



EFFECT OF COOPERATIVE LEARNING ON ACHIEVEMENT OF STUDENTS IN SCIENCE AT ELEMENTARY LEVEL

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Abstract: The investigator has tried to explore the effect of cooperative learning on Achievement of students in science at Elementary level in this paper. The hypothesis was that a significant difference existed between the mean post test scores for Science achievement of the experimental and control groups. Non –randomized pretest posttest control group design was chosen for experiment. It was conducted on fifty students as sample size from Balasore district of Odisha, of whom twenty-five students belonged to the experimental group and twenty-five students to the controls group. One instructional tool in the form of lesson planning in jigsaw cooperative strategy and measuring tool in the form of teacher made test were developed. The experimental group was taught through the Jigsaw cooperative learning method, while the controlled group has been taught in a traditional way. Finding of the study indicated that there exists significant difference achievement in science between experimental group and control group.

Keywords: Cooperative Learning, Academic achievement, Science

I. Introduction

The goal of education is not to increase the amount of knowledge but to create possibilities for child to invent and discover; and to create a man who are capable of doing new things (**Piaget**). In particular, the contribution of the constructivists to education is worth noting. Especially noteworthy is the constructivists' contribution to education. They changed an entirely new way of looking at education, viewing it as an active process in which students actively create knowledge in order to make sense of the world around them rather than just passively absorbing it. Cooperative

learning is one of the instructional strategies proposed by constructivists. Cooperative learning is a teaching method that helps students learn together in groups to maximize their learning with great interest and motivation. (Aziz and Hussain, 2010).

Cooperative learning is one of the instruction that involves students working in teams to accomplish a common goal under conditions that include the following elements (I) positive interdependent ,(II) individual accountability,(III) face to face interaction ,(IV) group processing ,(V) social skills(Johnson & Johnson,2010). Therefore, in order to improve results, it is important for teachers to be well equipped with all these teaching tools so that they can move on to the classrooms.

A teaching technique which is rapidly gaining popularity and momentum is cooperative learning. Cooperative learning principles include team building, communication skills, inclusiveness, and supportive interaction among the learners. Summarized in the words of Johnson and Johnson (1982), students "have to invest themselves in each other's learning if they want to be successful".

The world has changed dramatically in recent days. To become an effective student, it is crucial to communicate and cooperate effectively. The three R's of reading, writing and arithmetic are no longer adequate in schools. We need to focus on the four C's – critical thinking, creativity, collaboration and communication. Cooperative learning is a method of teaching and learning, where students team up in small groups for the purpose of achieving their academic objectives. Successful students need to cooperate effectively and work together on a task, share ideas and learn from each other in order to make this technique work.

II. Review of related literature

Mehta&Kulshrestha (2014) investigated on implementation of cooperative learning in science at secondary level. Research design has been used for one group of pre and post tests in this study, 40 students were selected through purposive sampling from ninth class of CBSE school .This study revealed that in the classroom of science, and students began to feel like they were working with a group and also increased their performance.

Mahmoud (2015) conducted a study on the The efficacy of the jigsaw strategy on achievement and learning motivation of the 7th primary grade students in the Islamic education the sample consisted of 53 female students: 26 students in the Experimental Group, and 27 students in the Control Group. The following statistical treatments were used: Arithmetic Means, Standard Deviations, ANCOVA, and Person Coefficient. There existed of a positive correlation between the achievement of the 7th primary grade students and their learning motivation.

Joshi and Bhatnagar (2015) conducted a study on effect of cooperative learning oriented teaching on the academic achievement of secondary level students. STAD strategy was used for intervention; quasi experimental study was used for research design. A total of 140 students from Class VIII at St. Mary's School, Binjor (U.P.), were chosen as participants for the study. Among them, 70 students were assigned to both the experimental and control groups. The study revealed that employing cooperative learning-focused teaching methods notably enhanced academic performance in chemistry.

Inuwa, Abdullah & Hassan (2017) conducted a study in an examination of the impact of cooperative learning on financial accounting achievement among secondary school students, a pre-test-post-test-control group design was employed. A total of 120 students were randomly selected from six schools to participate in the study. These students were evenly divided into two groups: one group experienced the experimental condition (cooperative learning approach), while the other underwent the control condition (conventional approach). Data collection utilized a Financial Accounting Achievement Test (FAAT). Initially, no statistically significant difference was observed between the achievement levels of students exposed to cooperative learning and those under the conventional approach during the pre-test stage. However, upon completion of the post-test stage, it was found that students who experienced cooperative learning exhibited significantly higher achievement levels compared to those exposed to the conventional approach.

III. Statement of the problem

The research problem was selected by the investigator as “*Effect of Cooperative Learning on Achievement of students in Science at Elementary level*”

IV. Objective of the study

To study the effect of cooperative learning on achievement in science of class V students.

To study the effect of cooperative learning on achievement in science of class V students with respect to gender.

V. Hypothesis of the study

H1 -There exists significant difference in science achievement between students of control group and experimental group.

H0-There exists no significant difference in science achievement between the boys and girls in post test experimental group.

VI. Delimitations of the study

The study was conducted in two elementary schools in Sadar Block of Balasore district, Odisha. The study was limited to the students of class 5th. The study was limited to topic of class 5th science. Only Jigsaw cooperative strategy had implemented in this study.

VII. Methodology

Description of the design of this study, variables, description of sample, tools used in the present study, procedure of data collection along with the statistical techniques used. .

VIII. Design of study

Representation of the non-randomized pre-test post-test control groups design

Group	Pre-test	Treatment (Independent variable)	Post-test
Experimental(A) Group	O1	T1 (Jigsaw- cooperative learning strategy)	O2
Control Group(B)	O3	Traditional method of teaching	O4

Where,

A= purposefully selected experimental group

B= Control group

T1= Exposure of group to an experimental (Treatment) variable

O1 & O3= Pre-test scores of Control Group

O2 & O4 =Post-test scores of control and experimental groups

8.1 Sample

The total sample was 50 out of which 25 students were in experimental group and 25 students were in control group. The experimental group was taken purposefully in accordance to their pre-test percentage of mark and control group was taken randomly without disturbing the intact classroom situation. Two schools were selected, Kasafal Primary School as experimental group and Narad Primary School, Balasore as control group.

Distribution of Sample

Groups	Total number of students
Experimental Group	25
Control Group	25
Total sample	50

8.2 Tools

The total sample tools were used .They were instructional tools in the form of unit wise lesson plans and measuring tools in the form of a teacher made test.

For the present study, the researcher had used two types of tools.

[I] **Instructional tools:** The investigator developed the lesson plan that based on Jigsaw cooperative learning instruction strategy in science subject of class v.

[ii] **Measuring tools:** Measuring tool was in the form of teacher made achievement test, prepared by investigator based on the objectives of knowledge, understanding, application &skill.

IX. Procedure of data collection

The experiment was conducted on the students of class V of Kasafal Primary School and Narad Primary School, Balasore .In very beginning of the experiment, the researcher conducted an achievement test .According to the pretest score the researcher formulated five homogenous experimental groups consisting of five students. They were taught through Jigsaw cooperative strategy with following steps of lesson planning i.e. Group Formation, Discussion within the Group, Interpolation, Presentation of group, Consolidation. Ten Lessons had been delivered through two methods. A post-test achievement was conducted of twenty five marks in both the group.

X. TECHNIQUES OF DATA ANALYSIS

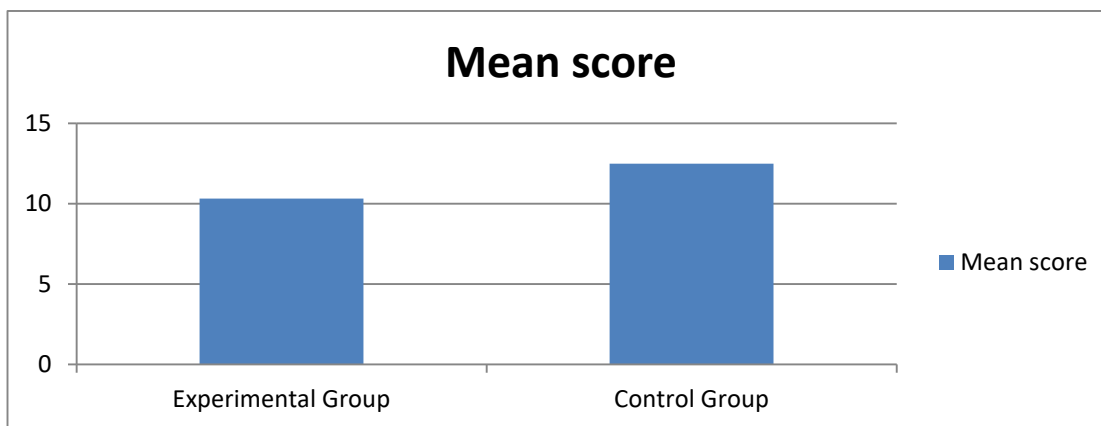
The experimenter used t test for analysis and interpretation of score

There exists significant difference in science achievement between students of control group and Experimental group.

To assess the aforementioned hypothesis, a comparison of mean scores between the experimental group and the control group was conducted using a t-test

Groups	Number of students	Mean	Standard Deviation	t-test	Degree Of Freedom	Remarks
Experimental Group	25	10.32	5.808	1.38	48	Not Significant
Control Group	25	12.48	5.239			

The above table indicate that the mean score of experimental group (10.32) is lower than the mean score of the control group (12.48). The calculated 't' value (1.38) is less than 2.01 at 0.05 significant level with df 48. So, there is no significant different between the mean achievement of experiment group and control group before intervention.



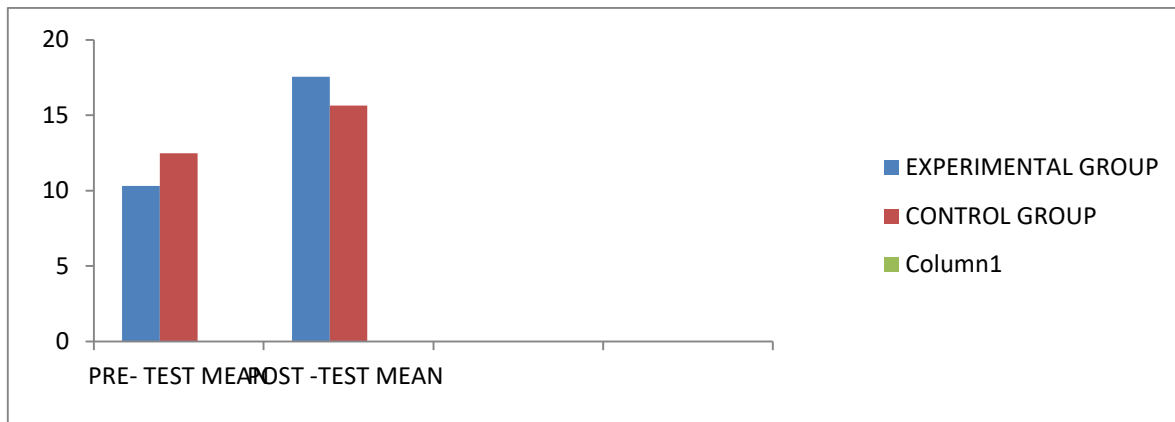
't'-test of two groups in relation to their achievement after intervention.

Groups	Number of the students	Mean	Standard Deviation	t-test	Degree of Freedom	Remarks
Experimental Groups	25	17.56	3.688	2.04	48	Significant at 0.05 level
Control Groups	25	15.64	2.924			

The above table indicate that the mean score of experimental group(17.56)is higher than the mean score of the control group (15.64).The difference between mean is significant in 't' test

(2.04) with $df=48$ at 0.05 level. Hence the hypothesis is accepted at 0.05 level. Therefore, it is concluded the result is accepted at 95% confidence level.

Graphical representation of average achievement gap between experimental group and control group



To test the hypothesis for the difference in science achievement between boys and girls

Table for the t test of post test experimental group

Girl	N1=10	M1=17.8	SD=3.81	SED=1.20	df =13	T=0.71
Boy	N2=15	M2=16.93				

It was found that with df of 13 the t value of 0.71 is less than the table value at both 0.05 and .01 level. So the H_0 is accepted there exists no significant difference in science achievement between the boys and girls in post test experimental group

XI. FINDINGS

The important findings of the present study.

A significant difference was found between mean achievement of the student exposed to cooperative learning and mean achievement of the student exposed to traditional approach. ($M_1=17.56$ i.e. experimental group, $M_2=15.64$ i.e. control group, t' value=2.04, $p<.05$). It implies that there exists significant difference in Science achievement between students of control and experimental group.

Mean achievement of boys and Girls exposed to cooperative learning ($M_1=17.8$ i.e. mean of girls, $M_2=16.93$ i.e. mean of Boys, t value=.71, $p<.05$). It implies that There exists no significant difference in science achievement between the boys and girls in post test experimental group

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