following criteria; i. Schools that have qualified professional Biology graduates as subject teacher in SS1 classes. ii. Schools with functional Biology laboratory. iii. Schools that are currently passing candidates for the senior secondary school examinations SSCE.

iv. Government owned and coeducational secondary school.

Simple random sampling technique was again used to assign the three schools to experimental group 1, 2 and 3 as control group through balloting.

Biology Achievement Test (BAT) and Biology Interest Scale (BIS) were the instrument used for the study. The reliability coefficient of .79 and .84 were obtained using Cronbach Alpha (A) and Kuder-Richardson's 20 formula (KR-20) for both BIS and BAT respectively. The scores obtained were analyzed using descriptive statistics (mean and standard deviation) for research questions and Analysis of Covariance (ANCOVA) for testing the hypotheses at 0.05 level of significance.

RESULTS

Table 1: Mean and standard deviation of interest scores of Biology students taught using learning activity package, think-pair-share instructional strategy and conventional lecture method

Variables Learning Strategy	N	Pre-test Xsd	Post-test xsd	Interest Mean Gain
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LAP	73	26.21	4.58	46.93	9.33	20.72
TPS	65	26.73	5.59	40.20	6.47	13.47
Conventional method	69	26.26	5.21	34.95	4.76	8.69

Where N= Number of respondents, \bar{x} = mean, SD= Standard deviation, LAP= Learning activity package, TPS= think-pair-share.

Table 1 showed that Biology students taught with learning activity package strategy had an interest pre-test mean score of 26.21 with a standard deviation of 4.58 and an interest post-test mean score of 46.93 with a standard deviation of 9.33. This difference between the pre-test and post-test interest mean for the learning activity package group was 20.72 which is the interest mean gain. The students taught Biology with think-pair-share had interest pre-test and post-test mean score of 26.73 and 40.20 respectively with standard deviation of 5.59 and 6.47 respectively and mean gain of 13.47. For students taught with conventional method had interest pre-test mean score of 26.26 with a standard deviation of 5.21 and post-test mean score of 34.95 with a standard deviation of 4.76 and mean gain of 8.69. However, for each of the groups, the post-test interest means were greater than the pre-test interest means with the students taught Biology using learning activity package strategy having the highest interest mean gain. This result shows that learning activity package strategy increase students' interest more than think-pair-share strategy and conventional method. This also means that learning strategy may have some effects on students' interest in Biology. A corresponding hypothesis was formulated to further address the research question.

Table 2: Analysis of covariance (ANCOVA) of students' mean interest scores of Biology students taught Biology using learning activity package, think-pair-share strategy and conventional lecture method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5272.229 ^a	3	1757.410	34.451	.000
Intercept	9775.215	1	9775.215	191.624	.000
PRE-TEST	148.417	1	148.417	2.909	.090
Strategies*	5136.472	2	2568.236	50.345	.000
Error	10355.510	203	51.012		
TOTAL	360649.000	207			
Corrected Total	15627.739	206			

a. R Squared = .337 (Adjusted R Squared = .328).

The result in Table 2 shows that with respect to the interest mean scores of Biology students taught with learning activity package, think-pair-share instructional strategy and conventional lecture method, an F-ratio of 50.345 was obtained with associated exact probability value of .000. Since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_{01}) which stated that there is no significant difference in the mean interest scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method is rejected. Thus, inference drawn is that there was a significant difference in the mean interest scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method with those taught with learning activity package strategy having a higher interest mean gain than think-pair-share and conventional method. This shows that learning activity package strategy increased students' interest in Biology than think-pair-share and conventional method. However, to determine the effect and direction of the significant difference a multiple comparison analysis was conducted using Turkey Least Significant Difference (LSD) method. The data is presented on the Table 3 below.

Table 3: Post Hoc tests multiple comparison analysis for students' interest scores (\bar{x}) teaching strategies in Biology using LSD method

(i) Strategies	(j) Strategies	Mean difference (i-j)	Std. Error	Sig.	Remark
LAP	TPS	8.8074*	1.15608	.001	S
	Conventional	13.3585*	1.13822	.000	S
TPS	LAP	-8.8074*	1.15608	.001	S
	Conventional	4.5512*	1.17176	.000	S
Conventional	LAP	-13.3585*	1.13822	.000	S
	TIPS	-4.5512*	1.17176	.000	S

Where; LAP= learning activity package, TPS= think-pair-share instructional strategies and conventional lecture method, S= Significant and *= the mean difference is significant at 0.05 levels.

The results in Table 3 shows that the mean difference between the LAP group and TPS group (8.8074) was lower the mean difference between the LAP and control group (13.3585). This showed the difference in effect of three approaches in improving students' interest in Biology with LAP showing the highest effect followed by the TPS and then the conventional method. Since the LAP improves students' interest in Biology than TPS and the conventional method, the null hypothesis is rejected. Therefore, the alternative hypothesis is hereby accepted, that there is significant difference in the mean interest scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method.

Table 4: Mean and standard deviation of mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies and conventional lecture method

Variables Learning Strategy	N	Pre-test xsd	Post-test xsd	Interest	Mean Gain	
LAP	73	39.75	7.73	67.36	8.71	27.61
TPS	65	41.43	5.23	62.83	6.77	21.4
Conventional method	69	40.28	5.47	56.56	7.56	16.28

Where N= Number of respondents, \bar{x} = mean, SD= Standard deviation, LAP= Learning activity package, TPS= think-pair-share.

Table 4 showed that Biology students taught with learning activity package strategy had achievement pre-test mean score of 39.75 with a standard deviation of 7.73 and achievement post-test mean score of 67.36 with a standard deviation of 8.71. The difference between the pre-test and post-test achievement mean score for the learning activity package group was 27.61 which is the achievement mean gain. The students taught Biology with think-pair-share had achievement pre-test and post-test mean score of 41.43 and 62.83 respectively with standard deviation of 5.23 and 6.77 respectively and mean gain of 21.4. For students taught with conventional method had achievement pre-test mean score of 40.28 with a standard deviation of 5.47 and post-test mean score of 56.56 with a standard deviation of 7.56 and mean gain of 16.28. However, for each of the groups, the post-test interest means were greater than the pre-test interest means with the students taught Biology using learning activity package strategy having the highest achievement mean gain. This result shows that learning activity package strategy increase students' achievement more than think-pair-share strategy and conventional method. This also means that learning strategy may have some effects on students' achievement in Biology. A corresponding hypothesis was formulated to further address the research question.

Table 5: Analysis of covariance (ANCOVA) of students' mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share strategy and conventional lecture method

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	4500.765 ^a	3	1500.255	25.444	.000
Intercept	14053.801	1	14053.801	238.381	.000
PRE-TEST	337.226	1	337.226	5.720	.018
Strategies*	4229.288	2	2114.544	35.869	.000
Error	11967.883	203	58.955		
TOTAL	8210050.000	207			
Corrected Total	16468	206			

a. R Squared = .273 (Adjusted R Squared = .263).

The result in Table 5 shows that with respect to the mean achievement scores of Biology students taught with learning activity package, think-pair-share instructional strategy and conventional lecture method, an F-ratio of 35.86 was obtained with associated exact probability value of .000, since the associated probability (.000) was less than 0.05 set as level of significance, the null hypothesis (H_{05}) which stated that there is no significant difference in the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method is rejected. Thus, inference drawn is that there was a significant difference in the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies and conventional lecture method with those taught with learning activity package strategy having a higher achievement mean gain than think-pair-share and conventional method. This shows that learning activity package strategy increased students' achievement in Biology than think-pair-share and conventional method. However, to determine the effect and direction of the significant difference a multiple comparison analysis was conducted using Turkey Least Significant Difference (LSD) method. The data is presented on the Table 6 below.

Table 6: Post Hoc tests multiple comparison analysis for students' mean achievement scores (x) teaching strategies in Biology using LSD method

(i) Strategies	(j) Strategies	Mean difference (i-j)	Std. Error	Sig.	Remark
LAP	TPS	4.5391*	1.32449	.001	S
	Conventional	10.8046*	1.30402	.000	S
TPS	LAP	-4.5391*	1.32449	.001	S
	Conventional	6.2656*	1.34245	.000	S
Conventional	LAP	-10.8046*	1.30402	.000	S
	TIPS	-6.2656*	1.34245	.000	S

Where; LAP= learning activity package, TIPS= think-pair-share instructional strategies and conventional lecture method, S= Significant and *= the mean difference is significant at 0.05 levels

The results in Table 6 shows that the mean difference between the LAP group and TPS group (4.5391) was lower the mean difference between the LAP and conventional group (10.8046). This showed the difference in effect of three approaches in improving students' achievement in Biology with LAP showing the highest effect followed by the TPS and then the conventional method. Since the LAP improves students' achievement in Biology than TPS and the conventional method, the null hypothesis is rejected. Therefore, the alternative hypothesis is hereby established that there is significant difference in the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategies and conventional method.

CONCLUSION AND RECOMMENDATIONS

The study investigated the effect of learning activity package and think-pair-share instructional strategies on secondary school Biology students' interest and achievement in Biology in Akwa Ibom State, Nigeria. Based on the findings of this study, the following conclusions are made: There was a significant difference in the mean interest scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method with those taught with learning activity package strategy having a higher interest mean gain than think-pair-share and conventional method. There was a significant difference in the mean achievement scores of Biology students taught Biology using learning activity package, think-pair-share instructional strategy and conventional lecture method with those taught with learning activity package strategy having a higher achievement mean gain than think-pair-share and conventional method. Based on the finding,

1. It was recommended that Biology teachers in Akwa Ibom State secondary schools should adopt learning activity package (LAP) strategy in exposing the students to biological concepts than the think-pair-share and conventional method since the LAP enhances achievement and interest of the student.
2. Biology teachers should be trained and retrained on the job to adopt the combined use of learning activity package and think-pair-share strategy in teaching and learning of Biology in the classroom.
3. Biology teachers should incorporate innovative instructional strategies, like learning activity package teaching strategy into their conventional teaching method to blend teaching and learning.

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