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A Study On The Effects Of The Cooperative Learning Method In Science And Technology Education On The Students' Attitude: Bursa Model

Sema Nur GÜNGÖR, Muhlis ÖZKAN

Uludağ Üniversitesi Eğitim Fakültesi
sgungor@uludag.edu.tr, muozkan@uludag.edu.tr

ABSTRACT

In this study, the e mphasis was given on the effects of the Cooperative Learning Method on the primary education 7th grade students' attitudes in Science and Technology Education. A total of 101 students of four different schools in Nilüfer, Kestel and Yıldırım provinces of Bursa were selected and participated in this study in which the chapter of "Human and Environment" was studied using the Cooperative Learning Method. The data originated from the application results were collected by means of the survey of the Students' Opinions on the Cooperative Learning Approach consisting of 20 questions, and evaluated using the SPSS 13.00 packaged software. In accordance with the results of the comparison made among the students studying Science and Technology subject at the four selected schools, it was found that the Cooperative Learning Method was positively effective in the attitudes of the 65% of the students, while it was negatively effective in the 20% of them; and it was also found that it was non-effective in the 15% of the students.

Key Words: Cooperative learning method, science and technology, attitude.

Fen ve Teknoloji Öğretiminde İşbirlikli Öğrenme Yönteminin Öğrenci Tutumuna Etkileri Üzerine Bir Çalışma: Bursa Örneği

ÖZET

Bu araştırmada, İşbirlikli Öğrenme Yönteminin İlköğretim 7. Sınıf öğrencilerinin Fen ve Teknoloji Öğretimindeki tutumlarına etkileri üzerinde durulmuştur. "İnsan ve Çevre" ünitesinin İşbirlikli Öğrenme Yöntemiyle işlendiği bu çalışmaya Bursa ilinin Nilüfer, Kestel ve Yıldırım ilçelerinden seçilen dört farklı okuldan toplam 101 öğrenci katılmıştır. Uygulama sonuçlarına ilişkin veriler, 20 sorudan oluşan İşbirliğine Dayalı Öğrenme Yaklaşımına İlişkin Öğrenci Görüşleri Anketiyle toplanmış ve SPSS 13.00 paket programında değerlendirilmiştir. Dört okul arasında yapılan karşılaştırma sonuçlarına göre İşbirlikli Öğrenme Yönteminin, Fen ve Teknoloji dersine katılan öğrencilerin %65'inin tutumları üzerinde olumlu yönde etkili olduğu, %20'sinin tutumları üzerinde olumsuz yönde etkili olduğu ve %15'inin tutumları üzerinde bir etkisinin olmadığı tespit edilmiştir.

Anahtar Sözcükler: İşbirlikli öğrenme yöntemi, Fen ve teknoloji, tutum.

INTRODUCTION

In order to have an effective teaching process, today's education system charges the educators with the teachers' responsibility to determine and use the teaching method which will maximize learning. Nevertheless, it is known that most of the teachers of primary education uses traditional narrative methods where the students are seen just as the audiences while a minority of them uses other teaching methods where the students are considered active participants.

For a successful teaching, it is significant for the teacher to choose the most appropriate teaching method amongst others for themselves, for the students, for the subjects, and for the desired behaviours (Fidan and Erden, 1994). However, it has been put forward that the students like to adopt the "Collective Learning Method" which makes the learning-teaching activities more effective where they can state and debate their personal opinions in properly created environments to listen to and to mind each other (Doolittle, 1997).

Cooperative learning is an approach where students from small groups to learn about a subject by solving a problem for the sake of an educational objective by studying cooperatively. The most important feature of the Cooperative Learning Method is to maximize the students' own and

each other's learning level by cooperatively working, discussing, and helping each other (Demirel, 2009; Gömleksiz, 1997; Millis, 1996; Açıkgöz, 1992; Bilgin and Geban, 2004). According to Evans, Gatewood and Green (1993), the Cooperative Learning Method should be used during the learning-teaching process since it makes all of the students contribute to the learning process, and is effective on the academic success, and makes the children in the group social, and gives them the ability to cooperate with the people around in various situations.

According to Slavin (1990) and Johnson (1981), in this method, the tasks, prizes, personal evaluations, and heterogenic group forming are important for the studies to be finalized successfully. In many studies it has been seen that cooperation has a positive effect on cognitive and affective learning (Johnson and Johnson, 1974; Slavin, 1980; Sharan, 1980; Slavin, 1987).

In this study, it has been aimed to determine the behavioural changes of the students in Science and Technology Education by evaluating their opinions towards Cooperative Learning Approach.

METHOD

Sample

The sampling of the study consisted of the 7th grade students of Bursa centre; Hasanağa TOKİ Primary School (Nilüfer), Kestel TOKİ Primary School (Kestel), Hazinedaroğlu Özkan Primary School (Nilüfer) and Süleyman Cura Primary School (Nilüfer).

101 students were selected as the study group amongst 7th grade students. Collective Learning Method techniques were used and active participations of the students were provided, and in this way the lessons were performed by the students. First of all, before the study, the students were given information about the Collective Learning and group work in a two-hour session. After the necessary information was given, the groups were formed in accordance with their success levels and genders. A great deal of effort was made to create groups consisting of students with high, middle and low success levels.

The researcher distributed the study sheets and project tasks which were prepared in advance to the groups in each lesson, and made the students study in groups on the activities given. In the end of each lesson, the most successful group became the first, and debates were performed as a

class to determine the points which were not understood. After the study, in order to get the students' opinions of the Cooperative Learning Method, the Survey of the Students' Opinions on the Cooperative Learning Approach was applied.

The Means of Data Collecting

In the study, as the means of data collecting, the Survey of the Students' Opinions on the Cooperative Learning Approach was used. The survey used in the study was obtained by scanning the references (Gümüş, 2006). Some statements were altered by applying to some experts' opinions and it was used to determine the students' opinions of the Cooperative Learning Method. The survey used was of Likert scale of 5 and consisted of 20 items 10 of which were negative and the other 10 positive. The highest grade to get from the test was 100 and the lowest grade was 20. The scale was applied on 101 students, and reliability coefficient was determined as 0,80. This originated result was seen sufficient for the survey to be used in the study. The grading of the positive statements in the survey was as follows: "Strongly Agree" (5), "Agree" (4), "Indecisive" (3), "Disagree" (2), "Strongly Disagree" (1). The grading of the negative items in the survey were evaluated reversely and added to the data base. The survey was applied after the research to the experimental groups, and lasted 20 minutes.

Data Analyzing

In this study, which was applied to the experimental group of Bursa and its districts' primary education 7^{th} grade students, the opinions of the students on Cooperative Learning were evaluated. The data were analyzed using the statistics in the SPSS 13.00 packaged software.

FINDINGS

In the study, "the Survey of the Students' Opinions on the Cooperative Learning Approach" was used. The analysis results according to all of the schools are indicated in Table 1. According to the data obtained from all of the schools, the analysis results have showed that the students answered the items of 3, 16, and 19 as *indecisive* (15%), the items of 2, 4, 10, and 13 as *negative* (%20) and the rest of the items as *positive* (%65).

Table 1: The Analysis Results of the Survey of the Students' Opinions on the Cooperative Learning Approach Obtained From all of the Participant Schools

	THE SURVEY OF THE STUDENTS' OPINIONS ON THE COOPERATIVE LEARNING APPROACH	School A	School B	School C	School D	General Average
		N:25	N:17	N:23	N:36	
		Average	Average	Average	Average	
1	I liked the teacher constantly guided us during the studies.	4,96	5	4,87	4,83	4,92
2	I had difficulty in reaching various references during the study.	4,24	2,59	3,83	3,42	3,52
3	I did not like to work with my group friends.	3,44	3,24	3,26	2,47	3,34
4	I do not believe that we need a lot of help with our studies.	3,72	3,24	3,52	3,17	3,41
5	I liked that everyone did their parts in their own tasks.	4,6	4,65	4,83	4,44	4,63
6	I believe that my friends who did not participate in the lessons now actively took parts.	3,72	3,59	4,35	3,22	3,72
7	Cooperative learning increased my interest in the studies.	4,48	4,29	4,83	4,28	4,47
8	I was difficult for me to be given tasks and perform them.	4,72	3,76	4,52	4,03	4,26
9	Cooperative learning increased my interest in Science and Technology lesson more.	4,44	4,59	4,74	3,86	4,41
10	I did not have fun studying the subjects in the lesson.	4,6	3,06	4,13	3,61	3,85
11	I felt relaxed in cooperative studies.	4,64	4,76	4,65	3,97	4,51
12	I liked to present our studies to my friends.	4,36	4,47	4,74	4,17	4,44
13	I felt very slog on cooperative studies.	3,96	3,24	4,13	3,89	3,81
14	I believed that I would be successful in Science and Technology lesson.	4,28	4,65	4,87	4,17	4,5
15	My self confidence in the lesson increased.	4,12	4,65	4,83	4,47	4,52
16	I prefer my teacher to teach Science and Technology lesson.	3,36	2,47	2,39	2,22	2,61
17	I liked Science and Technology lesson studied cooperatively.	4,68	4,65	4,83	4,25	4,61
18	I believe that I will not easily forget what I learned with the cooperative learning.	4,76	4,76	4,87	4,03	4,61
19	I do not think that Science and Technology lesson will be useful for me to understand the events in the environment.	3,64	3,12	3,78	2,75	3,32
20	I do not believe that I will benefit from Science and Technology in many areas in the future.	4,32	4,59	4,83	4,42	4,54

The result of the test of homogeneity of the variances which is the basic hypothesis of the One-Way ANOVA. Since the *p* value there is smaller than (Sig.) 0,05 it is said that the variances (p=0,018) are not homogenous.

To test the significance of the differences between the averages of the attitude points among the schools One-Way ANOVA's nonparametric opposite of Kruskal-Wallis test was applied. According to the data, the average attitude points of the schools were significantly different from each other (p=0,018). In order to determine how these differences are significant between which groups, Mann Whitney U tests were applied (Table 2).

Table 2: Mann Whitney U Test Results Among All of the Schools

Schools	**A**	**B**	**A**	**C**	**A**	**D**	**B**	**C**	**B**	**D**	**C**	**D**
Mean Rank	21,75	19,25	17,85	23,15	24,75	16,25	16,90	24,10	22,70	18,30	25,48	15,52
Sum of Ranks	435,00	385,00	357,00	463,00	495,00	325,00	338,00	482,00	454,00	366,00	509,50	310,50
Exact Sig.	0,512		0,157		0,021*		0,052		0,242		0,006*	

N:20

According to the data presented in Table 2, no significant difference was found amongst the average attitude points of the A-B, A-C, B-C and B-D schools (p>0,05). On the other hand, a significant difference between the average attitude points of the A-D and C-D schools in favour of the A and C schools was found (p<0,05).

DISCUSSION and CONCLUSION

In the result of the analysis of all the schools, it was seen that the students marked *indecisive* for the items of 3, 16 and 19 (15%), and they made *negative* statements on the items of 2, 4, 10 and 13 (20%). It is our opinion that the students were indecisive on the item 3 "I did not like to work with my group friends" originated from the existence of some students in the group who did not take their personal responsibilities; and that they were indecisive on the items of 16 "I prefer my teacher to teach Science and Technology lesson" and 19 "I do not think that Science and Technology lesson will be useful for me to understand the events in the environment" originated from the possibility that the students might have misunderstood the aforesaid items in the survey or that they might have thought that only they would teach the lesson or only their teacher would teach the lesson; and

additionally, it could be that this method was used for the first time and their teacher was replaced might have caused this result.

It was seen that the students stated positive opinions on the other items (65%). According to the obtained data, the results were as follows; the students were content about the teacher's being a guide during the lesson and about seeing that everyone did their part in the study, and this method was very effective to increase the interest towards the lesson and the study, the interest increased towards the lesson, the students were relaxed during the group activities, they enjoyed presenting their studies which they prepared, it was effective in increasing the students' self confidence, and they would benefit from the science and technology in many aspects in the future.

İflazoğlu (2003) informs us that the Cooperative Learning Method used in Science and Technology makes the students grow a positive attitude towards the lesson. The data recorded in this study seems to partially coincide with the data obtained from the studies of Yaman (2008) and Bourner and et al (2001). It has been seen that the students thought that studying the lessons with this method was informative, easy, pragmatic, useful, promoting and enjoyable (Doymuş, Şimşek and Bayrakçeken, 2004). It has been understood that the group works, research tasks, activities and worksheets which we planned and prepared not only helped students love Science and Technology lesson, but also increased their self confidence by changing their opinions of the future in a positive way.

To test the significance of the differences between the averages of the attitude points among the schools One-Way ANOVA's nonparametric opposite of Kruskal-Wallis test was applied, and the average attitude points of the schools were significantly different from each other. In order to determine how these differences are significant between which groups, Mann Whitney U tests were applied, and according to the data obtained there was a significant difference to the favour of the school A between the schools A-D, and another significant difference to the favour of the school C between the schools C-D. We are in the opinion that this situation was caused by the class population of the school D being crowded in comparison the other classes in the other schools, and also some students being ignored by the students in the groups, and some other students having difficulties working with the groups, and other effects caused by these problems might have resulted the said situation which does not coincide with the general expectations of the method. The focus made on the expectation of working with a homogeneous group in the studies directed to the student opinions about this method in the references seems to support this idea (Matthews, 1992).

Nhu (1999), studied the student behaviours, their confidence on Cooperative Learning and their attitudes towards this method, and recorded that this method was useful for the students to learn.

In some other studies, the Cooperative Learning Method is emphasised to have the widest field and to be the most effective amongst the other educational research and applications; and additionally to be relatively effective to teach the students social skills, to increase a positive attitude towards science and to perform the activities without getting bored (Herreid, 1998; Johnson et al., 2000).

SUGGESTIONS

It would be useful to inform the students in detail in advance about the plan prepared for the application of Cooperative Learning Method in order to eliminate negative prejudices. It should be noted that forming work groups which are not crowded by also considering the subjects and activities will increase the level of success which will be obtained from the method and will create positive attitude changes in students.

It is thought that it would be useful for the teacher who will use the method should make a pre-application on an appropriate topic of Biology, Physics or Chemistry. It is necessary to create opportunities to learn from each other in the group, to prevent the students from feeling alone and ignored during the learning-teaching process, to provide positive feelings towards each other, to increase the self confidence of the students, to focus on the self responsibility for learning and to help understand that the teacher is not the only "source of information".

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Başvuru:13.4.2012 Yayına Kabul: 22.5.2012