

The Impact of Teaching the Subjects under "Science in Time" Unit in the Social Studies Class in the 7th Grade Using Jigsaw Technique on the Academic Success of the Students

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Abstract The main point in today's educational approach is that it is based on a student-centered approach. One of the alternative instruction techniques having a convenient content for this system is the jigsaw technique. Since the introduction of this technique, it has been applied into many different fields of education, and determined that it positively influences students' academic success. The purpose of this study is to find out the impact of teaching "science in time" unit under "science technology and society" learning area in the social studies class in the 7th grade using jigsaw technique on the academic success of the students. Mixed method, in which both qualitative and quantitative research models were used, was utilized in this study. In the quantitative section, based on experimental research model, the study was shaped based on pre-test post-test control group. And in the qualitative section, the answers of the students to the interview questions were analysed based on content analysis technique. The study was implemented on a total number of 46 students studying in the 7th grade of a public secondary school of the Ministry of National Education in Bartın province during 2015-2016 academic year. At the end of the study, it was observed that instructing with the jigsaw technique had a positive impact on students' academic success, and there was a statistically significant difference (pre-test and post-test). In addition, although in general students made positive statements about jigsaw technique, there were also some partly negative statements. As a consequence, it could be stated that the use of jigsaw technique in teaching social studies can have positive contributions into students' academic success.

Keywords Social Studies, Jigsaw Technique, Academic Success

1. Introduction

In today's world, societies aim to improve the quality of individuals in order to reach their goals by being aware of the necessity of educating the individuals in the best way. Accordingly, societies attach a great importance to educational activities, and pay attention to improve the quality of the education process. In this scope, a variety of approaches, models, methods and techniques have been developed to make the learning permanent and effective, by taking the interests, needs and differences of the individuals into consideration Eggen and Kauchak [1]. The main aim of this study is to realize a meaningful and healthy learning process at the highest level, by putting the individual to the center of the education.

In the education process, students show tendency to learn the components that they are interested in, and find meaningful and important for themselves. In fact, it is necessary to use the new methods, with which students are active, rather than the traditional methods, with which they are in passive position, in the education and teaching processes. With such an understanding realized through this way, it is possible to let student learn how to learn Ünlü and Aydınhan [2]. In this process, student takes a role, which looks for, discovers, and organizes the knowledge through different ways, in a sense, designs learning as a meaningful whole, which s/he himself/herself has built Yıldırım and Girgin [3]. One of the teaching methods, which serves these aims mentioned and in which student plays an active role, is cooperative learning.

Cooperative learning is defined as an interactive learning teaching method based on studying of students as small groups in cooperation, in order to realize the shared learning aims at the maximum level Johnson et al. [4]. The most important feature of the cooperative learning is that students work in small groups, by helping the learning of each other,

in line with the common purpose. Group members cooperate by teaching each other or doing one part of the task. This is called “inner dependence” or “goal dependence”. The learning of a student in a group is affected by the learning of the other students in the group or the effort they spend. Therefore, everybody in the group is responsible for the learning of each other and encourages the learning of each other, to make the best of their own skills, Açıkgöz [5].

There are different techniques commonly utilized in the cooperative learning method. One of them is the jigsaw techniques, which is defined as “assembly technique” in some sources. Jigsaw technique first started with a study realized by Eliot Aronson and his friends by making several teachers from a variety of branches meet, in 1978 Dellalbaş and Soyulu [6]. In this technique, students are divided into groups of 3-7 people, called “primary”. The distribution is done by giving each group a topic from the same unit. Then, another distribution is realized individually in the group. Every individual leaves his/her primary group after studying the topic s/he is responsible for, form the groups, called “expertise”, with the other students, who are responsible for preparing the same topic. The individuals return their primary groups after thoroughly learning and discussing their topics. The group members, coming together again, are responsible for telling and teaching the topics, they have prepared, to each other. After these processes have been completed, all the class takes an exam and the results are individually announced Aranson et al. [7]; Açıkgöz [8].

In the learning process, based on the jigsaw technique, students create an interactive atmosphere, where everybody contributes individually at the high level, by taking the role of both teacher and student. The application of this technique can be said to be of quite importance for contributing to permanence in learning, promoting friendship, increasing the success and self-esteem as well as enabling communication in class Madden and Slavin [9]; Köseoğlu [10]. Besides, this technique is also of quite importance for that it encourages students to study together, everybody needs each other in order to learn the topic Şimşek [11] and it provides opportunities for cooperation and interdependence Batdı [12].

The contribution that jigsaw technique makes in the learning teaching process in the studies realized, enabled this technique to be utilized in several courses related to science, math and social studies. This technique can be considered to be suitable for social studies course, which includes social field disciplines with its aspects especially based on students' individually expressing themselves, learning together as well as cooperation and interdependence. As a course inherently based on verbal lecture, social studies do not involve much experiment, operations and applications, which brings about the necessity for the use of techniques such as jigsaw to increase the level of student attendance. It can be also stated that this technique will provide an effective learning in providing students with the necessary information, skill, attitude and values and in reaching the goals of the course by

making students active Gürdoğan Bayır [13]. The academic achievement of the students can be improved related to the teaching of social studies, and at the same time, the skills for having the qualities of a good citizen as a democratic individual Hendrix [14] which is one of the main goals of the course, can be provided.

This study bears importance for providing students with required information, skills, attitudes and values in the social studies field and creating efficiency in terms of teaching. Especially the fact that the studies realized related to this subject in social studies education and the ones realized in foreign language are not adequate, creates the need for such a study. In this sense, this study is considered to be guide to the researchers and practitioners in the education-teaching process and to constitute a source for the new studies by contributing to the literature in this field.

The purpose of this study is to find out the impact of teaching “science in time” unit under “science technology and society” learning area in the social studies class in the 7th grade using jigsaw technique on the academic success of the students. Answers to the following research questions were looked for within the scope of the study:

1. Is there a statistically significant difference among the pre-test and post-test scores averages of experimental and control group?
2. Is there a statistically significant difference between the post-test score averages of experimental and control group?
3. Is there a statistically significant difference among the follow-up test scores averages of experimental and control group?
4. Is there a statistically significant difference between the post-test and follow-up test scores of experimental and control groups?

In line with the purpose of the study, answers to the following questions were sought within the qualitative scope of the study:

1. What do you think about the efficiency of “Jigsaw technique”?
2. If you were a teacher, would you use this technique? Why? (Please explain your reason whether your answer is yes or no).

2. Materials and Methods

2.1. Research Model

Sequential explanatory design, a mixed method design, was used in this study. In sequential explanatory design, the researcher first conducts the quantitative method and later, to support the findings collected from quantitative data or to reduce them, s/he uses the qualitative method Fraenkel et al. [15]. The main aim of this design is to use the qualitative stage with the purpose of explaining the relationships and tendencies within the quantitative data Creswell, Plano Clark

et al. [16]. In the study, the impact of jigsaw technique (independent variable) on academic success (dependent variable) was examined. In the quantitative sub-factor of the study, an experimental research based on "pretest- posttest with control group" design was conducted. Experimental studies are those in which there are two groups; one being the experimental and the other being the control group. In such studies, after the experimental process is conducted on the experimental group, the results are compared with both groups Ekiz [17]. Pretest- posttest with control group design is strong one that provides the researcher with high statistical power relating to testing the impact of the experimental process on the dependent variable and one that enables the interpretation of the findings within the context of reason-result relationship Büyüköztürk [18]. In the qualitative sub-factor of the study, interviewing technique was used to collect in-depth information on the process of implementation and on the purpose of the study. The answers to the interview questions prepared based on expert opinion were subjected to content analysis and examined accordingly. It has been emphasized that the qualitative stage within the sequential explanatory design is applied for the purpose of explaining the relevant results in more detail, using an approach that focuses on explaining the findings Morgan [19].

2.2. Study Group

In the study, convenient sampling, one of the purposeful sampling methods, was used. Purposeful sampling allows in-depth investigation of situations which are assumed to involve rich information. In this context, it is useful for discovering and defining various facts and phenomena. Convenience sampling, on the other hand, is preferred for its capability to expedite and facilitate the research through adding practicability. In this method, researcher chooses a recent and accessible case since this requires relatively lower costs Yıldırım and Şimşek [20]. The study was carried out at 7/A and 7/B branches of a public secondary school of the Ministry of National Education in Bartın city during 2015-2016 academic year. There were a total number of 23 students in the experimental group, involving 13 males and 10 females; and there were 23 students in the control group involving 14 males and 9 females. The details of the students and branches involved in the study are given in Table 1 below:

Table 1. The distribution of the branches and students in the study

| Branch | Study Group | Female | Male | Total |
|--------|--------------|--------|------|-------|
| 7/A | Experimental | 10 | 13 | 23 |
| 7/B | Control | 9 | 14 | 23 |

While forming experimental and control groups in the study, in order to ensure objectivity, two 7th grade classes which has similar academic success notes in the previous semester was chosen as the experimental and control group. The details are given in Table 2.

Table 2. Distribution of the Academic Success Scores of the Classes which participated in the study

| Class | Study Group | Class size | Academic success scores from the previous year |
|-------|--------------|------------|--|
| 7/A | Experimental | 23 | 73.41 |
| 7/B | Control | 23 | 70.85 |

Before starting the study, t-test was administered to see whether there was a significant difference between the experimental and control groups in terms of academic success variable. The results of the test are shown in Table 3 below.

Table 3. T-test results of Experimental and Control Groups from the Pre-test

| Groups | | N | X | Ss | Sd | t |
|----------|--------------|----|-------|------|----|-------|
| Pre-test | Experimental | 23 | 62,17 | 7,81 | 22 | ,204* |
| | Control | 23 | 61,30 | 7,72 | | |

*p (.840)>.05

When Table 3 is examined, it can be seen that the average of the pre- test points of the experiment (X=62.17) and control (X=61.30) groups are close to each other. Independent t test results have determined that there is no significant difference between the averages of the groups ($t= 204, p (.840) > .05$). In the conclusion of this analysis it can be stated that both the experimental and control groups are equal in terms of their academic success.

This study was carried out on the basis of "science through time" unit which is a part of "science, technology and society" course included in 7th grade social studies curriculum. The application was implemented for a period of 4 weeks and 12 course hours between the dates of February 9 – March 6 2016, in line with the curriculum's framework. The gains and course hours of "science through time" unit in 7th grade social studies curriculum are shown in Table 4.

Table 4. The Gains and Class Hours of the "Science Through Time" Unit in The 7th Grade Social Sciences Education Program

| Learning Field | Unit | Gain | Class Hours | Ratio (%) |
|--|---------------------------------------|----------|-------------|-----------|
| The Individual and society | Communication and human relationships | 6 | 12 | 11 |
| Humans, places and surroundings | Population in our country | 5 | 12 | 11 |
| Culture and Heritage | A journey in Turkish history | 8 | 27 | 25 |
| Science, technology and society | Science through time | 5 | 12 | 11 |
| Production, distribution and consumption | The economy and social life | 6 | 18 | 17 |
| Power, authority and society | The living democracy | 5 | 12 | 11 |
| Global connections | Bridges between countries | 4 | 15 | 14 |
| Overall Total | | 39 | 108 | 100 |

As stated in the curriculum, there are five gains in the “science through time” unit intended for students. These gains can be listed as follows:

1. Exemplifies the contributions to scientific and technological developments made by early civilizations.
2. Recognizes the importance of writing’s fields of use and its importance in terms of conveyance of information based on early writing samples.
3. Evaluates the contribution of scholars in Turkish and Islamic states to scientific development process.
4. Recognizes the effect of developments experienced in Europe between 15th and 19th centuries on today’s scientific knowledge.
5. Expresses opinions within the framework of historical process and associates scientific freedoms with scientific developments.

In this unit, students will be informed about the emergence and development of science through time and the contribution of scientific knowledge to scientific developments. Additionally, they will be taught the contributions to the progress of scientific process by the scientists in Turkish-Islamic states and the developments between 15th -19th centuries in Europe. Finally, they will summarize the formation process of scientific heritage up to this day, and recognize the analogy between scientific thought and the developments in science and technology.

2.3. Data Collection Tools

In order to measure the success of the students and achievement test and interview form was used as data collection tools in this study.

2.4. Achievement Test

A total of 30 multiple choice questions were prepared using various sources and keeping in mind the gains that are associated with the teaching program. In order to make sure that the questions were appropriate in terms of content and appearance and appropriate with regards to the principles of measurement and evaluation, the opinions of three social sciences teachers and two assessment and evaluations specialists were taken. The test which was reduced to 24 questions having undergone the modifications which were deemed necessary was preliminarily applied to 200 students and was examined in terms of the item difficulty index. 20

questions which rated between .29 and .88 in the item difficulty index were used in the achievement test. Walsh and Betz recommend that the item difficulty index of a test should range between .10 and .90 cited in. Kan [21]. Furthermore, in order to ensure the test measurement reliability of the questions selected following item analysis, the halves method of internal consistency measurement was used. This method determined that the reliability of the measurements attained was $r=.87$. The reliability of the measurements achieved by the application of the achievement test on the working group was calculated by the KR-20 formula and found to be .91. This value demonstrates that the achievement test is considerably reliable in this study.

2.5. Interview Form

In the result of implementation of the experimental process in this study, the opinions of students were sought regarding the application of the jigsaw technique. The objective in doing so was to be able to view this study from a different perspective and be able to make a multidimensional evaluation. The interview form was prepared in line with this thought had, at first, three questions were reduced to two following the suggestions of specialists. Table 5 shows the class and student numbers which have participated in the interview.

Table 5. The Distribution of Classes and Students Who Participated in the Activity

| Class | Working Group | Girls | Boys | Total |
|-------|---------------|-------|------|-------|
| 7/A | Experiment | 10 | 13 | 23 |

The questions directed to students following the experimental application are provided below.

- 1 What are your thoughts and opinions regarding the effectiveness of the “Jigsaw Technique”?
- 2 If you were a teacher would you have used this technique? Why? (If your answer is yes or no, please explain the reason).

2.6. Data Collection

In order to demonstrate the level of effectiveness of the jigsaw technique in the study, a preliminary test, final test and monitoring test was implemented. The process regarding the implementation can be found in table 6.

Table 6. The Schematic View of the Implementation Process

| Preliminary test | Group name | Technique applied | Final test | Monitoring |
|------------------|--------------|--------------------|------------------|------------------|
| Achievement Test | Experimental | Jigsaw | Achievement Test | Achievement Test |
| | Control | Traditional Method | Achievement Test | |

In line with this research, a different environment was created for each two groups. The procedures below were carried out towards the experimental working group.

1. Lesson plans suitable for the Jigsaw technique were prepared.
2. Informative statements directed at students towards implementation of the Jigsaw technique were made.
3. Students were separated to equal groups.
4. Subjects were distributed to groups.

In the class of control group, on the other hand, subjects were taught on the basis of the traditional method and in compliance with the teaching activities proposed in the curriculum. Traditional method is a teaching model related to the conveyance process of subjects generally with verbal narrative method, in which the teacher is active and student is passive. In this method, the teacher defines the curriculum and subjects, supervises learning, and attaches particular importance to silence and order Temel and Dere [22].

In the qualitative dimension of the research, the answers students provided in the interview form were examined and evaluated in a way suitable to the content analysis technique.

2.7. Analysis of Data

The quantitative data of this study was gathered after being applied a total of three times; a preliminary test before the experimental study during the spring semester of the 2015-2016 educational year, the final test after the experimental study and the follow-up test a month later, all using the achievement test that was prepared. The data obtained was analyzed in terms of arithmetic average, standard deviation, t test using the SPSS 15 statistical package program.

On the other hand, the qualitative data of the study was gathered after the experimental study through the use of the interview form which was prepared with expert advice. The data gathered with the use of the interview form was analyzed using the content analysis technique. In order to ensure the reliability of the analysis, all of the data was separately coded and compared with the support of an expert academican. The 85% rate of consensus was achieved among the researchers who participated in the coding. Furthermore, in order to ensure the validity of the study all of the analyzed data which were examined in detail, were categorized by researchers and values related to these were commented on by being displayed as frequency on tables.

3. Results and Discussion

This section consists of the data obtained by participants using the data gathering tool and the findings and comments following the analysis of this data.

3.1. Findings Regarding the Quantitative Sub-Dimension of the Study

In this section answers were sought to the questions raised in the quantitative sub-dimension of the study.

In order to determine whether there was a differentiation between teaching and the academic success of students using the jigsaw technique, the results of the preliminary, final and the t test applied to both groups can be viewed in table 7.

Table 7. The Preliminary Test Scores-Final Test Scores T Test Scores of the Experimental and Control Groups

| Groups | | N | X | Ss | Sd | t |
|--------------|------------------|----|-------|------|----|-----------|
| Experimental | Preliminary test | 23 | 62,17 | 7,60 | 22 | -18,320** |
| | Final test | 23 | 83,70 | 6,61 | | |
| Control | Preliminary test | 23 | 61,30 | 7,72 | 22 | -8,662** |
| | Final test | 23 | 71,96 | 6,17 | | |

**P (.000)<.05

When the arithmetic average of the preliminary and final tests of the experimental group is examined using the Jigsaw technique, it can be seen that there is an increase of 22.18 points between the preliminary test (X= 62.17) and the final test (X= 83.70)

In order to determine whether or not this difference is meaningful a dependent t test was administered which concluded that this difference was indeed meaningful ($t = -18.320, p (.000) < .05$). The result that was obtained demonstrated that teaching with the jigsaw method increased the success of the student.

It can be see that there is a 10.66 point increase between the arithmetic average of the preliminary test results (X= 61.30) and final test results (X= 71.96) of the students in the control group in which the educational activities of the program had been applied to. The result of the dependent t test in order to determine whether or not this increase was statistically meaningful concluded that this difference was indeed meaningful ($t = -8.662, p (.000) < .05$). As a result of this technique it can be stated that there was an increase in student success.

The results of the independent t test which was applied to both groups in order to determine whether the final test data was meaningful in terms of whether teaching with the jigsaw technique made a difference in terms of the academic success of the students is displayed on table 8.

Table 8. T Test Results of the Final Test of the Experimental and Control Groups

| Groups | | N | X | Ss | Sd | t |
|------------|--------------|----|-------|------|----|---------|
| Final Test | Experimental | 23 | 83.04 | 6.61 | 22 | 41.318* |
| | Control | 23 | 71.96 | 6.17 | | |

*P (.000)<.05

The result of the independent t test which was administered in order to determine whether or not the data regarding the final test of the experiment and control groups were meaningful showed that the difference was meaningful in favor of the experiment group ($t = 41.318, p (.000) < .05$). This result obtained demonstrates that teaching with the jigsaw technique increases the success of the student.

The results of the final test, follow-up test and t test applied to both groups in order to determine whether there was any difference in terms of academic success among students who were thought using the jigsaw method can be viewed in table 9.

Table 9. The Final Test, Follow-up Test and T Test Results of Experimental and Control Groups

| Groups | | N | X | Ss | Sd | t |
|--------------|----------------|----|-------|------|----|----------|
| Experimental | Final test | 23 | 83,04 | 6,61 | 22 | 10,681** |
| | Follow-up test | 23 | 75,65 | 5,70 | | |
| Control | Final test | 23 | 71,96 | 6,17 | 22 | 3,581** |
| | Follow-up test | 23 | 66,73 | 8,06 | | |

**p(.000)<.05, **p(.002)<.05

As a result of the dependent t test a meaningful difference between the experiment group final test and follow-up test results was determined ($t= 10.681, p(.000)<.05$). Also, there was a meaningful difference in the final test and follow-up test of the control group ($t=3.581, p (.002) <5$). The magnitude of the difference between the final and follow-up test results of the experiment group ($X=8.05$) and the final and follow-up test results of the control group ($X=5.23$) demonstrates that teaching activities using the jigsaw technique largely increase the rate of success compared to techniques suggested in the teaching program. In order to determine whether or not this difference is meaningful the difference in score between the final test and follow-up test was compared.

In order to determine the difference in terms of academic success of the jigsaw technique in educating students, the t test results regarding the difference in final test-follow-up test scores applied to both groups can be viewed in table 10.

Table 10. The T Test Scores Regarding the Difference of the Final Test-Follow-up Tests of the Experiment and Control Groups

| Groups | N | X | Ss | Sd | t |
|--------------|----|------|------|----|--------|
| Experimental | 23 | 8.04 | 3.61 | 22 | 1.502* |
| Control | 23 | 5.22 | 6.99 | | |

*p (.266)>.05

The results of the t-test conducted to see whether the post-test and follow-up test results of the experimental and control groups was significant revealed that there was no significant difference between the groups ($t=1.502, p(.000)>.05$).

3.2. Findings Regarding the Qualitative Sub-Dimension of the Study

This section looks for answers to the qualitative research questions of the study.

The opinions of the students, who participated in the study, on the advantages of jigsaw technique are given in Table 11 below:

Table 11. The distribution of the student opinions on the advantages of jigsaw technique

| Student Opinion | f |
|---|----|
| Increasing course success | 9 |
| Improving individuals' expressing skills | 6 |
| Improving cooperation and solidarity | 5 |
| Equipping students with responsibility skills | 3 |
| Making learning more enjoyable and fun | 2 |
| Providing wide range of benefits for students | 2 |
| Total | 27 |

As it is seen in Table 11, regarding the advantages of jigsaw technique in practice, students' opinions were: "it increased success in the course ($f=9$), improved individuals' expressing skills ($f=6$), improved cooperation and solidarity ($f=5$), equipped students with responsibility skills ($f=3$), made learning more enjoyable and fun ($f=2$) and provided a wide range of benefits for students ($f=2$)".

Some sample statements of 7th grade students on the advantages of jigsaw technique in social studies classes are as given below:

S11: I think it is a useful activity, because we make research on the subject ourselves and learn how to distinguish the important points of the topic. Also, telling the topic to our friends brings us with a big responsibility and equips us with skills.

S4: I find this technique very productive and useful in terms of learning quickly. With this technique, we cooperate and prepare for examinations and have fun while we are learning. Also, our willingness to listen to the subject is increasing.

Some sample statements of the students, who participated in the study, on the disadvantages of jigsaw technique are as given below:

Table 12. The distribution of the student opinions on the disadvantages of jigsaw technique

| Student Opinion | f |
|--|----|
| It is time consuming and boring | 5 |
| Good for the teacher, difficult for the learner | 4 |
| Creates a negative impact on students with low performance | 3 |
| Necessitates continuous participation | 2 |
| Total | 14 |

As it is seen in Table 12, regarding the disadvantages of jigsaw technique in practice, students' opinions were: "it is time consuming and boring ($f=5$), Good for the teacher, difficult for the learner ($f=4$), Creates a negative impact on students with low performance ($f=3$), Necessitates continuous participation ($f=2$)".

Some sample statements of 7th grade students on the disadvantages of jigsaw technique in social studies classes are as given below:

S8: It is a good technique but it cannot be sustained for long. Because it is time consuming and sometimes becomes boring.

S12: In fact, it has advantages but it is a good technique for the teacher but a difficult one for the learner. Because misunderstandings arise and that causes to confusion.

The opinions of the students, who participated in the study and said "no" to "If you were the teacher, would you use this technique? Why?" question, are given in Table 13 below:

Table 13. Distribution of answers of the students who said "Yes" to If you were the teacher, would you use this technique? Why?" question

| Student Opinions | f |
|--|----|
| Equipping people with problem solving skills | 7 |
| Students' developing empathy | 6 |
| Students' learning with their own experiences | 4 |
| Providing motivation for students with low level of success. | 4 |
| Total | 21 |

As it is seen in Table 13, among the students who said "Yes" to "If you were the teacher, would you use this technique? Why?" question, 7 students indicated that it equips people with problem solving skills, whilst 6 of them indicated that students would develop empathy, 4 of them indicated that students would learning with their own experiences and 4 of them indicated that it will provide motivation for students with low level of success.

Some sample statements of 7th grade students, who said "Yes" to If you were the teacher, would you use this technique? Why?" question, are given below:

S20: I would use. Because I believe that telling is more effective then listening. Thus, I would help my students to tell about themselves in a more efficient way.

S14: If I were a teacher, I would use this technique. Because I believe that with the interaction in the team work, students learn problem solving skills for the problems they will face when they begin to work.

The opinions of the students, who participated in the study and said "no" to "If you were the teacher, would you use this technique? Why?" question, are given in Table 14 below:

Table 14. Distribution of answers of the students who said "No" to If you were the teacher, would you use this technique? Why?" question

| Student Opinions | f |
|---|----|
| Students might have difficulty in telling the subjects. | 3 |
| The seriousness and atmosphere of the class is damaged. | 4 |
| It is not good for students with low level of success. | 2 |
| The fact that students are inexperienced is a disadvantage. | 2 |
| Total | 11 |

As it is seen in Table 14, among the students who said "no" to "If you were the teacher, would you use this technique? Why?" question, 3 students indicated that students might have difficulty in telling the subjects, whilst 4 students indicated that the seriousness and atmosphere of the class will be damaged, 2 of them indicated that it will not be good for students with low level of success and 2 of them indicated that the fact that students are inexperienced is a disadvantage.

Some sample statements of 7th grade students, who said "No" to If you were the teacher, would you use this technique? Why?" question, are given below:

S3: No I would not use this method. Because the person who makes the presentation attach importance to it but the class might not attach the same importance, if I were a teacher, I would not take this risk.

S1: I would not use it if I were a teacher. Because I think that since students do not have the experience of instructing, they might have difficulty and therefore, I would prefer to teach myself.

4. Conclusions

In this study, which aimed to find out the impact of teaching "science in time" unit under "science technology and society" learning area in the social studies class in the 7th grade using jigsaw technique on the academic success of the students, it was found that instruction through jigsaw technique had a positive impact on academic success of the students and that there was a statistically significant difference in pre-test and post-test results.

When the results are examined, that the score averages of the students in experimental group are higher than the averages of the students in control group indicates that students followed the steps of jigsaw technique in the implementation process. In addition, this could be interpreted as students were aware of their individual responsibilities in the process; predicated on cooperation and collaboration by keeping communication within the group high and spent the maximum effort to learn the subject. This is similar to the studies in the literature carried out in the field of social studies. Meral and Şimşek [23] concluded in their studies that cooperative learning techniques increase 6th grade students' academic success in social studies class. Likewise Kuş and Karatekin [24] revealed in their studies that the cooperation based learning method is more effective than traditional teaching methods in increasing the academic success while teaching social studies. As Avcı and Alkış [25] stated in their studies, there was a significant difference in the academic success of students studying in a social studies class where cooperative learning method was applied when compared to the other class. In his study Katılmış [26] concluded that the jigsaw technique increases students' academic success in learning the topics about history in social studies class. Oral [27] ascertained in his study in which he compared the jigsaw II technique with the group work in social studies class that jigsaw II technique had more positive impacts than the group work activities on students' access level, the extent of permanent learning, and students' attitudes.

Kim-Eng et al. [28] and Tey Sau et. al. [29] concluded in their studies that low-performance students benefited more in social studies class in which cooperative learning method was used. Delen [30] and Lampe et. al. [31] emphasized in

their studies that cooperative learning method increased students' academic success in social studies class in comparison with the traditional method. Çetin [32] stated in his study that cooperation based learning method had positive effects on students' cognitive access levels while teaching them social studies at the 4th grade. These results are also similar to the results of the studies carried out in different branches. Buzludağ and Yılayaz [33], Dellalbaş and Soylu [6], Maden [34], Bilen [35], Köseoğlu [10], Doymuş [36], Hennessy and Evans [37], Sezer and Tokcan [38] and Altıparmak and Nakipoğlu [39]. The common result in those studies carried out to put forward the impact of using jigsaw technique on students' academic success especially while teaching them Science, Math, Geography and Turkish was that students were active, reached a high level of motivation in the learning model based on their own experiences and academic success showed a positive tendency.

In the findings related to the qualitative sub-dimension of the study, student opinions about the jigsaw technique were taken after the implementation. Students who participated in the study indicated the advantages and utility of jigsaw technique with the following statements: "it increased success and collaboration, improved expression skills and equipped us with problem solving and empathy skills." Regarding the disadvantages of the technique, students used the following statements: "it is time consuming and boring, difficult for the learner, students may have difficulty in telling the subjects and the seriousness of the class might be ruined." The common thing among the students who stated their opinions was that if this technique is accepted by the student and if the classroom is convenient for this practice, it will have a positive impact on success. The thing to be taken into consideration here is that this technique should be taught well to the students with its reasons and student motivation parallel to the willingness of the teacher should be kept at maximum level.

In the light of all these assessment, in today's educational systems, in which student-centered education is diversified around different models, jigsaw technique could be a good alternative. Because what lies on the basis of this technique is active individual, who takes responsibility, uses cooperation and communication skills and who learns to learn. As also stated by Lord [40] students learning with jigsaw technique attend the class at higher levels, they ask more questions, become both listener and narrator, and test their knowledge while they are listening. Also, students learning with this technique are given the opportunity to reconsider their misconceptions or missing knowledge as they are encouraged to learn via group study and exchange of information. Here, it should be noted that, this technique becomes effective to the extent that the teacher has a good grasp of this method and the physical conditions of the classrooms are appropriate for the technique. For such reasons, the use of jigsaw technique in education, particularly in social studies teaching, is likely to yield favorable outcomes.

5. Suggestions

The following suggestions could be made based on the academic success of the students as a result of the study and their opinions:

1. The aim and steps of this technique should be clearly told to the students before starting to apply this technique. In addition, the teacher should guide the students in the implementation phase of this technique.
2. Jigsaw technique, in terms of its technical features, is convenient for social studies classes. Particularly, using different skills based on cooperation matches with the objectives of social studies classes. So, this technique should be used in appropriate subjects at different times.
3. Classes and subjects in which this technique can be implemented can be determined in social studies curriculum. In addition, teachers could be informed about the implementation of this technique step by step.
4. Social studies laboratories where instructional technology and materials to enable the use of modern instructional strategies and methods as well as this technique within the scope of social studies classes could be created in the schools.
5. In addition to academic success, jigsaw technique could be used as a tool for students with communication, compliance and participation problems to overcome such problems.

REFERENCES

- [1] Eggen, P.D. and Kauchak, D.P. (2006). *Strategies and models for teachers: teaching content and thinking skills*. (5th ed.). Boston: Pearson Education.
- [2] Ünlü, M. ve Aydınhan, S. (2011). İşbirlikli öğrenme yönteminin 8. sınıf öğrencilerinin matematik dersi "permütasyon ve olasılık" konusunda akademik başarı ve kalıcılık düzeylerine etkisi. *Ahi Evran Üniversitesi Eğitim Fakültesi Dergisi*, 12(3), 1-16.
- [3] Yıldırım, B. ve Girgin, S. (2012). 8. sınıf kalıtım ünitesinin öğretilmesinde işbirlikli öğrenme yönteminin öğrenci başarısına ve bilginin kalıcılığına etkisi. *İlköğretim Online*, 11(4), 958-965.
- [4] Johnson, David W., Johnson, Roger T. and Holubec, Edythe. (1998). *Cooperation in the classroom, interaction book company*. 100, Edina, Minnesota, USA.
- [5] Açıkgöz, K.Ü. (1993). İşbirliğine dayalı öğrenme ve geleneksel öğretimin üniversite öğrencilerinin akademik başarısı, hatırd tutma düzeyleri ve duyuşsal özellikleri üzerindeki etkileri. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi: I. Ulusal Eğitim Bilimleri Kongresi (25-28 Eylül 1990)*. Ankara: MEB yay. 187-201.

- [6] Dellalbaş, O. ve Soylu, Y. (2012). Jigsaw ve grup araştırması tekniklerinin ilköğretim 8.sınıf öğrencilerinin matematik derslerindeki akademik başarılarına etkisi. *International Journal of Social Science* Volume 5 Issue 7, p. 229-245, December.
- [7] Aranson, E., Blaney, N., Stephan, C., Sikes, J. and Snapp, M. (1978). *The Jigsaw classroom*. Beverly Hills, CA: Sage.
- [8] Açıköz, K.Ü. (1992). İşbirlikçi öğrenme kuram araştırma uygulama. Malatya: Uğrel Matbaası.
- [9] Madden, N. and Slavin, R. (1983). Effects of cooperative learning on the social acceptance of mainstreamed academically handicapped students. *The Journal of Special Education*. Vol: 17, No: 2, PP: 171-182.
- [10] Köseoğlu, P. (2010). Biyoloji eğitiminde birleştirme tekniği temelli öğretimin akademik başarı, özyeterlik ve tutuma etkisi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi* (H. U. Journal of Education) 39: 244-254.
- [11] Şimşek, Ü. (2007). Çözeltiler ve kimyasal denge konularında uygulanan jigsaw ve birlikte öğrenme tekniklerinin öğrencilerin maddenin tanecikli yapıda öğrenmeleri ve akademik başarıları üzerine etkisi. Yayımlanmamış doktora tezi, Erzurum: Atatürk Üniversitesi Fen Bilimleri Enstitüsü.
- [12] Batdı, V. (2014). Jigsaw tekniğinin öğrencilerin akademik başarılarına etkisinin meta-analiz yöntemiyle incelenmesi. *Ekev Akademi Dergisi* Yıl: 18 Sayı: 58 Kış.
- [13] Gürdoğan Bayır, Ö. (2010). Sosyal bilgilerde güncel olaylardan yararlanmanın öğrencilerin eleştirel düşünme becerilerine etkisi. Yayımlanmamış yüksek lisans tezi, Anadolu Üniversitesi, Eskişehir.
- [14] Hendrix, J.C. (1999). Connecting cooperative learning and social studies. *Clearing House*, 73, 57-60.
- [15] Fraenkel, J., Wallen, N., and Hyun, H.H. (2012). *How to design and evaluate research in education* (8th ed.). Boston: McGraw Hill.
- [16] Creswell, J. W., Plano Clark, V. L., Gutmann, M., and Hanson, W. (2003). Advanced mixed methods research designs. In A. Tashakkori ve C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research* (pp. 135-165). Thousand Oaks, CA: Sage.
- [17] Ekiz, D. (2009). *Bilimsel araştırma yöntemleri*. Ankara: Anı Yayıncılık.
- [18] Büyüköztürk, Ş. (2001). *Deneysel desenler, öntest-sontest, kontrol grubu, desen ve veri analizi*. Ankara: PegemA Yayıncılık.
- [19] Morgan, D. L. (1998). Practical strategies for combining qualitative and quantitative methods: Applications to health research. *Qualitative Health Research*, 8(3) 362-376.
- [20] Yıldırım, A. ve Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri*. Seçkin Yayıncılık, Ankara.
- [21] Kan, A. (2010). Ölçme aracı geliştirme. S. Tekin (editör) *Eğitimde Ölçme ve Değerlendirme*. Pegem Akademi, Ankara.
- [22] Temel, Z. F. ve Dere, H. (1999). "Okul Öncesi Eğitimde Yaklaşımlar". Gazi Üniversitesi Anaokulu/Anasınıfı Öğretmeni El Kitabı. Ya-Pa Yayın Paz. Tic. A.Ş. İstanbul.
- [23] Meral, E. ve Şimşek, U. (2014). Sosyal bilgiler dersinde işbirlikli öğrenme yöntemlerinin 6.sınıf öğrencilerinin akademik başarılarına etkisi. *Bilgisayar ve Eğitim Araştırmaları Dergisi*. Cilt: 2 Sayı: 4 134-151.
- [24] Kuş, Z. ve Karatekin, K. (2009). İş birliğine dayalı öğrenmenin sosyal bilgiler dersinde akademik başarı üzerine etkisi. *Uludağ Üniversitesi Eğitim Fakültesi Dergisi* XXII (2), 589-604.
- [25] Avşar, Z. ve Alkış, S. (2007). İşbirlikli öğrenme yöntemi birleştirme-I tekniğinin sosyal bilgiler derslerinde öğrenci başarısına etkisi. *İlköğretim Online*, 6 (2), 197-203.
- [26] Katılmış, A. (2002). İşbirlikli öğrenme ve geleneksel öğretim yöntemlerinin sosyal bilgiler dersi tarih konularındaki başarı ve hatırd tutma düzeyleri üzerindeki etkileri. Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.
- [27] Oral, B. (2000). Sosyal bilgiler dersinde işbirlikli öğrenme ile küme çalışması yöntemlerinin öğrencilerin erişileri, derse yönelik tutumları ve öğrencilerin kalıcılığı üzerindeki etkileri. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 2 (19), 43-49.
- [28] Kim-Eng, C.L., Maureen, Ng. and Rosalind, P. (1999). A school-based study of cooperative learning and its effects on social studies achievement, attitude towards the subject and classroom climate in four social studies classrooms. Database: ERIC (ED434070).
- [29] Tey Sau, H., Kim-Eng, C.L., Maureen, Ng. and Joy, C. (1999). Primary five pupils' cooperative behaviours and perceptions of the use of cooperative learning in social studies classes in Singapore.
- [30] Delen, H. (1998). Temel eğitim beşinci sınıf sosyal bilgiler dersinde kubaşık öğrenme yönteminin akademik başarıya etkisi. Yayımlanmamış yüksek lisans tezi, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü. Adana.
- [31] Lampe, Judith R., and others (1996). Effects of cooperative learning among hispanic students in elementary social studies. *Journal of Educational Research*, v89 n3 p187- 91.
- [32] Çetin, B. (2002). Sosyal bilgiler öğretiminde işbirliğine dayalı öğrenme yönteminin ilköğretim 4. Sınıf öğrencilerinin bilişsel erişi düzeylerine etkisi. Yayımlanmamış yüksek lisans tezi, Marmara Üniversitesi Eğitim Bilimleri Enstitüsü, İstanbul.
- [33] Buzludağ, P. ve Yılayaz, Ö. (2012). 6. sınıf fen ve teknoloji dersi "canlılarda üreme, büyüme ve gelişme" ünitesinin işbirlikçi öğrenmeyle (jigsaw tekniği) öğretiminin öğrenci başarısına etkisi. *e-Journal of New World Sciences Academy* Volume: 7, Number: 1, Article Number: 1C0477.
- [34] Maden, S. (2011). Jigsaw 1 tekniğinin yazılı anlatım becerisi akademik başarısına etkisi. *Kuram ve Uygulamada Eğitim Bilimleri Educational Sciences: Theory & Practice – 11 (2) Bahar/Spring* 901- 917.
- [35] Bilen, K. (2011). İlköğretim 6. sınıf fen ve teknoloji dersi öğretiminde jigsaw tekniğinin öğrencilerin akademik başarıları üzerine etkisi. *e-Journal of New World Sciences Academy* Volume: 6, Number: 4, Article Number: 1C0458.
- [36] Doymuş, K. (2007). Effects of a cooperative learning strategy on teaching and learning phases of matter and one-component phase diagrams. *Journal Of Chemical Education*, 84 (11), 1857-1860.

- [37] Hennessy, D. and Evans, R. (2006). Small-group learning in the community college classroom. *The Community College Enterprise*, 12 (1), 93-110.
- [38] Sezer, A. ve Tokcan, H. (2003). İşbirliğine dayalı öğrenmenin coğrafya dersinde akademik başarı üzerine etkisi. *Gazi Eğitim Fakültesi Dergisi*, 23 (3), 227-242.
- [39] Altıparmak, M. ve Nakipoğlu M. (2005). Lise biyoloji laboratuvarlarında işbirlikli öğrenme yönteminin tutum ve başarıya etkisi. *Türk Eğitim Bilimleri Dergisi*, 3(1); 105-123.
- [40] Lord, R. T. (2001). Reasons for Using Cooperative Learning in Biology Teaching. *The American Biology Teacher*.63 (1), 30-38.