

Impact of Learning Together Strategy on Anxiety and Performance in Ecology among Secondary School Slow Learners, Kano State, Nigeria

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ABSTRACT

*This study investigated the impact of Learning Together strategy on anxiety, and performance among secondary schools' biology slow learners in Kano State Nigeria. The study adopted a pre-test, post-test quasi-experimental control group design. The population consisted of 5185 SS2 biology students made up of 3392 males and 1793 females. Stratified random sampling technique was used to select the sample due to gender difference in senior secondary schools in Kano state. Four schools were randomly selected using balloting method, which involved hand picking from the container, two were females' schools and two were males' schools. One hundred and twenty-three (123) identified slow learners were purposively selected from the four sampled schools. A total of 62 students were in the experimental group and taught using enriched cooperative learning strategy while 61 students were in the control group taught using lecture method. The two groups were taught ecology concepts for six weeks. Two instruments used are; Ecology Performance Test (EPT) with reliability coefficient of $r = 0.98$ and Biology Students Anxiety Questionnaire (BSATQ) with reliability coefficient of $r = 0.87$. Four null hypotheses were formulated to guide the researcher. The hypotheses were tested using *t*-test and *U*-test statistics at $P \leq 0.05$ level of significance. The result of the analysis shows a significance difference exist in the first two hypotheses while it shows that, there is no significance difference in the last two hypotheses. The researcher concluded that, Learning Together strategy has significant effect on anxiety, and performance of slow learners in ecology concept among secondary school students in Kano State. The researcher recommended that biology teachers in secondary school should be using Learning Together strategy.*

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INTRODUCTION

Biology is one of the core science subjects taught at the senior secondary school level, which requires a pass at credit level in order to qualify for admission into tertiary institutions to pursue science based courses. According to Michael (2014) the term biology is the coined from two Greek word, bios meaning life and logos meaning to study, hence biology can simply be

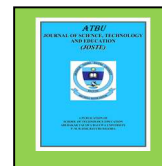
defined as the study of life. Biology is basically grouped in two main branches; botany and zoology. Botany is the study of plant, while zoology is the study of animals. Biology is a discipline which focuses itself with the study of life of living organism, their structure, function, growth, evolution among others. Some of the biology concepts taught at Senior Secondary School level include cells biology, living and non-living things,

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reproduction digestive system, hormones, sense organs, ecology, evolution, genetics among others (FRN, 2013). However, ecology is one of the biology concepts that link to environment and direct influence on human social life.

Ecology is a Greek word 'oikis' means home, logus means study, so it literally means as the scientific study of the interaction between organism and their environment. Scientifically, Ecology is the study of living organism in relationship with his environment and some of the concepts are: Ecosystem, Biotic factors, a biotic factor (physical factors), Population, species, biotic community, Ecological Niche and Succession. However, for effective biology teaching, the use of method/strategy which would make the use of the environment would achieve much and bring home the actual meaning of the concepts. Aina (2011) identified variety of methods with which biology can be taught which include lecture, enquiry, guided discovery, field trips, and cooperative methods among others. Biology concepts can sometimes be difficult particularly when describing ideas that are abstract in nature which cannot be fully comprehend and understood by the students for the first time (WAEC, 2015). For effective teaching and learning to take place an activities based strategy need to be introduce such as cooperative learning strategy.

Cooperative learning is one of the means of active learning might serve as an increase learning effectiveness and providing students with skills of collaborating, cooperating, sharing and socializing. Salavin (2011) reveal cooperative learning as instructional method in which teachers organised students into small group, which then work together to help one another learn academic content. Cooperative Learning Strategy refers to instructional method which teachers organized students into small group who then work to help one another learn academic content (Johnson, Johnson & Smith, 2014). It is a mode of learning in which Students of different levels of deferent ability level work together in small groups to achieve a purpose. In a cooperative setting, students work together to

attain group goals that cannot be obtained by working individually. Cooperative Learning Strategy has several models which has been used to improve students' anxiety, and performance in difference subject such as Learning-Together Model.

Learning-Together Model is one of the cooperative learning techniques which is based on group dynamics and social interaction which was developed by Johnson and Johnson at the University of Minnesota. It is the learning strategy in which students work as a team in small groups while they share ideas and experience in the process (Johnson & Johnson 1990). Learning-Together Model is a process in which students work as in four or five heterogeneous or homogenous group on a group assignment sheet. Learning-Together is considered as an efficient technique to convert students into active learners in classrooms and it makes teaching and learning more satisfactory, momentous, enjoyable and effective (Gupta & Pasrija, 2012). Learning-Together Model constitutes a paradigm shift in the area of learning. Sani (2017) on the other hand supports the claim that, students of small groups are allowed to work together, assist each other, and the conclusion reached are generally adopted by the group members. Learning-together has been proven to be effective for all types of students, including academically gifted and mainstream student because it promotes learning and foster respect and friendships among diverse groups of students (Sahin, 2010). Learning-together is part of a group learning techniques where students interact with each other to acquire and practise the elements of a subject matter and to meet common learning goals which is different from lecture method were the students are just passive listener.

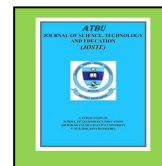
Lecture method which is predominantly used in senior secondary schools in Nigeria contributes to the poor academic performance in senior secondary school biology students in Nigeria (Ezenwoso, 2013). Lecture method is a teaching strategy which involved verbal presentation where the teacher delivers the lesson to the students with little or no active participation

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by the students. It is a teacher centered approach which involved one- way form of communication from the teacher to the students. This is why it is referred as didactic approach because it involved verbal presentation of concepts, where the teacher present, spoken and discourse on a particular subject while the students remain passive listeners and taking down note. Lecture method of teaching emphasize "Talk and Chalk" in the teaching of science subjects, biology inclusive. More than 80% of the scientific information and principles are delivered as lecture. Hence the teaching of ecology is face with the dilemma of either using simplified or more complex materials. Therefore, teaching certain ecology concepts require basic knowledge about the species involved and their natural environment. Usman (2010) observed that lecture method encourages rote learning without proper understanding, thereby resulting in poor performance. However, the use of activity based strategies such as learning-together strategy may increase the performance of students' and reduce their anxiety level particularly slow learners.

Anxiety is another psychological factor that students most at times developed when teachers used unsuitable and unfavourable teaching strategy. Anxiety is the common psychological problem facing school students' particularly slow learners. The feelings of anxiety can interfere with daily activities such as job performance, school work, and relationships. Yusiph, (2016) defined anxiety as a future oriented mood or feelings characterized by negative effect accompanied by self-focused, psychological and self-preoccupation within the controllability of future threat or potentially negative situation. It is regard as a general term for several disorders that can course fear apprehension and worry. It is human reaction to any unknown situation and pervasive problems with far reaching educational outcomes for any student (Nwokolo & Uche 2017). The occurrence of anxiety in an individual is determined by the interactions prone to anxiety and the amount of stress in the situation. Anxiety has been linked with negative consequences on student's social, emotional development,

academic failure and long-term effects on psychological functioning in adulthood, such as anxious feeling, tense, scared, worried, and fearful (Walsh, Deb & Chatterjee 2017). Negative consequences are influenced by decreased abilities in thinking, listening and responding to questions. It is a feeling that male and female students might have especially in a school situation where performance really count. Most of our secondary schools are co-educational comprises male and female students.

Empirically the review some previous works of other researchers such as the work of Bukunola and Idowu (2012) examined the effect of Cooperative Learning on Nigerian Junior Secondary School students' academic achievement in Basic Science Ogun State, Nigeria. The study adopted a quasi-experimental design. With population of 2043 junior secondary school students was used and a sample of 120. Descriptive statistics, t-test and Analysis of Covariance (ANCOVA) were used to analyze the data. The result of the findings showed that there is significant difference in achievement in favors of experiment group.

Odoh, (2013) determined the effect of Cooperative Learning Strategy on students' achievements among senior secondary chemistry students in three Education Zone in Benue State, Nigeria. The population of the study is 3654 chemistry students and a sample of 330 SS2 chemistry students. Pre-test post-test quasi-experimental control group design was used. t-test statistical tool was used to test the null hypotheses at $P \leq 0.05$ significant level. One of the finding showed that experimental group achieved higher than the of control group.

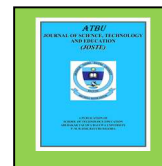
Molla and Muchi (2018) studied the impact of Cooperative Learning Approaches on students' academic achievement and laboratory proficiency in biology among Secondary Schools in Farta District, Northwest Ethiopia. The population of the study is 3934 and the sample size is 369 students. Quasi-experimental control group interrupted time series design was used. Multivariate Analysis (two-way ANOVA) was used to analyze the data. The findings showed that

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there was significant difference in the average test scores of academic achievement of the students exposed to Learning-Together Model and those taught with lecture method which is in favour of experimental group.

Kambuga (2016) investigated the Causes and Effects of Anxiety on academic Performance among Secondary School Biology Students in Tanzania. The population of the study is 2157 and a Simple size of 92 students was used. The study utilized a survey research design and Biology questionnaire was used to collect data from two public secondary schools in Dodoma urban. The data collected through questionnaires were analyzed using descriptive analysis, multiple-responses and covariates (chi-square). The findings indicate that a considerable number of students were affected by anxiety leading to poor performance.

From the review, the researchers observed that, the gender differences in anxiety and performance are occurred as result of so many factors such as instructional strategy and many more. To overcome this problem, the researcher investigated the impact of learning together strategy strategies on anxiety and performance in ecology among secondary school in Kano. To achieve this the following hypotheses were formulated as follow:

Null Hypotheses

The following null hypothesis was raised to be tested at $p \leq 0.05$ level of significance

1. There is no significant difference between the performance of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods
2. There is no significant difference between the anxiety level of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods.
3. There is no significant difference between the performance of male and female slow learners taught ecology concepts using Learning Together strategy.
4. There is no significant difference between the anxiety level of male and female slow

learners taught ecology concepts using Learning Together strategy.

METHODOLOGY

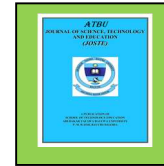
The design adapted for this study is quasi- experimental control groups design as recommended by Kerlinger (1973). Two groups were considered for this study. The two groups were pre-tested with (EPT) in order to determine the equivalence of students' ability level of the two groups. The Population of the study comprises the entire public Senior Secondary Schools, (SSII) students in Dawakin Kudu Education Zone, Kano State. There are 36 senior secondary schools in Dawakin Kudu Education Zone, which consist of single sex secondary schools. Records of enrolment showed that, 5185 students as the tagged population that comprised 3392 boys and 1793 girls. The sample size of 123 students were used which is in line with the central limit theory that recommends minimum of 30 samples as variable for the experimental research (Tukman 1975). Thus, 123 samples were considered appropriate for the research study as pointed out by Sambo, (2008). Two instruments were used namely Biology Students Anxiety Questionnaire (BSAQ) and Ecology Performance Test (EPT), the two instruments were validated by expert in science education and the reliability of the two instruments were obtain to be 0.87 and 0.92 using crombach- α and Pearson Product Moment Correlation. A Treatment was given to the experimental group by exposing them to learning together enriched with outdoor laboratory strategies for six weeks and control groups was taught ecology concepts with lecture method only for same numbers of weeks. At the end of six weeks' treatment a post-test was administered to both groups (experimented and control) using BSAQ and EPT. The scripts were collected and mark by the researcher and recorded it tables for data analysis. The data were analysed using t-test and U-test statistics. The result of the analyses is presented as follows.

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Ho₁: There is no significant difference between the performance of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods

To test the hypothesis one, independent t-test was used and the summary of the analysis is presented in Table 1

Table1: Independent Samples t-test Analysis of Mean Performance Scores between Experimental and Control Groups

Group	N	Mean	Std. D	Df	t _{cal}	P-value	Decision
Experimental	62	23.63	4.39	120	15.78	0.00	Significant
Control	60	12.33	3.45				

Significant at p<0.05 level

Table 1 present the summary of t-test analysis with t_{cal} of 15.78 and P-value of 0.00 at df. of 120. This shows that, the P-value of 0.00 is less than the α -value of 0.05 level of significance. Based on this evidence, the null hypothesis is rejected. Therefore, there is significant difference between the performance of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods. This shows that, the treatment given to the

experimental group has significance effect on the slow learners' performance in ecology concept.

Ho₂: There is no significant difference between the anxiety level of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods.

To test the null hypothesis three, a Mann-Whitney U-test statistic was used. The summary of the analysis is presented in Table 2

Table 2: Summary of Mann-Whitney U-test Analysis of Post-test Scores for Students' Anxiety in the Experimental and Control Group

Groups	N	Mean Rank	Sum of Ranks	df	U-test	p-value	Decision
Experimental	62	59.14	3666.50	121	1713.50	0.03	Rejected
Control	61	64.91	3959.50				
Total	123						

Not Significant at P> 0.05 level

Table 2 present the summary of Mann-Whitney U-test analysis of experimental and control groups with U-test value of 1713.50 and p-value of 0.03 at df. of 121. This shows that, the p-value of 0.03 is less than the α -value of 0.05 level of significance. Based on this evidence the null hypothesis is rejected. Therefore, there is significant difference between the anxiety level of slow learners in ecology taught using Learning Together strategy and those taught using lecture methods. This shows that, the anxiety level of the experimental group is smaller than that of the

control group as a result of the treatment given to the experimental group Learning Together strategy. Therefore, Learning Together strategy is capable of reducing the anxiety level of students in ecology concept.

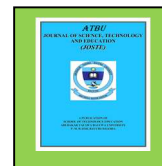
Ho₃: There is no significant difference between the performance of male and female slow learners taught ecology concepts using Learning Together strategy.

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To test the null hypothesis four, an independent t-test statistic was used. The summary of the analysis is presented in Table 3

Table 3: Independent Samples t-test Analysis of Mean Performance Scores between Male and Female Slow Learners in the Experimental Group

Group	N	Mean	SD	df	t	P-value	Decision
Male	32	24.13	4.57	60	0.92	0.36	Retain
Female	30	23.10	4.20				

Not Significant at $p > 0.05$

Table 3 revealed the summary of t-test analysis of male and female students in the experimental group with $t(60) = 0.92$, $p = 0.36$ at df. of 121. This shows that, the p-value of 0.36 is greater than the α -value of 0.05 level of significance. Based on this evidence the null hypothesis is retain. This indicated that, there is no significant difference in the performance mean scores of male and female slow learners in the experimental group. This shows that, the strategy (Learning Together strategy) is gender friendly. This implies that teaching ecology concept using Learning Together strategy improved the

academic performance of both male and female slow learners.

Ho4: There is no significant difference between the anxiety level of male and female slow learners taught ecology concepts using Learning Together strategy.

To test the null hypothesis six, a Mann-Whitney U-test statistic was used. The summary of the analysis is presented in Table 4

Table 4: Summary of Mann-Whitney U-test Analysis of Post-test Scores for Male and Female Students' Anxiety in the Experimental Group

Gender	N	Mean Rank	Sum of Ranks	df	U-test	p-value	Decision
Male	32	30.20	966.50	60	438.50	0.56	Not Sig
Female	30	32.88	986.50				
Total	62						

Not Significant at $P > 0.05$ level

Table 4 showed the summary of Mann-Whitney test analysis of male and female students in the experimental group with $U(60) = 438.50$, $p = 0.56$ at df. of 60. This shows that, the p-value of 0.56 is greater than the α -value of 0.05 level of significance. Based on this evidence the null hypothesis is retain. This implies that there is no significant difference in the anxiety level of male and female slow learners after been taught ecology concepts using Learning Together strategy. Therefore, the null hypothesis which

stated that there is no significant difference between the anxiety level of male and female slow learners taught ecology concepts using Learning Together strategy retained. By implication, teaching biology using Learning Together strategy had same effect on male and female students' anxiety towards ecology concepts of biology.

DISCUSSION OF MAJOR FINDINGS

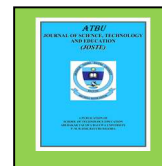
The result of Table 1 revealed that, there was significant difference in the performance

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mean scores of slow learners taught ecology concepts using Learning Together strategy and those taught using lecture methods in favour of experimental group. The finding of this study is in agreement with the finding of Odoh, (2013) whose findings showed that, the experimental that taught chemistry concept using Cooperative Learning Strategy achieved higher than those of control group. In addition, Molla and Muchi (2018) whose finding shows that, there is significant difference in the average test scores of academic achievement of the students exposed to Learning-Together Model and those taught with lecture method which is in favor of experimental group.

The analysis of Table 2 revealed that, there is significant difference in the anxiety level of slow learners after been taught ecology concepts using Learning Together strategy and those taught using lecture methods in favour of experimental group. The finding of this result is in agreement with the finding of Benjamin (2016) in his study found that, there is significant difference in student anxiety levels regarding the use of clickers among the three units in biology department. However, the finding is contrary with Kambuga (2016) who found that, there is no significant difference in student anxiety levels of both experimental and control group.

The finding of Table 3 revealed that, there was no significance difference between the mean scores of male and female slow learners after been taught ecology concepts using Learning Together strategy in favour of male students. The finding of this result is in agreement with finding of Yusuf and Afolabi (2010) who's reported that, gender had no effect on academic performance of students in computer-assisted cooperative learning. However, Kolawole (2013) found that boys performed better than girls in both cooperative and competitive learning strategies when he conducted a research on the effects of competitive and cooperative learning strategies on Nigerian students' academic performance in mathematics

The result of Table 4 revealed that, there is no significance difference between the anxiety mean rank of male and female slow

learners taught ecology concepts using Learning Together strategy. The finding of this result is in accordance with finding of Kambuga (2016) who reached to a general conclusion that, both male and female anxiety level were improved as well as the students' academic performance. However, this finding differed with the finding of Gupta and Ahuja, (2014) and Kolawole (2013) who revealed that, male anxiety level reduced than girls after being exposed to experimental treatment.

CONCLUSION

Based on the findings obtained from this study, it was concluded that, Learning Together strategy is effective in improving slow learners' academic performances, reducing the anxiety level of slow learners, bridging the gap between the anxiety level of male and female slow learners and in bridging the gap between the performance of male and female slow learners in ecology concept.

RECOMMENDATIONS

Based on the findings of this study, the researcher recommended that:

1. The teachers of secondary school should be using Learning Together Strategy to teach ecology in order to reduce the slow-learners' anxiety level and improve slow-learners' students' performance in ecology.
2. Teachers of secondary school in Kano State should be using Learning Together Strategy to teach ecology in order to reduce the male and female slow-learners' anxiety level and improve male and female slow-learners' students' performance in ecology.

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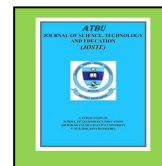
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