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RESEARCH PAPER

Effect of Cooperative Learning Strategies on Students' Learning

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ABSTRACT

It is noticed that students are stay deprived from the practical teaching because our teaching and learning system has its base on rote system. In this paper, researcher tried to bring in teaching method that may support students learning so that they are able to develop their concepts by promoting self-learning to polish students' creative abilities. This study was purely experimental in nature and data was collected from control and cooperative learning (experimental) groups twice. Students of first group were taught with the help of cooperative learning strategies and no such treatment was given to control group students. Data was collected from both groups and analyzed by using descriptive statistics as well as analysis of co-variance (ANCOVA). Study results showed that there was a significant difference seen and students those were taught by using cooperative learning strategies were able to perform significantly better than control group students.

Introduction

The success and advancement of a country mainly depends on the choice of education that is accessible to its population as the education is the backbone infrastructure of any country in the world. It is most dominant tool of change (Simmons, 2006). Now a days, teachers have to face many challenges to teach the students of various abilities. VanSciver said, "now teachers have to face academic variety which was rarely seen in past" (VanSciver, 2005: p.534). Many researchers showed the considerable effect of instructional strategies on student's scholarly presentation. Those pupils extensively secure higher marks in their subject tests that were given instruction in modern teaching methods in contrast to those who taught lesson in traditional way. The information that is based on activity enhances the ability of students to resolve their daily issues and improve their concepts to utmost grade. Students also effectively learn the lesson by activity-based instructions (Boud

& Feletti, 1997). The learning is influenced by use of variety of information processing than direct way of curriculum study. Hence, in this research two types of teaching methods are focused to find the effect on students' achievement level.

From all the famous cooperative learning (CL) thinkers, Slavin & Madden (2001), explain the CL as the condition of teaching techniques in which the learners perform in the form of groups with the help of other members and are motivated to work in groups for the purpose of teachings tasks. CL technique might be as clear and simple as the learners meet with each other to clear the concepts related to academic responsibilities or these concepts might be tough or ambiguous. They can also use the motivation techniques to improve the performance of all the group members.

The CL strategies also provide the facility to students to share one's concepts and answers with their group fellows. They could write their answers against that question, move towards his seat fellow or group fellow, and share his answer with fellow and discuss it with all the class fellows as well. This strategy allows learners talk about their reasoning, break down their position, and clarify their perspective to their fellows. Through this discussion with the whole class, the learners become able to evaluate their performance by collecting information from the whole class. The instructor would likewise have the chance to assess the learners' understanding in view of the discussed material. The application of such methods i.e. cooperative learning method would be simple in science classes even with the burden of syllabus, it's topic to be covered, and to obtain good marks on demand from parents.

Components of Cooperative Learning

Here are some components recognized by Johnson (1994) that consist on CL. The details of these components are given under.

Face to Face Interaction is the element in which students are motivated to follow verbal and non-verbal both types of communication skills while they are describing learning content and concepts (Johnson, 1994). They perform activities face to face by which they become enable to describe the ideas and to solve their assignments. Though face to face doesn't meant that they are really in front of each other having eye to eye interaction but it can also be thorough telephone, by emails, by Skype etc. it last till the students are in collaboration with each other.

Positive Interdependence means learners feel responsibility for their actions and sense of belongingness while working in groups for various academic tasks. This responsibility is enhanced when they realized that they all are together for work. Consequently, students investigate that the level of their group is dependent on their performance and on each other. In this component of cooperative learning, it is

significant make sure the achievement of each student represents the achievement of whole group as well.

Group Processing is a component of cooperative learning in which the students are provided with the chance to show that how they act in group activities and to judge how much learning they had received. In this element of CL teachers enable the students to recognize the limit till which the interactive skills are applied. Furthermore, communication also plays very important role in this matter. All the group participants are bound to use open communication phrases to make sure the concern and complaint so that they can be articulated in the group contexts. It is also essential to make sure the efficient working relations are increased in the group for the surety that contradictions are minimized.

Individual Accountability is combination when students are working in group then different tasks is assigned to each of them which they proceed to make sure the group objectives are attained. As the result learners are responsible to answer for theory participation in the group. The specific defined roles assist the students to be aware about the responsibility for group and individually both. It is also essential for the group participants to leave influence in decision making process that will maximize the belief and consistency in group participants.

Negative Interdependence is essential component in CL. It is the component that produce competitive environment in the classroom (Kagan, 1995). This factor to compete in the CL might be wrongly interpreted by many students. Though, it is main issue in increasing the production and progress of working conditions in the group participants. The competitive environment makes sure that the people keep the focus that it is necessary to fulfill the goals and objectives related to learning in near future.

Goor and Schwenn (1993) present elements in CL that are listed below:

(i) The use of flexible diverse groups

(ii) Sharing aims and opinions by the team to promote common support

(iii) arranging classroom for team task

(iv) Teaching students how to work with one another.

(v) selecting CL method to attain the target of the lesson

Cooperative Learning Techniques

Cooperative learning techniques, such as jigsaw, learning with each other, students group-achievement divisions, group games tournament, have likewise is used trying to fix a large number of society's ills running from bigotry to harassing to violence. Third, CL skills reflect rigid but useful rules for teaching process. The teachers have many types of methods for each situation. On the other hand, with such a large amount of choices and not very many courses regarding which and how to consolidate cooperative learning procedures, the objective of this exploration ponder was to distinguish the viability of shifting agreeable strategies. They differentiate 4 main problems with applicable teaching methods. The first of them is concerned with to what extent the research was feasible to assist the CL strategies. Old studies were distinguished for the maximum relevancy which focuses on the effect of study as compare to the effect of CL strategies. As per Johnson, Johnson, and Stanne (2000) the second issue is "there has never been a far reaching evaluation of what number of agreeable learning strategies have been experimentally tried". Agreeable learning strategies can be changed in various methods through which we can identify the basic flaws of system

Ascertaining the adequacy of CL on success is the next point and it decided the characteristics of cooperative learning methodologies was the next point form this. This point is identified as the methods of CL may be fixed on the base of continuity of its utilization. To make it clearer we can say the CL techniques consist on the trustworthy and highly demanding methods of teaching that instructors can easily and rapidly apply any time in any situation. Teachers are ready to use this system because this method demands minimum effects from the side of instructors with minimum teachers are there who are using these strategies (JJ & Stanne, 2000).

Johnson, Johnson, and Stanne (2000) identified the other side of CL methods as the reasonable CL strategies based on the applied system through which instructors learn and apply the format to redesign the existing drill methods and apply the most suitable one. Educators are ready to design helpful practices to accommodate their specific situation. These techniques initially are more time taking while making arrangements but are comfortable to apply in classroom.

At the beginning theoretical method of teaching may be more difficult and time taking to understand and apply in the classroom, but when the teacher got full command over these approaches, He/she got the ability to adapt and modify these approaches. The technique used in the analysis was meta-analysis. The process of CL and the grouping of the process were utilized as two independent variables. Individual studies were grouped base on concept of the approach used in the research like jigsaw or learn from each other. A type was depicted by using the idea of direct or conceptual CL strategies. Student achievement represented as dependent variable (JJ & Stanne, 2000).

Hypothesis

The hypothesis of the study was:

Ho: After controlling for pretest scores, there is no significant difference exists between the posttest results of achievement test scores across all groups

Material and Methods

Nature of Study

This study was purely experimental in nature, data was collected based on pre-test and post-test control and experimental groups design.

The pure experimental research studies are considered to be genuine type of research designs, mostly it is backed by statistical analysis so that research can make decision to reject and accept hypotheses or to answer research questions accordingly. Before applying any statistical analysis, mostly it is considered that important to distribute individuals into different groups based on randomization. In this such design, experimental group receives intervention and control group does not, based on statistical analysis occurrence of change, if any, can be seen on dependent variable based on intervention given.

Population, Sample and Sampling Technique

The female students of 10th class of biology were taken as targeted population of the study. Subset of the population were taken as accessible population based on assessbilty within the Jhang region taken from Farahn girls high school, Jhang city, after getting their voluntarily inclusion in this study. The set of chosen elements, people or objectives, for the sake to participate in research is called sample of the study; selection of people is known as participants or subjects of the study and this process of selection group of participants, incidents, behaviors, etc for the sake to conduct research study is called sampling technique or simply sampling **(**Creemers & Kyriakides, 2007**)**.

The convenient sampling technique was used to select sampled school because this school was willing to get involved into this research, after getting plenty of discouraging responses from most of the public sector schools. All the female students from biology of 10th standard from Faran High School, Jhang city were taken as sample of the study. The reasons for selecting the private sector school were that, the public sector high schools were not willing to approach their students due to safety issues and government policies. Then the private school was selected as the sample of study because the standard of this school was very near to the public sector schools. The income of employees and the policies about the teachers' selection

criteria, qualification, and student teacher ratio was all near to the public sector standards. The students who enrolled in this school all were from good socio economic status. Besides this, they had a good strength of biology students and had minimum number of vacations in this school as compare to other private sector school. So, the researcher was able to complete his experiment without unnecessary gaps and obstacles during the experiment. This school had 69 girls in one class. The researcher took that class as the sample and divided the sample in three groups on the base of randomization of students. The randomization of students was done by enlisting all the 60 names of class on a paper. Then all the names were turned in a piece of paper. All the names were put in a basket then randomly selected 20 coupons for group 1, then next 20 for group 2 and next 20 for control group. Through this sampling technique equivalent groups were formed as they were double checked i.e. by randomization and pre-test. The pre-test results of the sample ensure the equality of groups.

The treatments applied to experimental group were based on the following designs.

Cooperative Learning Strategies

1. Communication of the Group Goal (C.G.G.)
2. Communication of the Tasks Structure (C.T.S.)
3. Pupil-Pupil Interaction (P.P.I)
4. Monitoring and Intervention by the Teacher (M.I.T.)
5. Testing of Individual Learning (T.I.L)

Design of the study was

Experimental Group	**R**	**O_1 Pretest**	**X_1 Treatment**	**O_2 Posttest**
Control Group	R	O Pretest		O Posttest

Experiment Procedure

The researcher first of all visited the school and checked the school timings, strength, and suitability level to select this school as the sample of study. The researcher met with the school principal and discusses his intention to work in that school. The researcher conducted a detailed meeting with the biology teacher to discuss about the study. Before starting the intervention the researcher trained the

biology teacher of the sampled school about cooperative learning strategies. The researcher consumed 5 days to make the things clear with the class teacher.

The students of 10th class were randomly divided in 2 groups containing 20 students in each group. The experimental group was formed by the researchers and this group was given treatment based on cooperative learning strategies. The second group was the control group. Then the researcher took pre-test from all the groups. Pre-test of science achievement was conducted of all these groups to ensure equivalence and also compare effect of the treatment in post-test. The school teacher was handling all the groups. She was taking 3 classes each class was of 45 minutes.

The participants of experimental group were taught same topics but in different teaching methods such as by using CL strategies. The participants of group 1 were divided in small groups. Each group comprised on 5 students. They learnt the things by sharing the concepts with each other within the group and with other groups as well. On the other hand the control group participants were taught simply by lecture methods. The teacher covered section I consisting of 2 chapters from the book named '' Gaseous Exchange'' and '' Homeostasis''. After intervention of 11 weeks the researcher took the post-test from all the groups.

After expert opinion pilot testing phase was conducted. The test having 53 items was conducted on the 20 students of 10th class biology students in other private school in same locality. After this item analysis was done to confirm the moderate difficulty level and discrimination power of items. At the end, 49 items were finalized for the science achievement test. Item analysis is attached in appendix F. The reliability of this tool was measured and found 0.89 which was reliable to use in this research.

Results and Discussion

Table 1
Internal Consistency Reliability of Achievement test (Cronbach Alpha Coefficient) for students (n=20)

No. of Items	Alpha Reliability
49	0.89

At the end 49 items were finalized for the science achievement test which is attached in appendix G.

Analysis and Interpretation of Data

As per design of the study, two quantitative analysis techniques were applied by using SPSS v.22 such as descriptive statistics, and analysis of co-variance (ANCOVA).

Table 2
Age-wise classification of respondents

Age	Frequency	Percent
14-16	15	37.5
16-18	25	62.5
Total	40	100

The table 2 represents the age wise classification of respondents of the study. It is revealed that 15 participants of the study were from the age range of 14-16 years and 25 respondents were from the age range of 16-18 years.

H_0 After controlling for pretest scores, there is no significant difference exists between the posttest results of achievement test across all groups

Table 3
Analysis of covariance based on posttest scores for achievement test

	Students' Scores			
	Observed Mean	Adjusted Mean	SD	N
Control	4.060	4.056	.3333	20
Treatment	3.714	3.719	.3910	20

Source	Sum of Squared	*df*	Mean Squares	F	Sig	Partial Eta Squared
Pretest	.978	1	.978	8.962	.005	.195
Groups	1.133	1	1.133	10.38	.003*	.219
Error	4.037	37	.109			

*$p < 0.05$

The analyzed results of table 3 of one-way ANCOVA shows that there was a significant difference exists in mean achievement scores of respondents where [F (1, 37)= 10.38, p=0.003] between both groups such as control and cooperative learning, whilst adjusting for their pretest achievement scores as covariate. The partial eta squared (ETA) is 0.219 or around 22% elaborates effect size existence and this effect is considered to be moderate level according to Cohen's guidelines. Additionally, calculated value of p (0.003) also falls under significance level (0.05), on the basis of aforementioned results, the null hypothesis is rejected. It further concluded that there was significant effect of treatments given to students of treatment group and they showed better achievements scores as compared to what they earned previously. Moreover, adjusted mean scores also reflect significant and positive shift in achievement scores of the children especially for the treatment group those were given treatment based on cooperating learning strategies.

The table 2 shows the distribution of respondents with respect to their age which showed that most of the respondents were in the age range of 16-18 years. In table no. 3, the results of one-way analysis of covariance (ANCOVA) showed that there was significant difference exists, in pretest and posttest, between achievement scores of both groups such as Cooperative and Control based on Science Achievement Test Scores. The calculated value of p showed that the null hypothesis (H_0) was rejected. Moreover, deeper understanding of the said table showed that there was medium level effect size seen on treatment group which received the intervention based on cooperative learning strategies. It is observed from teachers' duties that they are trying to improve the students' achievement level using various instructional methods and utilizing practical techniques to enhance concept development process but this is not the actual story. Our students are still suffering from the use of old and boring traditional styles of teaching on the bases of which proper concept of development and creative thinking abilities are not possible to produce. In this study an attempt is made to provide a novel and unique learning situation to students to enhance the performance of students and introduce new styles of teaching techniques. Thus the findings of this study highlight the effect of cooperative learning strategies on the achievement of science students. The students of cooperative learning strategies enjoyed a lot while learning in group form as compare to the students of other group participants.

Conclusion

The results are evident to show that treatments given to cooperative learning group based on cooperative learning strategies during teaching at school helped the students to perform comparatively better and significantly different as compared to students included in control group. These results were based on science achievement test conducted twice before and after the study and it was clearly concluded that students of cooperative learning performed better than control group where no treatment was given at all. Smith (2000) expressed that the learners that were guided with the assistance of specific roles and learn through steps of cooperative learning with the cooperation of group members were also showed improved performance relatively. Also, Johnson & Johnson (2018) clarified that cooperative learning technique was the indirect source for the improvement by giving a chance to the students to plan and track their learning, and furthermore, the CL techniques can be utilized for self-clarification also.

Recommendations

This study was conducted in the district Jhang of Punjab province, hence it is recommended that it should be studies in different districts and provinces as well.

- This study was carried out on the secondary level science subject students i.e. biology. This study should also be conducted on the students of social sciences and on primary or tertiary level students.

- This study should be conducted on wide number of sample size and also on both gender students i.e. girls and boys.

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