Effectiveness of Co-Operative Learning for Teaching Mathematics at Secondary Level

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Co-operative learning is one such approach which makes the students to learn as group to maximize their own and each other's' learning. Co-operative learning strategy stands for teaching in which students are provided opportunities on co-operative principles in which they share their knowledge and experiences with their peer group. In Co-operative learning, individuals' work with his\her peers to achieve a common goal rather than individual gain. Thus, we have shown that cooperative learning is an alternative to answer the socialization, motivation and academic performance problems, and we have verified that co-operative strategies can be an efficient tool, among others, to improve the class climate.

Keywords: Learning, Mathematics, Experiences, Students and Understanding.

Introduction

Education is derived from the Latin word "Educatum" which means to draw out to foster growth and to develop. Education in its general sense is a form of learning in which knowledge, skills, and habits of a group of people are transferred from one generation to the next generation through teaching training and research or simply through any experience, that has a formative effect on the way one thinks, feels or acts. The word "Education" has a very wide connotation and it is very difficult to define it precisely. Education is important from various points of view. Its field of activity is so wide that all activities and experiences are embraced in its sphere of work. Education develops the social qualities of service, tolerance, co-operation, fellow-feeling inspiring the child to lay down all, even his life for the glory and prosperity of his country. Education is an effort of the senior people to transfer their knowledge to the younger members of society.

Co-operative Learning

Co-operative learning is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more too co-operative

learning than merely arranging students into groups, and it has been described as "structuring positive interdependence." Students' *learning* goals may be structured to promote *co-operative*, competitive, or individualistic efforts. Co-operative learning is a successful teaching strategy in which small teams, each with students of different levels of ability use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for leaning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement.

Co-operative learning is the instructional use of small groups so that students work together to maximum their own and each other learning. Co-operative learning provides the context within the cognition and meta cognition takes place. Within the cooperative leaning group, interpersonal exchange takes place, intellectual change result from conflicting ideas and conclusions; they promote critical thinking, higher level reasoning and Meta cognitive thought.

Need and Significance of the Study

Now a days, there is a trend to consider learning as perceived by the students and not as the teacher. Effective learning occurs only through effective and constant interaction between the learner and the teacher is psychologically engaged in. Now a day's peer collaboration is used in many classrooms. In this study the investigator tried to unreal the possibilities of co-operative learning by comparing with the conventional method.

Co-operative learning methods have been used in several schools in recent years. The use of cooperative learning methods indicates better students' achievement and the spin off in the form of the development of skills and attitude of working together. The use of co-operative learning method in the classroom boosts an involvement of each individual to achieve a common goal and sharing of the experience.

Usually mathematics is taught as one of the subjects in school and universities. Mathematics is considered as queen of all sciences. The present study is an investigation on the Effectiveness of co-operative learning for teaching mathematics in particular to the secondary school students. Many complex mathematical concepts can be taught easily with the help of co-operative learning. So, it is the need for the teachers in their millennium to provide quality in delivering of learning instruction to the learners. Learning which is considered as the lifelong process should be effective, meaningful and joyful to the learner.

Objectives of the Study

- To find whether any significant difference between pre-test score of control group and experimental group.
- To find whether any difference between post test score of control group and experimental group.
- To find whether any significant difference between pre-test and post test score of control group.
- To find whether any significant difference between pre-test and post test score of experimental groups.

Hypotheses of the Study

- There will be significant difference between pre-test score of control group and experimental group.
- There will be significant difference between post test score of control group and experimental group.
- There will be significant difference between pre-test and post test score of control group.
- There will be significant difference between pre-test and post test score of experimental groups.

Method Used for the Present Study

Among of the various methods of research, the investigator plans to adopt experimental method on view of objective of the study.

Population and Sample

A population is any group of individuals that have one or more characteristics in common that is of interest to the researcher. The population of the present study is the entire student doing in secondary level. The sample portion of the population selected for observation and analyses is called sample. For the investigation two divisions of VIII standard students will select from one school. A sample of 40 students will select for the study. One group is considered as control group and other as experimental group.

Tools used in the Study

- Lesson Presented through Co-operating Learning Method
- Achievement Test in Algebra
- Personal Data Sheet

Analysis of Data

H1: There will be significant difference between pre-test scores of Control group and Experimental group.

Table - 1
Difference Between Pretest Scores of Control group and Experimental Group

Test	Group	N	Mean	S. D	t - value	p - value	Result
Pre-test	Control	20	54.850	15.4316	-1.058	0.846	N. S
	Experimental	20	59.850	14.4524			

The table 1 shows that the p value is greater than 0.05 at 5% level of significance.

Hence the hypothesis is accepted. That is, there is no significant difference between pretest scores of control group and experimental group.

H2: There will be significant difference between post test scores of Control group and Experimental group.

Table - 2
Difference Between Post Test Scores of Control group and Experimental Group

The table 2 shows that the p value is greater than 0.05 at 5% level of significance.

Test	Group	N	Mean	S. D	t - value	p - value	Result
Post test	Control	20	66.900	15.2139	-3.263	0.772	N. S
	Experimental	20	81.400	12.7873			

Hence the hypothesis is accepted. That is, there is no significant difference between post test scores of control group and experimental group.

H 3: There will be significant difference between pre-test and post test scores of control group.

Table - 3

Difference Between Pre-test and Post test Scores of Control Group

Group	Test	N	Mean	S. D	t - value	p - value	Result
Control	Pre-test	20	54.850	15.4316	-8.975	0.000	S
	Post test	20	66.900	15.2139			

The table 4.3 shows that the p value is less than 0.05 at 5% level of significance. Hence the hypothesis is accepted. That is, there is a significant difference between pre-test and post test scores of control group.

H 4: There will be significant difference between pre-test and post test scores of experimental groups.

Table - 4

Difference Between Pre-test and Post test Scores of Control Group
The table 4 shows that the p value is less than 0.05 at 5% level of significance.

Group	Test	N	Mean	S. D	t - value	p - value	Result
Experimental	Pre-test	20	54.850	14.4524	-15.189	0.000	S
	Post test	20	66.900	12.7873			

Hence the hypothesis is accepted. That is, there is a significant difference between pre-test and post test scores of experimental groups.

Findings of the Study

- No significant difference found between pre-test score of control group and experimental group.
- No significant difference found between post test score of control group and experimental group.
- Significant difference found between pre-test and post test score of control group.
- Significant difference found between pre-test and post test score of experimental groups.

Interpretation

From the results derived from the testing of hypothesis, it is observed that the control and experimental group differ significantly in the post test scores. The experimental group students are found to be superior to control group students with regard to posttest achievement score. This may be due to the fact that the students of VIII standard may gain more information or knowledge during the experimental teaching of algebra.

Co-operative learning of teaching improves the creativity of bright students and the dull students can also understand the content easily. In traditional method students may omit some concepts, unknowingly, but through Co-operative learning method increase the interest of students. It saves the time for learning. During examinations, students can learn the concept on seeing the picture itself. This study further revealed that there is significant difference between pretest and post test scores of control group.

The post test scores of control group is greater than the pretest scores of control group. This may be due to the effectiveness of teaching method used by the teacher who handles the subject to the control group. Hence, they are found to be superior in this regard.

In the experimental group, there is significant difference between pretest and post test scores of students of standard VIII. The post test scores of experimental group students are greater than the pretest scores of experimental group students. The reason behind this may be the method of teaching (direct experience) may provide various information about the algebra. Through direct experience, the students are able to understand the concept meaningfully.

Educational Implications

Co-operative learning has several strategies and techniques for promoting an educational experience that facilitates students and teachers to move beyond standard classroom parameters. In co-operative learning, teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of the subject through a constructivist approach. In recent research studies, researchers used many of the cooperative learning strategies alone or with the cooperation of other methods, techniques and technologies to prove their points.

The investigator of the present study would like to recommend the following educational implications.

- The Co-operative Learning method of teaching should be introduced in the schools for the development of mathematical attitude and interest in pupils.
- Faculty improvement programmes viz., orientation courses refresher courses, seminar and workshop should be organized for teachers to familiarize them with various instructional strategy such as Co-operative Learning.
- Model lesson transcripts based on the Co-operative Learning of teaching on selected units may be developed by an expert's team and made available to the teachers.
- The present study proves the effectiveness of direct experience for teaching algebra to the students of standard VIII. Considering the meritorious aspects of such teaching method, the teacher handling difficult subjects may use this method of teaching for the better understanding of the subject matter among the students.
- The teacher should adopt novel methods of teaching. Such introduction of novel practices in teaching promotes interest and involvement in the subject among the students. It also motivates the students to learn the subject matter with spirit and enthusiasm, which in turn, the scholastic achievement of students may also be increased.
- The experiment done in the present study cannot be implemented in the classes where the student's strength is more in number. Such classes may be divided into two or three sub-sections and they can be given this experiment with the help of fellow teachers.
- The government and educational authorities should encourage the teachers who undertake or introduce such novel experiment in the traditional method of classroom teaching.
- The direct experience of field trip should be introduced not only for the Mathematics students but also for the subject groups. While making field trips, the students should be properly guided by the teacher or the expert in the concerned field and the students should take necessary notes. After the field trip or direct experience, the teachers should provide additional time for clarifying their doubts.
- Proper guidelines should be provided in the method field study, evaluation and grading.

Conclusion

In this study it is found that co-operative learning in teaching mathematics is more effective than the traditional method. The traditional method is effective in some dimensions. But co-operative learning is more effective than the traditional method in classroom teaching learning process. The co-operative learning approach is more effective than the traditional method. So, Co-operative learning approach is a powerful tool in the classroom situation.

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