

EFFECTS OF CO-OPERATIVE LEARNING STRATEGY ON JUNIOR SECONDARY SCHOOL STUDENTS' ACHIEVEMENT IN BASIC TECHNOLOGY

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Abstract

In this study, the effect of Co-operative learning on student's achievement in Basic Technology was investigated. A quasi experimental design-specifically non-randomized pretest-posttest control group design was adopted. Two research questions and two research hypotheses guided the study. A sample of 110 JSS II students (60 males and 50 females) was selected from four schools using purposive random sampling technique. Basic Technology Achievement Test (BTAT) was used for data collection. The reliability co-efficient of the Basic technology achievement test was found using Kuder Richardson formula 20 (KR-20) to be 0.82. It was found that co-operative learning is more superior to lecture method in terms of teaching method. Students taught Basic Technology performed better than those taught with lecture method. In terms of gender, boys taught with co-operative learning scored higher than the girls taught with the same method. It was recommended that co-operative learning should be used in our classrooms and there should be regular workshops, and in-service training for teachers on the use of co-operative learning.

Introduction

Technology plays profound roles in the life of the individual and the nation. According to Aniodoh (2002), technology enables man as an individual to take rational decision, create a just society and understand his environment. It helps to improve an individual's life expectancy and provides him means of tackling problems of existence such as disease and hunger. Aniodoh also emphasized that national contributions of technology could be seen in the area of our modern health, automation, genetic engineering, gene cloning, agriculture, transportation, building and construction. Impacts of technology on individual and nation explain why most countries including Nigeria are making huge investment in the field of technology today.

In a study conducted by Ibe (2004) on how to combat shortage of science and technology teachers in Nigerian schools, it was concluded that poor staffing, teaching method adopted in giving instruction, nature of schools and inadequate provision of laboratory equipment in secondary schools are the chief causes of students' low performance in science and technology subject.

Lecture method is the practice of hearing the teacher or lecturer at the front of the class talking to the students and the students listening to the teacher. This is seen as one way of communication, since the teacher or lecturer is the only one speaking. It is only suitable for a large class or for introduction of a new topic by the teacher. It does not enhance achievement in technology (Cooper, Pamela & Molly, 2010).

Co-operative learning is an innovative teaching-learning strategy. Kagan (2001) defined co-operative learning as a successful teaching strategy in which small team (each with students of different level of ability), use a variety of learning activities to improve their understanding of a subject. Co-operative learning allows children to work collaboratively in small groups, it also gives them the opportunity to verbalize what they know and consider each others view point.

Fraser, Anderson & Weberg (2001) also defined co-operative learning as an instructional use of small groups that will allow students to work together to maximize their own and each others learning. In this method of learning, students are made to co-operate with group members, work as a team in a mix-ability classification. Robinson (2001) explained that there are different types of co-operative learning.

Mueck (2000), Kagan (2012) & Abonyi (2008) Gender is also one of the factors influencing student's performance/ achievement in Basic Technology as junior secondary schools levels. Anakwe (2006) found some items which account for gender performance. These include among others, unfair behaviours of teachers which retard female student's interest and participation, unequal access for male/female student's to participate in classroom discussion, higher achievement level set for boys than girls and female students being assisted often in practical, projects and other assignments even by some of their teachers.

It is therefore become expedient to explore the efficacy of co-operative learning method (using Basic Technology Students') to check if science learning outcome could be improved.

Research Question 1: What are the mean achievement scores of students taught basic technology using co-operative learning method of instruction and those taught using lecture method?

Research Question 2: What are the mean scores of girls and boys taught Basic Technology using co-operative learning method?

Research Hypotheses

Ho₁: There is no significance difference in the mean achievement scores of students taught Basic Technology using co-operative learning method and those taught using lecture method.

Ho₂: There is no significance difference in the mean scores of girls and boys taught Basic Technology using co-operative learning method.

Methodology

A quasi experimental design was used for the study. The study was carried out in Minna, Niger State. The population of the study comprised of all J.S.S. two students in Minna Niger State. J.S.S. two students were used for the study because the selected topics were mainly from J.S.S. two Basic Technology scheme of work. Basic Technology Achievement Test (BTAT) was the Instruments used for data collection. The reliability co-efficient of the BTAT was found using Kuder Richardson formula 20 (KR – 20) and was found to be 0.82. Mean and standard deviations was used to answer the two research questions. Analysis of Covariance ANCOVA was used for testing the stated hypotheses; the hypotheses were tested at 0.5 level of significance. The principal of the schools selected were contacted for permission to use their schools. The assisted teachers used for the experiment were trained on the use of the instructional guide. The first week was used to administer the pre-test for the assertion of the experimental and control groups. Five weeks was used for the treatment of the experimental group using cooperative instructional guide while the control group receives their treatment with the use of conventional instructional guide. The researcher monitored teachers used for the treatment of the experimental group through out the five weeks. The Basic Technology Achievement Test (ITAT) was then administered at the end of the treatment on sixth week which was post test.

Results and Discussion

Research Question One: What are the mean achievement scores of student taught Basic Technology using co-operative learning method and those taught using lecture method?

This research question was answered by mean scores and standard deviations. The analysis is shown in Table 1.

Table 1: Mean achievement pretest and post-test scores on basic technology and standard deviation of students in experimental and control groups

Students	Pretest		Posttest		Gain score
	Mean	SD	Mean	SD	
Experimental Group	13.53	3.64	19.14	3.55	5.61
Control Group	12.93	4.65	13.86	4.5	0.93

Table 1 shows that the students in the experimental group obtained mean scores of 13.53 in the pretest and 19.14 in the posttest with respective standard deviations of 3.64 and 3.55. The control group students obtained mean scores of 12.93 and 13.86 in the pretest and posttests respectively. Their respective standard deviations were 4.65 and 4.54. The table shows that the experimental group had a higher mean score, than the control group in the post- test.

Hypothesis One

There is no significance difference in the mean achievement scores of students taught Basic Technology using co-operative learning method and those taught using lecture method.

This research hypothesis was tested with one way analysis of covariance (ANCOVA). The computed results of students' achievement scores of the experimental and control groups are as shown in Table 2.

Table 2: One way analysis of covariance (ANCOVA) of students' achievement in basic technology for experimental and control groups

Source of Variation	Sum of squares	df	Mean squares	F-Cal	F-table	Dec
Covariance	269.9476	1	269.9476	1.24	3.89	NS
Main affect	917.0862	1	917.0862	4.22	3.89	S
Method	917.0862	1	917.0862	4.22	3.89	S
Explained	1208.8294	2	604.4147			
Residual	5150.4603	237	217.3190			
Total	6359.2897	239				

Table 2 shows that for covariate, the F-cal (1.24) was less than the F-table.(3.89) Hence, covariate is not significant. For the method of teaching, the F calculated (F cal) value of 4.22 is greater than the F-table value of 3.89. Hence, there is a significant difference between the mean achievement scores of students taught Basic technology using co-operative learning method and those taught Basic Technology using the lecture method.

Research Question Two: What are the mean scores of male and female students taught Basic Technology using co-operative learning method?

Research Question two was answered by computing mean and standard deviations of student's perception scores of boys and girls taught Basic Technology using co-operative learning method as shown in Table 3.

Table 3: Mean achievement scores and standard deviations of boys and girls taught basic technology using co-operative learning method

Sex	Pretest		Protest		Gain score
	Mean	SD	Mean	SD	
Boys	89.42	18.61	103.40	15.89	12.68
Girls	78.80	22.43	110.30	18.66	31.50

Table 3 shows that the boys in the experimental group obtained mean scores of 89.42 and 103.10 on the pretest and post-test respectively with a standard deviation of 18.61 and 15.89. The girls had mean scores of 78.80 and 110.30 respectively in the pretest and posttest scale with respect standard deviation of 22.43 and 18.66. The post scores revealed that the girls had higher scores than the boys in the same experimental group.

Research Hypothesis Two

There is no significant difference in the mean scores of girls and boys taught Basic Technology using co-operative learning method.

Hypothesis 2 was tested using one way ANCOVA at 0.05 level of significance. The results are shown in Table 4.

Table 4: One way ANCOVA of girls and boys scores in the experimental group

Source of Variation	Sum of square	Df	Mean Square	F-cal	F-Table	Dec
Covariate (Pretest)	221.4101	1	221.4101	1.99	3.89	NS
Main effect	223.6354	1	223.6354	2.01	3.89	NS
Sex	223.6354	1	223.6354	2.01	3.89	NS
Explained	447.2508	2				
Residual	26368.9518	227				
Total	26816.2026	229				

Table 4 shows that for the covariate, the F-calculated value of 1.99 is less than the F-table value of 3.89. Hence, covariate is not significant for sex; F-calculated value of 2.01 is less than F-table value of 3.89. So the null hypothesis is accepted. There is no significant difference between the mean scores of girls and boys taught Basic Technology using co-operative learning method.

Discussion of Results

The findings from Table 4 showed that the mean achievement scores of the students' taught with co-operative learning method was higher than the mean achievement scores of students taught with lecture method. The difference in scores was confirmed by the ANCOVA result to be significant so that null hypothesis 1 was rejected. This is in consonance with the view of Cooper and Mueck (2000), who claimed that co-operative learning method is superior in the classroom to most teaching method. Co-operative learning enhances elaborate thinking and more frequent giving and receiving explanations which has the potential to increase depth of understanding, quality of reasoning and higher rate of long term retention, equipping students with manipulative and creative skills required

for scientific growth. Since the findings of this study has proved co-operative learning to be effective it could therefore be used to stereotype lecture method that has dominated Nigerian classrooms. The effects of gender on students' performance using co-operative learning

Result indicated that the girls in the experimental group performed better than the boys using the same co-operative learning method, rejecting null hypothesis 2. This is contrary to the findings of Asumagha (2004) and Abonyi (2008). Their finding revealed that there was no significance difference in the attitude (performance) of male and female student towards basic technology. The ANCOVA result of gender influence on students' performance co-operative learning revealed the psychosocial differences in the perception of boys and girls on their environment. This is Inline with the finding of Agwagah in Imiko (2004) whose research revealed that female students scored higher than male counterparts in mathematics. The findings revealed that there is gender performance in Nigerian classroom. Nwosu (2003) was of the opinion that cognitive ability and type of exposure such as teaching methods may relate more '[strongly to the general achievement level of student's in basic technology.

Conclusion and Recommendations

It is a known fact that students' performance in Basic Technology is not encouraging at all. This may be attributed to the inappropriate instructional techniques being adopted by many Basic Technology Teachers. Therefore, with the finings, the instructional planners should introduce cooperative learning techniques that will ensure group work and enhance better academic achievement. The Basic Technology teachers should focus on activities that would foster cooperative learning.

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