

LEARNING THROUGH COOPERATION

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Abstract

The students in a traditional class of a school in India sit as passive learners with little chance to share their knowledge with their peers. This lack of space for dialogue and students' expression in classrooms is also remarked by the National Curriculum Framework, 2005. As a solution, the said document suggests that the structure of a class should be interactive. It says that in a class, interaction with teachers, with other peers of the same age group as well as those who are older and younger can open up many more rich learning possibilities. Cooperative learning approach is a right and suitable alternative to the traditional teaching approach which fits in to the needs of a classroom, as stated in NCF, 2005. It is an approach to instruction in which students work in small groups to help one another learn. Various researches in different countries all over the world support that cooperative learning enhances achievement in many subjects along with significant positive contribution in development or enhancement of various psychological attributes like interpersonal relations among peers, social acceptability among peers, interest, Present study examines the effectiveness of STAD, a method of cooperative learning, in terms of achievement in science. The sample consists of forty students of grade IX. A 'two group pretest-posttest' design under quasi experimental design has been used to conduct the experiment. Data analyzed using ANCOVA reveal the significant effectiveness of cooperative learning. Students accept that learning science was more interesting and fun in a cooperative class.

Introduction

We human beings have been successful as a species because of our ability to apply our intelligence to cooperate with others to accomplish group goals. It is difficult to think of adult activities in which the ability to cooperate with other is not important. Human society is composed of overlapping cooperative groups: families, neighbourhoods, work-groups, political parties, clubs, teams etc. Evolution of language is another example of cooperation, which is a result of common agreement on some symbols to communicate. All these situations represent the actual systems of society and negate the notion of the 'Social Darwinists' that our society is highly competitive and one should be able to function in 'survival of the fittest' world. This notion of Darwin does not stand true for social interactions. Cooperation, rather than competition, is the predominant characteristic of human beings.

Because schools socialize children to assume adult roles, and because cooperation is so much a part of adult life, one might expect that cooperative activity would be emphasized in schools. However, this is far from truth. Traditional classroom environment is competitive. Most of the time students work independently and they are continually in competition with one another for grades, praise, and recognition. Such competition does have negative effects. Even high achievers may not achieve their best because they know that they will be near the top anyway.

Thus, present academic environment of institutions is against the societal needs and it promotes students to concern for self well-being rather than others. Whereas, NCF (2005) states that first educational aim is a commitment to democratic values of equality, justice, freedom, concern for others' well-being, secularism, respect for human dignity, and rights. It emphasizes that work related experiences in schools should help in inculcating a mental frame to work with others in a spirit of cooperation.

Again, present approach of instruction in classrooms is totally teacher-centered, which does not provide space for dialogue and students' creative expressions. It considers the students as recessive receivers of information rather than knowledge creators. In practice, it does not follow the general assumption that 'Two heads are better than one'. It is also mentioned in NCF (2005) that – “Children's voices and experiences do not find expression in the classroom – often the only voice heard is that of the teacher. When children speak, they are usually only answering the teacher's questions or repeating the teacher's words. They rarely do things, nor do they have opportunities to take initiative.” It suggests that education must provide the means and opportunities to enhance the child's creative expression. All these situations indicate the need of re-shaping and re-creating our present

classrooms' environment and methodologies as per the basic societal needs and the educational aims suggested by NCF (2005).

To fulfill societal needs and achieve educational aims, an alternative to traditional competitive classroom is 'cooperative learning'. It is a method of promoting learning through students' cooperation rather than competition. According to Johnson and Johnson (1987), there are three basic ways students can interact with each other as they learn. They can 'compete' to see who is "best"; they can work 'individualistically' on their own towards a goal without paying attention to other students; or they can work 'cooperatively' with a vested interest in each other's learning as well as their own. Cooperative learning exists when students work together to achieve joint learning goals (Johnson, Johnson, & Holubec, 1992, 1993). It is an approach to instruction in which students work in small groups to help one another learn (Johnson & Johnson, 1987). Students in 'cooperative learning' work together to achieve common successes. Johnson and Johnson (1987) suggest that in order for cooperative learning approach to be successful, one must structure the classroom in such a way that cooperation is not only helpful for academic success, but, in fact, necessary for it. Simply putting students in groups and setting them loose to work on a topic together is not cooperative learning. Rather, they are encouraged to work in groups on academic tasks with a common goal. The members of the groups swim or sink together.

Cooperative learning approach in classroom helps students interact with each other, generate alternative ideas, and make inferences through discussion. It involves discussions, group discoveries, helping each other, and sharing materials and helps students to learn from each other. In cooperative learning, students work in small, mixed abilities, inter-status (social or others) heterogeneous groups. Small groups of three to five students cooperate in achieving identified cognitive learning objectives. Through cooperative learning, students achieve the benefits of social participation and help one another to discover knowledge together.

However, all groups, in which students are sitting together, are not cooperative groups. To become cooperative a group should have some basic elements. Researchers have identified five essential elements of cooperative learning as positive interdependence, individual accountability, face-to-face interaction, use of interpersonal and small-group skills, and group processing skills (Johnson & Johnson, 1987). Effective implementation of cooperative learning involves heterogeneous grouping, stating instructional objectives, explaining strategies for achieving group goals, monitoring progress and providing help when necessary and evaluating students' achievements. Various methods of cooperative learning, for example, Student Teams Achievement Divisions (STAD), Teams-Games-Tournaments (TGT), Team Accelerated Instruction or Team Assisted Individualization (TAI), Jigsaw, Jigsaw II, Learning Together, Group Investigation etc., have been developed and researched by many educationists, in different parts of the world. These methods are different from one another in many aspects; however, they have the idea in common that 'students work in groups to attain a common goal'.

Johnson and Johnson (1987), based on their research, revealed that if cooperative learning were used more widely and more often, students would learn more science and mathematics, and come to feel better about themselves as science (or mathematics) students. Johnson and Johnson (1974, 1987) also assert that the research data on cooperative learning show that its use leads to students learning more material, feeling more confident and motivated to learn, exhibiting higher achievement, having greater competence in critical thinking, possessing more positive attitudes toward the subject studied, and exhibiting greater competence in collaborative activities. The literature concerning cooperative learning methods in science classroom have revealed significantly higher academic achievement in many studies. Slavin (1983a) identified 46 field experiments on cooperative learning, conducted in elementary and secondary classes (Grade 2-9). The effect of cooperative learning on students' achievement was clearly positive. Lyons (1982), Yager (1985), Miller (1992), Ahuja (1995), Towns and Grant (1997) reported the greater effectiveness of cooperative learning for science achievement over traditional method. Although majority of studies favour the superiority of cooperative learning, there are studies that found no significant differences in these two methods with regard to science

achievement (Scott, 1982; Sherman, 1988; Chang & Lederman, 1994; Wolf, 1995; Boxtel, van Carla, van der Jos, Kansellor, 2000). The present study was undertaken in search of an appropriate teaching method that would enhance achievement in science along with promoting cooperation among students as per societal needs. For this, the effect of one of the cooperative learning methods – STAD – was examined on students' achievement in science.

STAD, developed by Slavin (1983b), is one of the extensively researched and widely used cooperative learning methods. In this method, students are assigned to three-to-five members learning teams. Teams are made as heterogeneous as possible. This is done because each team represents the composition of entire class, i.e., with respect to performance level, sex, ethnicity, racial backgrounds or caste. Cooperative learning activity begins by the presentation/introduction of the new material via lecture or discussion by the teacher and providing the worksheet to the master. The worksheet contains problems, questions or such things from which students can review and grasp the main points of the lecture/discussion. Then, the team members study the worksheet provided to them. They may work in pairs or as a group. During this stage they quiz each other, discuss the content, clarify difficult or confusing points or use any other means they wish to master the material. It is made clear to the students that their task is simply not to complete/fill the worksheet but to master it. At least one team member is provided the answer sheet to worksheet and assigned the role of checking written or oral responses of others. Sufficient time is allowed to students to complete the worksheets. They are clearly told that they should continue studying until they have understood the content. After sufficient practice on the worksheet, students are given quizzes individually over the material they have been studying. Students are not allowed to help their team members during this activity. They are left at their own. The quizzes/tests are scored soon and formed into a team score.

There are well-defined rules in STAD to prepare team score, which ensure individual accountability and enable the approach to guarantee success for everyone. The role of the teacher is different from the usual classrooms. He acts as resource person and monitors group activities.

The objective of the present study was to determine the effect of STAD method of cooperative learning on science achievement. To analyse, hypothesis was framed in null form as follows:

There will be no significant difference in science achievement of students taught using STAD method of cooperative learning and traditional method of teaching.

Methodology

The nature of the present investigation was quasi-experimental in nature and the two-group pretest-posttest design was used to carry out the experimentation. The sample of the study consisted of two intact classes of IX grade, each having 20 students, from a Hindi medium secondary school of Bilaspur city of Chhattisgarh, India. Dahley (1994) suggests that the ideal cooperative learning classroom has about 15 to 20 students. One class was taught by STAD method of cooperative learning and the other by traditional method. The treatments were assigned randomly to the groups and both the groups were taught the same content for 28 instructional days. The experimental class consisted of heterogeneous groups of four students of mixed ability in each group. Science achievement of the students was measured by a science achievement test, consisting 50 items, developed by the researcher for this purpose. This test was used as the pre- and posttests. Analysis of covariance, taking pretest scores as covariates, was used to analyse the data.

Results and Discussion

The science achievement test was administered on the both the groups prior to experimentation as pretest, whereas the same test was again administered on both groups after experimentation to obtain the posttest scores. The means and standard deviations of both the groups on pretest and posttest have been given in Table 1:

Table - 1
Mean and SD of both the Groups for Achievement in Science

Groups	Pre Test		Post Test	
	Mean	SD	Mean	SD
Experimental (N=20)	14.15	4.12	35.75	4.81
Control (N=20)	15.00	6.08	30.60	6.68

To study the effect of cooperative learning on science achievement, marks obtained by students on the science achievement test, taught by both methods, were compared using ANCOVA. Results of the ANCOVA are given in Table 2:

Table - 2
Summary of Results of ANCOVA for Achievement in Science

Source of Variation	df	SS _{y,x}	MS _{y,x}	F _{y,x}
<i>Between means</i>	1	341.86	341.86	22.64*
<i>Within means</i>	37	558.67	15.10	

*P<0.01

It is clear from Table-2 that the value of F_{y,x} is 22.64, which is statistically significant at the .01 level for 1/37 degrees of freedom. It indicates that both the groups differ significantly in terms of science achievement, after holding the effect of previous achievement constant. Since the posttest mean of experimental group is higher than of the control group, it can be concluded that cooperative learning significantly enhanced the science achievement of students as compared to traditional method.

These findings may be explained on the basis of the task and reward structures of STAD, both of which are cooperative. Students in cooperative learning work in groups with a common goal. For the group to succeed the members must help their teammates and encourage each other to put maximum efforts. There is peer tutoring mechanism which operates within mixed ability cooperative groups where high ability students help and encourage their low ability teammates to master the assigned task. Traditional classroom structure does not provide opportunities for learning from more able peers. This situation may have a positive effect on overall performance of the experimental group as compared to the control group. In addition to this, motivational factor might have contributed to such a finding. When members of the group are helped and encouraged by each other and enjoy success, which is available to only a few high ability students in traditional classroom, there are chances that their motivation will increase. Realization on the part of the students that success is within their reach and they are one of the contributors to the success of the team might have been one of the factors for better achievement in science.

To know the students' reactions towards learning experiences in cooperative class, they were asked to express their ideas in this regard in the forms of write ups. All the students accepted that learning science was more interesting and fun in a cooperative class.

This research has a number of implications for teaching and further research. If the purpose is to enhance achievement in science as well as to develop the cooperation among future citizens, cooperative learning strategy can be put to an advantage. There is a dearth of studies related to this area in Indian conditions. Further researches may be conducted to investigate the effect of cooperative learning on achievement of high, average and low ability students as well as on boys and girls.

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