

International Multidisciplinary Research Journal

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EFFECT OF CO-OPERATIVE LEARNING ON STUDENTS' ACADEMIC ACHIEVEMENT IN DIFFERENT GROUPING FORMATS

Yogita Mandole¹ and Dr. Shefali Pandya²

¹Assistant Professor , Gandhi Shikshan Bhavan's , Smt. Surajba College of Education.

²Professor ,Department of Education , University of Mumbai.

ABSTRACT

This paper attempts to ascertain the effect of co-operative learning strategies on students' academic achievement in different grouping formats. For this purpose, an intervention programme based on co-operative learning strategies of about 44 hours was developed



for students of standard eighth spreading over nine weeks. The aim of the research was to ascertain whether different strategies based on co-operative learning facilitates the academic achievement of students. Structured tools were used in the study. The participants of the study included 96 boys and 68 girls in

the different grouping formats. Students were found to be significantly influenced by the intervention programme. Students in the mixed ability group scored significantly high than the students from the other three groups. The effect size of the intervention programme on academic achievement of the students was found to be 4.29 which is high in magnitude.

KEYWORDS :Co-operative Learning Strategies, Academic Achievement, Grouping Formats.

1.INTRODUCTION

Co-operative learning is a combination of academic and social learning experiences. It refers to an approach where students must work collectively to complete tasks and fulfill academic goals. It is different from individual learning, which is competitive in nature. In this learning approach, students learn co-operatively. The achievement measure includes knowledge attainment, retention, precision and vision of problem solving and higher-level interpretation. In classrooms where collaboration is practiced, students pursue learning in groups of varying size: negotiating, initiating, planning and

evaluating together. Rather than working as individuals in competition with every other individual in the classroom, students are given the responsibility of creating a learning group of people where all students participate in important and meaningful ways. Co-operative learning requires that students work together to achieve goals which they could not achieve individually. The present study has the mixed ability group which refers to students having different intellectual abilities, the similar ability group in which students of similar intellectual ability are put up in small groups, the randomly selected group in which the students are assigned randomly by the teacher in different groups and the self-selection group in which the students are given freedom to choose the groups according to their choice.

1.1 Rationale of the Study

Co-operative learning strategies based instructional programme could be used for enhancing academic achievement of the students in differing grouping formats. Teachers who employ co-operative learning methods promote learning because these collaborative experiences engage students in an interactive approach to processing information, resulting in greater retention of subject matter, improved attitudes toward learning, and enhanced interpersonal relations among group members which ultimately results in the academic achievement of the students in different domains of learning. Academic achievement represents performance outcomes that indicate the extent to which a student has been able to achieve specific goals that were the focus of activities in instructional environments. The grouping formats are also expected to influence students' academic achievement due to the fact that the format of the group will influence academic and social interactions amongst students.

1.2 Review of Related Literature

Co-operative Learning and Academic Achievement: Dick (2000) in a study aimed to describe the Treisman model which involves supplemental workshops in which college students' solve problems in collaborative learning groups. The results revealed a significant effect on achievement favoring Math Excel students'. Bernero (2000) in a study project aimed to generate more interest in math, reduce math anxiety, and make math more enjoyable for students' through the use of cooperative learning. Results indicated that the use of cooperative learning generated more interest in math and made it more enjoyable for both students' and teachers. Students' improved academically, socially, and in self-esteem. Dotson (2001) in a study compared achievement scores of sixth-grade social studies students' who participated in classes using spencer kagan's structures of cooperative learning with students' who did not. The results were consistent with those of earlier studies comparing other cooperative learning methods against lecture/independent styles of instruction. Hijazi (2003) in a study aimed to identify the effectiveness of collaborative learning strategy in science achievement of primary pupils and attitudes towards collective action. The findings of the study showed that the differences are statistically significant between the means of pupils test, and trends towards collective action for the benefit of the experimental group. Moore (2005) investigated the impact of a cooperative learning calculus program on the first year calculus experience of non-Asian ethnic minority engineering students'. It addresses the issue of collegiate mathematics achievement of underrepresented minority students'. Findings indicated that the cooperative learning calculus program has been successful in improving retention and academic success rates for colored freshmen engineering students'. Shakili (2005) in a study aimed to determine the impact of the cooperative education strategy on academic achievement and retention of information and trends of students'. Results showed that there was no

significant statistical differences in the achievement or retention of information between the two groups of study (cooperative / traditional), while showed significant statistical differences in the trends towards the teaching method for the benefit of cooperative learning group. Kwen (2007) conducted an action research to explore the effectiveness of using cooperative learning strategies on students' academic achievement, their understanding of physics concepts and their motivation to learn in the physics classroom. The study involved a secondary four express physics class of 41 students in a neighbourhood school. Various cooperative learning structures were used to teach the topics on "Current Electricity" and "D.C. Circuits" over a period of about 8 weeks. During this period, teacher-crafted pre- and post-intervention tests were administered to the class. A questionnaire survey was used to examine students' motivation to learn and perceptions of their learning experiences before and after the treatment period. A class using traditional method of teaching was also involved in the study as a control. The effects of using cooperative learning on students' academic achievement and their motivation to learn were examined through the analysis of the results of the pre- and post-tests and students' perception surveys, while the extent of using cooperative learning on helping students achieve a better understanding of physics concepts was examined through the qualitative analysis of the students' journals. The results showed that the use of cooperative learning does increase students' academic achievement helps students to achieve a better understanding of physics concepts and increases students' motivation to learn. Peter (2008) examined the effects of CL strategies on the academic achievement of Asian students. Fourteen studies are included in the review. Sample characteristics, measures, findings, and effects are reported in a table. Achievement outcomes are found mixed with 50 per cent of the studies reporting neutral and negative findings and 50 per cent reporting positive findings. The paper also reveals mismatches between CL's principles and Asian cultures based on what was reported in the reviewed studies. Future research needs to further investigate this issue. Also, for CL to work more effectively in the Asian context there needs to be some further research that investigates how to change those principles of CL that may be inappropriate in the Asian context so they may be more compatible with Asian culture and conditions. Sedat (2011) conducted a study to compare the effects of Jigsaw I technique from the cooperative learning methods and traditional teaching method on academic achievement and retrieval of Turkish teacher candidates in the matter of written expression. The sample of the study consists of 70 students studying at the Department of Turkish teaching in the academic year of 2009 2010. One of the classes was randomly specified as control group (N=34) to which traditional teaching method was applied while the other as test group to which the Jigsaw technique (N=36) was applied. The study was predicated on "Non-equal control group pattern". Learning styles of the groups were determined by the Kolb Learning Style Inventory (LSI). Data about their academic success were collected through Success Test for Written Expression (STWE) applied as pre-test and post-test and views of students about Jigsaw I technique were collected through a form questioning students' views (SVF). Then, the results obtained from them were analyzed. It was observed as a result of statistical analyses that there was not a significant variation in favor of the test group in terms of academic success and stability between the test group and the control group in teaching the written expression subject. It was also determined according to the results obtained from the study that the students stated positive views for the Jigsaw I technique. Suleyman (2011) found that science lessons taught via experiments motivate the students, and make them more insistent on learning science. This study aims to examine the effects of cooperative learning on students' academic achievements and their skills in identifying laboratory equipments. The sample for the study consisted of a total of 43 sophomore students in primary school education and who took a science technology laboratory applications course in the 2010 to 2011 academic year. Students took

the course in two groups, one of which was selected, via cluster sampling, as the control group in which the traditional learning method was used, and the other as the experimental group, in which the cooperative learning method was used. The data were gathered using four measurement tools: The preliminary knowledge test (PKT), the science-technology laboratory achievement test (STLAT), the identification of experimental equipment test (IEET), and the science-technology course attitude scale (STCAS). Results of the study showed that the experimental group, compared to the control group, scored higher in academic achievement, in the identification of laboratory equipment, and in the attitudes towards science, and that the differences were statistically significant. Kemal (2013) conducted a study to determine the effect of jigsaw cooperative learning and computer animation techniques on academic achievements of first year university students attending classes in which the unit of chemical bonding is taught within the general chemistry course and these students' learning of the particulate nature of matter of this unit. The sample of this study consisted of 115 first-year science education students who attended the classes in which the unit of chemical bonding was taught in a university faculty of education during the 2009-2010 academic year. The data collection instruments used was the Test of Scientific Reasoning, the Purdue Spatial Visualization Test: Rotations, the Chemical Bonding Academic Achievement Test, and the Particulate Nature of Matter Test in Chemical Bonding (CbPNMT). The study was carried out in three different groups. One of the groups was randomly assigned to the jigsaw group, the second was assigned to the animation group (AG), and the third was assigned to the control group, in which the traditional teaching method was applied. The data obtained with the instruments were evaluated using descriptive statistics, one-way ANOVA, and MANCOVA. The results indicate that the teaching of chemical bonding via the animation and jigsaw techniques was more effective than the traditional teaching method in increasing academic achievement. In addition, according to findings from the CbPNMT, the students from the AG were more successful in terms of correct understanding of the particulate nature of matter.

II. METHODOLOGY

2.1 Statement of the Problem

The present paper seeks to study whether there is any effect of grouping formats in co-operative learning on academic achievement of students.

2.2 Operational Definitions of the Terms

Co-operative Learning Strategies: Co-operative learning is defined by a set of processes which help students' interact together in order to accomplish a specific goal or develop an end product which is usually content specific.

Academic Achievement: It refers to the marks obtained by the students' in the test constructed by the researcher.

Grouping Formats: It refers to the criteria used by the researcher for making the groups in the classroom for instruction and includes random, self-selected, mixed ability and similar ability groups in the present study.

2.3 Scope and Delimitations of the Study

The study included students of various English medium secondary schools from greater Mumbai. The study was delimited to secondary schools of Greater Mumbai. It does not include

secondary schools from any other city, state of the country. The experiment was conducted on students of standard eighth only. The study excluded other standards from its purview. The present study was confined to English medium secondary schools students and does not include regional medium students. The study restricted itself to the study of implementing of co-operative learning strategies on secondary school students' and observes its effect on academic achievement.

2.4 Aim of the Study

To ascertain the effect of the intervention programme on academic achievement of students in different grouping formats.

2.5 Objectives of the study

- 1.To compare the pre-test scores of academic achievement of students in different grouping formats.
- 2.To compare the post-test scores of academic achievement of students in different grouping formats.
- 3.To compute the effect size of the intervention programme on academic achievement of students in different grouping formats.

2.6 Null hypotheses of the Study

- 1.There is no significant difference in pre-test scores of academic achievement of students in different grouping formats.
- 2.There is no significant difference in post-test scores of academic achievement of students in different grouping formats.

2.7 Methodology of the Present Study

The study has been adopted the quasi- experimental method. In the present research, quasi experimental design of the pre- test post-test, non -equivalent groups was used. It can be described as follows:

O X1 O₂
 O₂X2 O₂
 O5 X3 O6
 O7 X4 O8
 Where,

O₂ ,O₂ ,O5 and O7 = Pre-test scores

O₂ ,O₂ ,O6 and O8= Post-test scores

and

X₁: Intervention Group1 (Mixed Ability Group)

X₂: Intervention Group 2 (Similar Ability Group)

X₃: Intervention Group 3 (Randomly Selected Group)

X₄: Intervention Group 4 (Self-Selected Group)

The duration of the treatment was for 44 hours in each group.

2.8 Sample of the Study

In the present study, the sample consisted of students from four secondary schools affiliated to

the state board of Maharashtra. The four groups had 164 students in all from English medium schools situated in Greater Mumbai of Mumbai district in Maharashtra out of which three schools were private un-aided and one school was private-aided.

Table 1: Sample of the Study

Grouping	Boys	Girls	Total
Mixed ability group	30	12	42
Similar ability group	19	20	39
Random sampling group	20	19	39
Self selection group	27	17	44

2.9 Tools of the Study

In the present study, the following tools were used by the researcher to collect the data:

1. Academic Achievement Test (Mandole, 2014). The test was prepared on the basis of domains of human learning – cognitive (knowing, or head), affective (feelings, or heart) and psychomotor (doing, or kinesthetic, tactile, haptic or hand/body) identified by Anderson and Krathwohl.

2.10 Intervention Programme

In order to achieve the objectives of the present research, a carefully prepared set of study material was developed. Thus, the researcher prepared lesson plans on co-operative learning strategies. It had four different modules with different co-operative learning strategies. The intervention programme based on co-operative learning strategies of about 44 hours was developed spreading over nine weeks.

2.11 Techniques of Data Analysis

The present research used statistical techniques of ANOVA and Wolf's formula.

III. FINDINGS AND CONCLUSIONS

1. Null Hypothesis 1: There is no significant difference in pre-test scores of academic achievement of students in different grouping formats.

Table 2: Pre-test AAS in different grouping formats

Grouping	Mean
Mixed ability group	3.1905
Similar ability group	3.4615
Random sampling group	4
Self selection group	3.8409

The technique used to test this hypothesis was the One-Way ANOVA. The following table shows the relevant statistics of the pre-test scores of AAS of students' in different grouping formats.

Table 3: Pre-test ANOVA for AAS in different grouping formats

Source	SS	df	MS	F	P
Treatment (between groups)	16.5061	3	5.502	2.16	0.094852
Error	408.0549	160	2.5503		
Total	424.561	163			

The preceding table shows the F-ratio is not significant ($P = 0.09$). Hence the null hypothesis is accepted.

It may be concluded that the mean pre-test academic achievement scores of the students in different grouping formats do not differ significantly.

2.Null Hypothesis 2: There is no significant difference in post-test scores of academic achievement of students in different grouping formats.

Table 4: Post-test AAS in different grouping formats

Grouping	Mean
Mixed ability group	19.9286
Similar ability group	12.1282
Random sampling group	9.8974
Self selection group	12.1818

The technique used to test this hypothesis was the One-Way ANOVA. The following table shows the relevant statistics of the post-test scores of AAS of students in different grouping formats.

Table 5: Post-test ANOVA for AAS in different grouping formats

Source	SS	df	MS	F	P
Treatment (between groups)	2389.7445	3	796.5815	14 5	< .0001
Error	873.2799	160	5.458		
Total	3263.0244	163			

The preceding table shows the F-ratio is significant ($P = < .0001$). Hence the null hypothesis is rejected.

It may be concluded that the mean post-test academic achievement scores of the students in different grouping formats differ significantly. The mean post-test scores of the mixed ability group is significantly greater than the similar ability, randomly selected and self-selection group.

The following table shows the relevant statistics of the Tukey HSD test of AAS of students in different grouping formats.

Table 6: Tukey HSD Test for AAS in different grouping formats

M_1 vs M_2 $P < .01$
M_1 vs M_3 $P < .01$
M_1 vs M_4 $P < .01$
M_2 vs M_3 $P < .01$
M_2 vs M_4 nonsignificant
M_3 vs M_4 $P < .01$

It may be concluded from the table 4 and table 6 that the mean AAS on the post-test is the highest in case of students from mixed ability group followed by similar ability group, self-selection group and randomly selected grouping in that order.

Moreover, the mean post-test AAS of students from randomly selected group was significantly smaller than that from the other three groups.

It is also evident that the mean post-test AAS of students from similar ability group and self selection group do not differ significantly.

3.1 Conclusion

It may be concluded that the mean AAS of students is significantly greater. Thus, the co-operative learning strategies were found to be effective in enhancing the academic achievement of students' in different grouping formats. The mixed ability group had scored highest than similar ability group, randomly selected and self-selection group.

IV. DISCUSSION

The treatment i.e the intervention programme developed by the researcher is found to be effective for enhancing academic achievement of students in different grouping formats. The mixed ability group had scored the highest in the post-test scores as it had students in the co-operative learning groups which had students of different intellectual levels. The members of this group may have provided academic support to each other so that all can succeed academically. The similar ability group and self-selected group may have supported each other socially. The randomly selected group is least effective as compared to the other three groups in the post-test scores as the grouping was based neither on ability nor on friendship. Hence the interaction of the randomly selected group was academically and socially not effective.

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Assistant Professor , Gandhi Shikshan Bhavan's , Smt. Surajba College of Education.

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