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## A Comparison of the Cooperative Learning Model and Traditional Learning Model on Academic Achievement

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**Abstract:** The present study compared the effects of the cooperative learning model and the traditional learning model on academic achievement. The main questions included (1) which learning model is more effective on school achievement (2) which has more consistency effects during the follow-up phase. Experimental and control (intact classes) were selected and comprised 23 students each. In Phase 1, an educational subject was taught to both groups for 4 weeks. In phase 2, the experimental and control groups were instructed using cooperative learning model and traditional learning model, respectively for six weeks. In the final phase, both groups were instructed using traditional learning model, for 4 weeks. The results revealed significant differences between pre-test and post-test for the experimental group but not for the control group. In addition, significant differences were found between the two groups on phases 2 and 3.

**Key words:** Cooperative learning, traditional learning, school achievements, Iran

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### INTRODUCTION

Students do not learn by simply sitting in a classroom listening to the teacher, memorizing prepackaged assignments and returning answers. Students must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives (Chickering and Zelda, 1987). Students who are actively involved in learning retain information longer than when they are passive recipients of instructions (Cross, 1987). In a quick review of outputs of the educational centers in recent years, it seems that the traditional learning model has not well suited to educational aims. Many students showed weak educational performance and school drop out. Basically, the traditional learning model depends on presenting the subjects for non-active learners. Koyngad (1998) mentioned that in traditional learning model the teachers are responsible for learning, while in the new learning strategies like the cooperative learning model, the teacher attempts to encourage the learners to think and involve themselves in educational tasks (Abrami and Chambers, 1995; Stevens and Slavin, 1995; Slavin, 1997).

Cooperative learning is the instructional use of small groups so that student's work together to achieve shared goals. In cooperative learning groups, students are given two responsibilities: to learn the assigned material and to make sure that all other group members do likewise.

Cooperative learning is one of the best studied pedagogical strategies in the history of education research, with over 1,000 research studies on the topic dating as far back as 1898 (Johnson *et al.*, 2000). The benefits of collaborative learning have been demonstrated in countless studies and several meta-analyses (Johnson *et al.*, 2000). Results show that students who have opportunities to work collaboratively learn faster and more efficiently, have greater retention and feel more positive about the learning experience (Whicker *et al.*, 1997). This is not to say that students can just be put into a group and assigned a project to complete. Students must be able to interpret, relate and incorporate new information with existing knowledge and apply the new information to solve novel problems. The first factor that influences meaningful learning is the degree of mastery of the original material. Importantly, peer instruction significantly enhances mastery of the original material (Cortright *et al.*, 2005).

Tanner and Marr (1997) have shown that cooperative learning model has significant effects on academic peer relationships and social development. Group goals and rewards and equal chance are also the main aims of the cooperative learning model. Active learners help each other to comprehend and accomplish the task as well as put in more effort and criticize if necessary. Students continue to work so that they become confident in receiving sufficient training (Liu *et al.*, 1992;

Arends, 1994). Shachar and Sharan (1994) showed that in cooperative learning model, learners found how to work together and experienced the succession. Successful experiences increase the learners' motivations for high performance and self-esteem in both educational fields and outside school (Arends, 1994; Stevens and Slavin, 1995; Slavin, 1997). In Iran, the traditional learning model is still dominated in educational management which is the main cause of drop-out rate in our educational centers. However, this should consider as one of the main causes of anxiety and other emotional and behavioral problems in students. The present study aims to compare the effectiveness of traditional learning model and cooperative learning model on learning the school materials and the stability of effectiveness of these methods the follow-up. The specific hypotheses are that school achievement attained by cooperative learning model will be significantly higher than traditional learning model and in follow up, the effectiveness (school achievement) of participants engaged in cooperative learning model will be stronger than those in traditional learning model.

**MATERIALS AND METHODS**

**Participants:** Two classes in grade 11 from a girl's high school were selected. Each group consisted of 23 students. The mean age of the experimental group was 17.1 year and for the control group was 17.1 year. The average school marks for the experimental group was 12.6 (SD = 2.4) and for the control group was 12.2 (SD = 2.1). Analyses of the two groups average grades in school subjects revealed no significant differences between them. This study is quasi-experimental and the data of two experimental and control groups were compared in pre- and post-tests as well as a follow-up.

**Materials:** To evaluate the school achievement of the subjects in the present study a teacher-made questionnaire was developed by the researchers. First 60 items were chosen and supported by the researchers and several psychologists. The first draft of the questionnaire was administered to 42 students not in the present study. Then the items with high (>0.85%) and low (<0.40) difficulty coefficients (M = 0.72) were taken out of the questionnaire. Finally, 26 items for the pre-tests (13 items for the pre- assessment of chapters 1 and 2 and 13 items for the assessment of chapters 3 to 5) and 20 items for the post-test were selected. The reliability of the questionnaire was computed by Kuder- Richardson analyses in pre- and post-tests and was 0.70 and 0.65, respectively.

**Table 1: The mean and standard deviation of the groups scores in pre-test**

Groups	First part (chapters 1 and 2)			Second part (chapters 3, 4 and 5)	
	n	M	SD	M	SD
Experimental	23	11.02	2.20	0.64	4.12
Control	23	10.30	3.48	0.78	5.19

**Procedure:** In the first phase, chapters 1 and 2 of an educational subject were instructed for the participants of both groups by the traditional learning model in a period of four weeks. Then the pre-tests were carried out for the both groups. The pre-test questionnaire consisted of two parts, the first part (pre-assessment) assessed the learning level on chapters one and two and the second part evaluated the learning of material in the next three chapters (i.e., 3, 4 and 5) in the subjects. The mean and standard deviation of the first of the test scores for the experimental group were 11.02 and 2.2 and for the control group were 10.3 and 3.48; while for the second part test scores for the experimental group were 0.64 and 4.12 and for the control group were 0.78 and 5.19, respectively (Table 1). Based on these results, the educational background of the two groups was similar and matched.

In the next step, the experimental groups was instructed by cooperative learning model for a period of six weeks, while the second group was instructed by traditional learning model coverage chapters 3 to 5 in both classes. At the end of phase II, the post-test questionnaire was administered to both groups. In the third phase, the follow-up phase, cooperative learning model was excluded from the instruction program and the subjects continued their learning processes for chapters 6 and 7 by traditional learning model. After four weeks, again, both groups were tested.

**RESULTS**

The means and standard deviation of scores on the tests at pre-test, post-test and follow-up phases for the both groups are shown in Table 1. In order to test whether or not there were significant differences between the subjects' scores on pre- and post-tests, the data for each group were separately analyzed by t test and the results indicated significant differences between pre- and post-tests scores for the experimental group (<0.05), but not for the control group (Table 2). That is, the subjects of experimental group had significantly higher scores on the post-test than the pre-test, while for the control group, similar results were not met.

In addition, to find the possible significant differences between the experimental and the control groups on the follow-up phase, the scores of both groups were computed and the t-test revealed significant

Table 2: The mean and standard deviation of the groups scores in pre, post and follow up phases

Groups	n	Pre-test		Post-test		Follow-up	
		M	SD	M	SD	M	SD
Experimental	23	11.02	2.20	12.39	3.19	14.05	3.15
Control	23	10.30	3.48	10.74	2.35	9.64	3.10

Table 3: The results of pre and post test scores for the experimental and control groups

Groups	$\Sigma D$	$\Sigma D^2$	df	$t_{ob}$
Experimental	29.5	215.25	22	2.16
Control	9.5	265.24	22	0.64

\*  $p < 0.05$

Table 4: t-test analyses of the follow up phase for the experimental and control groups

Groups	N	M	$S^2$	df	$t_{ob}$
Experimental	23	14.05	9.79	44	4.84**
Control	23	9.64	9.68		

\*\*  $p < 0.01$

Table 5: One way ANOVA on school achievement

Variables	Sum SQ	df	Mean SQ	$F_{ob}$
Phases (A)	36.67	2	18.33	2.12
Learning models (B)	173.11	1	173.11	20.06**
Interaction A × B	81.80	2	40.90	4.74*
Variability (between groups)	1140.45	132	8.63	
Sum	1432.03	137		

\* $p < 0.05$  \*\* $p < 0.01$

differences between the groups ( $p < 0.01$ ). These results showed that the school achievement of the experimental group was significantly higher than the control group (Table 3). In other words, on the following phase, the students of the experimental group were more likely to show higher scores than the control group students.

To find whether or not there were significant differences on the results of the pre-, post-test and the follow-up tests' scores between the experimental and control groups, further analyses by one way analysis of variance were carried out (Table 4) and the results supported that: 1) with respect to the three phases (pre-test, post-test and follow-up) no significant differences were found between the groups, 2) with respect to the independent variable (i.e., cooperative learning model) significant differences were found between the groups ( $p < 0.01$ ) and 3) the interaction effects between the experimental and the control group was significant ( $p < 0.05$ ). The results of Turkey analyses indicated that the mean scores of the follow-up phase of the experimental group significantly differed from the mean scores of the control group in all three phases (Table 5).

In addition, significant differences were found between the mean scores of the follow-up phase and the pre-test for the experimental group. That is, more students in experimental group tend to maintain the cooperative learning styles during their educational activities.

Moreover, the mean scores between the post-test of the experimental group with the follow-up phase scores of the control group were significantly differed.

## DISCUSSION

Traditionally, educational settings have taken a competitive approach to learning and many of those who have succeeded in school and pursued careers in science excel in these environments. Competitive learning environments are beneficial in that they prepare students for life experiences such as applying for jobs or competing for grants. In addition, these situations can develop self-reliance and self-confidence in students. However, when students are placed in competitive academic situations, learning may be viewed as a commodity to be competed for and students can be entrained to view other students as opponents because a students' success is measured against the performance of their peers (Chatman and Allen, 2003).

The results of this study showed that the cooperative learning model has a significant effect on academic achievement which supports previous research (e.g., Arends, 1994; Shachar and Sharan, 1994; Jacobs *et al.*, 1996; Nichols, 1996; Slavin, 1996, 1997; Tanner and Marr, 1997). It seems that cooperative learning model can enable the learners to receive positive feedback from the process of thinking, problem solving and group interaction and that this results in better skills and comprehension of the educational concepts as well as in task sharing (Tanner and Marr, 1997; Slavin, 1997; Whicker *et al.*, 1997). Students learn how to organize their thoughts and orientation for the complex educational tasks and are pushed to present logical explanations (Stevens and Slaven, 1995). Such generalization and expanding of the educational tasks result in deeper understanding of the educational concepts. In contrast, the traditional learning model attempts to transfer the scientific knowledge by doing many exercises (Arends, 1994). In this strategy, the learners have less opportunity to think (Liu *et al.*, 1992; Tanner and Marr, 1997; Whicker *et al.*, 1997). Studies have shown that combining segments of lecture with short activities is an excellent way to keep students interested and involved (Carbone, 1998). Active involvement enhances the student's understanding and ability to integrate and synthesize material. Active involvement also improves the student's conceptualization of systems and how they function and increases retention (Elliott, 1996; Modell, 1996). In this case, the students in the cooperative learning class seemed to have better understanding while the rate of forgetting decreased.

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