EFFECTIVENESS OF COOPERATIVE LEARNING STRATEGY AMONG IX STANDARD STUDENTS ACHEIVEMENT IN MATHEMATICS

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Abstract: *Cooperative learning is widely recognised as a pedagogical practice that promotes socialization and learning among students from pre-school through to tertiary level and across different subject domains. It involves students working together to achieve common goals or complete group tasks – goals and tasks that they would be unable to complete by themselves. This experimental study investigated the effects of cooperative learning on the achievement in mathematics .These secondary school students were divided into two intact groups. In the experimental group, cooperative learning was employed, while in the control group, lecture-based teaching was used. The results showed that, approximately after 8 weeks treatment students who were instructed using cooperative learning strategy achieved significantly higher scores on the achievement and knowledge retention post-tests than the students who were instructed using lecture-based teaching. The study supports the effectiveness of cooperative learning in secondary school education.*

Keywords: Cooperative Learning, Learning together, Academic Achievement, Mathematics

Introduction

Teaching is a dynamic, well-planned and logical presentation of facts, ideas, skills and techniques to students and its focus is to acquire maximum learning experiences. Selection of the most suitable teaching pedagogy is the basic condition for successful teaching / learning process. Teachers make attempts to create conducive climate for learning by building teaching learning resources and also using innovative teaching learning practices. It is an established fact that 'teaching is a complex process'. It is a process that demands knowledge and skills of both content and pedagogy. The teachers normally use pedagogy, in order to transfer knowledge to

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next generation i.e. learners. Teacher using conventional approach will have teacher – student interaction which will not be able to satisfy students' curiosity, understanding and interest towards the subject. Students work in groups and interact with each other. This aspect is often missing in traditional classrooms.

Modern researches indicate that if proper and suitable methods and techniques are used, even the students of less intelligence can easily learn. Modern researches indicate four models of instruction that can lead to students' achievement. These include Direct Instruction, Cooperative Learning, Mastery Learning and ProjectBased Instruction. The aims and objectives of mathematics education mentioned below can be achieved if Group Learning Approaches are incorporated by the mathematics teachers in the classroom.

Cooperative learning

Cooperative learning has been defined by Johnson and Johnson (1994) as a situation in which there is a positive interdependence among student's goal attainment; therefore, students perceive that they can only reach their learning goals if all the members of the group achieve the learning goals as well. Cooperative learning is an instructional methodology which splits class members into small groups in order for them to learn assigned material and make sure that all members of the group master the assignment (Johnson & Johnson, 1994).

Significance

Mathematics teaching can only be made meaningful and exciting when the learners are actively involved in the process and when real-life experiences are taken into consideration. Driver and et al. (1985) argue that children even when they are young have ideas about things and these ideas play a role in their learning experience. Traditionally, mathematics has been perceived as a fixed body of (absolute) knowledge to be transmitted by the teacher. In this approach, emphasis is on content and rote learning at the expense of understanding. Hence, learners become passive recipients of such knowledge. Watters and Ginns (1996) argue that content-driven approaches fail to engage learners in effective learning. Teachers are no longer seen as the all knowing transmitters of facts. Their role is to create an appropriate environment conducive to learning. Learners become active participants in the learning process (Harmelen, 1997). Hence the focus of classroom activities should shift from the teacher to a leaner-centred approach, recognizing that learners do contribute to their own knowledge and to the learning environment (Watters and

Ginns, 1996: 58). In this research endeavor, the investigator will therefore investigate the appropriateness and implications of Group Learning Approaches as a teaching and learning strategy in relation to Mathematics and Technology. Johnson et al. (1986) argue that learners learn better when they are in groups. Furthermore, learners can be encouraged to participate actively, to ask questions freely in their language, to share ideas and to solve problems collaboratively when group work is employed, provided it is properly implemented. Group work therefore gives learners an opportunity to learn from each other through task orientated activities. This promotes learning and social skills rather than the accomplishment of tasks, as traditional approaches to teaching and learning tended to emphasize.

Objective of the Study

- To examine the effectiveness of co-operative learning approach in the academic achievement of secondary school mathematics students.

Hypothesis of the Study

- Secondary school mathematics students taught through Co-operative learning Approach do not differ significantly in their academic achievement than students taught through Conventional Method of Teaching.

Sample of Study

The sample of the present study consisted of secondary school mathematics students. Two intact groups of secondary school students selected as Experimental and control groups. The selection of the school had been done through purposive sampling method.

Design and Procedure of the Study

The Pretest- Posttest Equivalent Group Design was selected for the study.

G_1 O_1 X O_2

G_2 O_3 C O_4

Where G1 = Experimental group, G_2 = Control group, X = Application of experimental treatment, C =Application of control treatment, O_1, O_3 = Pretests, O_2, O_4 = Post tests

In the present study, Co-operative learning Approach is the independent variable. It has two levels – Cooperative learning Approach and Conventional Method of Teaching. The dependent variable of the present study is Academic Achievement.

Topics for treatment were selected from the secondary school mathematics syllabus (same syllabus mentioned for methodology paper).

Tools for the Study

The following were the tools used for the study.

1. Lesson Transcript for Co-operative Learning Strategy
2. Lesson Transcript for Conventional Method
3. Achievement Test Scale (Dr. Femila Pangat)
4. Verbal Group Test of Intelligence (R. K. Tandon)
5. Raven Standard Progressive Matrices Test (Raven)
6. Classroom Environment Inventory (Aruna, etal.)
7. Socio Economic Status (Rajbir Singh, Radhey Shyam and Satish Kumar.)

Analysis of Data and Interpretation

To find the effectiveness of co-operative learning strategy on academic achievement of secondary school students, single factor ANCOVA was used.

Single factor ANCOVA for the Academic achievement using Covariates

Sl.No	Sources of vaiation	Sum of squares	Df	Mean square variance	F- Ratio	Level of significance
1	Group	459.42	1	459.42	42.01	0.01
2	Within Cells	678.01	62	10.94		
	Total	1137.43	63			

Form the table, the obtained F-ratio for treatment variable is found to be greater than the table value. Hence it is significant at 0.01 level.

So there exists a significant difference between two groups even after removing the combined effect of the covariates.

To know which group causes difference in terms of the variation in the criterion Mean, Scheffe' test of post – hoc comparison was made with the adjusted criterion Mean for the Experimental and Control groups on significant F values. It is shown in the below table.

Sample	N	Dependent Variable	Groups compared	Means		F-Ratio	Value of F		Level of significance
				M_1	M_2		0.05	0.01	
Total	71	Academic achievement	Experimental & Control Group	118.99	113.17	55.06	3.92	6.85	0.01

Form the table, the obtained F-value for comparison between the experimental and control group is 55.06. The corresponding F- value is found greater than the value of F required for significance at both level. It can be inferred from the result that significant difference in the academic achievement is very much evident between the two groups.

- The F value obtained after ANCOVA clearly shows that the Experimental group got higher scores.
- Scheffe' Test of Post hoc comparison reveals that the effectiveness of Co-operative learning Strategy on the academic achievement of secondary school students (Experimental Group).

Conclusion

It is clear that secondary school students taught through Co-operative learning Strategy differ significantly from secondary school students taught through Conventional Method of Teaching. With respect to mathematics achievement, some studies show that students' achievements do not change as a result of learning in a cooperative learning environment, whereas other studies give empirical evidence that cooperative learning may improve students' mathematical achievements.

Overall the main findings of the investigation are as follows: 1. The implementation of the co-operative learning settings promoted students' active explorations in the mathematics classroom. 2. A close examination of the nature of students' activities indicated an increase in students' mathematical communications. 3. An investigation of the types of help that students received while learning showed that verbal explanation is the predominant type of help received by the students. 4. Students' attitudes towards the co-operative learning method were positive. 5.

Students' achievements in the experimental method were at least as good as those of students learning in the conventional way.

References

1. Adams, D., Carson, H., & Hamm, M. (1990). Cooperative learning and educational media. Englewood Cliffs, NJ: Educational Technology
2. Driver and Ericson, (1983) Theories-in-action, some theoretical and empirical issues in study of students' Conceptual frameworks in science, Studies in Science Education, 10, pp. 37-60
3. Ginns, I.S. & Watters, J.J. (1996) Experiences of Novice Teachers: changes in self-efficacy and their beliefs about teaching, paper presented at the Annual Meeting of the American Educational Research Association, New York.
4. Hancock, D. (2004), Cooperative learning and peer orientation effects on motivation and achievement. *The Journal of Educational Research*, 97. (3), 159 - 166. Retrieved Jan. 24, 2007 from A*cademic One File*. Thomson Gale. National Institute of Education.
5. Harmelen F (1997) Exploiting domain knowledge for approximate diagnosis (1997) In: Pollack ME (ed) Proceedings of the 15th international joint conference on artificial intelligence. Kaufmann, Nogoya, Japan, August 1997, pp 454–459
6. Heller, P., Keith, R. & Anderson, S. (1992). Teaching problem solving through cooperative grouping. Part 1: Group versus individual problem solving. *American Journal of Physics, 60*(7), 627 – 636.
7. Johnson, D. W. & Johnson, R. T.(1989).Cooperative and competition: Theory and research Edina, MN: Interaction Book Co.
8. Johnson, D. W., & Johnson, R.T. (1994). Leading the cooperative school (2nd ed.). Edina, MN: Interaction Book Co.
9. Millis,B.(2010).Cooperative learning in high education: Across the disciplines, across the academy.
10. Satyaprakasha C V (2001). Effect of Cooperative Learning on Achievement and Process Skill in Biology, Achievement Motivation, Children's Learning Preferences and Social Relations. Unpublished Doctoral ?Thesis. University of Mysoreerling, VA : Stylus Publishing.

11. Sharan,S.(1980).Cooperative learning in small groups Recent methods an effects on achievement, attitudes and ethnic relations, Review of Educational Research, 10, 241-271.
12. Slavin, R. E. (1980). Cooperative learning. Review of Educational Research, 50, 315-342.
13. Slavin, R.E, & karweit, N. (1981). Cognitive and affective outcomes of an intensive student team learning experience. Journal of Experimental Education, 50,29-35.

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