

# EFFECTIVENESS OF CO-OPERATIVE LEARNING METHOD IN LEARNING OF MATHEMATICS AMONG EIGHTH STANDARD STUDENTS

By

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## **ABSTRACT**

*Co-operative learning is defined as students working together to "attain groups goals that cannot be obtained by working alone or competitively". The main purpose of co-operative learning is to actively involve students in the learning process, a level of student empowerment which is not possible in a lecture format. The present study found out the effectiveness of co-operative learning in mathematics learning among the eighth standard students of Tirunelveli district. Two equivalent group experimental-designs are employed for this study. The investigator has selected 40 students studying VIII standard in High School, Tirunelveli Educational District. According to the scoring of pre-test, 20 students were chosen as control group and 20 students were chosen as experimental group in a cluster sampling techniques. Finally the investigator concludes that; (a) There was significant difference between control and experimental group students in their gain scores. That is the experimental group student is better than control group students in their gain scores. (b) There was significant difference between control and experimental group students in their gain scores for attainment of the knowledge, understanding, and application objectives.*

*Key words: Co-operative Learning, Tirunelveli District, VIII Standard Students, Mathematics.*

## **INTRODUCTION**

In addition to prompting mathematics achievement there were other findings from the analysis of co-operative learning in mathematics instruction, such as increasing social communication, changing learning behavior (ie. Passivity becoming activity) and increasing self esteem because of getting help from others.

First, teachers and students were in favour of co-operative learning being used in mathematics instruction (Jacobs 1997). They said that co-operative learning method in mathematics classroom increase discussion, sharing, help and supports and collaboration among students. May be because mathematics is a subject, which needs in analyze, comprehend and synthesize, second, the result of achievement measures between treatment groups and control groups increased differences over time. It may take some time before the benefits of co-operative learning become apparent. The reason might be that the operation of the group using co-operative learning to study needs some time to establish some

social behavior, acceptance and recognition among group members. The implication of this finding is that the teacher using co-operative learning to teach had better be patient for students learning in order to get more benefits for students, third research showed that students liked to change their group members frequently (Whicker 1997). However, whicker (1997) stated that changing members frequently might be harmful for the stability and relationship of groups, are even final academic performance. This needs to be confirmed in further research. Fourth, the social behaviors' between high achievers and low achievers are different in co-operative learning mathematics classes. Mathematics classes are though be difficult and always make students afraid because of the insufficiencies in the education system. Therefore, co-operative learning method can be used in every area and every level by the developing countries, which can fulfill the deficiencies in the education system, conclusions of this study are expected to

- Be useful for math teacher while they plan the process

of teaching learning.

- Bring variety to the methods and techniques used in the process of teaching learning.
- Create new discussion and researches concerning the methods and techniques used in math teaching in elementary schools.
- Contribute to the curriculum of the education faculties.
- Make suggestions that will be useful for the improvement of the curriculum of math lesson of elementary schools.

So the investigator has selected the topic "Effectiveness of Co-operative learning method in Learning of Mathematics among the Eighth Standard Students in Tirunelveli Educational District"

### Definition of the Terms

The investigator wants to give explanations for the terms used in the title of the study.

*Effectiveness:* It refers to the adequacy to accomplish a purpose as well as producing the result intended or expected results. This study measures the effectiveness in terms of the achievement scores of the students if the Co-operative Learning is used in learning Mathematics.

*Co-operative Learning:* Cooperative learning happens when a large group of students gets divided into small groups of say three or four students each, assigned for the duration of the course. Students then learn cooperatively as they perform activities such as homework assignments, practical assignments, etc as a group.

*Mathematics:* Mathematics is a collection of symbols, notations and numbers. (Anice James, 2005)

*Eighth Standard Students:* The students those who are studying eight standard in school.

### Objectives of the Study

- To study the effectiveness of co-operative learning mathematics for the VIII standard students
- To find out whether there is any significant difference between control and experimental group trainees in their gain scores.

### Hypotheses of the Study

- There is no significant difference between control and experimental group trainees in their gain scores.
- There is no significant difference between control and experimental group trainees in their gain scores for attainment of knowledge, understanding and application objectives.
- There is no significant difference between pre-test and post-test scores of (i) control and (ii) experimental group students.

### Methodology

Two equivalent group experimental-designs are employed for this study. To find the effectiveness of co-operative learning, the investigator has chosen Experimental research. Experimental research describes what will be when certain variables are carefully controlled or manipulated. The focus is on variable relationship.

### Sample

The sample of the study consisted of 40 Eighth standards students of Tirunelveli district. According to the scoring of pre achievement test, 20 eighth standard students were chosen as control group and another, 20 eighth standard students were chosen as experimental group.

### Tools Used for the Study

The following are the tools used for the present study.

- A co-operative learning situations developed by the investigator for eighth standard students.
- An achievement test (Pre and Post test) in mathematics constructed and validated by the researcher.

### Conducting the Experiment

#### Administration of the Pre-Test

Just before the treatment the entry behavior test was administered and it was found out that all the selected samples possess the entry behavior. The bio-data information was also collected. Then the pupils were made to be seated conveniently and strict invigilation was done to avoid consultation. Pre-test was administered and the results were analyzed. The mean of the pre-test

scored for both experimental and control group are almost equal. Less difference is seen in the case of standard deviation as well. Hence, the Experimental and Control Group were matched.

### Administration of the Post-Test

The parallel form of post-test questions was given to the students of both the two groups and their results were statistically analyzed to find out efficiency and effectiveness of co-operative learning method. While conducting the feedback test strict and effective monitoring and supervision were taken against malpractice.

### Treatment

The Experimental Group sample of 20 students was taken to the separated class. These students were taught with co-operative learning method. Corrective feedback was given wherever necessary. The treatment has been given for 60 minutes per day. The co-operative learning treatment was given by the investigator in fifteen days. The control Group sample of 20 students was taken to the regular classroom. These students were taught with traditional method like lecture method. The treatment has been given for 60 minutes per day.

### Test Administration

Soon after the session was over care was taken not to allow them to consult. They were given the post-test soon after the exposure. After this the control group was taught in the conventional method by the investigator himself. The investigator trained him in such a way that there should not be any experimental bias. Soon after the session was over care was taken not to allow them to consult. They were given the post-test. The posttests were scored objectively and the scores were transferred to the data sheet.

### Statistical Techniques Used

Statistical techniques serve the fundamental purpose of the description and inferential analysis. The following statistical techniques were used in the study:

- Mean (m) and standard deviations (SD)
- t test for determining the significance of difference between means of two sub-groups. (Aggarwal, Y.P, 1990)

## Hypotheses Testing

### Null Hypothesis 1

There is no significant difference between control and experimental group students in their gain scores.

It is inferred from the Table 1 that there is a significant difference between control and experimental group students in their gain scores. That is, the experimental group students are better than the control group students in their gain scores. Hence, the co-operative learning is effective for learning mathematics among eighth standards students.

### Null Hypothesis 2

There is no significant difference between control and experimental group students in their gain scores for attainment of knowledge, understanding and application objectives.

It is inferred from Table 2 that there is significant difference between control and experimental group students in their gain scores for attainment of knowledge, understanding and application objectives.

### Null Hypothesis 3

There was no significant difference between pre-test scores of control and experimental group students. There is no significant difference between post-test scores of control and experimental group students.

It is inferred from Table 3 that there is no significant difference between Pre-test scores of control group and experimental group students. But there is significant difference between Post-test scores of control group students and experimental group students.

Group	N	Mean	S.D	Calculate 't'	Remarks at 5%
Control group	20	6.46	2.60	value	level
Experimental group	20	9.92	2.32	3.58	*Significant

(\*At 5% level of significance the table value of 't' is 2.02)

**Table 1. Difference between Control and Experimental Group Students in their Gain Scores**

Objectives	Control group Mean	Control group S.D	Experimental group Mean	Experimental group S.D	Calculated 't' value	Remarks at 5% level
Knowledge	3.46	1.98	5.00	1.68	2.13	*Significant
Understanding	1.78	1.28	3.13	1.79	2.93	*Significant
Application	1.54	1.19	2.61	2.62	2.23	*Significant

(\*At 5% level of significant the table value 't' is 2.02)

**Table 2. Difference between Control and Experimental Group Students in their Gain Scores for Attaining the Objectives**

Group (N=20)	Control group		Experimental group		Calculated 't' value	Remarks at 5% level
	Mean	S.D	Mean	S.D		
Pre-test	8.85	2.64	8.53	2.02	0.33	*Not Sig.
Post-test	15.31	2.46	18.46	1.66	3.83	*Sig.

(At 5% level of significance the table value of 't' is 2.10)

**Table 3. Difference between pre-test and post-test scores of the Control and Experimental Group Students.**

## Interpretation & Discussion

The 't' test result shows that the experimental group students are better than the control group students in the gain scores. This may be due to the fact the co-operative learning is effective in teaching Mathematics for the eighth standard Students. Since the co-operative learning is developed the students in self confidence, group work, tolerance, and so on. (Woolfolk, A. E. & Hoy, W. K. 1990). And also the learning is more meaningful. So the student's attention is drawn in the topic to be learnt.

The 't' test result also shows that the experimental group students are better than the control group students in attainment of knowledge, understanding and application level objectives in the gain score. This may be due to the fact that co-operative learning has motivated the students to understand the concepts of mathematics. Since the group work and individual accountability are very useful for all learners. It stuffed the fresh minds of experimental group students very sharply. So the experimental group is better than control group in attainment of knowledge, understanding and application.

The outcome of the study is clearly pointing out to the fact that Co-operative learning is more effective in learning Mathematics than the conventional teaching method. The present study reveals that the experimental group students who learn through co-operative learning achieved more in mathematics than control group students who learnt through conventional method. This is in congruence with the result of Yannis, saromiliokos and Symeon Retalis, (2003) who reported that the changes made in the design and presentation of the learning material resources improved the learning effectiveness of the web based learning system.

The following are the advantages of co-operative

learning for the students. It develops higher level thinking skills, promotes student-faculty interaction and familiarity, Increases student retention and Builds self esteem in students, Enhances student satisfaction with the learning experience, Promotes a positive attitude toward the subject matter, Develops oral communication skills, Develops social interaction skills, Encourages student responsibility for learning, Involves students in developing curriculum and class procedures and encourages alternate student assessment techniques. (Crow, L.D., & Crow, A., 2007).

## Recommendation of the Study

The large oak tree outside the high school campus shades a stone picnic table. It is a favourite spot for students to gather and talk about dating, sports, TV, and, sometimes, homework and upcoming exams. Informal study groups meet there to discuss particularly troublesome aspects of algebra or chemistry. Teacher can tell intellectual work is occurring: the concentration is evident, the seriousness is real. These groups exchange questions and explanations that are rich and intense. Informally, such small group interaction is common. Students have always gathered together to practice and study. But there is a growing acknowledgment that combined with whole group instruction and individual work; cooperative learning should be a regular part of the week's classroom instruction.

Student interaction makes cooperative learning powerful. To accomplish their group's task, students must exchange ideas, make plans, and propose solutions. Thinking through an idea and presenting it in a way that can be understood by others is intellectual work and will promote intellectual growth. The exchange of alternative ideas and viewpoints enhances that growth and stimulates broader thinking. It is the teacher's job to encourage such exchanges and structure the students' work so their communication is on-task and productive.

In addition to intellectual growth, cooperative learning enhances students' social and personal development Group members can learn to work together in classrooms that reflect the complexity and diversity of the world.

Students' lives are full of interactions with friends, family members and strangers and their futures will find them in jobs that require cooperation. The skills that are essential for productive group work in the classroom are relevant for today and the future.

## Conclusion

The National Council of Teachers of Mathematics (NCTM) recommends that students be provided opportunities to work together cooperatively in large and small groups on significant problems—problems that arise out of their experiences and frames of reference. Group assignments should help learners combine new knowledge with prior knowledge, leading to the construction of new ideas within the group. Students should question, discuss, make mistakes, listen to the ideas of others, provide constructive criticism and summarize discoveries the problem. (Anderson, L. 2004).

Changes are needed in science and mathematics teaching. Teachers should give less emphasis on students' acquisition of information, presenting scientific and mathematical knowledge through lecture, asking for recitation of acquired knowledge and working alone. (Gibson, S. & Dembo, M. 1984). More emphasis should be given on students understanding of a particular concept, guiding students in active learning, providing opportunities for discussion and elaboration and encouraging them to work with peers and teachers. In a recent development, the government has introduced the use of English as the medium of instruction in science and mathematics. (Bandura, A. 1997). This move would provide students the opportunities to keep abreast with the rapid development of knowledge in science, mathematics and technology. Collaborative effort with students from other countries is now possible and should be supported. Findings of cooperative learning study should be disseminated to all schools India to encourage other teacher to consider this instructional approach. A staff development program should focus on the needs of the teachers. Needs analysis study should be done before running any courses. The courses should be hands-on and include basic concepts of cooperative learning and the

rationale for using cooperative learning in schools setting. (Dembo, M. & Gibson, S. 1985). Although cooperative learning cannot cure all the problems faced by teachers in teaching and learning science and mathematics, it may serve as an alternative to traditional method of teaching.

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