

Full Length Research Paper

Effects of jigsaw II technique on academic achievement and attitudes to written expression course

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This study aims to explore the effects of a cooperative technique Jigsaw II (experimental group, n=42) and instructional teacher-centered teaching method (control group, n=38) on Turkish language teacher education department students' attitudes to written expression course (a course in which writing skills were taught), their academic achievement, retention and their views, in 2009 to 2010 academic year. In this research "pre-test/post-test with control group experimental design" was used. The data was collected through Attitudes to Written Expression Scale (ATWES) and Written Expression Achievement Test (WEAT), Students' View Form (SVF). The statistical analyses revealed that there were significant differences between the experimental and control groups in terms of their attitudes, academic achievement, and retention in favor of the experimental group. In addition, It was determined that the experimental group students had positive views on the use of Jigsaw II technique.

Key words: Written expression course, writing, cooperative learning, jigsaw II technique, instructional teacher-centered teaching.

INTRODUCTION

Humans as social beings, achieve living together in a society by their expression of skills, thoughts and feelings. In today's communication age, written expression skills are almost as important as spoken expression skills. Written expression or writing which is regarded as an important skill in education is tried to be taught to the students in every stage of education. It is taught according to age, purpose, and individual preferences. The students who acquire writing skills at school use it throughout their lives. Writing can be defined as a means of expressing oneself giving meanings to some different symbols.

Writing is a powerful means of thinking. While writing essays, students learn things about both themselves and life and can convey their thoughts and feelings to others. It can give the opportunity to self-develop and has effects on the change of world. Writing is also a tool to be successful at school and to find a good job in the future (Bradley-Johnson and Lesiak, 1989). According to the National Educational Statistics Centre, people from every kind of profession have to communicate complex thoughts and information in the form of clear and brief writing. Writing is a tool by which people reveal their knowledge (Graham and Harris, 2005).

Writing is defined as a behavior including various closely interrelated complex skills such as punctuation, hand writing, spelling, creativity, and self-expression (Shapiro, 1996) as well as specific writing components such as grammar, mechanics, production, order of writing, linguistics, and understanding. Given the complexity of writing, it is very difficult to determine which interrelated special skills are most important and which tasks are most difficult for students to achieve (Bradley-Johnson and Lesiak, 1989). Literature provides different approaches to writing process. Stemper (2002) states that, since mess has been considered as a failure in the traditional writing teaching, students hate writing and revising. Students should know that writing covers the process of being dirty; and, confusion and mess are natural parts of writing but not signs of mistakes or failure of the person writing. Also according to Sokolik (2003) writing is the combination of process and product.

Kennedy-Kalafatis and Carleton (1996) indicate that writing is a type of communication and it cannot exist without audience. Therefore, the absence of communication means the loss of the aim of writing.

Cooperative learning is one of the tools which can be used in educational settings in order to develop individuals'

writing skills in their first language. Cooperative language learning methods are very useful in multi-level classes, in that they allow both homogeneous and heterogeneous grouping in terms of language proficiency (Theodore and Richards, 2001: 198). Cooperative learning is one of the approaches most frequently evidenced in the areas of research and educational applications in addition to being a concept drawing attention among teachers, school administrators and educationalists (Johnson and Johnson, 1999; Slavin and Sharan, 1990; Graham, 2005; Maloof and White, 2005). Cooperative learning, proven to have positive effects on achievement in learning process, is increasingly used in more and more areas everyday (Slavin et al., 1995; Webb et al., 2002; Siegel, 2005).

Cooperative learning approach helps students learn many things from each other as well as it encourages them to discuss on a topic and make some evaluations on it (Parker, 1985; Slavin, 1990; Coppola and Lawton, 1995; Gillies, 2006). Cooperative learning can be defined as an approach in which students help each other with an academic issue for a common purpose forming small groups both in and outside the classroom, in which they gain self-confidence, develop their communicative skills, strengthen their problem solving and critical thinking abilities, and participate in teaching-learning process actively (Bolling, 1994; Gardener and Korth, 1996; Bowen, 2000; Levine, 2001; Prince, 2004; Eilks, 2005; Gillies, 2006; Hennessy and Evans, 2006; Lin, 2006; Prichard et al., 2006; Şimşek, 2007). Cooperative learning imposes the students in Group two different responsibilities: Learning the targeted behaviour and making sure that other members of the groups also learn it (Johnson and Johnson, 1999). Johnson and Johnson indicates that a student in a group can individually achieve his/her aims as long as the other members can be successful; and, Hawkins, Douck and Liskner, claims that cooperative learning makes a student depend on others for positive outcomes, rewards (Miller, 1989).

Cooperative learning is a process in which students can achieve a task given to them by working in groups (Slavin, 1995). Other definitions of cooperative learning cover the descriptions of classroom settings in which students perform some academic tasks in small groups in interaction with each other (Parker, 1985). Cooperative learning facilitates this process by enhancing learning through group works. Therefore, students can be more successful, develop their social skills and strengthen their working capacities (Colosi and Zales, 1998). Cooperative learning is regarded to be a mean of preparing students for, when necessary, integrating their energies and working together for a common purpose in various settings at work and home (Mergendoller and Packer, 1989; Bolling, 1994; Eilks, 2005; Gardener and Korth, 1996; Bowen, 2000; Levine, 2001; Prince, 2004; Gillies, 2006; Hennessy and Evans, 2006; Lin, 2006; Prichard et al., 2006). Most cooperative learning techniques use the cooperative learning principles for special purposes.

These techniques can be grouped as follows: (a) Constructive approach, (b) Group analysis, (c) Student group analysis, (d) Packages of programs, (e) Learning together, and (f) Jigsaw. It is reported that Jigsaw techniques which have flexible use and unlimited variations are among the most frequently used and researched ones today (Hedeen, 2003; Doymuş, 2008).

Jigsaw techniques

Jigsaw, one of the cooperative learning techniques, is based on group dynamics and social interactions. It is one of the "pure" cooperative learning techniques (Açıkgöz, 2006: 210). This technique, including two different treatments with different small groups in order to help learning and improving cooperation between students, was first designed by Aronson in 1978 (Hedeen, 2003).

In the application of Jigsaw technique, students separate from their own groups and form new groups with the other students who are responsible for preparing the same subjects. These groups, called "groups of experts" try to make other students understand the subject; they make plans about how they can teach the subject to their friends, and prepare a report. Afterwards, they turn to their own groups and teach their subjects to them with the help of the reports they have prepared. In the last stage, stage of completing, teachers can perform some activities with individuals, small groups or the whole class in order to unify students' learning. For instance, she/he can make one of the home groups or individual students make presentations in the classroom on their subjects. In the evaluation stage, the study is completed by making the evaluation proposed by the cooperative learning method (Şimşek, 2007: 19).

Jigsaw technique allows students to actively participate in learning process. By being constantly subjected to this method, they should feel more comfortable about their roles. Ways of evaluating the groups can enhance the effectiveness of the jigsaw technique by making each student have a sense of responsibility for their group's performances (Lucas, 2000: 221).

In Jigsaw technique, each student prepares a part of the assignment outside the classroom. Later they turn to their groups and peer-teach other members. Whereas all groups can take the same subject, different groups can take different parts of it as well. Groups are reorganized to teach the subject in turn (Grasha and Yangarber, 2000). Jigsaw technique supports cooperative learning by giving each student the responsibility to teach a part of the subject. In this technique, there are members of two different groups, 'home group' and 'Jigsaw group' (Doymuş et al., 2004). Home groups separate from each other, just like the parts of a Jigsaw, and join the Jigsaw groups consisting of the members of home groups which were given the same part of the material. Afterwards,

Table 1. Comparison of jigsaw and jigsaw II techniques.

Stages	Jigsaw	Jigsaw II
1	Formation of home groups and pre-work	Formation of home groups and pre-work
2	Giving the groups of experts the units of work	Giving the groups of experts the units of work
3	Expert groups research their expertise subjects before they return to their home groups	Expert groups research their expertise subjects before they return to their home groups
4		A test of expertise is given to expert groups before they return to their home groups
5	Students in expert groups return to their home groups to share what they have learnt with their friends.	Students in expert groups return to their home groups to share what they have learnt with their friends.
6	Individual evaluation and grading.	Individual evaluation and grading.

(Holliday; 2000, p. 8).

students in the Jigsaw groups discuss on the subject to make sure that they understood it completely. Later, students return to home groups in which they would teach the material to the rest of the group members (Colosi and Zales, 1998).

After the research on the Jigsaw technique, some changes were made in the application process of the technique and new types of it appeared. Every type of Jigsaw technique follows the same stages but there are some differences of practices between different Jigsaw techniques. By the changes in the application process this technique began to be referred to with different names. Jigsaw provided the field of education with various sub-Jigsaw techniques by the alterations in practice.

Today there are three different Jigsaw strategies that teachers can use in their classrooms: (a) Jigsaw developed by Aronson (1978), (b) Jigsaw II developed by Slavin (1987); and (c) Jigsaw III developed by Stahl (1994). Jigsaw and Jigsaw II differ from each other only in that Jigsaw II allows group competition (Table 1).

The same is valid for Jigsaw III, too. However, it is different from Jigsaw I and II since the process in it is evaluated by forms. Later, by Holliday (2000), Jigsaw IV was developed. Its difference from Jigsaw I, II, and III is that some quizzes are given to students in order to check the learning in expert and home groups and the parts of the units which are not taught are added to the process of instruction again. In addition to these, reverse jigsaw was developed by Hedeem (2003) and subject jigsaw was developed by Doymuş (2007).

The strategy suggested for most social and science studies is the series of Jigsaw (Slavin, 1990). The basic reason underlying this strategy is that there is not only a single answer of any question in social sciences. This is one of the techniques that can be preferentially used in language teaching since it enhances the interaction, competition, cooperation, and research in the classroom

and teaches students how to teach others. For this reason, it is necessary to diagnose the effects of this technique on the teaching of writing which plays an important role in native language teaching.

In the study, it was aimed to determine the views of students in the group in which Jigsaw II technique was used on this technique as well as the effects of the instructional teacher-centered teaching method and Jigsaw II technique on students' academic achievement and their attitudes to written expression course classes. For this purpose, answers of the following research questions were sought:

1. Is there a significant difference between experimental and control group students' attitudes to written expression course before and after the treatments?
2. Is there a significant difference between the experimental group and the control group, in terms of their pre-, post- and retention academic achievement tests scores?
3. What are the views of the students in the experimental group in which Jigsaw II technique was used on this technique?

MATERIALS AND METHODS

"Pre-test/post-test design with control-experimental group" was used in this research. Effects of Jigsaw II technique and instructional teacher-centered teaching method on pre-service native (Turkish) teachers' academic achievement and their attitudes to written expression course and also their views on Jigsaw II cooperative learning technique were sought. The participants consisted of two different classes of 80 undergraduate Turkish language teacher education department students who were attending written expression course classes at Atatürk University in 2009 to 2010 academic year. One of the classes was randomly assigned as experimental group (n= 42), and the other was randomly assigned as control group (n= 38). In control group (non-Jigsaw group) students were taught through the instructional teacher-centered method whereas in experimental group (Jigsaw group) students

Table 2. The use of instruments on groups.

Pre-test	Group name	Technique	Post-test	Retention
ATWES WEAT	Jigsaw (experimental)	Jigsaw II	ATWES WEAT SVF	WEAT
ATWES WEAT	Non-Jigsaw (control)	Instructional teacher-centered teaching method	ATWES WEAT	WEAT

subjected to the cooperative learning (Jigsaw II) technique. In order technique. In order to explore the differences between the two groups in their attitudes to the written expression course and academic achievement in that course, ATWES and WEAT were given to both groups as pre-tests at the beginning of the treatment. During pre-tests, students' SSUE¹ (Selection of Students to University Education) scores and GPAs were also determined. According to the data related to ATWES, WEAT and SSUE-GPA scores, it was found that there were no significant differences among the participants; and thus, experimental and control groups were selected based on a random selection technique.

Instruments

Background information form

The form designed to determine the genders, General Point Average (GPAs) and SSUE points of the participants was given to each participant before the application. This form was designed by the researcher by the assumption that knowing the characteristics of the group before the research would positively affect the process.

Attitudes to written expression scale (ATWES)

Students' attitudes to written expression courses and writing activities were sought by attitudes to written expression scale given to them both before and after the experiment. The scale was designed by Temizkan and Sallabaş (2009). The scale used with a different name consisted of 25 items. In this 5-point Likert scale, the options of responses, "strongly disagree", "disagree", "no opinion", "agree" and "strongly agree" were graded as 1, 2, 3, 4, and 5 respectively; and negative items were reversely scored. Reliability and validity of the attitude scale were determined and they were tested through alpha coefficient. After the reliability analysis, internal consistency of the scale was found to be .84. This shows that the scale is reliable. The validity of the scale was measured by, one of the factor analysis techniques, Kaiser Meyer-Olkin (KMO). The KMO value was found to be 0.81; and the Bartlett value was calculated to be 1924.11. After these reliability and validity analyses, the scale was determined to be applicable (Temizkan and Sallabaş, 2009).

Written expression achievement test (WEAT)

The data related to students' academic achievement levels were collected through the WEAT. WEAT questions were selected from previous SSUE, Entrance Examination for Graduate Studies

¹ SSUE (Selection of Students to University Education): Original name as "ÖSS (Öğrenci Seçme Sınavı)". In Turkey this exam is used to select the students who will continue university education after highschool.

(EEFGS²) and Selection of Government Employee Exam (SGEE³) examinations. The number of the questions was decreased from 50 to 30 according to the advices of the experts. A pilot study was carried out with 156 Turkish language teacher education department students in order to test the reliability of the scale. As a result of the reliability analysis, the significance values of the achievement test varied between 0.22 and 0.88 and the inconsistency coefficient was found to be 0.82 with KR-20 technique.

In the reliability analysis after the pilot study, five items (2, 9, 16, 23 and 29) were found to be unreliable and extracted from the scale. Each question in the scale was graded as 1. The WEAT test consisted of 25 questions, and this test was given to experimental and control groups as WEAT pre-test, WEAT post-test and WEAT-retention test.

Student views form (SVF)

Students' views on the Jigsaw II technique, one of the cooperative learning techniques, were collected by the SVF. This form was given to experimental group students after the experiment. The aim of the form was to determine student views on Jigsaw II technique. In designing the instrument, a review of literature was carried out and the researchers who had studied on Jigsaw techniques were consulted. The view form consists of three open-ended questions. Students' responses to these questions were recorded, grouped and their percentages were calculated. The questions in this form are given in "findings and discussion". In Table 2 the use of all instruments on groups are showed.

Procedure

There are some practices related to principles of Jigsaw II technique and instructional teacher-centered teaching method which are valid in both theory and practice. The researchers determine the number of the participants and the course which is appropriate for working in groups in the preparation stage of the research. After some analyses, written expression course at the Turkish language teacher education department is chosen for the application. The subjects on written expression course is viewed and divided into sub-titles taking the number of group members into account. Written expression course subjects are taught to the groups through the mentioned method and technique 4 h a week for 6 weeks.

² EEFGS (Entrance Examination for Graduate Studies): Original name as "ALES (Akademik Lisansüstü Eğitim Sınavı)". In Turkey this exam is used to select the students who will continue postgraduate education after graduation.

³ SGEE (Selection of Government Employee Exam): Original name as "KPSS (Kamu Personeli Seçme Sınavı)". In Turkey this exam is used to select the government employee for professional posts in public organizations.

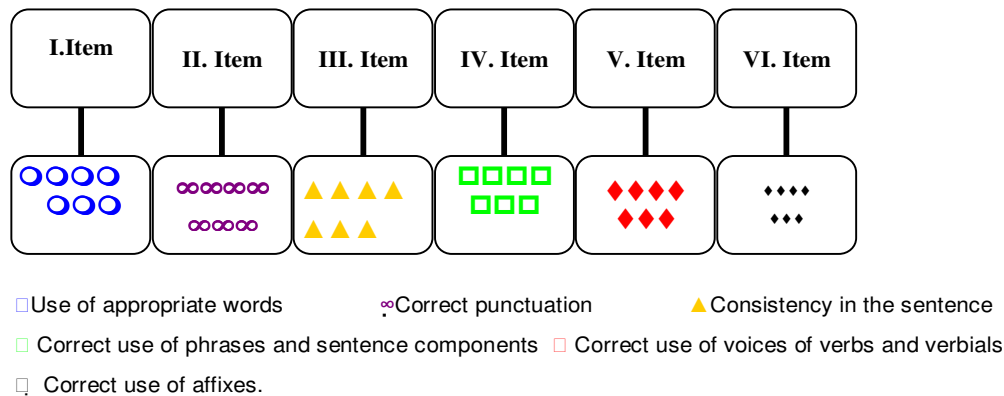


Figure 2. Distribution of groups of experts according to subjects.

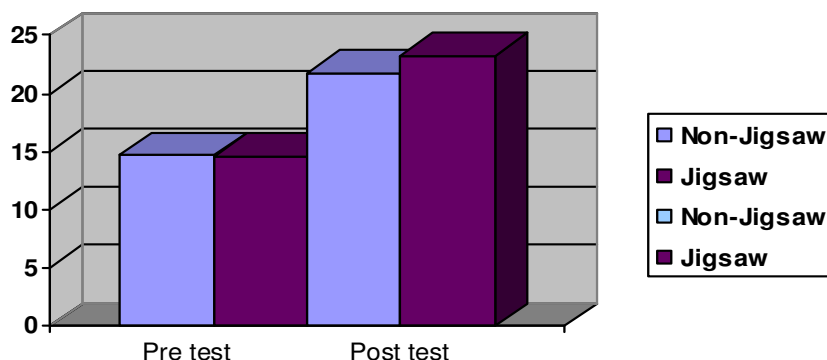


Figure 3. Jigsaw and non-jigsaw groups pre-test and post-test descriptives.

In the experimental group

Group information forms were formulated for the sub-groups of the experimental group. In the form, names of groups, number of members, subjects to be worked on by each member, and group leaders were identified. Depending on these forms heterogeneous groups of six members (Figure 1) were formed and each of them was coded by a letter. By this way, seven groups coded A, B, C, D, E, F, G were formed. The members in groups were coded according to the subjects. Example: A1, A2, A3, A4, A5, A6.

The same subject was given to all groups. The sub-titles of the written expression course were distributed among the members by the group leader. The sub-titles of the written expression course were given as in Figure 2.

The topics were distributed among the students in the way that members with the same codes would take the same topics (A1, B1 and C1 etc.) and would study the same topics. Getting the students with the same codes together, Groups of experts were formed in Jigsaw groups (Figure 2) and they were asked to work on their topics and turn to their groups.

The procedure was started by forming home groups, getting the members with same codes together (forming expert groups), and conducting pre-tests. In the experimental group, in the first week, home groups, by group discussions, determined how they would study their topics and in the second week, they prepared the teaching materials and get ready for their written expression course

topics. In the third week, the participants with the same codes (A1, B1 and C1 etc.) were gathered in expert groups.

In the fourth week, expert groups were given tests on the subject and their level of expertise was measured. Since a level of achievement over 90% was determined, experts were allowed to return their home groups in the fifth week. In the fifth week, after experts returned their home groups, they taught the topics (subjects) to the members of their groups. In the sixth week, the written expression course topics were orally presented by a randomly chosen member to all groups.

In the control group

Written expression course topics were taught through the instructional teacher-centered teaching method. In the non-Jigsaw (control) group, during the first six weeks, theoretical information on all the topics was taught by the researcher. Daily plans belonged to the lessons that were planned to be taught through the instructional teacher-centered teaching method were designed in a way that they would cover all the behaviours the students needed to acquire. The tools and materials were prepared in advance. Before each lesson, students' background information on the topic was tested. In the theory-based classes, the researcher gave the information on the topic of the day in a plain instruction and emphasized the critical

Table 3. Pre- and post-ATWES t test results.

Tests	Groups	n	Mean	Standard deviation	t	p*
Pre-test	Jigsaw II	42	2.70	0.960	1.288	0.202
	Non-Jigsaw	38	2.43	0.848		
Post-test	Jigsaw II	42	3.87	0.711	2.626	0.011
	Non-Jigsaw	38	3.26	1.265		

*p < 0.05.

points. At the end of the lesson, the topic was summarized. Students were given assignments. After the theoretical lessons, the researcher took feedbacks from the groups and repeated the points that had not been completely understood. These feedbacks and reinforcements were given by the researcher and the lessons were completed.

The course was conducted in both groups by the researcher 4 h a week for six-week duration. After the course, experimental (Jigsaw-II) and control (Instructional teacher-centred teaching) groups were given the ATWES and WEAT post-tests and it was attempted to find whether there were differences between the two different techniques in their effects on students' attitudes to the written expression course and their academic achievement in it. Experimental group students' views on the technique were obtained through the SVF. Five weeks after the application, retention tests were given to the groups. The data collected through the pre-tests, post-tests and WEAT-retention test which were given to both experimental and control groups were analysed by SPSS.

FINDINGS AND DISCUSSION

The findings of the study and interpretations on these findings are given. In the study, independent samples T test, for the data obtained from ATWES and WEAT, and percentages, for student responses to the open-ended questions in SVF, were used.

Findings related to students' attitudes to written expression course classes

Independent samples t test analyses of the data obtained from ATWES pre-tests and post-tests applied to determine the differences between experimental (Jigsaw II) and control (non-Jigsaw) group students' attitudes to written expression course classes before and after the process of teaching performed through Jigsaw II technique and instructional teacher-centered teaching method are presented in Table 3.

In Table 3, it is seen that there is no significant difference ($t=0.372$; $p= 0.71$) between experimental and control groups' means of ATWES pre-test scores. On the other hand, when the results of ATWES post-test are analyzed, it is obvious that there is a significant difference ($t= 6.411$; $p= 0.00$) between the mean scores of the experimental group, in which Jigsaw II technique was used, and the control group, in which instructional

teacher-centered teaching method was used.

Findings related to the differences between experimental and control groups' academic achievements

A t test was used in order to explore whether there were differences between the experimental/Jigsaw and control/instructional teacher-centered groups in terms of their written expression achievement test scores before and after the experiment (Table 4).

The t score (0.342) related to the differences between WEAT pre-test scores of the experimental and control group students was found to be non-significant ($p > 0.05$). This reveals that there is no difference between experimental and control group students' WEAT pre-test scores.

In the analysis of the table, the t score (4.376) related to the differences between the experimental and control group students' scores from WEAT post-test was found to be significant ($p < 0.05$). This result shows that there is a difference between experimental and control group students in terms of their WEAT post-test scores. Again in the table, it can be seen that the mean of post-WEAT scores of the students in Jigsaw group is 23.33 and higher than the mean (M: 21.79) of the scores of non-jigsaw (control) group students. As a result, it can be said that post-WEAT scores of the students in Jigsaw group are higher than the scores of those in the control group. To find out if there are intra-group variances between WEAT pre-test and post-test scores of the students in experimental and control groups, a dependent samples t test was used.

When Table 5 is analyzed, it is seen that the t score (23.498) related to pre- and post- WEAT scores of the students in the Jigsaw group is significant at the level of 0.05 ($p < 0.05$). These findings show that the difference between pre- and post- WEAT scores is significant. When the table is analyzed, it is seen that mean of the post-test scores is higher than the mean of the pre-test scores. This finding indicates that the Jigsaw technique is effective on students' academic achievement in written expression course classes.

The t score (14.940) pertaining to the variance between

Table 4. Findings related to levels of learning of the written expression course subject by students in experimental and control groups before and after the experiment (WEAT).

	Groups	n	Mean	Standard deviation	t	p
Pre-test	Non-Jigsaw	38	14.76	2.10	0.342	0.733
	Jigsaw	42	14.59	2.27		
Post-test	Non-Jigsaw	38	21.79	1.74	4.376	0.000
	Jigsaw	42	23.33	1.41		

Table 5. Findings related to the WEAT pre- and post-test scores of experimental and control groups.

Groups		n	Mean	Standard deviation	t	p
Jigsaw	Pre-test	42	14.59	2.24	23.498	0.00
	Post-test	42	23.33	1.41		
Non-Jigsaw	Pre-test	38	14.76	2.10	14.940	0.00
	Post-test	38	21.79	1.74		

Table 6. Findings from WEAT retention test scores of the students in the experimental and control groups after the treatment.

Groups	n	Mean	Standard deviation	t	p
Jigsaw	42	20.47	1.83	4.916	0.000
Non-Jigsaw	38	18.71	1.23		

control-group (instructional teacher-centered method) students' scores from pre- and post-WEAT given to them before and after the treatment was found to be significant ($p < 0.05$). When the table is analyzed, it is seen that the mean of the post-test scores is higher than the mean of the pre-test scores. This finding means that instructional teacher-centered method is also effective on the academic achievement level in written expression course classes (Table 6).

T value pertaining to differences between the scores of experimental and control groups from the WEAT retention test given to students 5 weeks after the application was found to be significant at the level of 4.916 ($p < 0.05$). When the table is analyzed, it is clearly seen that the mean of the retention test scores of the experimental group is higher than that of the control group. These findings indicate that Jigsaw technique is more effective than instructional teacher-centered teaching method on both learning and retention.

Findings related to students' views

Interviews were made with students in order to determine their positive and negative views on cooperative learning environment and Jigsaw II technique; and their responses to the interview questions were recorded.

Question 1

What can you say about the aspects of Jigsaw II practices which have positive effects on you? The responses to these questions are analyzed Table 7. According to findings, it is seen that a great number of students reported that 'Jigsaw II technique was very instructive', 'made them like the subject', 'positively affected the interaction and cooperation in the classroom', and 'directed them to search information' and 'learning to teach was enjoyable'.

Question 2

What can you say about the sides of the technique (Jigsaw II) with negative effects in your opinion? (Table 8). It can be inferred from the findings that students reported that "Jigsaw II technique was time-consuming", "Their friends with low achievement made them tired" and "The noise occurred during group works was disturbing". Besides, 7% of the students reported that it would be more effective if the units were taught by the teacher instead of using this method.

Question 3

Did your attitudes towards how to get access to information

Table 7. Responses to these questions.

Views	%
It enhances achievement in both theory and practice.	95
My self-confidence increased thanks to this technique.	81
It positively affected the interaction and cooperation in the classroom.	81
It eliminated memorization.	86
It enhances the desire for research.	74
Learning to teach was enjoyable.	92
Learning the subjects from classmates makes it more affective.	95

Table 8. negative effects of the Jigsaw II technique.

Views	%
It was time-consuming.	55
My friends with low achievement made me tired.	24
If the subjects had been taught by the teacher, it would have been more effective.	7
The noise occurred during group works was disturbing.	10

Table 9. Attitudes towards the jigsaw II technique.

Views	%
I did more research in the library thanks to this technique.	86
I began to use the Internet more frequently to get access to information.	74
I learnt how to get access to information.	79
I began to like doing research.	86
There has been no change in my attitudes to doing research.	10
I learnt that doing research was not boring but enjoyable.	82

change after the application of this technique? (Table 9).

Findings show that a great number of the students reported that they experienced great a development in getting access to information. However, 10% of the students stated that there was no change in their attitudes to doing research. The positive responses to the items pertaining "how to get access to information" showed that, thanks to this technique, a great majority of the students 'learnt how to get access to information', 'began to use the Internet and the library more often to get access to information' and 'quitted their beliefs that doing research was boring'.

Our study investigates the effects of cooperative learning (Jigsaw-II) on academic achievements of students in written expression courses at the Turkish language teacher education department.

In the study, the effects of Jigsaw II, one of the cooperative learning techniques were investigated, it was found that after the treatment (application) that there was a significant difference between the experimental group in which Jigsaw II was used and the control group in which instructional teacher-centered method was used. The effectiveness of cooperative learning on the

achievement in writing was evidenced in various studies as well. Bruffee (1999) claims that successful writing is possible by only cooperative learning. Also, Randolph (1997) indicates that students learn writing by writing about it together. In one of Hillebrand's (1994) studies, concluded that writing in groups is superior to individual writing activities. Other studies found that cooperative writing makes more contribution to the academic achievement than individual writing does (Reither and Vipond, 1989; Englert et al., 2001).

In the study, it can be seen in the WEAT post-test and retention test that cooperative learning technique, Jigsaw II is more effective than the instructional teacher-centered teaching in acquiring writing skills to pre-service teachers. However, Lee-Ernest (2008), in his study, compared individual teaching technique with cooperative learning and found that it was more effective than cooperative learning.

Conclusion

After the analysis of the data, it was found that Jigsaw II

technique was more effective than instructional teacher-centered teaching in the development of writing skills of the students, in the experimental group. This study that focused on Jigsaw II and the study of Mattingly and VanSickle (1991) support Slavin's (1987) claims related to teaching conditions that should be provided for small groups for cooperative learning to be more effective.

Those home groups and expert groups in the experimental group provide activities that are rich in cooperation to teach the subject, solutions, and suggestions shows that Jigsaw technique is effective in terms of teaching contents and atmosphere besides having positive effects on academic achievement. In addition, use of quizzes, beside academic achievement tests in Jigsaw II groups, expert groups contributed to a complete understanding of subjects. The results of the retention test conducted a while after the experiment revealed that Jigsaw II was effective on learning and retention.

In the control group, it was noticed that students had difficulties in learning written expression course subjects. However, control group managed to be successful, too, at the end of the process. In addition, since the students in Jigsaw II group found solutions by sharing ideas on the topics during expert group studies, they could completely understand the topic and when they returned to their groups they did not have any difficulty in teaching it to their friends.

The reason why the students in the Jigsaw group had higher scores than those in the control group can be attributed to the fact that students in the cooperative (Jigsaw II) group completely learn their subject topics by fulfilling their individual responsibilities, try to make their friends understand the topic, have effective interactions with their friends, and are all actively involved in the process. These findings are in parallel with the other findings in literature (Ernst and Byra, 1998; Wilson, 1998; Huang, 2000; D'Arripe-Longueville et al., 2002; Johnson and Ward, 2001; Barrett, 2005; Ward and Lee, 2005; Tunçel, 2006).

According to the findings pertaining to students' views on written expression courses, it was determined that Jigsaw II technique was more effective than instructional teacher-centered teaching in developing positive attitudes to these courses. The reasons that the students in Jigsaw II group worked in this technique for the first time, they found the method exciting, and they had good interactions with their friends may be regarded to have affected the development of their attitudes in this technique when compared to the conventional method. Findings of this study are in line with previous research revealing that cooperative learning has positive effects on students' affective characteristics and attitudes (Cai, 1997; Sarıtaş, 1998; Ernst and Byra, 1998; Dyson, 2001; Dyson, 2002). However, they are not consistent with the studies of Mirzeoğlu (2000) and Güneş (2007) in which they could not find significant variances between the scores of experimental and control groups.

From the findings related to students' views on Jigsaw II technique, it was inferred that most students reported some expressions such as 'this technique enhances learning', 'it increases self-confidence', 'provides interaction and cooperation', 'it lets students be more active', 'and it makes us like learning to teach'. Views revealed by this research are in parallel with those reported in the similar studies (Bourner et al., 2001; Mills, 2003; Ulmer and Cramer, 2005).

As a result, it can be said that use of Jigsaw II, one of the cooperative learning techniques, in writing expression classes has positive effects on students' academic achievement and attitudes to these classes. Taking into consideration the high academic achievement levels, positive attitudes to writing expression classes, and students' views in Jigsaw II groups, some suggestions were listed below. The effects of Jigsaw techniques on different levels of students and different language skills can be investigated.

1. Native language courses can be planned according to cooperative learning and on which language skill cooperative learning has greatest effects can be analyzed.
2. It is necessary to plan cooperative language learning and prepare the required tools and materials in advance.
3. In the classrooms the jigsaw techniques would be applied for the first time, students should be informed on the purposes of Jigsaw technique and other cooperative learning methods and the qualities the students should have.
4. It should be kept in mind that good planning of time is very important to be successful in practices of cooperative language learning and it is necessary to make a good review of literature.

Cooperative learning groups can easily work on the tasks given to them, for example, in the task-based approach to language teaching. However, cooperative language learning is similar to strategy teaching in that both, in addition to language teaching, need language in the teaching of other skills (Freeman, 2003: 169). According to the results, it can be said that Jigsaw II technique may result in positive outcomes in teaching, in addition to writing, other language skills and in developing individuals' communicative and problem-solving skills.

REFERENCES

- Açıkgöz KÜ (2006). *Aktif Öğrenme*, 8. Edition, İzmir: Biliş Yay.
- Aronson, A. (1978). *The Jigsaw classroom*. Beverly Hills, CA: Sage.
- Barrett T (2005). "Effects of Cooperative Learning on The Performance of Sixth- Grade Physical Education Students", *J. Teach. Phy. Educ.*, 24: 88-102.
- Bourner J, Hugnes M, Bourner T (2001). "First-year Undergraduate Experiences of Group Project Work". *Asses. Eval. Higher Educ.*, 26(1): 19-39.
- Bolling A (1994). Using group journals to improve writing and comprehension. *J. Excell. Col. Teach.*, 5(1): 47-55.

- Bowen CW (2000). A quantitative literature review of cooperative learning effects on high school and college chemistry achievement. *J. Chem. Educ.*, 77(2): 116–119.
- Bradley-Johnson, S., Lesiak JL (1989). *Problems in written expression: Assessment and remediation*. New York: Guilford.
- Bruffee KA (1999). *Collaborative learning* (2nd ed.). Baltimore: The Johns Hopkins University Press.
- Cai SX (1998). "Student Enjoyment of Physical Education Class in Three Teaching Styles Environments. *Education*, 118: 412–421.
- Colosi JC, Zales CR (1998). Jigsaw cooperative learning improves biology lab course. *Bioscience*, 48 (2): 118–124.
- Coppola BP, Lawton RG (1995). Who has the some substance that I have? A blueprint for collaborative learning activities. *J. Chem. Educ.*, 72 (12): 1120-1122.
- D'Arripe-Longueville F, Gernigon C, Huet M, Cadopi M, Winnykamen F (2002). Peer Tutoring in a Physical Education Setting: Influence of Tutor Skill Level on Novice Learners' Motivation and Performance. *J. Teach. Phys. Educ.*, 22: 105-123
- Doymus K, Simsek U, Bayrakceken S (2004). The effect of cooperative learning on attitude and academic achievement in science lessons. *J. Turk. Sci. Educ.*, 2(2): 103–113.
- Doymuş K (2007). The Effect of a Cooperative Learning Strategy in the Teaching of Phase and One-Component Phase Diagrams. *J. Chem. Educ.* 84(11):1857-1860.
- Doymus K (2008). Teaching Chemical Equilibrium with the Jigsaw Technique. *Res. Sci. Educ.*, 37 (5): 249-260.
- Dyson B (2001). "Cooperative Learning in an Elementary Physical Education Program" *J. Teach. Phys. Educ.*, 20: 264-281.
- Dyson B (2002). 'The Implementation of Cooperative Learning in an Elementary Physical Education Program', *J. Teach. Phys. Educ.*, 22, 69–85.
- Eilks I (2005). Experiences and reflections about teaching atomic structure in a jigsaw classroom in lower secondary school chemistry lessons. *J. Chem. Educ.* 82(2): 313–319.
- Englert CS, Berry R, Dunsmore K (2001). A case study of the apprenticeship process; Another perspective on the apprentice and the scaffolding metaphor [Electronic version]. *J. Learn. Disabil.*, 34 (2): 152-171.
- Ernst M, Byra M (1998). Pairing Learners in the Reciprocal Style of Teaching Influence on Student Skill, Knowledge and Socialization. *Phys. Educ.*, 55: 24-38.
- Freeman DL (2003). *Techniques and Principles in Language Teaching*. Oxford University Press.
- Gardener BS, Korth SD (1996). Using reflection in cooperative learning groups to integrate theory and practice. *J. Excel. Col. Teach.*, 7(1): 17–30.
- Graham DC (2005). Cooperative learning methods and middle school students. Ph. D. Thesis, Capella University.
- Graham S, Harris K (2005). Improving the writing performance of young struggling writers: Theoretical and programmatic research from the Center on Accelerating Student Learning. *J. Spec. Educ.* 39: 19-33.
- Grasha AF, Yangarber-Hicks N (2000). Integrating teaching styles and learning styles with instructional technology. *Col. Teach.*, 48(1): 2–11.
- Gillies RM (2006). Teachers' and students' verbal behaviors during cooperative and small-group learning. *British J. Educ. Psychol.* 76(2): 271–287.
- Güneş B (2007). 'Fitness Instructor of Physical Education Unit of Cooperative Learning Achievement Levels of Students' Cognitive Affective and Psychomotor Effect' Abant İzzet Baysal University, Master Thesis, Institute of Social Sciences.
- Hedeen T (2003). The Reverse Jigsaw: A process of cooperative learning and discussion. *Teach. Sociol.*, 31(3): 325-332.
- Hennessy D, Evans R (2006). Small-group learning in the community college classroom. *Community Col. Enterp.*, 12(1): 93–109.
- Hillebrand RP (1994). Control and cohesion: Collaborative learning and writing [Electronic version]. *English J.*, 83 (1): 71-74.
- Holliday DC (2000). The Development of Jigsaw IV in a Secondary Social Studies Classroom. Paper presented at the 2000 Midwest Educational Research Association (MWERA) Annual Conference in Chicago, IL.
- Huang CY (2000). "The Effects of Cooperative Learning and Model Demonstration Strategies on Motor Skill Performance During Video Instruction". *Proc. Nat. Sci. Council*, 2: 255-268.
- Johnson DW, Johnson RT (1999). What Makes Cooperative Learning Work. In Kluge, D. McGuire, S., Johnson, D.W., Johnson R.T., Eds. *Cooperative learning*. Tokyo: Japan Association for Language Teaching.
- Johnson M, Ward P (2001). "Effects of Classwide Peer Tutoring on Correct Performance of Strinking Skills in 3rd Grade Physical Education", *J. Teach. Phys. Educ.*, 20: 247-263.
- Kennedy-Kalafatis S, Carleton D (1996). Encouraging Peer Dialogue in the Geography Classroom: Peer Editing to Improve Student Writing. *J. writing? NAEP Facts*, 1:96-845.
- Lee-Ernest RJ (2008). *Collaborative Writing: A study on the effects of co-authoring on writing quality*. Degree Doctor of Philosophy, Capella University.
- Levine E (2001). Reading your way to scientific literacy. *J. Col. Sci. Teach.* 31(2): 122–125.
- Lin E (2006). Learning in the science classroom. *Sci. Teach.*, 73(5), 35–39.
- Lucas AC (2000). Jigsaw Lesson for Operations of Complex Numbers'. *PRIMUM (Problems, Resources, and Issues in Mathematics Undergraduate Studies)*, 10(3): 219-22. Taylor & Francis
- Maloof J, White VKB (2005). Team study training in the college biology laboratory. *J. Biol. Educ.*, 39(3): 120-124.
- Mattingly RM, VanSickle RL (1991). Cooperative learning and achievement in social studies: Jigsaw II. *Soc. Educ., Res. Lib.*, 55(6): 392.
- Mergendoller J, Packer MJ (1989). *Cooperative learning in the classroom: A knowledge brief on effective teaching*. San Francisco: Far West Laboratory.
- Mills P (2003). "Group Project Work with Undergraduate Veterinary Science Students", *Assess. Eval. Higher Educ.*, 28(5): 527–538.
- Miller AK (1989). "Enhancing Early Childhood Mainstreaming through Cooperative Learning: A Brief Literature Review". *Child Stud. J.* 19(4): 285-291.
- Mirzeoğlu D (2000). "Voleybol Dersindeki Davranışların Öğreniminde, Yapılandırıcı Öğrenme Etkinliklerinin Öğrenci Erişi Düzeyine Etkisi." Yayımlanmamış Doktora Tezi, Abant İzzet Baysal Üniversitesi Sosyal Bilimler Enstitüsü, 66–68, 138–139.
- Parker R (1985). Small-group cooperative learning in the classroom. *Oregon Sch. Stud. Council Bull.*, 27(7), 1–28.
- Prichard JS, Bizo LA, Stratford RJ (2006). The educational impact of team-skills training: Preparing students to work in groups. *British J. Educ. Psychol.*, 76(1): 119–140.
- Prince M (2004). Does active learning work? A review of the research. *J. Engin. Educ.*, 93(3): 223–231.
- Randolph G (1997). "Fused Horizons": Collaboration and co-authored texts: A case study of a freshman writing group (Doctoral dissertation, Capella University, Dissertation Abstracts International (UMI No. 9722670).
- Reither JA, Vipond D (1989). Writing as collaboration [Electronic version]. *Col. English*, 51(8): 855-867.
- Sarıtaş M (1998). "Primary Schools 4 grade Physical Education Teaching and Learning Methods of Cooperative Learning Method in Competitive Effects," Unpublished Master's Thesis, Pamukkale University School of Social Sciences, Denizli.
- Shapiro ES (1996). *Academic skills problems: Direct assessment and intervention* (2nd edition). New York: Guilford Press.
- Siegel C (2005). Implementing a research-based model of cooperative learning. *J. Educ. Res.*, 98(6): 339-350.
- Slavin RE (1987). *Cooperative learning: Student teams, what research says to teachers* (2nd ed.).
- Slavin RE (1990). Cooperative learning. *Rev. Educ. Res.*, 50(2): 315–342.
- Slavin RE, Sharan S (1990). *Comprehensive Cooperative Learning Methods: Embedding Cooperative Learning in the Curriculum and School*, Cooperative Learning: Theory and Research. New York: Preston Press.
- Slavin RE (1991). Are cooperative learning and untracking harmful to the gifted? *Educ. Leadersh.*, 48: 68–71.
- Slavin RE, Madden NA, Karweit N, Livermon BJ, Dolan L (1995). Success for all: First year outcomes of a comprehensive plan for reforming urban education. *Amer. Educ. Res. J.*, 27: 255-278.

- Slavin R (1995), Cooperative learning: Theory, Research, and Practice, 2nd edition, (Allyn and Bacon: Boston).
- Sokolik M (2003). Writing. Practical English Language Teaching. In: D Nunan (ed.). New York, NY: McGraw-Hill, 87-107.
- Stahl R (1994). Cooperative learning in social studies: A handbook for teachers. Menlo Park, CA: Addison-Wesley.
- Stemper J (2002). Enhancing Student Revising and Editing Skills through Writing Conferences and Peer Editing. Retrieved February 27, 2009, (ERIC Document Reproduction Service No. ED465187) Published April 2008 by Salah-Din, Deborah, Persky, Hillary and Miller, Jessica.
- Şimşek Ü. (2007). Çözümler ve Kimyasal Denge Konularında Uygulanan Jigsaw Ve Birlikte Öğrenme Tekniklerinin Öğrencilerin Maddenin Tanecikli Yapıda Öğrenmeleri Ve Akademik Başarıları Üzerine Etkisi, Yayımlanmamış Doktora Tezi, Atatürk Üniversitesi Fen Bilimleri Enstitüsü, Erzurum.
- Temizkan M, Sallabaş ME (2009). Compare The Attitudes Of Teacher Candidates Related To Reading And Writing Activities, Elect. J. Soc. Sci., Winter: 8(27). (www.esosder.org)
- Tunçel, Z. (2006). "Cooperative Learning in Physical Education Achievement, Cognitive Processes and Effects on Social Behaviour", Unpublished Ph.D. Thesis, Dokuz Eylül University, School of Social Sciences, İzmir.
- Ulmer, J.D., Cramer MM (2005). "Why are those kids in groups". Agric. Educ. Mag., 77(6): 14-17.
- Ward, P., Lee MA (2005). "Peer-assisted Learning in Physical Education: A Review of Theory and Research" J. Teach. Phys. Educ., 24: 205-225.
- Webb, NM, Sydney H, Farivor AM (2002). Theory in to practice. Col. Educ., 41(1): 13-20.
- Wilson, S., (1998). "The Effect of Two Teaching Styles on Children's Skill Performance and Task Analyses ability Related to Skill Observation." Research Quarterly for Exercise and Sport; Abstract of Completed Research.