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The effects of classroom management based on cooperative learning approach on science course academic achievement of sixth grade students in the town of Piranshahr

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Abstract : The present study was an investigation into the effects of classroom management based on cooperative learning approach on science course academic achievement of sixth grade students in the town of Piranshahr, Iran. The study was a quasi-experimental one in which a pre-test post-test design was utilized and there were two experimental groups and two control ones. The statistical population included Piranshahr's sixth grade students in the school year of 2012-2013. The study sample consisted of 120 students who were selected through cluster sampling. The two experimental groups (1 & 2) included 60 students and there were the other 60 students in the two control groups (1 & 2). In the experimental groups, cooperative learning approach to classroom management was utilized and in the control groups classes were managed using the traditional teaching approach (lecture). The study instruments included researcher-designed academic achievement tests whose validity and reliability (91%) were obtained. Data analysis was conducted through descriptive statistics and inferential statistics (ANCOVA).The results of the study showed that students of those classes managed through cooperative learning approach outperformed students of lecture teaching approach in terms of their academic achievement. There was no significant difference between the two experimental groups.

Keywords: classroom management; cooperative learning approach; academic achievement; science course; sixth grade

1.Introduction

As a social group and system, classroom is a place for education and training. Class groups, known as so-called communities, are secondary groups that have common beliefs, norms, and values. Classroom has been on the focus of educational and curriculum designers and educational psychologists' attention so that they would be able to create learning opportunities and facilitate teaching/learning process. Educational managers have also paid special attention to it in order to enhance the teachers' effectiveness and efficiency. Educational scholars defined classroom management as a set of skills that are required by teachers in order to reach an attractive, constructive, and effective educational environment.[1]

Like other social and group situations, classroom management also requires management functions such as design, organization, leadership, supervision, control, and assessment. Realization of these functions converts the classroom environment into an educational and learning one. Class situation has specific features; therefore, separation of functions is hardly impossible. However, realization of all functions in classroom management process is necessary. Classroom management has always been one of the main issues of concern for teachers because managing and

controlling a classroom are bound to creating an effective learning environment in order to achieve educational objectives. Designing and organizing a classroom facilitate classroom management. Classroom management needs to be designed in a way whereby more learning opportunities can be provided and the students' social and cooperative abilities will be enhances. Studies on classroom design and planning indicate that lack of a well-organized curriculum causes a lot of behavioral problems among students, especially when it is not compatible with their psychological characteristics (Oliwa, 2000).

In her study entitled "student-centered classroom management", Martin has explained the relation between education and classroom management. She concluded that because education and classroom management are mutually and closely related, they should not be considered separately. This claim is based on the assumption that these two variables simultaneously influence the classroom atmosphere. However, this relation is often ignored. Although nowadays new teaching methods like student-centered and cooperative approaches are constantly recommended, traditional teaching approach is still applied in classroom environment. At the same time, it should not be forgotten that cooperative or student-centered teaching cannot be obtained without cooperative or student-centered classroom management (Martin, 2003). In the present study, classroom management means all teaching-learning activities conducted in classrooms. Scientific and educational management of teachers guides them to choose their teaching methods, in which special attention needs to be paid to the learners' conditions, situation, characteristics, and level and educational facilities and equipment so that the teacher can choose suitable teaching methods and act according to the conditions and the course subject (Samadi *et al*, 2008). Wragg (1999) considers classroom management as planning for further involving the students in teaching-learning process.

In most class educational activities, the dominant approach is traditional teaching approach. That is, through learning process most learners do not get involved in challenging situations and are less provided with situations of cooperation, consultation, discussion, and conversation between the teacher and the students (Keramati, 2007). In other words, in traditional classroom management, the main emphasis is placed on the text book and the teacher. Therefore, memorizing the materials (and not analysis and logical argument) is equal to learning. In such a situation, students get frustrated if they come across conceptual problems. As a result, fundamental weakness in their scientific ideology begins to get root and their academic performance will decrease (Korsunsky, 2004). One of the latest teaching approaches is cooperative learning approach which in regard with teaching paradigms is classified as a social cooperative one. This approach can be an appropriate substitution for the traditional one that is associated with several disadvantages such as rapid forgetting and students' fatigue and lack of interest (Gharib *et al*, 2004). In order to correctly conduct this approach, it is necessary for the teachers to get familiar with its definition, nature, and learning features like positive internal dependence, individual responsibility, progressive cooperation, interpersonal relationship, and group process because only in this case conducting this approach can lead to positive results (Gillies *et al*, 2008). All teachers agree that cooperative learning approach affects students' academic achievement; however, there is less agreement over the effect of different styles of cooperative learning on academic achievement, which seems to be related to the quality of conducting these styles; therefore, the teacher's proficiency and knowledge are necessary in order to provide suitable conditions. In this regard, Cohen states, "The teacher's professional development is a prerequisite for applying cooperative approach. He should be aware of theoretical and philosophical basis of cooperative learning in order to reach a professional development in terms of conducting the approach. He should know different methods of cooperative learning and take advantage of his colleagues and other teachers' support" (Damas & Cohen, as cited in Keramati, 2005, p. 137). Learning through cooperation means utilizing small groups in a way that students cooperate with each other in order to maximize their and other students' learning (Barkley, 2005). Most of the conducted studies on improving science course teaching have considered the teacher's role pivotal and counted his guidance effective in formation of science concepts. However, there are very few studies on the effect of student-to-student relationship in learning science concepts. The results of the conducted studies show that students' failure in fifth and sixth grade science courses is due to their passiveness and that encouraging them to participate in learning process in groups is one of the ways to activate them in science class. The effectiveness of cooperative learning in academic achievement is one of the special topics of investigation in teaching and learning realm, which is less paid attention to.

Bearing in mind the abovementioned paragraphs, the present quasi-experimental study was aimed at investigating the effects of classroom management based on cooperative learning approach on science course academic achievement of sixth grade students in the town of Piranshahr, Iran during the school year of 2001-2012.

2.Research hypotheses

1. Compared to traditional approach, cooperative learning classroom management results in higher science course academic achievement in sixth grade students.
2. Cooperative learning classroom management results in higher academic achievement in girls compared to boys.

The concept of cooperative learning classroom management

Classroom is a place where a number of students sit daily and while communicating with each other learn materials from their teacher. Some novice teachers worry how they can control the class while having a good relationship with their students; this is a major problem for them. Classroom management is related to methods and strategies whereby teachers improve students' behavior and pave the way for them to learn efficiently. Classroom management is a prerequisite for effective teaching and learning; in other words, it is the basis for a class success (Mortazavizadeh, 2006). Effective classroom management maximizes effective teaching and learning. According to the definition provided by Wolfgang and Glickman (1986) classroom management is all attempts made by the teacher in order to supervise class activities including social interactions and students' behavior (Martin & Yin, 2004). According to Wolfgang, teachers form their behavior in classroom management based on their belief about growth and learning. Every different behavioral pattern or style can have different effects on students' growth and development. Based on psychology of learning and classroom management, he has proposed a conceptual framework out of three classroom management approaches on a control continuum. These three approaches respectively are interventionism, cooperative, and non-interventionism. The more we move from interventionism approach to non-interventionism one, the less the class control will be and the more responsible and cooperative the students will be (Wolfgang, 2004). Among classroom management styles, cooperative approach based on educational psychology and theories of classroom management like Albert and Dreikurs cooperative discipline (1989), William Glaser reality therapy without failure (1975, 1986, 1992), and Curwin and Mendler discipline with dignity (1999) proposes methods for cooperative classroom management such as using cooperative and group techniques in learning, holding sessions to solve educational and social problems, assigning class rules democratically, and sharing responsibilities in learning and behavior and self-assessment. According to these scholars, correct application of these techniques can result in responsibility, responsibility in learning, self-control of behavior, self-positive system, self-assessment, and self-regulation (Ibid). In cooperative techniques, students learn through cooperation in groups and feel responsible for each other's learning. They help their classmates whenever they need so. Other's success and failure are theirs. This approach deepens learning, creativity, and innovation in students. In classroom management based on cooperative approach, control and discipline are established through a cooperative process taking place between the teacher and the students; and students have a say in class organization and planning. The teacher provides the students with the opportunity to supervise their own performance and judge their behavior. Assessment is also carried out in a process of mutual negotiation. Advantages of such an environment include: creating a chance for students to have effective and constructive communication, increasing logical communication between the teacher and the students and encouraging them to make logical arguments and justify their beliefs and accept logical rules, accepting their responsibility in learning and class behavior, and growing in a self-positive system (Martin & Yin, 2004). Taking a look at investigations conducted on cooperative class management style, it can be concluded that the teacher as a manager controls the classroom in a cooperative manner. In cooperative approach, unlike traditional techniques such as memorizing and overlearning, teaching and learning processes are student-centered and the teacher while keeping his managerial role in class plays a vital role in creating and managing activities and learning experiences. The teacher provides the groups with lesson subjects so that they can solve and discuss them and he constantly supervises their activities. And students make comments about the proposed topics and while creating a face-to-face communication with their teammates, do their common assignments and help each other to obtain acceptable scores and grades. Advocates of cooperative learning approach believe that through cooperative work, students play an active role in learning process (Kathleen *et al*, 2003).

3.Review of the literature

a. In their study entitled, "The effect of cooperative learning on science course academic achievement and exam anxiety", Keramati *et al* (2012) concluded that cooperative learning techniques can remarkably enhance the experimental students' academic achievement in science course and reduce their exam anxiety.

b. In their study entitled, "Comparing the effects of cooperative learning technique and lecture technique on Yazd's intermediate third grade female students' critical thinking and academic achievement in career and technology course", Rasouli *et al* (2012) indicated that cooperative learning approach is more effective that lecture method. This effect was observed to be higher for less proficient students.

c. In their study entitled, " Cooperative learning and the achievement of motivation and perception of student in 11th grade chemistry classes", Fischer and Shachar (2004) showed that students taught using this approach gained higher scores compared to the control group.
d. The results of a study conducted by Aziz *et al* (2010) entitles, "A comparison of cooperative learning and conventional teaching on students' achievement in secondary mathematics" showed that there was a significant difference between the experimental group and the control group after the experimental group had been taught through cooperative learning approach. These results indicated that cooperative learning group had outperformed the control one. Therefore, cooperative learning approach can effectively improves academic achievement in students' secondary mathematics.

4.Study design

Selecting a special design depends on the experiment objectives, types of variables, and factors that limit the study in a certain context. Since in behavioral studies selecting subjects and assigning them to groups are hardly possible and experimental and control interventions are not randomly carried out, the design of the present study is quasi-experimental with two experimental groups and two control ones chosen from among sixth grade students. Although subjects were selected randomly, students of the both groups who had almost similar were considered as real participants of the study. Moreover, the two groups were alike in regard with the teachers' characteristics. The independent variable of the study was classroom management which was conducted in two cooperative learning and typical methods. The dependent variable of the study was the students' score of academic achievement test during a semester.
In the experimental groups, the science class was held based on cooperative learning approach while the control ones based on the typical method (lecture). The reason for selecting two experimental and control groups was to check the difficulty level of pre- and post-tests and to control the cooperation of the first experimental and control groups.

Table 1. Pre-test post-test design with two experimental and control groups

Experimental Group	Male	T_1	X	T_2
	Female	T_1	X	T_2
Control Group	Male	T_1	-	T_2
	Female	T_1	-	T_2

5.Statistical population

The statistical population of the study includes all of the male and female sixth grade students of Piranshahr in the school year of 2012-2013.

Sample and sampling

Since it was impossible to create a framework for sampling out of all of the statistical population, conducting simple sampling was failed. In order to increase the study accuracy in experimental studies, there is an attempt to reduce the statistical population so that the interfering effect of other variables can be more accurately investigated. Therefore, multi-stage cluster sampling was carried out in order to select some schools. In so doing, first the elementary schools were divided into two groups according to the students' gender. Afterwards, a school was randomly selected from each group. And finally, two classes were randomly selected in each school. As a result, subjects of the study consisted of 4 classes (120 students), i.e. two experimental classes (60 students) and two control classes (60 students). The control group included a girl class (30 students) and a boy class (30 students) and the control group also included a girl class (30 students) and a boy class (30 students).

Data collection instruments

In the present study, in order to measure the students' academic achievement, two tests, a pre-test and post-test, were constructed based on the contents of lessons 1 to 6 of elementary sixth grade science textbook. These tests were constructed based on the related table of characteristics and according to the elementary education experts of the region and utilizing the recommendations of 3 experienced sixth grade teachers. Therefore, the tests had sufficient validity. In order to check the reliability of the academic achievement tests, with an interval of two weeks two parallel tests were administered on a group of sixth grade students in another school. In so doing, first form A of the

test and then form B were given to the students. Afterwards, the correlation between the two sets of the scores was calculated, in which Pearson correlation coefficient was utilized. The reliability of the tests was calculated as 91% at significance level of $p<0.001$ (N=30, *r=91%*, $p<0.001$).

Data analysis

Data analysis was conducted through descriptive statistics (mean and standard deviation) and inferential statistics (covariance analysis). Levene's test was used to check the equality assumption of variances.

The first hypothesis**:** Compared to traditional approach, cooperative learning classroom management results in higher science course academic achievement in sixth grade students.

Table 2. Students' score of science academic achievement in pre- and post-tests

Variables	Group	N.	M.	SD
Pre-test Score	Experimental	60	13.5	0.964
	Control	60	13.48	1.13
Post-test Score	Experimental	60	15.69	1
	Control	60	14.11	0.772

According to the results of descriptive indices, it can be stated that there is not a great difference between the two groups in pre-test stage. In post-test stage; however, there is a significant difference. Homogeneity of variances is one of the pre-assumptions for covariance analysis. Levene's test was used to calculate homogeneity of the scores.

Table 3. The results of Levene's test to check homogeneity of variances of error score for academic achievement in the experimental and control groups

F	df_1	df_2	Sig.
2.482	3	116	0.064

Since Levene's F was not at a significant level $\alpha=0.05$, covariance homogeneity assumption of the scores was concluded. Utilizing covariance analysis to check the hypotheses with the assumption of covariance homogeneity was permitted.

Table 4. Covariance analysis results to check the effect of the treatment on science course academic achievement

Variation Source	Sum of Squares	df	Mean of Squares	F	Sig.	Effect of Eta	Statistical Power
Pre-test effect	70.190	1	70.190	339.602	0.000	0.747	1
The effect of cooperative classroom management	70.224	3	23.408	113.256	0.000		
Error	23.769	115	0.207				
Total	26824.750	120					

According to the data presented in Table 4, since F=113.256 with freedom degrees of 115 and 3 is at a significant level $\alpha=0.05$, the first hypothesis of the study is confirmed by the 95% certainty. In other words, by comparing the mean scores of post-tests in the control group (lecture approach) and the experimental group (cooperative learning approach), it can be concluded that compared to the traditional approach, cooperative learning classroom management results in higher academic achievement. According to Eta coefficient (0.747) it can be stated that variations and differences between the experimental and control groups' science scores is owing to the cooperative learning approach.

The second hypothesis: Cooperative learning classroom management results in higher academic achievement in girls compared to boys.

Table 5. Levene's test results to check homogeneity of variances of error score for academic achievement in the experimental groups

F	df_1	df_2	Sig.
0.511	1	58	0.478

Since Levene's F was not at a significant level α=0.05, covariance homogeneity assumption of the scores was concluded. Utilizing covariance analysis to check the hypotheses with the assumption of covariance homogeneity was permitted.

Table6. Covariance analysis for the second hypothesis

Variation Source	Sum of Squares	df	Mean of Squares	F	Sig.
Pre-test effect	45.108	1	45.108	187.210	0.000
The effect gender	0.324	1	0.324	1.343	0.251
Error	13.734	57	0.241		
Total	14832.750	60			

According to the data presented in Table 4, since F=1.343 with freedom degrees of 115 and 3 is at a significant level α=0.05, the first hypothesis of the study is rejected by the 95% certainty. In other words, by comparing the mean scores of the two male and female experimental groups (cooperative learning approach), it can be stated that cooperative learning approach to classroom management does not result in significant differences between male and female students regarding science course academic achievement. Therefore, the effect of cooperative approach to classroom management has identical effect of male and female experimental groups.

7.Discussion and results

The present study was aimed at investigating the effects of classroom management based on cooperative learning approach on science course academic achievement of sixth grade students. The results of the study indicated that the experimental students who were taught through cooperative learning approach in term of science course academic achievement outperformed the control students who were taught through the traditional approach (lecture). Covariance analysis test was utilized to analyze this hypothesis. The results of this analysis showed that the observed difference in the experimental group was significant (F=113.256, p<0.05). Weighted mean for cooperative learning classes was 15.69 while for the traditional classes was 14.11. This finding confirms the first hypothesis of the study, which is in agreement with the results of the studies conducted by Thurstone *et al* (2010), Fischer and Sachar (2004), Aziz *et al* (2011), Keramati (2007), Keramati *et al* (2012), and Rasouli *et al* (2012). However it is not in line with the results of the studies conducted by Saeed Khan *et al* (2011), Hancock *et al* (2004), Wermetten *et al* (2002), and Gharib *et al* (2004). In recent years, there have been a lot of changes in application of active and student-centered teaching/learning approaches, and development of techniques that help students create effective communication with each other has accelerated. Traditional teaching approaches in which the teacher is the only presenter of the knowledge and information and the students are inactive receivers are based on one-dimensional view of education. According to these approaches, the only role of education is to transmit knowledge to the students. In recent teaching methods in which there is emphasis on students' activeness and all-dimensional growth, the teacher is not only the transmitter of knowledge but also facilitator of learning process and growth of cognitive, emotional, and behavioral characteristics in them. Student-centered teaching can result in an increase in student's satisfaction, acceleration of learning, creation of problem solving skills, retention of learning, and establishment of critical thinking. Active learning through cooperation is an effective teaching method which in comparison to lecture method can result in higher level of learning, longer retention of the information, and students' enjoyment. Since learning of science concepts needs an environment full of practice and rehearsal, according to the results of the

present study it seems that cooperative learning can create such an environment. In addition, some concepts and subjects of science require out-of-class and laboratory work, in which students can help to enhance their and other's learning because in a cooperative group each student analyzes the subject in his/her own view which finally can result in learning to be more deep and meaningful. The results of the study also showed that there was no significant difference between the male and female experimental classes that were taught through cooperative learning approach. Covariance analysis was utilized to check this hypothesis. The results of this analysis indicated that in both groups ($F=1.343$, $p<0.05$) was not significant. This result rejects the second hypothesis of the study.

In other words, cooperative learning approach has similar effect on male and female students' academic achievement in science course. However, this effect is higher for female students; i.e. weighted mean for the male students was 15.63 and for the female students was 15.76. This finding is in line with the results of the studies conducted by Keramati (2007) and Ostovar (2008). However, it is not in agreement with those of Keramati (2008) that indicated female students profit more from cooperative learning approach than male students. Moreover, Khodadadnezhad (2009) concluded that in cooperative learning approach male students had better performance compared to female students; however, this difference was not significant. Previous studies have reported different results. For example, Mulryan (1995), Webb (1989), and Johnson (1989) have reported that male students had better performance in cooperative learning groups while other studies like Peterson and Fnma (1985) concluded that female students had outperformed male ones. On the other hand, othe studies like Smith (1982), Wall Mark (1980), and Webb (1989) reported that male students' performance was totally better than female students (ac cited in Khodadadnezhad, 2009). The results of the present study also indicated that although the female students' mean score was higher than that of the male students, this difference was not significant, which is in line with the results of previous studies.

A brief look at the three available or dominant approaches of learning and teaching can help to conclude. One of these three approaches is the competitive approach in which students try to win. In this approach this ideology is dominant among students that if you are the winner then I am the loser and if I am the winner, you and others are the loser. This approach creates an environment that can cause fear and anxiety among students. Even those who win are scared of losing their situation. The other approach is individual learning approach. In this approach, the students individually try to progress and their failure is their own concern and has no public concern. In this approach, fatigue, lack of diversity, interest reduction, loneliness, and isolation are all gifts of teaching/learning process. The third approach is cooperative learning approach in which students learn in small groups. The results of hundreds of studies on this approach indicate that students in cooperative groups not only have more positive attitude but also learn and perform more effectively compared to the students of competitive and individual approaches.

During cooperative learning, students construct their knowledge with the help of others and connect what they learn with what they already know. They are organizing and improving their knowledge all the time and revise and reform it. This trend results in active, meaningful, and deeper learning.

8.Limitations of the study

Like other studies, the present study also had some limitations like:

1. Sampling method was one of the limitations of the present study, in which instead of assigning the subject into group, classes were taken as the study subjects. In other words, such sampling makes the study quasi-experimental. In true experimental studies, control of the study remarkably increases. In addition, sample size is delimited to one grade and in a period of 3 months.
2. Conducting the trial design of classroom management based on cooperative learning approach in sixth grade was limited only to town schools and the researcher could not conduct sampling in rural regions.
3. Since the experiment has been conducted on elementary students, it is not generalizable to other education levels.
4. Due to time limitation, this approach was only applied for science course, the result of which cannot be generalized to other courses. One of the ways to delimit this limitation is to conduct the study in a longer time for example a complete term.
5. Due to conducting this method in some sixth grade classes, increasing the number of subjects was impossible.

9.Suggestions

Since in the present study and previous ones the important role of cooperative learning approach in achieving educational objectives has been confirmed, following suggestions are proposed in order to further utilize it.

1. Utilizing cooperative learning approach, teachers can help students' all dimensional growth. In addition to deep learning of materials, students also grow in regard with their social and communication skills.
2. Holding regional conferences, effective in-service courses, and workshops can help to utilize this approach more.

3. Training teachers is the main recommendation for education authorities and managers who should inform and teach the teachers about this approach.
4. Teachers can cooperate and help each other. Teachers can share issues and questions that they come across while utilizing this method with other teachers and find suitable solutions for them. Therefore, they will have this feeling that in addition to formal education they have received, they can also learn from their co-workers. Here, the managers' responsibility is to provide the teachers with such opportunities and support them sufficiently.
5. Future researchers are recommended to study application of this approach for other courses and levels and also in other educational milieus like universities, teacher training centers, and educational groups in schools.

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