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The Relation Between Student's Academic Achievement and Cooperative Learning

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Abstract: The present research aims at a detailed investigation of the impact of cooperative learning on student's academic achievement in math course through learning together. The research method was quasi-experimental and the statistical community included sixth grade students of four areas of Karaj in 2012-2013. From among the four areas of Department of Education in Karaj, areas 1 and 3 were randomly selected. The findings indicate that the consequent achievement in math course is significant after testing the experiment group. Cooperative learning method was utilized in the experiment group and traditional method was used for the control group. For data analysis, descriptive statistical methods, t-test and variance analysis were employed. Cooperative learning method has more positive effects on student's academic achievement than the traditional method and the research proves that cooperative learning method based on the proposed pattern has significant effects on student's academic achievement in math course.

Key words: Cooperative learning, academic achievement, students, traditional learning, effect

INTRODUCTION

According to education experts, those students who learn by active learning not only learn things better but enjoy more in the process; since instead of being mere listeners, the students participate actively in their own education and feel responsible toward it. One of these currently-practiced methods which has attracted the attention of many education experts is cooperative learning. Cooperative learning is a teaching strategy in small groups but any teaching in groups is not necessarily cooperative learning. Because cooperative learning has its own specific methods and requirements and until the correct fulfillment of these requirements, one cannot claim that cooperative learning is employed. The traditional education approach believes that knowledge acquisition necessitates concentration and discipline and establishing such discipline for learning is a duty of teacher. The modern method believes that knowledge acquisition needs a proper educational environment and inspiring students and here, the duty of teacher is to design and create such an educational environment (environment is not limited to its physical aspect but it means the collection of physical elements and relations between students and teacher). The traditional approach emphasizes on repetition for learning but the modern approach focuses on research. Every student in the modern approach has his/her own unique aptitudes and the teacher should encourage each individual to discover his/her gift. Now a days, learning goes through various approaches or better to say, teaching is conducted with different methods.

Today, the traditional approach which had long dominated the education system fails student's and teacher's demands. By contemplating more deeply on the subject, the main reason for many student's failures is the application of improper learning methods, which brings about irrecoverable ill effects to the individuals and to the society as well, we must note that it is a combination of various methods that can achieve education goals. Cooperative learning has attained more academic achievement when compared with the traditional approach. Research findings attest that most of the students view school as a competitive environment in which every person tries to get ahead of others. Students rarely congratulate each other's success and with no heed to race, educational success, language and appearance, they work alongside each other. Since, math problems naturally necessitate various solution strategies, the application of the modern approach in teaching math course is extraordinarily highlighted. Students can find different solutions for problems by working in groups and consulting with each other. They can learn effective strategies with the help of their classmates and the guidance of teacher. Studies proved that the most difficult course for children is mathematics. The nature of math problems is more effectively learned by discussion and group work. Students can achieve real learning by talking,

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listening, explaining, thinking, evaluating and being evaluated in small groups. The study of agneau basy indicated that the students that participate in cooperative learning methods attain more academic achievement and responsibility toward education in comparison with those students leaning on their own. The former group holds a positive view on school and to invocate Fazlikhani, it is possible to lower student's inactivity by using appropriate educational trends.

Johnson *et al.* in an article entitled "Cooperative Learning Methods" emphasize that cooperative learning is not restricted to a specific method but it includes a vast collection of them by which the classroom is organized in an effective and flexible way. The diversity of cooperative learning is so great that every teacher can adapt it to his/her own condition, situation and philosophy. In their view, the theoretical, experiential and administrative background of cooperative learning has turned it to a strong pattern. This pattern is associated with theories in anthropology (Parsa, 1952), sociology (Shahraray, 1952), economics (Abedi, 1970), politics (Farahani, 1969), developmental psychology (Fereidooni,1968), linguistics (Karimi, 1967) and psychology of learning (Lotf, 1964). Studies conducted in cooperative learning field indicate that the effectiveness of this method is higher than the traditional approaches such as competitive and individual approaches. For example, the recent study of Sharan and Slavin indicated that cooperative learning significantly influences student's academic achievement and improves their inter-personal skills while no significant positive effect was observed in competitive and individual approaches. Elizabeth Cohen refers to four principal concepts in cooperative learning efficiency. The first concept is student's academic achievement which is assessed by some specific tests. In her opinion, academic achievement tests should focus on basic concepts and functions, specifically in math and arithmetic courses. The second concept is associated with high-level thought skills development.

The third concept is concerned with equal opportunities for cooperative group members in interacting with each other. And the fourth concept emphasizes on the student's favorable social behaviors in cooperation groups which can otherwise be called positive group communications. In Payne and Whittaker's view, groups (especially student groups) pass through the following stages.

Self-recognition, gaining power and influence, integration development and duty fulfillment. The most lasting cooperative learning groups are base cooperative groups which evolve through the main four stages, self-recognition, gaining power, integration development and duty fulfillment. Some scholars describe specific groups as highly functional cooperative groups whose most obvious characteristic is trust, respect and excessive love between members. This feature quickens group works because members voluntarily help each other. This research intends to draw an outline of this subject as a guide to establishing cooperative groups for teachers.

In 1991, Slavin, regarding cooperative learning techniques through learning together, maintains that eight cooperative learning methods exist in the overall findings of cooperative learning researches.

MATERIALS AND METHODS

Random sampling was conducted in several stages. At first, schools of areas 1 and 3 were divided into girl schools and boy schools and then from each group, two schools were randomly selected from among the four areas. Finally, one class was randomly selected out of each school. Thus, research samples included eight classes which four of them were classified as the experiment groups and the other four were classified as control group. The experiment group, like the control group, included two boy classes and two girl classes. The research method was quasi-experimental carried out in the community of sixth grade students of Karaj in 2012-2013. Because of the vastness of the community and not being able to study all of them, two areas of 1 and 3 were randomly chosen out of the four areas of Karaj City. The education program is for the first four months of the year. Education period is four months, four sessions per week, a total of 60 sessions. Teaching days and hours are set according to the school syllabus.

For data analysis and testing hypothesis, t-test and variance analysis were utilized. Also, the valid confidence level for accepting and rejecting hypotheses was predicted 99% and probability of error was 1%. The scores of the experiment group are significantly different from the control group in both pre and post-test.

Table 1 indicates that the mean score of math academic achievement pre-test in the experiment group is insignificantly different from the control group. Meanwhile, girl's academic achievement scores in math pre-test are lower than boys. Table 2 indicates that the

Table 1: Description of data related to pre-test academic achievement in math course

Gender	Group	No. of samples	Mean	SD	SE
Total population	Experiment	66	13.69	1.81	0.22
	Control	66	13.70	1.82	0.22
Girls	Experiment	34	13.56	1.84	0.31
	Control	34	13.55	1.89	0.32
Boys	Experiment	32	13.82	1.79	0.31
	Control	32	13.87	1.77	0.31

Table 2: Description of data related to math academic achievement post-test

Gender	Groups	No. of samples	Mean	SD	SE
Total population	Experiment	66	15.34	3.28	0.40
	Control	66	12.96	4.18	0.51
Girls	Experiment	34	14.72	3.70	0.63
	Control	34	11.67	4.29	0.73
Boys	Experiment	32	16.00	2.67	0.47
	Control	32	14.34	3.64	0.64

Table 3: Score differences in students' academic achievement in math course in pre and post-test

Groups	No. of samples	Mean	SD	SE
Experiment	66	11.65	2.24	0.27
Control	66	9.26	3.04	0.37

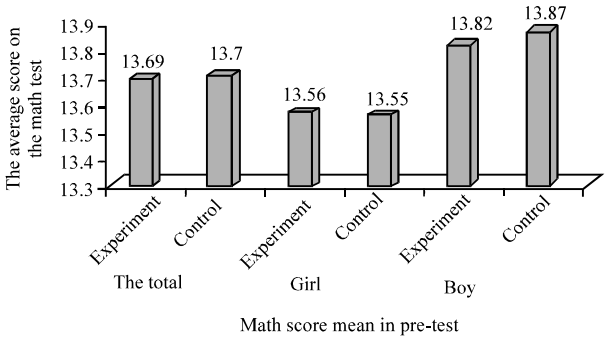

Fig. 1: Comparison of means related to math academic achievement pre-test

mean score of math academic achievement post-test in the experiment group is higher than the control group. Moreover, boys had more academic achievements in comparison with girls.

Table 3 and Fig. 1 indicate that student's academic achievement in the experiment group in post-test has increased by 11.65 while the scores of students in the control group increased only 0.31. Table 3 shows that the attained progress in post-test math score in the experiment group is significant. Since, the calculated value of t is 3.62 which is higher than the critical value of t table which is 2.58. Thus while confirming the hypothesis, one can claim that the achieved development is due to the experimented method, namely cooperative learning. Table 3 indicates that the influence of gender and experiment operation is significant on the math academic achievement.

RESULTS AND DISCUSSION

Cooperative learning is one of the new teaching approaches put forward by experts which intends to encourage the spirit of cooperation and accordingly weaken the spirit of competition. By cooperative learning in this research it is meant that students work in non-homogeneous groups of four people in order to learn their lessons and mutually help each other. The results of this study are in line with those research in the field of student's academic achievement through cooperative learning conducted by Lotf (1964) Abuseji (2007). Also, the above results are in accordance with the researches concerned with the impact of cooperative learning on high school academic achievement conducted by Aronson (1978) Atkeson and Forehand (1981) Johnson and Johnson (1999).

Karimi (1967) has concluded that math and natural science courses necessitate more thought skills and because of this, students enjoy more from the application of cooperative learning method and learn their lessons more deeply. The results of Rahimuf's study attest to the significant impact of cooperative learning method without reward on the academic achievement. He concluded that cooperative learning without reward is more effective in long-term that the method with reward. This conclusion, while validating the proposed pattern of cooperative learning, is in line with the findings of this research regarding academic achievement.

Keeping enough flexibility while teaching, interaction and communication of the students which is at its lowest in inactive methods, can be achieved through cooperative learning method. Therefore, the application of this method for increasing interaction and knowledge transfer between the students is necessary. To achieve a desirable community with people having control on their own lives which in coexisting aim at cooperation, accountability and all-inclusive development in the society, the education system must be revolutionized, this revolution is possible and practical with the application of methods utilizing participation and cooperative learning in education. Teachers must be inspired enough to utilize this method. It seems that many teachers simply ignore this method due to lack of knowledge of its benefits. Thus, teachers should meet the required instructions and the education system should support the application of this (cooperative) method.

CONCLUSION

According to the findings of this research, the mean score of math academic achievement in the experiment and the control groups were almost the same before the execution of cooperative method but after the implementation of this method, the mean score of the experiment method was significantly increased while the mean score in the control group was increased insignificantly. Therefore, this research proves that cooperative learning method with the proposed pattern is effective in student's academic achievement in math course.

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