EFFECT OF COOPERATIVE TEACHING STRATEGY ON RETENTION AMONG SECONDARY SCHOOL AGRICULTURAL SCIENCE STUDENTS IN KATSINA STATE, NIGERIA

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Abstract

This study investigated the effect of cooperative teaching strategy on academic performance among Secondary Schools Agricultural Science Students in Katsina State, Nigeria. The specific objectives for the study were to find out the difference on retention ability between the students exposed to cooperative teaching strategy and those taught using conventional teaching method Two research questions and two research hypotheses were formulated and tested at 0.05 level of significance for this study. The study was quasi-experimental with pre-test and post-test design. Agricultural Science Retention Test (ASRT) was developed and administered to 95 students from a population of 2,647. The instrument was validated and the reliability coefficient of ASRT was established at r=0.805. Experimental group was taught using cooperative teaching strategy, while control group was taught using conventional teaching method. Research questions were answered descriptively using mean and standard deviations, while null hypotheses were tested at p=0.05 level of significance. Results revealed that the cooperative teaching strategy has significant effect on student's retention ability in Agricultural science among senior secondary schools in Katsina state. From the findings of the study, it was recommended that teachers should be using cooperative teaching strategy as a pedagogical means of helping students toward their retention ability since cooperative teaching have a great effect on students' retention ability.

Keywords: Effect, Cooperative Teaching Strategy, Retention.

Introduction

Education is the process of imparting and acquiring knowledge through teaching and learning, especially at a school or a similar institution. Education is very important for the success of an individual in life. It provides learners with the requisite knowledge, skills and competencies that prepare them to become self-reliant; through education the society grows and develops by bringing about desired societal changes. Therefore as spelt out in the National Policy on Education, Nigeria's educational objectives have been geared towards self-realization, better human relations, individual and national efficiency, effective citizenship, national consciousness and national unity as well as social, cultural, economic, political, scientific and technological progress. Indeed, changes are most often affected through the educational system of the nation involving various reforms, programs and curriculum development. Education is generally recognized as the bedrock of individual and national development.

Agricultural Science is one of a number of precise subjects taught in the Nigerian secondary schools. It is important to both students and modern civilization and great for reason that it wounds transversely all compasses of human effort as can be understood in its simplest form by learner. However, the teaching of Agricultural Science continues to suffer some challenges.

Poor Retention of secondary school Agricultural Science students raise doubts on the efficiency of the

teaching methods utilized by teachers in schools. It has been found that teachers continue to use traditional method instead of activity oriented strategies at the expense of meaningful learning on the part of the learners.

Despite the prime position Agricultural Science occupies in our educational system and effort made by the researchers to enhance retention, students' retention in Agricultural Science is still low. Some of the reasons identified for this failure include; inappropriate use of instructional approaches in teaching Agricultural Science, lack of mastery by some teachers, in adequate instructional materials, laboratory inadequacy, non-coverage of the syllabus, examination malpractice, class size, time constraint on conducting practical among others. Therefore, poor instructional approach is among the major contributor to poor achievement in Agricultural Science. Based on the above issues it has become necessary to device a means of addressing poor students' retention in Agricultural Science.

Nnaka (in Abdullahi 2018), suggest a shift and going beyond the conventional approaches of teaching science, technology and mathematics, (STM) for better students retention STM education in our primary and secondary schools. Therefore, the shifting and going beyond the conventional teaching approaches, he also suggested that it implies adopting the innovative approaches to teaching and learning STM. Effective teaching is very crucial to learning, the products of teaching such as knowledge, skill attitudes and values acquisition are much dependent on the teacher's teaching effectiveness. Learning can be enhanced through the use of appropriate strategy adopted in learning situations. In Agricultural Science education, in recent years, the increasing awareness of the important of learner-centeredness in teaching learning process has generated a lot of attention in relation to understanding of the subject matter and retention.

The use of effective teaching approaches plays a significant role toward helping students' retention of the subject matter. Retention is the ability of the students to recall information from short term and long-term memory for the purpose of attaining better Retention.

As a result of poor retention among secondary schools Agricultural Science students, the researcher intended to explore a teaching strategy that could bring a change and improve the retention among students in Agricultural Science.

Statement of the Problem

The teaching of Agricultural Science in Nigeria focused on the use of conventional lecture method, which always makes teachers to dominate the class while the leaners remain passive. It discourages open questions, inquiry and active participation of students, and these makes Agricultural Science classes difficult and boring (Yunusa, 2019). Agricultural Science as a discipline is not a unified subject of study, dichotomy lies within its scope. Some of its aspect often to be abstract, which makes some students of Senior Secondary Schools to perform poor in Agricultural Science when conventional teaching method was used.

Students' poor retention in Agricultural Science were not seen encouraging. Many students register for Agricultural Science but unfortunately only few pass at Credit level as reported by West African Examination Council (WAEC 2022, 2023 & 2024).

Although there were several studies carried out in order to alleviate the poor students, retention in Agricultural Science but still the poor retention still persist. In line with persistent in poor students retention which may be due to ineffective use of teaching method, this study sought to find out if the use of cooperative teaching strategy will enhance Agricultural Science students' academic performance and retention ability.

Hence, this research investigated the effect of cooperative teaching strategy on retention among Secondary School Agricultural science students' in Katsina State, Nigeria.

Objectives of the Study

The general objective of this study was to find out the effect of cooperative teaching strategy on retention among secondary school agricultural science students in Katsina State, Nigeria.

Specifically, the study was set to find out:

1. The difference on retention ability of the students exposed to cooperative teaching strategy and those taught using conventional teaching method in Agricultural Science among senior secondary schools in Katsina state.

2. The effect of cooperative teaching strategy on student retention ability in Agricultural Science among males and females Senior Secondary Schools in Katsina state.

Research Questions

This research work addresses the following research questions:

1. What is the difference on retention ability of the students exposed to cooperative teaching strategy and those taught using conventional teaching method in Agricultural Science among senior secondary schools in Katsina state?

2. What is the difference in retention ability among male and female students taught Agricultural Science using cooperative teaching strategy among senior secondary school in Katsina state?

Hypotheses

The following null hypotheses were formulated to guide the study, and tested at 0.05 level of significance. These hypotheses were used in answering the research questions raised above.

$H0_1$: There is no significant difference on retention ability of the students exposed to cooperative teaching strategy and those taught using conventional teaching method in Agricultural Science among senior secondary schools in Katsina state.

$H0_2$ There is no significant difference in retention ability of male and female students taught using cooperative teaching strategy in Agricultural Science among senior secondary schools in Katsina State.

Methodology

The design of this research study was quasi-experimental research design. According to Kothari (2010) noted that, quasi experimental design was essential and qualified to determine the cause and effect of any given treatment to the sampled respondents. This design is appropriate because the intact classes and the rigid school timetable would not allow the researcher to fully randomize the subjects. However, the research subjects were successfully assigned to experimental and control groups based on their intact classes. This research, however, is an experiment because its aim is to determine the effect of the independent variable on the dependent variable under study. In this regard, the cooperative teaching strategy is the independent variable, while students' retention was considered as the dependent variables.

Firstly, a pre-test was administered to both experimental and control groups; this will measure the knowledge of Agricultural Science and the equivalent ability of both experimental and control groups before the treatment. The experimental group was exposed to treatment, in which they were taught using cooperative teaching strategy while the control group received the same instruction as the experimental group using conventional method of teaching and Post-test was administered at the end of the treatment.

The population of this research work covered all public senior secondary schools offering Agricultural Science in Dutsin-ma Educational Zone. There are eighteen (18) senior secondary schools with population of two thousand six hundred and forty seven (2647) Senior Secondary School (SS II) students offering Agricultural Science in the study area. The characteristic of this population involved

male and female at adolescent stage of average of 17 years. The sample size of ninety five (95) students were selected from the samples population of two thousand six hundred and forty seven (2647) students. Subjects were randomly assigned to experimental and control groups prior to the administration of treatment. Two intact classes (one from experimental group and one from control group) were used for the study. However, before selecting the sample, simple random sampling technique was used in selecting schools that was formed the sample. As a result of this exercise, GPSS Dutsin-ma and GSSS Birchi were sampled. The choice of 95 students as a sample of this study is in line with central limit theorem which recommended minimum of thirty sample size as noted by Tukman, (in Salisu 2015). This suggests that the minimum of 30 sample size for experimental research. The details of the samples are presented in table below:

Sampled Schools

s/n	Sample school	Nature	Size male	Female	Total	Code
1.	GPSS Dutsin-ma	Experimental	27	18	45	A
2.	GSSS Birchi	Control	30	20	50	B
Total			**57**	**38**	**95**	

Instrumentation

For the purpose of this study, one research instrument entitled, Agricultural Science Retention Test (ASRT) was used to measure the retention ability of the learners in the experimental and control groups. The instrument consisted of 30 items retention test using content on Agricultural Science ecological concepts. It was used in determining the retention of students in Agricultural Science prior and after treatment. The instrument was developed from (5) topics of ecological concepts namely, basic ecological concepts, ecological factor, eco system, food chain and food web and soil types and its effects. The distributions of Agricultural Science Retention Test (ASRT) items consisted of 30 objective test items each with four alternatives (A-D). Reliability coefficient of the instrument was established at 0.8051.

analysis of research hypotheses involved analysis using t-test independent sample at 0.05 level of significance using data of post-test academic retention scores of students in experimental and control groups.

Results

Analysis of Response to Research Questions

The two research questions were analyzed using descriptive statistics by considering mean and standard deviation as shown in the table below:

Research Question One: What is the difference on retention ability of the students exposed to cooperative teaching strategy and those taught using conventional teaching method in Agricultural Science among senior secondary schools in Katsina state?

The response to this research question was analyzed using the raw scores obtained on the retention ability of experimental group and control group, the scores were subjected to descriptive statistics using the SPSS package.

Table 1 Mean and Standard Deviation of Retention Ability of Experimental and Control Groups

Group	N	Mean	Std. Deviation	Mean diff

Cooperative Teaching Strategy	45	25.822	1.749	10.482
Conventional Teaching Method	50	15.340	3.000	

Table 1 shows the mean of cooperative teaching strategy which is 25. 822 and standard deviation of 7.748, while compared with the mean of conventional teaching method with the mean of 15.340 and standard deviation of 3.000 on student's retention ability, this implies that, cooperative teaching strategy has the higher retention ability.

Research Question Two: What is the difference in retention ability among male and female students taught Agricultural Science using cooperative teaching strategy among senior secondary school in Katsina state?

The response of this research question was analyzed by subjecting the raw scores obtained from the experimental group on retention ability to descriptive statistics using the SPSS package.

Table 2: Mean and Standard Deviation of Retention Ability of Male and Female Students in Experimental Group

Group	N	Mean	Std. Deviation	Mean diff
Male	27	26.07	1.859	0.630
Female	18	25.44	1.542	

Table 2 shows the mean and standard deviation of male and female students' retention ability in experimental group. From the result obtained, male students recorded a mean of 26. 07 and standard deviation of 1.859 while female students recorded a mean of 25.44 and standard deviation of 1.542. A mean difference of 0.630 was recorded.

Testing Null Hypotheses

T-test independent sample was used to analyzed the data obtained in order to test the hypotheses raised.

$H0_1$: There is no significant difference on retention ability of the students exposed to cooperative teaching strategy and those taught using conventional teaching method in Agricultural Science among senior secondary schools in Katsina state.

This hypothesis was tested using the data collected from the experimental and control groups on students' retention ability. t-test independent sample statistics was used in comparing their retention ability at 0.05 level of significance.

Table 3: t-test Analysis of Retention Ability of Experimental and Control Groups

Group	N	F	T	Df	P	Decision
Cooperative teaching	45	13.969	20.502	93	.000	Rejected

strategy	
Conventional Teaching Method	50

From table 3, the t-value obtained is 20.502, df is 93 and p-value of .000. Therefore, p-value is less than the alpha level which is 0.005. As such the null hypothesis which states that there is no significant impact of cooperative teaching strategy on student's retention ability in Agricultural Science among senior secondary schools in Katsina state is rejected. This signifies that cooperative teaching strategy has significant impact on students' retention ability. Therefore, cooperative teaching strategy improves' retention.

H0$_2$ There is no significant difference in retention ability between male and female students taught using cooperative teaching strategy in Agricultural Science among senior secondary schools in Katsina State.

This hypothesis was tested using the data collected from experimental group on students' retention ability due to gender difference. t-test independent sample statistics was used in computing the retention ability of male and female within the group at 0.05 level of significance.

Table 4: t-test Analysis of Retention Ability of Male and Female Students in Experimental Group

Gender	N	F	T	Df	P	Decision
Male	27					
		0.786	19.264	43	0.380	Accepted
Female	18					

From table, t-value obtained is 19.264, df is 43 and p-value of 0.380. The p-value is greater than 0.05 and the difference is not significant. The hypothesis was therefore, accepted, implying that there was no significant difference in retention ability between male and female students taught using cooperative teaching strategy in Agricultural Science among senior secondary schools in Katsina state, hence it is gender friendly.

Summary of Findings

The major findings of the study are:

1. The cooperative teaching strategy has significant impact on student's retention ability in compared with the conventional teaching among senior secondary schools in Katsina state (Refer to Table 3)
2. Cooperative teaching strategy has no significant gender effect in retention ability of students taught Agricultural science among senior secondary schools in Katsina state (Refer to Table

Discussion of the Findings

The main purpose of this study was to find out the effect of cooperative teaching strategy on retention among secondary schools Agricultural science students in Katsina state, Nigeria.

From Table 3 analysis it was discovered that there was significant impact of cooperative teaching strategy on students' retention ability in Agricultural science among senior secondary schools in Katsina state. From the result obtained, experimental group has a mean score of 25.822 and the mean of control group is 15.340 on their retention ability. This signifies that there is significant impact of

cooperative teaching strategy on students' retention ability. Therefore cooperative teaching strategy improves student's retention ability. This was in line with Abdullahi (2018) and Olarewaju (2015) studies which revealed that students taught using cooperative teaching are more retentive than their counter part taught using conventional teaching method. Therefore, cooperative teaching influences students' retention ability in Agricultural Science.

From Table 4. analysis it was discovered that there was no significant gender effect in retention ability between male and female students taught using cooperative teaching strategy in Agricultural science among senior secondary schools in Katsina state. From the result obtained, the mean of students' retention ability of male and female students exposed to cooperative teaching strategy is 26.07 and 25.44 respectively. This signifies that there is no significant difference in retention ability between male and female students exposed to cooperative teaching strategy. This was not in line with Abdullahi (2018) study and Olarewaju (2015) study findings. Therefore, the present study revealed that no difference exists between male and female students in retention ability when taught using cooperative teaching strategy.

Conclusion

The study examined the effect of cooperative teaching strategy on retention among secondary schools Agricultural Science students in Katsina State, Nigeria,

The study also revealed that retention of Agricultural Science concepts can be enhanced by the use of cooperative teaching strategy as the result show that there is significant effect of cooperative teaching strategy on students' compared with the conventional teaching. Therefore, cooperative teaching strategy improves retention. The study also discovered that, there was no significant difference in retention ability between male and female students taught using cooperative teaching strategy in Agricultural Science among senior Secondary School in Katsina State, hence it is gender friendly.

Recommendations

Based on the conclusions drawn the following recommendations were made:-

1. It is recommended that teachers should be using cooperative teaching strategy as a pedagogical means of helping students toward their retention ability since cooperative teaching have a great effect on students' retention ability.

2. Professional Associations like the Science Teachers Association of Nigeria (STAN) and (NTI) should popularize the effective use of cooperative teaching in teaching Agricultural Science concepts through seminars, work-shops, conferences and publications.

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