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Ibrahim Benek, Behiye Bezir Akcay
Istanbul University-Cerrahpasa

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A New Cooperative Learning Technique: Question Jury

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Abstract

This study aims to develop a new cooperative learning technique and to examine the effectiveness of this technique. In the study, action research pattern, in which one of the qualitative research methods was used. The study included 12 male and 8 female students, in total 20 students, studying at 5th grade of a secondary school in Van province of Turkey in second semester of 2015-2016 academic year. The study was conducted for 4 times a week over the course of 8 weeks in "Let's Meet the World of Living Creatures", "A Must of our Lives: Electric" and "The Mystery of Earth" units of science class. This study consisted of three phases. The first draft form of the "question jury" technique was formed as a result of the literature research at the first stage. At the second stage, "question jury" draft form was applied to the mentioned group for 4 weeks and the "question jury" application was put into its final form in the light of the obtained data. The developed "question jury" was applied to the same group for 4 weeks at the third stage. The data in the study were collected using semi-structured interview form, observation forms, student diaries, video recordings and "information card form". Content and descriptive analysis methods were used to analyze the data. As a result of the analyses, "cognitive learning", "affective learning", "assessment" and "process" themes and various codes under these themes were formed. As a result; it was determined that, this technique developed was in accordance with the principles of cooperative learning, it increased students' conceptual levels, students found the technique useful, simple and understandable, this application led them to study the course and to research the knowledge, the students enjoyed the participation and they helped students to make self-assessment and contributed to their personal development.

Introduction

The learning approach, mostly known as "cooperative learning" (Slavin, 1988) in literature and founded by Dewey, Vygotsky, Slavin, Piaget, Bandura and Kagan is an active approach that students work in small groups and help each other for a common learning objective or produce a common product, and the interaction of students in and out of the group is provided (Aksoy & Doymuş, 2011; Johnson & Johnson, 2002; Slavin, 1990, 1991). If the students work together in the learning-teaching process and achieve the common learning objectives, then cooperative learning is realized. The main purpose of cooperative learning is to enable students to reach a goal by working together.

Cooperative learning is a modern and active learning model that small heterogeneous groups composed of students with different qualifications in terms of success, ability, gender, intelligence etc. create a team spirit for common purposes and study, where each student is responsible for his or her own learning and group friends' learning, develop students' self-esteem, thinking abilities at a high level, problem solving and inter-personal relationships, ensures a high level of success and improves their cognitive sides such as critical thinking, supports good communication, team work, students' taking responsibility, developing their leadership skills and social skills such as reconciliation, where students establish academic relationships, groups gain awards depending on their performances and a student-centered education environment is provided (Açıkgöz, 1992, 2006; Bean 1996; Christison, 1990; Doymuş et. al., 2005; Gillies, 2006; Gömleksiz, 1993; Hanze & Berger, 2007; Hennessy & Evans, 2006; Johnson & Johnson, 1994, 1995, 1999; Kagan, 1994; Senemoğlu, 2005; Shachar & Fischer, 2004; Slavin, 1980b, 1987, 1988; Şimşek, 2005; Tinto, 1997). The cooperative learning technique has positive effects on students. The cooperative method contributes to the development of students' skills such as interaction, communication, research-examination, socialization, problem solving, critical thinking,

reflective thinking and acting together (Eilks, 2005; Hanze & Berger, 2007; Shachar & Fischer, 2004; Sherman, 1991; Slavin, 1992).

Features of Cooperative Learning

Positive Interdependence: The group members are responsible for each other's learning according to positive commitment principle which is the most important condition of cooperative learning (Johnson & Johnson 1986, 1989, 1990) and the center of cooperation (Aydın, 2009; Jacobs & Hannah, 2004; Saban, 2014) . The success of the group depends on the individual achievements of the group members. According to this principle, the students have the approach of "Either we all win or we all lose!" A positive sense of engagement can be created with the common goal, common reward, resource and role distribution.

Individual Accountability: Each student is obliged to fulfill his / her duties and responsibilities within the group. It is important for each student to work on the topic they have taken the responsibility of and teach it to his/her friends (Johnson & Johnson, 1992), to fulfill the task (printer, spokesperson, controller, etc.) he or she has taken on and to complete the study (homework, project, product, etc.) he or she has to do. Individual assessment, monitoring tests, achievement tests, peer assessment can be conducted to prevent any negativity including the students' not fulfilling their duties (Açıkgöz, 1992; Kocabaş, 1995; Moura & Hattum-Janssen, 2011; Saban, 2014; Senemoğlu, 2005).

Group Reward: It is a prerequisite for the development of positive commitment. For group members to be successful individually, they work as a group in line with the purpose of the group and gain a prize. The success of the group depends on the structure of co-operative reward (Slavin, 1992).

Social Skills: Students acquire various social skills such as speaking, building friendship, listening, being tolerant, showing empathy, self-confidence, being able to be respectful and sharing as cooperative learning necessitates while working in heterogeneous groups (Bear et. al., 2011; So & Ching, 2011). These types of social skills are important for group dynamics and for the group to have a productive structure (Johnson et al., 1991; Johnson et al., 1994).

Face to Face Promotive Interaction: Each of the students in the group should sit in a way that they can easily see one another. It is important for students to have this type of seating arrangement so that they can see, motivate, convince each other in the name of winning, stimulate and encourage one another, make mutual discussions and explanations, exchange ideas, use the necessary tools and facilitate their works supporting each other (Açıkgöz, 2006; Doymuş et. al., 2010; Johnson & Johnson, 2002; Karaoğlu, 1998; Posluoğlu, 2002).

Equal Participation: Each student has an equal chance of success. Each student can contribute to the group in accordance with their potential. The teacher evaluates each student with a special assessment according to their individualistic potential. Each group member contributes to his group by doing the best that s/he can (Senemoğlu, 1998; Slavin, 1995).

Evaluation of the Group: Individual evaluation is done in cooperative learning, but the main evaluation is group evaluation because it is more important for group to reach their common goals and receive the award than the evaluation of the individual. The observation forms, reports, projects, assignments and exams that the teacher will use can be utilized as an evaluation tool (Hollingsworth & Hoover, 1999).

These features were discussed and developed by many scientists (Açıkgöz, 1990; Gömleksiz, 1993; Johnson et al., 1991; Johnson, Johnson & Smith, 1998; Johnson, Johnson & Holubec, 1994; Johnson & Johnson, 1989, 1992, 1995, 1999a, 1999b; Kagan & Kagan, 2009; Nas, 2002; Özkal, 2000; Posluoğlu, 2002; Putnam, 1993; Saban, 2014; Senemoglu, 2005; Slavin 1983, 1995; Sucuoğlu, 2003; Tonbul, 2001).

Cooperative Learning Techniques

There is no single application form of cooperative learning. Different collaborative techniques have been developed by different scientists in time. Jigsaw (Aranson et. al., 1978), Teams-Games-Tournament (Slavin, 1978), Group Investigation (Sharan & Hertz-Lazarowitz, 1980), Team Assisted Individualization or Team Accelerated Instruction, Academic Controversy (Johnson & Johnson, 1987), Student Teams Achievement Divisions (Slavin, 1990), Learning Together (Johnson & Johnson, 1991) are some of the commonly known

cooperative techniques. In addition, researchers also developed many cooperative techniques including Jigsaw-II Jigsaw-III, Jigsaw-IV, Controversy Jigsaw, Subjects Jigsaw, Co-op Co-op, Cooperative Integrated Reading and Composition, Let's ask together, Spontaneous Group Discussion, Think-Pair-Share, Complex İnstruction, Team Product, Numbered Heads Together and Cooperative Critique. These techniques include various application differences along with being dependent on basic principles of cooperative learning such as positive commitment, face-to-face supportive interaction, equal opportunity for success, social skills, group awards, individual and group assessment. These differences can be listed as group formation process, the form of evaluation, the way of implementation in cooperation, forms of collaboration within and between groups, reinforcement methods, competitions, structuring of the group, etc.

The Importance of the Study

A new cooperative learning technique was developed in this study. In this technique developed, it was ensured that students specialized going through various phases. Specialization process was taken out of four walls and areas such as school, house, library, etc. were integrated with the educational environment. The learning process was organized according to the "information card form" used in this technique. In addition, this form provided the student an opportunity to compare the academic standing at the beginning and the end of the process. The students acquired the skill of asking questions thanks to the question jury technique. The students also learned the concept/subject while preparing the questions. In addition, as the jury activity was held several times on the same sub-topic, the students were encouraged to repeat and reinforce the concept / subject. Unlike other cooperative learning techniques, this technique has become important due to the specialization of the students and the fact that this specialization process was carried out inside and outside the school and the "question jury" activity was conducted.

Purpose of the Study

The study aims to develop a new cooperative learning technique based on the opinions of the students and their experiences during the implementation process and to examine the effectiveness of the technique developed by the researchers. In line with this purpose, the answers to the following research questions were sought:

1. What are the views of the students about the developed question jury technique?
2. Which experiences have the students gained during the implementation of the question jury technique?
3. Does the developed question jury technique have an impact on students' conceptual levels?

A New Application: Question Jury

A new cooperative teaching practice (technique) has been developed by researchers. The application steps of this technique are given in Figure 1.

1st Stage: Beginning of the Unit

a) Creating Groups

The teacher forms heterogeneous groups by adhering to the principles of grouping of the cooperative learning model. The teacher ensures that students in the same group have different properties in terms of gender, success, skills, learning styles and strategies etc. in the process of forming groups. At the end of the group forming process, tasks are shared within each group. In-group tasks may vary from application to application. Students can have these tasks: chairman writer, speaker, equipment responsible etc. Each student takes on a different task within the group. Since the students are in need of each other in terms of duty, it leads to a positive commitment. It is ensured that the number of students in groups remains between 2-6 people.

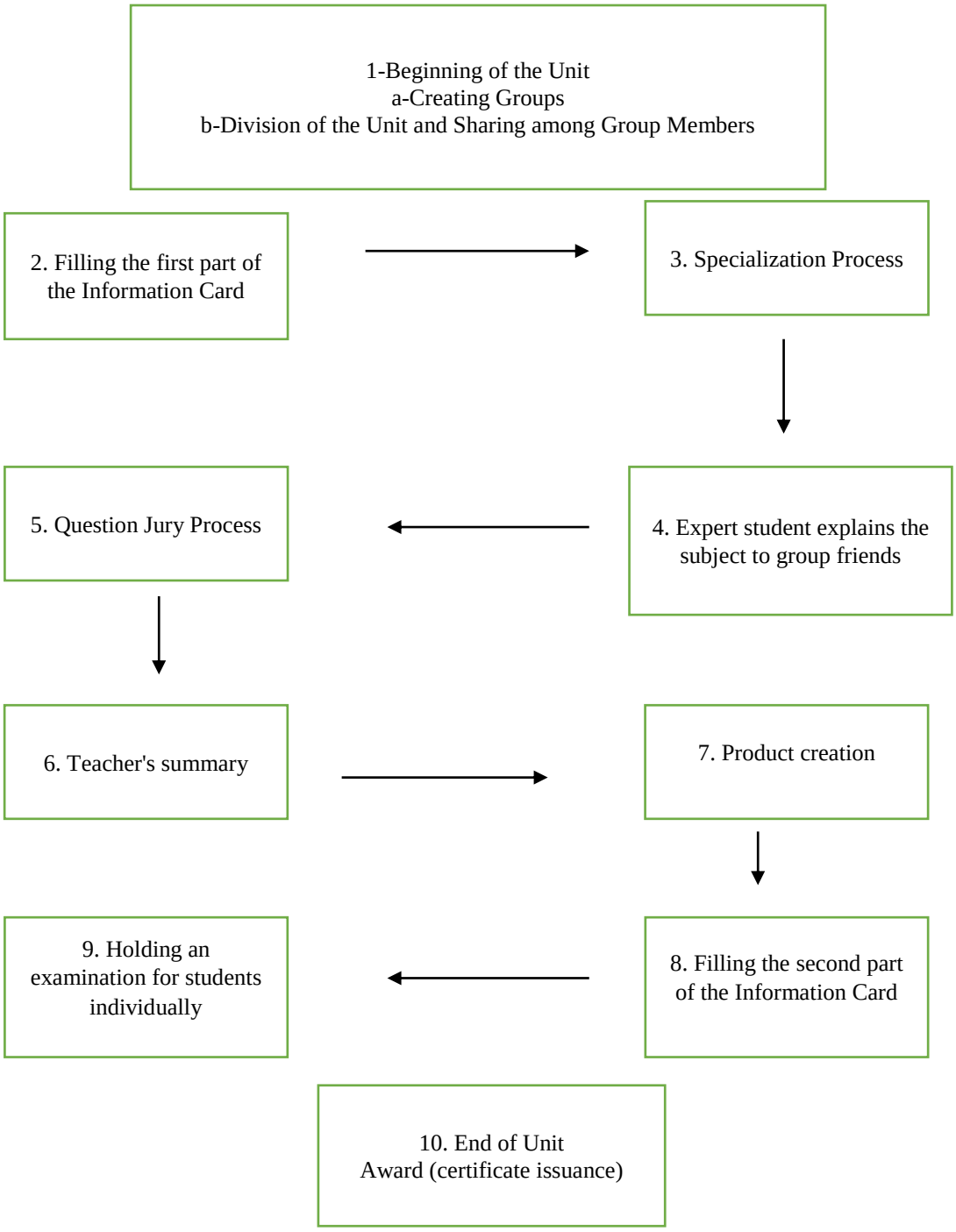


Figure 1. Application stages of question jury

b) Division of the Unit and its Distribution among Group Members

The unit is divided into sub-subjects equal to the number of students in the group and these sub-topics are examined by the group members for 2-3 minutes. Then each student chooses a sub-subject according to his / her interest. Each student in all groups is responsible for a sub-subject of the unit. The subjects are not distributed among the students by the teacher but via a consensus among them. Since each student is responsible for a different sub-topic of the unit, i.e. the student is in need of the subject of his/her friend, a "positive commitment" develops between students. Figure 2 shows the sharing of a unit by groups and group members:

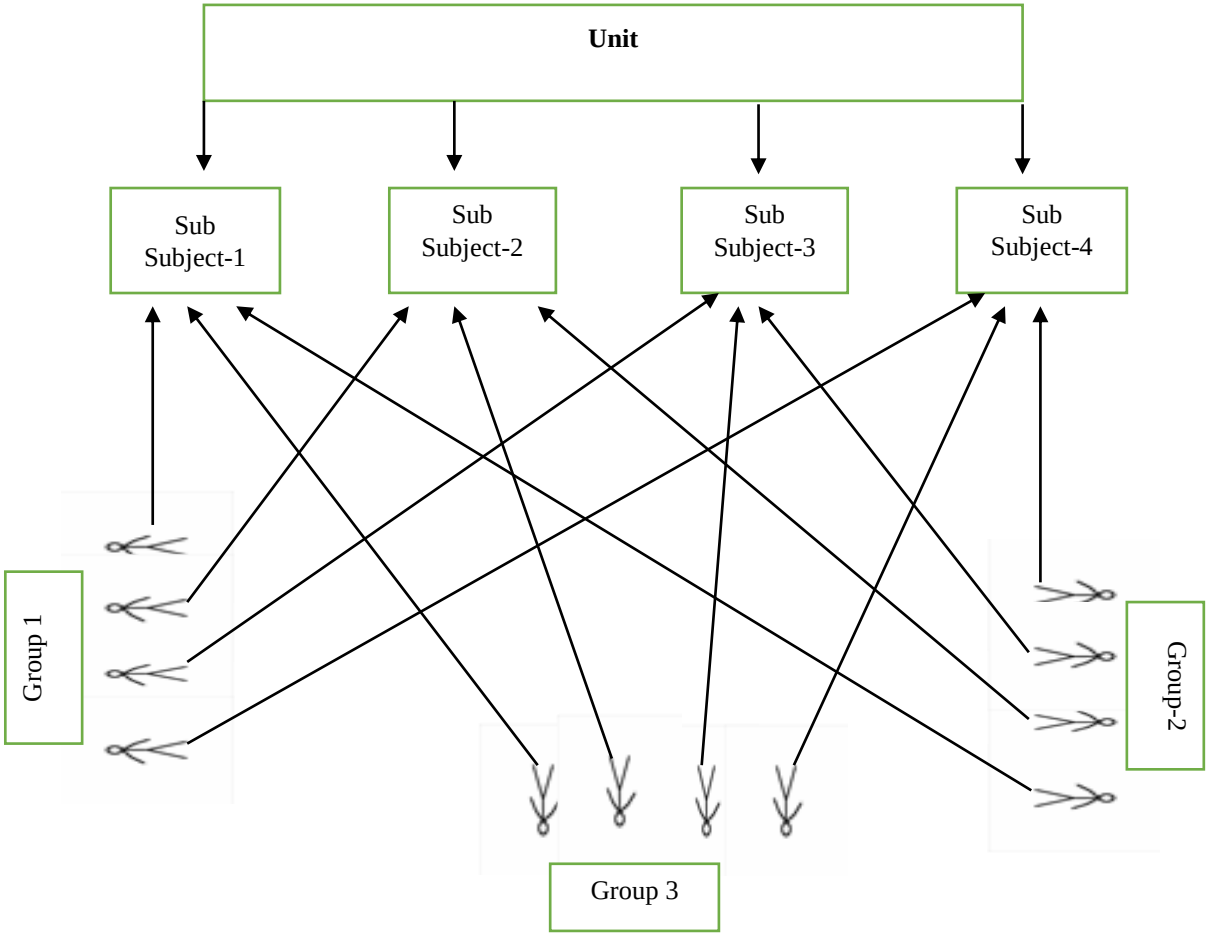


Figure 2. Separation of a unit into sub-subjects and sharing of these sub-topics by group members

2nd Stage: Filling the first part of Information Card

Prior to each sub-subject, each student individually writes what he or she knows in the first part of "Information Card" as "What I Know." The aim is to reveal students' prior knowledge about the subject. The information card form is discussed in detail in data collection tools part.

3rd Stage: Specialization Process

The student who is responsible for the first sub-subject from each group, studies his/her sub-subject at home, at school, in the library, etc. individually and specializes in that subject. The student creates an individual report on the subject (lecture note) and submits the report to the teacher's control (extracurricular). The main purpose here is;

1) That the teacher helps the student in the areas where he or she has difficulty in specializing,
2) That the teacher controls whether the student specializes or not and guides the student to prevent any misconceptions (non-scientific concept) as s/he covers the topic for his/her friends.

4th Stage: Expert student explains the subject to group friends

Students in each group who are responsible for their sub-topic (the student who specializes) can simultaneously tell their group friends about the topic and ensure that they learn it.

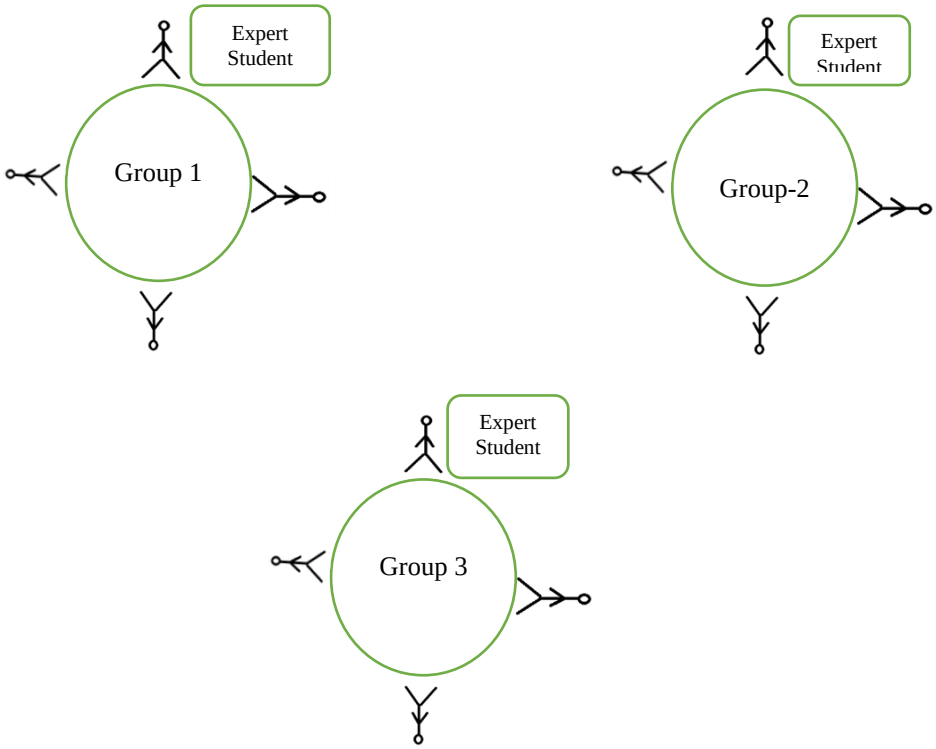


Figure 3. Expert students' explaining the subject to group friends

5th Stage: Question Jury Process

One student from each group (excluding the group who will perform) come together to form a new group called the Question Jury. The members of the Question Jury group are composed of other students who do not specialize in their own groups. These students depart from their own groups in a specific order planned in advance and go to the Question Jury group. Groups (other students than the specialist student) are to demonstrate their performance before the Question Jury group in turn. The expert student of the group will not be in the group who will show their performance. Because the student has detailed information about the sub-topic of the question jury application. Therefore, it may play a dominant role in answering questions. This may cause other group friends to be passive in this process. The student has already learned the subject matter in the process of specialization. What is important is that other group members also learn the topic.

The Question Jury group prepares questions about the subject. The Question Jury group can benefit from various resources (book, notebook, lecture note etc.) when preparing questions. Each group member completes their preparations to ask one (1) question. After completing the question preparing process, group members of Question Jury ask question to the group who will perform in a certain order and try to receive their answers. The answering group gives their common answer as a group by reaching a consensus. Meanwhile, another selected student writes the questions that Question Jury asked (to prevent repetition). The teacher draws a table on the board including all group names, gives points to the answering group, and then writes it instantly on this board. Following the question and answer process, the teacher gives points and all students (Question Jury and performing group) go back to their desks.

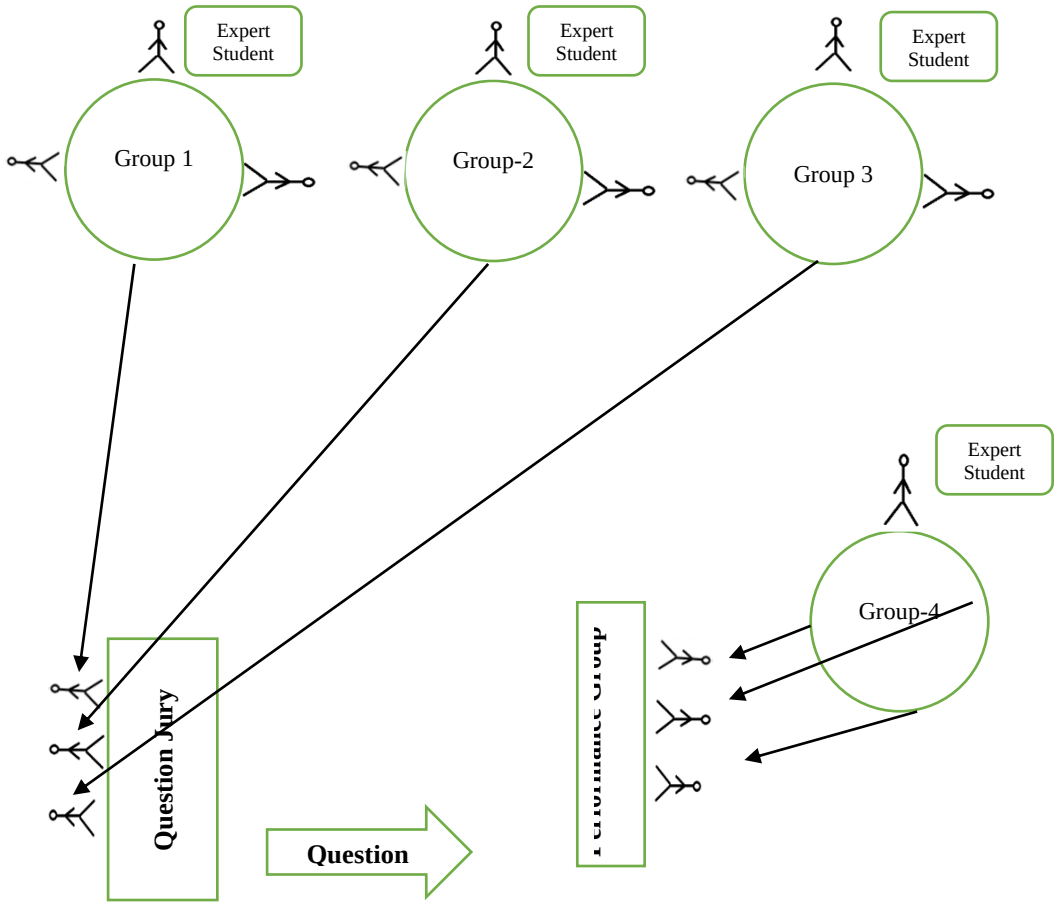


Figure 4. Question jury process

When Figure 4 is examined, it is observed that Question Jury group is formed with one student from group 1, 2 and 3 except for the expert student. This newly formed group asks various questions to the members of group 4, except for the expert student who will perform. After the completion of this process, again, a student from each group (except for the group who will perform) come together and create a new Question Jury (except for the expert student) and the new group who will perform (except for the expert students) try to answer the questions in front of them. This process continues until all groups show their performance.

All students excluding expert-student participate in the question jury group following a certain order. The question jury group consists of students other than expert students. The main purpose of following such a way is to prevent non-expert students from being affected by the expert student in the question-making process of the question jury. Students in the question jury can help each other in creating questions. Each of the students in this group must prepare a question and direct them to the performing group.

6th Stage: Teacher's summary of the subject

During the question jury activity, student performances are taken into consideration and if there is still a deficiency in the sub-subject, the teacher eliminates these deficiencies giving a short lecture.

7th Stage: Product creation

The groups prepare products such as banner, puzzle, poem, poster, instrument / device etc. using their special abilities and skills regarding the sub-topic.

8th Stage: Filling the second part of the Information Card

Students fill in the second part of the Information Card, which is "What I have Learned" individually. The aim is to monitor the development of the student in terms of learning throughout the process.

9th Stage: Holding an examination for students individually.

At the end of the process, all students are subject to a short quiz about sub-subject individually. After completing the procedures up to the first sub-subject, the same process is re-performed for the next sub-subject (from the 2nd to the 9th stage). After applying this process for all sub-subjects one by one, 10th stage starts.

10th Stage: End of Unit

Certificate (Award)

The certificate is issued at the end of the unit, not at the end of each six subjects. Students' individual quiz marks are collected and group score is obtained. Group scores from all sub-subjects are collected, a relative assessment is made and a certificate is given to the most successful group. The certificate is given to each group member separately.

The technique is applied at “Beginning of the Unit” and “End of the Unit” considering its application stages. The stages from 2 to 9 are applied for each sub-subject. There are common features and distinctive features of the question jury technique and other collaborative techniques. Table 2 shows these common and distinctive features.

Table 2. Comparison of the question jury and other cooperative techniques

Question Jury Technique	Other Cooperative Techniques
Unit Beginning:	
Creating Groups	Yes
Division and Distribution of the Unit	Partially exits
1st. Stage: Filling the first part of Information Card	Does not exist
2nd Stage: Specialization Process (at school, at home, in library, etc.)	Partially exits
3rd Stage: Explaining of the subject by the expert students	Partially exits
4th Stage: Question Jury Process	Does not exist
5th Stage: Teacher's summary of the subject	Partially exits
6th Stage: Product creation	Partially exits
7th Stage: Filling the second part of the Information Card	Does not exist
8th Stage: Holding an examination for students individually.	Partially exits
End of Unit: Certificate (Award)	Partially exits

The application period of question jury technique may vary according to lesson and topic. The average duration of application of the Question Jury is given in Table 3.

Table 3. The average duration of application of the question jury

Question Jury Technique	Duration
1st Stage: Beginning of the Unit a) Creating Groups b) The Division and Distribution of the Unit	Before the process (one lesson hour)
2nd Stage: Filling the first part of Information Card	During the process: 1-2 minutes
3rd Stage: Specialization Process (at school, at home)	Before the process - 1 week
4th Stage: Explanation of the subject expert students	During the process: 15-20 minutes
5th Stage: Question Jury Process	During the process: 15-20 minutes
6th Stage: Teacher's summary of the subject	During the process: 3-4 minutes
7th Stage: Product creation	During the process: 20-30 minutes
8th Stage: Filling the second part of the Information Card	During the process: 1-2 minutes
9th Stage: Holding an examination for students individually	At the end of the process (time for each student)
10th Stage: End of Unit Certificate (Award)	At the end of the process

Method

Study Design

This study is designed as action research study which is one of the qualitative research methods. Action research is used to make teacher's teaching more productive, increase the quality of teaching in the classroom, make in-class applications more effective, to develop a critical approach to one's own applications by gaining various information, skills and experiences, to integrate theory and application, to conduct various improvement works in accordance with scientific research systematic and to make changes in teaching applications based on the experiences gained from various applications (Ekiz, 2003; Kemmisand & McTaggart, 1992; Kindon & Elwood, 2009; Sagor, 2000; Yıldırım & Şimşek, 2013).

Study Group

This study was conducted in the second semester of 2016-2017 academic year, with 20 students studying in fifth grade of a secondary school located in Van province, which is in the eastern part of Turkey. Of the students 12 were boys and 8 were girls. The school in which the research was conducted had a low socio-economic region. The economic level of the students was disadvantaged and the education level of the parents was low. Considering the grades of the students one year ago; 6 of them had high and, 7 of them had middle and low academic achievement level. Students voluntarily participated in the study and necessary permissions were obtained from the parents of these students for the study.

Data Collection Tools

In this study, qualitative data collection tools including interview, observation and document analysis (information card, daily, video) methods were used.

Semi-Structured Interview Form

A semi-structured interview form was developed for the interviews with the students within the scope of the study. When deciding on the questions to be included in the interview form, firstly, the observations made by the researcher-teacher throughout the implementation period and the one-to-one interviews with the students were taken into consideration. The main purpose of following this method is that, it is thought that it will reveal students' opinions about the application. The questions included in the interview form were open-ended questions that could easily be understood. To this end, a question pool including 20 questions was formed. The prepared question pool was checked by experts, necessary corrections were made and a 10-question form was created. In order to determine the clarity of the questions in the form, a pilot interview was conducted with 3 students. The interviews were carried out with 18 people using the semi-structured interview form after the application. Since the two students were absent during the week of the interviews, they could not be interviewed. The interviews were conducted individually with each student in the relatively quieter guidance room of the school. The interviews were recorded with the voice recorder and each interview lasted approximately 4-5 minutes.

Observation

The researcher-teacher kept observation notes to determine the experiences of students during the implementation of the question jury technique and to gather information about the classroom environment in "participant-observer" role during the application process of question jury technique. In this process, the researcher-teacher used an unstructured observation form. The researcher made descriptive notes in his observations during the application.

Information Card Form

The information card was created by researchers being inspired by K (know) -W (want) -L (learn) scheme developed by Ogle (1986). Information Card Form was divided into two as “What do I know? and What have I

learned?" Students filled this form for each sub-subject individually. Before each sub-subject, the students fill the form about the subjects/concepts they knew before to "What do I Know?" section. After the question jury application was completed on each sub-subject, students wrote the subjects / concepts that they have learned throughout the process in "What have I learned?" section. The main purpose of using this form before and after each sub-subject is to determine the students' conceptual learning levels. This form is shown below.

INFORMATION CARD	
What do I know?	What have I learned?
…….. …… ……	……... ……... ……...

Student Diaries

It was ensured that students kept diaries to learn what their experiences were throughout the implementation process and how their approach and opinions were regarding this technique. Students filled the diaries at the day the question jury performed and the other day researchers collected them.

Video/Footage

In-class activities were recorded to re-examine the situations which may have been missed during the application and to make detailed analysis. Another expert watched these records and expert's opinion was taken. After the above explanations for data collection tools, data collection tools and data collection time used within the scope of the research questions were summarized in the following table:

Table 4. Data collection tools and data collection time for research questions

Research question	Data Collection Tools	Data collection time
1. What are the views of the students about the developed question jury technique?	Semi-Structured Interview Form Student Diaries	After application Throughout the application
2. What experiences have students gained during the implementation of the question jury technique?	Observation Video	Throughout the application
3. Does the developed question jury technique have an impact on students' conceptual levels?	Information Card Form	At the beginning and end of each unit

Data Collection

Data collection was carried out in two stages. The first data collection phase is a pilot implementation study to determine the deficiencies of the developed Question Jury technique. The second stage of data collection is the main application study investigating the effectiveness of the developed and finalized Question Jury technique. The study included only the data collection tools used in the original application. These data collection tools were presented in detail in the "data collection tools" part. The data collection tools used in the pilot and the actual application and the week, unit and subject where these data collection tools were used are shown in Table 5.

Data Analysis

Descriptive and content analysis were conducted in accordance with the qualitative research method when analyzing data. The records obtained during the interviews were analyzed by the researcher and the interviews were transferred to the computer. In this process, students' opinions were used in the same way as they expressed. Each student was given a code (Student-1, Student-2, etc.) when the students' opinions were

transferred. After the readings on the views of students, which were transferred to digital media, the themes emphasized in their opinions were determined and the themes obtained were coded. Then the second researcher independently re-coded the interviews and the consistency percentages between the coding of the two researchers were calculated according to the formula proposed by Miles and Huberman (1994).

Table 5. Data collection process

	Data collection								
	Development of technique				Real application of the developed technique				
Week	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	
Unit	Chapter 5	Chapter 5	Chapter 5	Chapter 5	Unit 6	Unit 6	Unit 7	Unit 7	At the end of application
Subject	Microscopic creatures	Fungi	Plants	Animals	Variables affecting lamp brightness	Schematic representation of the circuit	What's in the earth's crust	Erosion, Landslide, Underground-Groundwater, Air-Water-Soil Pollution	
Semi-Structured Interview									X
Dairy 1							X		
Dairy 2								X	
Video				X		X			
Information Card	X			X	X	X	X	X	
Informal interviews	X	X	X	X	X	X	X	X	
Observation	X	X	X	X	X	X	X	X	

The percentage of consistency between the two researchers was calculated to be 95%, and this ratio was found to be sufficient to demonstrate the credibility and consistency of the encodings, as this ratio was above the 70% suggested by the researchers. In addition, direct quotations from students' views in interviews and diaries were made to directly transfer the views of the participants as much as possible in the findings section. Direct quotations were made from the observation notes that the researcher kept in the process to determine the students' experiences during the process. Moreover, videos were carefully monitored and the students' experiences in the process were determined. The frequencies of the concepts in the first and second sections of the Information Card were examined and the difference between the two sections was examined. In this way, the effect of question jury technique on concept learning was examined.

Application Procedure

The study was carried out following three stages.

1. Development of the draft of question jury technique

At this stage the need was determined and the literature was examined in detail. In the literature review, all cooperative learning techniques were examined in detail and, unlike all these techniques, a new cooperative learning technique was formed as a draft. The developed technique was named "Question Jury" by the researchers.

2. Application of the draft of question jury technique to the working group

In the second stage, the draft of question jury technique was applied to the study group for 4 weeks in the second semester of the 2016-2017 academic year. At this stage, the following sub-subjects "Microscopic Creatures", "Fungi", "Plants" and "Animals" in the fifth unit of fifth grade Science Class were used (Table 4). At this stage, each step of draft of question jury technique were applied separately. During the implementation process, the researcher-teacher kept various field notes, made observations, received video/photo recordings, and made informal interviews with the students in the classroom/corridor/garden, and tried to gather information about their instant thoughts and experiences during the process. At the same time, experts' opinions were consulted on

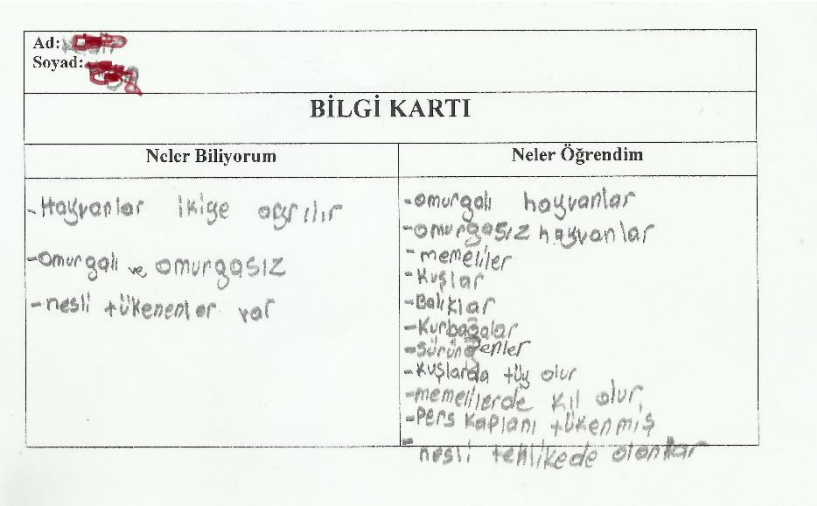
the technique's implementation. In the light of the obtained data and feedback, some changes were made in the technique developed and the technique was finalized. The final development of the technique was described in detail in the introduction.

3. Application of the final jury technique to the study group

In the third stage, the final question jury technique is applied to the same group for four (4) weeks. At this stage, the application stages of the final version of the question jury in Figure 1 was applied. First of all the unit is determined (6th and 7th unit) and then four sub-subjects were specified as 1) The variables effecting the lamp brightness, 2) Schematic depiction of the circuit 3) What is in the earth's crust? and 4) Erosion, Landslide, Ground-Above and Ground Waters, Air-Water-Soil Pollution considering the question jury stages. After the sub-subjects were identified, five groups including four people were formed in the classroom and the sub-subjects were shared among the group members. Studies were carried out on a sub-subject every week respectively.

In the first week, the students who were responsible for the first sub-subject individually studied at home, at school, at the library, and became expert. The teacher provided one-on-one counseling during the process to the students living the specialization process. After the specialization process was completed within the determined plan, in-class stages of the application were passed.

The course started with the transition of the groups to a pre-planned seating plan. The second application of the question jury was initiated and each student from the groups were distributed "Information Card Form" and they filled the first part "What I Know" to reveal their knowledge about the sub-subject "the variables affecting the lamp brightness. This form filled by one of the students is shown below: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BİLGİ KARTI

Neler Biliyorum	Neler Öğrendim
-Hayvanlar ikiye ayrılır -Omurgalı ve omurgasız -nesli tükenenler var	-omurgalı hayvanlar -omurgasız hayvanlar -memeliler -Kuşlar -Balıklar -Kurbağalar -Sürüngenler -Kuşlarda tüy olur -memelilerde kıl olur, -Pers Kaplanı tükenmiş nesli tehlikede olanlar

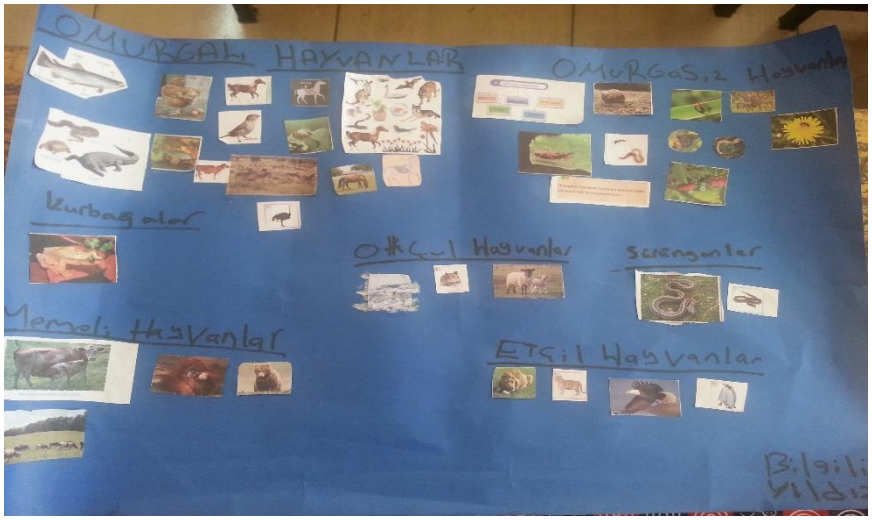
Picture 1. The Information Card Form filled by one of the students

The completed forms were collected by the teacher and the third step was initiated. In the third step of the technique, expert students explained to their group friends the sub-subject of “The variables affecting the lamp brightness”. After explaining the first sub-subject to their group friends, the next step of the “question jury technique” was initiated.

Students sat on the sitting arrangement in the middle of the class for three students (except the expert student) to perform in the question jury application. One student from each of the other groups (except for the expert students) came together and formed the “question jury” group and these students started their studies to ask questions to the first group who will perform their performances in the determined place (Figure 4). Students in the question jury group work in a common way and complete each student's preparation to ask a question. Meanwhile, the group that will perform its performance started to think about the answers to possible questions. After the preparations were completed, the question jury asked questions to the first group in a sequence they determined among themselves and the members of the first group gave common answers. Another selected student noted the scores they took from the answers given by the first group to the questions. The teacher determines the value of the score in advance for the correct answer to be given to each question. For example, 10 points for full answer, 5 points for half answer and 0 points to wrong answer were given to the answers. After the question jury asked all questions (4 questions) and the first group answered all the questions, the process ended.

Then, the second group came to the stage (except for the expert in the group, three people) to perform and a group of students from the other groups excluding the second group came together (except for the expert students) to create a new group of "question jury". (Students sent to question jury group must follow a certain order) The same steps are repeated again. The same procedures are followed for the third, fourth and fifth groups respectively. Processes that are not completed in two hours continue in the following courses.

After the “question jury process” completed about the first sub-subject, “teacher's subject summary” which is the later step was initiated and the teacher lectured the subjects/concepts about the class that the students needed briefly. After the teacher briefly summarized the subject, the next step of the question jury which was “product forming” was initiated. In this step, all groups simultaneously created a simple electrical circuit consisting of a socket, switch, connecting cables and battery in relation to the sub-subject of “The variables affecting the lamp brightness”. The product produced by one of the groups about “creatures” is given below:



Picture 2. Poster work by one of the groups

After completing the product studies of the groups, the next step of the question jury which is “Filling the second part of Information Card” was passed and each student filled the part “What I have learned” which is the second part of “Information Card” individually. Later on, the last step which is “holding examination for students individually” was applied and the students filled the quiz about the sub-subject of “The variables affecting the brightness of lamp”. The teacher collected the quizzes and thus the application of the question jury on the first sub-subject ended.

After the first jury application (1 week) on the first sub-subject ended, the same steps for the second sub-subject (schematic representation of the circuit), the third sub-subject (what is in the earth’s crust) and the fourth sub-subject (erosion, landslide, underground-surface waters, air-water-soil pollution) were repeated as one sub-subject for each week. The points that the groups received during the “question jury (5th step)”, the points received from the products (8th step) and from the quizzes (8th step) were calculated and their scores were ranked and the group that received the highest score was awarded with a certificate.

During the practices, observations were made to determine students' experiences throughout the process, various field notes were held and informal interviews were conducted with the students. In the last two applications, students were asked to keep a diary to determine their opinions and thoughts about the application of the technique and the diaries kept were collected by the teacher the following day. At the end of the application, semi-structured interviews were conducted with eighteen (18) students in the study group. Two students were not interviewed for various reasons. In addition, the Information Card Form which was filled regarding each sub-topic was collected by the researchers to determine the students' conceptual learning levels. The application steps of the study are summarized in the flow chart below:

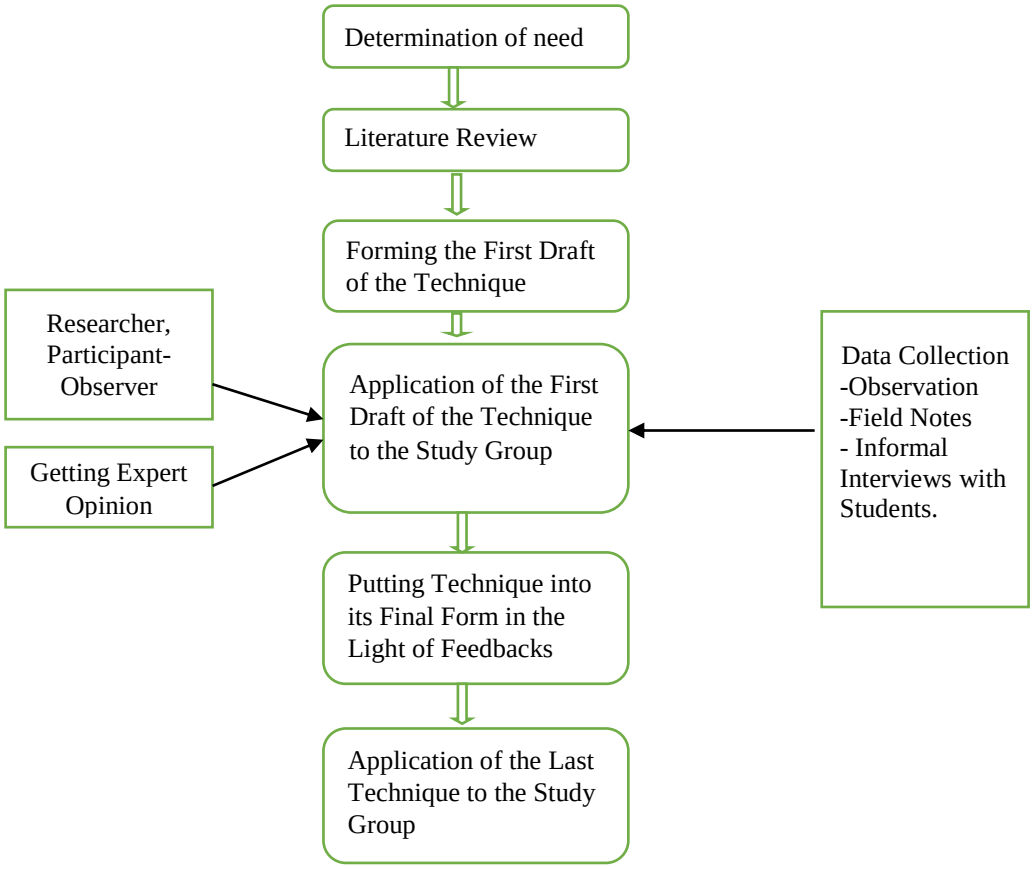


Figure 5. Flowchart of the study

Validity and Reliability of the Research

In this study, triangulation was applied to provide the diversity of data used to ensure internal validity in qualitative research. In triangulation method, interview, observation and document analysis were conducted. The following processes were followed for the validity and reliability of the study: expert opinion was consulted for interview form, observation form and Information Card form related to assessment tools, students were informed about the study in advance, voice recorder was used in semi-structured observations and students directly wrote their opinions, personal comments were avoided in this process, themes and codes were created as a result of the data analysis, an expert opinion (validity of the study) was consulted to check whether the themes and codes were formed effectively or not (Creswell, 2003), the same data were coded by another researcher so that the consistency between the encoder and the data was analyzed and direct quotes were taken from the students' opinions to directly transfer the reader in the data analysis (transferability).

The Role of the Research

The researcher is a Science Teacher who has a total of 8 years of experience in the same school and is still continuing a PhD in Science Education. From the beginning to the end of the study, the researcher himself served as a tutor and participant observer. The researcher gained experience with students throughout the process and spent time with them in areas such as corridor, garden, canteen etc. and then, made informal talks about the application of the technique with them. The researcher-teacher collected all necessary data (interviews, observations, videos, pictures, etc.) using the data sources, recorded the records and analyzed the data. Moreover, the experiences of the researcher in his previous lectures played a role in the maturation of this technique. In 2014, the researcher / teacher applied this technique in one unit of the science course and received positive feedback from the students. Due to the positive nature of these feedbacks, the researcher / teacher used the first version of this technique including it in cooperative learning principles in later semesters and years. In the light of received data and feedback, the idea that this technique could be a cooperative technique arose. Therefore, the investigator played an active role in the occurrence, maturation and finalization of this technique.

Findings

1. Findings regarding the First Question of the Study

In this part, the findings obtained regarding the first question of the study which was *"What are the opinions of students about the Question Jury technique?"* was examined. For this purpose, the diary the students kept and the semi-structured interviews were analyzed. The themes and codes obtained from the analyzes and the frequency and percentage values for these themes and codes are shown below.

Table 6. Themes and codes obtained from observations and diaries.

Theme	*Code*	Interviews (18 people)		Day 1 (19 people)		Day 2 (8 people)	
		f	%	f	%	f	%
Cognitive Learning	*Beneficial*	*8*	*44*	*2*	*10*		
	Encouraging to think	*1*	*5*				
	Assistant to learn the subject / concept	*5*	*27*	*2*	*10*	*3*	*37*
	Knowledge research	*1*	*5*				
	Finding answers to unknown questions	*1*	*5*				
	Contribution to personal development	*3*	*16*	*1*	*5*	*1*	*12*
	Understanding subjects / concepts	*1*	*5*				
	Teaching difficult subjects	*2*	*11*				
	Obtaining new information	*1*	*5*				
	Increasing success	*8*	*44*	*1*	*5*	*1*	*12*
	Persistence of knowledge	*2*	*11*			*1*	*12*
Affective learning	*Pleasant*	*11*	*61*	*8*	*42*	*2*	*25*
	Fun	*4*	*22*	*5*	*26*	*4*	*50*
	Exciting	*1*	*5*				
	Nonsense	*1*	*5*				
Evaluation	*Contribution to self-evaluation*	*2*	*11*				
	Contribution to receiving good note	*3*	*16*	*1*	*5*		
Process	*Coping with challenges*	*1*	*5*				
	Encouraging to study	*2*	*11*	*2*			

According to Table 6, the answers of the students to the interview questions, the thoughts that they stated in the diaries, the observations made by the researcher, the video shooting and the concepts in Information Card form; "Cognitive Learning", "Affective Learning", "Evaluation" and "Process" were brought together under four themes. In "Cognitive Learning" theme *beneficial, encouraging to think, helpful to learn the subject/concept, knowledge research, finding answers to unknown answers, contribution to personal development, making subjects/concepts understandable, learning difficult subjects, increasing success codes were included,* "Cognitive Learning" theme involved *nice, enjoyable, exciting, nonsense codes,* "Assessment" theme included *contribution to self-assessment, contribution to getting good grades* and "Process" theme had *coping with difficulties, encouraging to studying* codes.

In the theme of Cognitive Learning; 8 students in interviews, 2 students in dairy-1 stated that question jury is a useful technique. Some of the student opinions that make up this code are as follows;

> *"I think it is very beneficial for us... Yes. Because we get information from our books and write in our notebooks. We read with friends. And it is very beneficial..."* (Student-2 Interview).
> *"It is really good for me. Because we are asked questions and we answer. So very nice…"* (Student-3 Interview),
> *"This technique is very nice. The course is very good. I can pass the exams easily. The question jury is very good..." (*Student-11 Daily-1: 18.05.2016).

> *"This application is very beneficial for me "We have found this application 2 months ago and we were lectured the subjects. Our subjects are microscopic organisms, plants, animals and fungi. We have no deficiency in these subjects..."* (Student-19 Daily-1: 18.05.2016).

During the interviews, one student expressed that the application of the question jury encouraged him to think. The student's view of this code is as follows;

> *"...The question jury application makes me think well..."* (Student-4 Interview).

A total of 5 people in the interviews, 2 people in the Daily-1 and 3 in the Daily-3 reported that the question jury application helped them to learn the subject / concept. Some of the student opinions that make up this code are as follows;

> *"...I learn and apply science concepts..." (*Student-14 Interview).
> *"I liked this activity so much. Now I learned the symbol of the bulb, battery, switch and cables. I really liked this activity. I easily learned. I never had a hard time when learning. So I am pleased with this activity."* (Student-4 Day-1: 18.05.2016);
> *"...I have learned the mystery of the earth's crust. I learned about magma, mantle, stone sphere, fire sphere. Thanks to this activity, we all learned together..." (*Student-4 Day-2: 26.05.2016).
> *"... I learned everything about earth's crust thanks to question jury"* (Student-18 Daily-2: 26.05.2016).

In the interviews, 3 students stated that they could find answers to the questions they did not know with this application. Some of the student opinions that make up this code are as follows;

> *"...because I learn the answers of the questions I don't know and ask my friends..."* (Student-14 Interview).
> *"...because we were asking questions and answering them. Our friends answered if we didn't know..."* (Student-18 Interview).

In interviews and diaries, two people (2) expressed that this practice contributed to their personal development. Some of the student opinions that make up this code are as follows:

> *"...questions are developing me..."* (Student-1 Interview).
> *"...First, I studied with my friends on a lot of subjects. We told a lot of topics... This application took us further..."* (Student-5 Day-1: 18.05.2016).

In the interviews, two (2) students stated that the subject/concept was more understandable for themselves. Some of the student opinions that make up this code are as follows:

> *"...I ask where I don't understand or how I will do it and they help me..."* (Student-3 Interview).
> *"... Because they helped me when I didn't understand things..."* (Student-6 Interview).

One (1) person in the interviews stated that s/he learned the difficult subjects better with this practice. The student opinion of this code is as follows:

> *"...It helps me with difficult issues"* (Student-5 Interview).

In the interviews, eight (8) students stated that question jury application was effective in learning new knowledge. Some of the student opinions that make up this code are as follows:

> *"...Because we learn knowledge..."* (Student-12 Interview).
> *"...I have become more knowledgeable..."* (Student-13 Interview).
> *"...Because we learn new things in question jury application..."* (Student-16 Interview).

Two (2) interviews and two (2) diaries stated that this practice was effective in increasing their success. Some of the student opinions that make up this code are as follows:

> *"My science grade was very low. I was very sorry. Thanks to this, my science grade is very good."* (Student-14 Interview).
> *"...Yes I would want it so that my math grade would be higher..."* (Student-5 Interview)
> *"...We became successful and our exam scores significantly increased..."* (Student-5 Day-1: 18.05.2016).

"Science course is very good. I can pass the exams easily thanks to question jury..." (Student-11 Daily-1: 18.05.2016).

One (1) student in the diaries stated that the persistence of knowledge increased due to the question jury. The student opinion of this code is as follows:

"The activities we did were very nice and we liked it very much. Enjoyable and tasteful. It sticks in the mind..." (Student-15 Daily-2: 26.05.2016).

In the theme of Affective Learning Eleven (11) people in the interviews found nice, four (4) people found entertaining, one (1) person was excited and one person (1) found ridiculous; (2) people found fun and four (4) people found excited. Some of the student opinions that make up this code are as follows:

"Question jury application is a very nice application…" (Student-5 Interview)
"What we did, the question jury was very nice." (Student-15 Interview).
"The question jury influenced me. I spent exciting hours." (Student-11 Interview)
"...It is an enjoyable application..." (Student-10 Interview)
"... The application made by our teacher is very beautiful…" (Student-11 Daily-1: 18.05.2016).
"...I really liked this activity..." (Student-4 Day-1: 18.05.2016)
"I think it is a very nice application. I liked this application very much. I am satisfied with this application. This application will last until the school is over. A very nice application. It is a very joyful and exciting application." (Student-21 Day-1: 18.05.2016)

During the theme of evaluation two (2) people stated that they could assess themselves (contribution to self-assessment); three (3) people said that they received good grades (contribution to receiving good grades) and one (1) person in diary 1 expressed that this application contributed to receiving good grades. Some of the student opinions that make up this code are as follows:

".. We are checked to see if we have learned or not." (Student-9 Interview)
"...It affected us, we were getting higher scores" (Student-5 Interview)
"...This application took us further... In our classes, we became more hardworking and our exams grades increased considerably..." (Student-5 Day-1: 18.05.2016).
"...We inserted the battery and the bulb, then pressed the on-off button, the bulb turned on. I'm so glad. I was very happy when we got high score as a group." (Student-6 Day-1: 18.05.2016).

During the process theme, one (1) person had the opinion that they were able to cope with the difficulties in the course and two people from interview and diaries (in total 4) suggested that this practice led them to study. Some of the student opinions that make up this code are as follows:

"...I think the application contributed to me. I handled the challenges in the science class... I was dealing with the challenges that I liked." (Student-5 Interview)
"..It allows us to study lessons better." (Student-18 Interview).
"..We studies, we tried and won..." (Student-6 Day-1: 18.05.2016).
"..All the topics we studied until now were nice. We studied, we made an effort and received a certificate..." (Student-7 Day-1: 18.05.2016).

The students answered some questions asked during the interview as "yes" and "no". The frequency values of the answers given by the students are given below:

Table 7. Frequency values of questions that students answered as "yes" and "no"

Questions	Yes (f)	No (f)
Question 2: Do you believe that the question jury has contributed to you, how?	16	2
Question 3: Did you have any difficulties during the question jury application?	6	12
Question 7: Do you want us to practice the Question Jury application next year, why?	16	2

Most of the students (16 people) suggested that this technique contributed to them. A large part of the students (12 people) stated that they did not encounter any difficulties in the implementation process of this technique and six (6) students said they encountered various difficulties. These students pointed out that the difficulties they faced were the difficult questions asked by "question jury" during the practice. Opinions of some students:

"At one point, a very difficult question was asked, but we couldn't find the answer" (Student-3)
"The questions sometimes seemed difficult. But we were trying to answer the questions" (Student-14).
"Yes, there were many difficult questions" (Student-16).

In addition, most of the students (16 people) said that they wanted this technique to be applied in their courses in the next year.

The students were asked about the application steps of the question jury application technique. Table 8 shows the frequency values of these questions' answers given by the students.

Table 8. The frequency values of the answers given by the students to the question about the application steps of the technique

	Existing application	A different application
Question 8: How would you like the question jury implementation to be implemented differently than we do?	16	-Asking individual questions: 1 -Longer time: 1

A large number of the students (16 people) expressed that the current practice could remain and two (2) students said a different practice could be added. One of the students said that the students could ask each other individual questions and the other said they wanted process to be longer.

The students were asked about in which courses they would like to use this technique. The frequency values of the answers given to this question are given in Table 9.

Table 9. The frequency values of the answers given by the students to the question of which courses they want to use

	Science	Mathematics	Turkish
Question 9: In which course do you want to use the question jury?	11	5	2

The students suggested that they would like to use this technique in Science (11 people), Mathematics (5 people) and Turkish (2 person) courses.

Researcher-teacher applied the existing curriculum of Ministry of Education for the first semester and used "Question Jury" technique for the second semester for Science class. Students were asked about two different approaches applied in two different periods. Table 10 shows the frequency values of the answers given by the students:

Table 10. Comparison of the classical (existing) teaching method and the question jury method

		Question Jury	Existing curriculum
Question 10: When we compare the course lecturing styles (existing curriculum) and the Question Jury style we applied in spring semester,	Which do you like better?	16	2
	Which one is more useful when learning Science?	16	2
	What have increased your success in science in your opinion?	16	2

A large number of students (16 people) expressed that they liked the question jury technique than the current curriculum used in the first semester, the question jury technique in learning the science course was more useful and it contributed more to the course in terms of increasing the success in Science class. Two students expressed their views on the current curriculum.

2. Findings for the Second Question of the Research

This is the second question in the research *"What experiences did the students gain during the implementation of the question jury technique?"* The data for the question has been examined. The observations and video recordings of the researcher during the process were analyzed.

By the participant/researcher on May 26, 2016; *"The application of the question jury led great excitement for the students. Almost all students followed this practice effectively. It is observed that some students who were not very active in the courses in the previous semester were willing to participate in the lesson and to answer the questions. This technique can be said to play an important role in increasing the success of these students. In fact, the observation note as "this technique can be interpreted to be beneficial for students in all aspects"* showed that this technique excited students, enabled them to participate effectively in the lesson and improved students' success. In fact, these findings support the views of the students, who formed the "beneficial" code as a result of the interview and the analysis of the diaries, and took part in the cognitive learning theme supported students' opinions.

Participant researcher's Observation-2 and Observation-3 conducted on May 18 - 26, 2016; *"...In this application, some students were observed to experience serious thinking processes in questioning and answering questions..."* and "*...During the implementation of the question jury, it was observed that some students thought in detail before answering the questions..."* The observation notes showed that this technique led students to think. These findings supported the student views that made up the code of "encouraging to think".

According to researcher's observation 3 made on May 26, 2016; *"...With this application, it can be said that the students have learned the conceptions of science very well by their reactions, the speeches they made on the subject and the questions they asked each other. Since the time we applied this technique, a significant increase in the level of students' learning science concepts was observed. The researcher noted that "students asked me questions about different concepts (they newly learned) during the class breaks, at corridors and in the garden etc. at different places and times..."* When these notes are examined, it is seen that the applied technique helped students to learn science concepts. This finding supported the code of "helps to learn the subject and the concepts" as a result of the interview and the examination of the diaries. It also supported the data obtained from the analysis of the Information Card Form, which will be mentioned later.

The researcher stated in Observation-2 on May 18, 2016, *"...Some students observed that they researched the subject / concept / information from textbooks, notebooks and supplementary books and they noted the information to their small notebooks..."*, and in Observation 3 on June 25, 2016, *"...A number of students researched information from different sources and noted in their notebooks..."* Considering these data, it is observed that the question jury technique provided students research skills. In fact, as a result of the analysis of video footage made on 11.05.2016, the fact that some of the students researched the information from various sources and took notes of the subject supported this result. In addition, in the observations dated May 18 - 26, 2016 the researcher, noted that, *"Thanks to this application, students can find answers to their questions researching from different resources..."*

According to researcher's observation date May 26, 2016 (Observation-3); *"...This practice positively affected students who were introvert, unsuccessful, silent, in shade-pupil positions, with poor interaction and communication skills."* When examining this note, it can be said that the applied technique contributed to the personal development of non-social students. This finding is similar to the views of the students who created the code of "contribution to personal development" as a result of examining observations and diaries.

Researcher, noted that in Observation-1 on 11.05.2016; *"...almost all students enjoyed the process…",* in observation-2 on 18.05.2016; *"... Students found this application enjoyable…"* and observation-3 on 26.05.2016; *"... The excitement of the students for this application is visible in their eyes..."* When these data are examined, the application was found to be beneficial in terms of affective features (enjoyment, excitement, happy etc.). In addition, students progressed emotionally as a result of the analysis of video recording performed

on 12.05.2016. These results showed similarity with the students' opinions who formed the following codes: *"nice, enjoyable, exciting"* as a result of the interview and diary examination.

This application allows student assessment and they can also make self-assessment when the notes of the researcher was analyzed. These notes are as follows: Observation-1 on May 11, 2016; "*...Students can determined what and to what extent they learned thanks to this application..."*, Observation-2 on May 18, 2016; *"...Students can make self-assessment and realize what they have learned..."* Observation-3: *"...Students can compare the scores they obtained from the previous question jury and they can observe their development..."*

The researcher stated in Observation-1 on May 11, 2016 that *"Thanks to this application, students studied more..."*, in Observation-2 *"...Students made more effort to learn the subject and prepare question...",* in Observation-3 on May 26, 2016; *"...Students seemed to be studying the subject from textbooks and researching the subject from supplementary sources and books. It was observed that this practice increased the students' success contributes to the students' learning effort, increases their skills of questioning and encourages students to study, when the following notes were taken into consideration."* When the notes are taken into consideration especially in the previous periods, some students who were not very successful started researching, examining or learning. This can be interpreted as that this technique encourage them to study. In addition, this finding was similar to the "process" theme which was created as a result of the observation and diaries analysis.

According to Observation-1 on May 11, 2016; *"One or two students were not content with the process. In fact, these students had previously expressed their dissatisfaction. The main reason for this is that these two people did not get along with their group friends. It was noted that they were bothered because of studying with people whom they did not want."* As a result of the analysis of this data, there were students who had negative thoughts about the practice.

Researcher noted on May 18, 2016 that "*Some students in certain groups did not come to school today. It was observed that the students whose group friend did not come was not content because they thought that the group may receive a lower grade..."* According to this observation note, students' absenteeism problem was not welcomed within the group.
The question jury technique could be considered when the researcher notes regarding the fact that *"Students easily adapted the application staged of this technique"* on May 18, 2016, and *"Students stated that they did not have any difficulty when applying this technique during the class break."* on May 25, 2016.

Observation and video data were used to determine whether the key features of cooperative learning including "positive commitment" , "individual responsibility", "award", "social skills", "face-to-face interaction", "equal success" and "group evaluation" occurred during the application process or not. The analysis results of the observation and video data are given below.

Table 11. The data regarding the observations and features of cooperative learning from observations and videos

Features of Cooperative Learning	Obser.1	Obser.2	Obser.3	Video
Positive commitment	√	√	√	√
Individual responsibility	√	√	√	√
Award	√	√	√	√
Social skills	√	√	√	√
Face to face interaction	√	√	√	√
Equal success	√	√	√	√
Group Evaluation	√	√	√	√

The features mentioned in the observations of the researcher on May 11, 2016; May 18, 2016 and May 26, 2016 occurred in question jury technique. The observer-teacher observations of this finding are given below; *"All students in the groups were seem to be in an effort to improve the learning of their group friends..., ...Each student in a group has a separate task and it leads them to solidarity within the group..., Groups work independently in tables located in different corners of the class. The students in the group sit in a way that they can see each other. With this seating arrangement, students can encourage and motivate each other..., some timid students behave more actively in this process..."* From this point, the question jury technique includes the basic features of cooperative learning.

3. Findings regarding the Third Question of the Study

In this part, the data regarding the third study question which is *"Does the developed question-jury technique have an impact on students' conceptual levels?"* were examined. The Information Card Form was analyzed for this purpose.

The researcher allowed students to fill out the Information Card Form before and after each sub-subject during the application of the question jury. The form consists of two stages. Students wrote the subjects / concepts they have known before to "What do I know?" part regarding the sub-subject before starting the studies about the sub-subject. Students wrote the subjects / concepts they have learned about the sub-subject to "What I have learned?" part which is the second part of the form after the studies about each sub-subject were finished. Students filled "information card-1, information card-2, information card-3 and information card-4" in the following subjects: "the variables affecting the lamp brightness", "schematic depiction of a circuit", "what the earth's crust has in it" and "erosion, landslide, underground waters, air-water-soil pollution" respectively. The concepts written by all students on the forms were analyzed one by one and the frequencies of these concepts were determined. The following table shows the concept numbers that students the students wrote about the subject before the sub-subject and the concepts they wrote at the end of the sub-subject.

Table 12. Data obtained from Information Card Form

	INFORMATION CARD-1		INFORMATION CARD-2		INFORMATION CARD-3		INFORMATION CARD-4	
	What do I know?	*What have I learned?*	*What do I know?*	*What have I learned?*	*What do I know?*	*What have I learned?*	*What do I know?*	*What have I learned?*
Student-1	-	4	2	5	1	4	2	8
Student-2	-	7	1	6	-	6	3	6
Student-3	2	10	3	8	-	5	2	6
Student-4	4	11	3	5	2	5	4	8
Student-5	1	3	1		3	8	3	5
Student-6	-	3	-	8	-	7	2	7
Student-7	1	3	3	6	2	6	-	5
Student-8	-	2	1	5	1	5	1	7
Student-9	2	9	1	7	-	4	-	8
Student-11	1	5	2	5	2	9	2	6
Student-12	1	7	1	8	1	7	-	9
Student-14	-	4	2	5	1	8	1	7
Student-15	-	4	1	6	1	5	1	8
Student-16	1	8	1	7	2	8	-	4
Student-17	2	6	1	6	3	7	-	6
Student-18	-	4	2	5	1	6	3	8
Student-19	1	9	2	6	-	5	2	7
Student-20	1	9	1	6	2	8	1	5
Total	17	108	28	106	22	113	27	120

When Table 12 was examined; at the very beginning of the question jury application, students wrote a limited number of subjects/concepts to the "What do I know" part of the information card (in total 17, 28, 22 and 27), but at the end of the question jury application of the information card, students wrote more subjects / concepts to

"What have I learned" part (in total 108, 106, 113 and 120). From this point of view, the question jury application had a positive effect on learning the subject / concept. In addition, this finding was supported by the code "helping students to learn the subject/concept" formed as a result of the observation and diary analysis, *"...It can be said that, students learned the science concepts well based on the conversations they had, questions they asked each other and their reactions thanks to this application..."* which was the observation-3 noted on May 26, 2015.

Discussion

When the Table 6 is examined, based on the data obtained from interviews and diaries, the question jury technique was a useful technique, this technique led students to think, they helped them to learn the subject or the concept, contributed to their personal development, and they did not know or intend to research information through this technique, this technique made the subjects or concepts more understandable, helped them in the teaching of difficult subjects, contributed to them to gain new knowledge and increased their success in the science course.

The question jury technique helped the students to learn new subjects/concepts/knowledge and to increase their success in science. In the Observation- 3 made on May 26, 2016, the code (Table 6) which is "helping students to learn the subject and concept" formed as a result of the observation diary analysis and the data obtained from Information Card Form (Table 12) used to determine students' conceptual learning levels supported this result. Thus, it can be concluded that the question jury technique positively contributed to the students' conceptual learning levels. These results were parallel to the results of the studies which concluded that cooperative learning had a positive effect on students' achievements (Armstrong, 1997; Artut & Tarım, 2007; Ghaith, 2003; Doğan et. al., 2010; Doymuş & Şimşek, 2007; Ebrahim, 2012; Göçer, 2010; Gürbüz et. al., 2012; Koç, 2009; Maden, 2011; Öcal, 1996; Parveen, 2010; Perkins & Saris, 2001; Slavin & Lake, 2008; Şimşek, 2007; Şimşek et. al., 2014; Yıldız, 1998; Zakaria, Chin & Daud, 2010). In this context, it can be concluded that the question jury technique helped students to learn the subject/concept that it was useful in teaching difficult subjects and that students understood the subject or concepts better with this technique. These results indicated that other collaborative learning models provided positive learning (Mills et, al., 1999; Tanel & Kavcar, 2007; Towns & Grant, 1997) and suggesting that information was more persuasive (Bilgin & Geban, 2004) showed parallelism with the results of the studies. Based on the observations that the students stated in the formal interviews and the diaries they kept, this technique contributed to their personal development and they were interested in researching the information through this technique, and the researcher made the observations of the jury technique, students developed themselves cognitively, affectively, and kinesthetically and at the same time they gained the ability to conduct research and examination.

Almost all of the students showed positive attitudes towards this technique according to data obtained from interviews, daily observations and video footage. These results obtained from the study were similar to results of the studies concluded that the students developed positive thoughts on the model of collaborative learning (Efe, 2011; Nichols & Miller, 1994; Nichols, 1996; Quiros, 2006; Slavin, 1987, 1991; Spuler, 1993; Thompson, 2008). In addition, two students reported negative opinions in the affective learning theme: one (1) student in Table 7 (question 2) two students (2) in Table 10 (question 10). In fact, there were students thinking negative in Observation-1 made on May 11, 2016. Similar results were found in the literature. The negative thoughts of the students regarding the model of cooperative learning were: some of the group members did not participate in the studies, some students did not contribute to the group work, some students were more prone to study individually instead of in a group, some students had resentment in the group, some group members did not fulfill their responsibilities, some students were familiar with the traditional training process, team integrity was not provided (Aydın, 2009; Thompson, 2008; Ural, 2007).

When Table 6 is examined, it was found that students could assess themselves (self-assessment) through question jury technique. During the question jury process, it was concluded that the students were able to evaluate themselves according to their ability to answer the questions directed to them. The evaluation can be very versatile. Students performing in the question jury process can face one-to-one questions and at the same time, other students who are in the listener position (waiting to demonstrate their performance) can implicitly assess themselves as they hear the questions in the application environment. Students who have already performed their performance are given points according to their level of answers and the points used are used at the end of the unit for group evaluation. In addition, according to the opinions of the students, it is concluded that the question jury technique contributed in terms of getting good grades in the science course. Thus, it was concluded that the question jury technique positively contributed to the students' achievements in the science

course. This result were parallel to the studies indicating that the cooperative learning increased academic achievement in the literature (Abdullah & Shariff, 2008; Karadeniz & Doymuş, 2015; Ebrahim, 2012; Kıncal, Ergül & Timur, 2007; Okur-Akçay, 2012; Peterson & Miller, 2004; Temperly, 1994; Tran, 2013; Wenli et al., 2011; Wyk, 2012).

In the same way when table 6 was examined, students could cope with some difficulties in the science course by means of the question jury technique. The students started studying through the application of this technique. For example, the expert student tried to be a better equipped student (expert student) by conducting research-investigations throughout the process to better teach the subject to their group friends. Since all students experienced the process of specialization, it can be interpreted that this technique increased the research skills of all students. The data obtained from the observations of the researcher on May 18, 2016 and May 26, 2016 supported this result.

When Table 7 (question 3) was examined, some of the students faced various difficulties in the process. Students who stated that they faced various difficulties attributed these difficulties in the process of the application of the question jury to the difficulty of certain questions. During the implementation of the cooperative learning model, very few of the following negativeness emerged in study: free-riding effect, being exploited effect, richness of the rich, responsibility disorder, social abstain, dominance in group, non-functional duty, difficulty in adaptation, noise, resentment in group, absenteeism, unproductive use of group work (Açıkgöz, 1992; Cohen, 1986; Gillies & Boyle, 2010; Jacobs & Hall, 2002; Jacobs, McCafferty & Iddings, 2006; Kagan & Kagan, 2009; Koç, 2009; Sancı, 2011; Slavin, 1983; Slavin, 1990; Şimşek, 1994; Wang, 2007). When the field note of the researcher dated May 18, 2016 was analyzed, the problem of absenteeism of the students was not welcomed within the group. In fact, the problem of absenteeism seen in other cooperative learning techniques also appeared in the question jury technique. However, in the process of question jury application, problems other than absenteeism which was encountered in the literature were not seen; therefore, the application limitations found in other cooperative learning techniques did not exist in question jury technique.

When examining Table 7 (question 3), it can be said that question jury technique is an easily applicable method based on the observations of the students that they did not encounter any difficulty than "difficult question" and the observations of the researchers made on May 18, 25 and 26, 2016. As can be seen in the same table, most of the students stated that they wanted this technique to be applied the next year. Thus, it was concluded that students enjoyed the question jury technique and the question jury technique process.

As can be seen in Table 8 (question 8), most students have expressed their opinion in favor of the current practice of the technique. From this point of view, the application steps of the question jury technique were considered as simple and understandable. In addition to these implementation steps, two students reported that individual questions and longer hours for the application can be provided. As it is known, the question jury group allowed the members of performing group answer questions as a group instead of answering individually. When the data were re-analyzed, the student who defend this idea put forward similar ideas in student's (student-9) diary as well. As a result of the informal interviews conducted with the students and the observations made during the implementation process, this student argued that she/he was more prone to individual work than group work. Other students' stated that they would like question jury application to last longer and these students showed that they liked this technique.

Table 10th (question 10) showed that students' preferences between the question jury technique and the existing curriculum are in favor of the question jury. Most of the students (16 people) voted in favor of the question jury, while two people voted for the current program. It was found that the students who had negative opinions about the question jury were students' number 1 and 9. As mentioned earlier, it was concluded that these students did not like working as a group, because of the resentment and personal problems they experienced with the group friends. As a result of many students suggesting positive opinions about the question jury technique, the question jury technique was interpreted as being more useful than the current curriculum.

Conclusion and Suggestions

In light of the data obtained, the Question Jury technique is suitable for the principles of cooperative learning approach, it is a beneficial, simple and straightforward technique which is easy to implement, it contributes student in learning a subject/concept and increases success, it helps students to socialize, the students love this technique, it encourages students to research information and study, it enables to gain research and analysis

skill, contributes students' personal development and develops students cognitively, affectively and kinesthetically.

In addition, some suggestions can be given to teachers and researchers in accordance with the results of the research and the experience of the researchers in the process. This study concluded that Question Jury technique was an effective method for the teaching of 5th (Let's Meet the World of Creatures), 6th (The Essential of our Lives: Electricity) and 7th (The Mystery of the Earth's Crust) units of 5th grade Science class of secondary school. In this context, it is suggested and recommended that question jury technique can be useful in all units of Science course. The question jury technique can also be used effectively in other courses as well. In our study, it is considered that this technique can be useful for teachers to use because students learned the concept / subject, socialized and enjoyed the participation. Considering the implementation steps of the question jury technique, the implementation of crowded classrooms may reduce the control of groups, so teachers and educational researchers who want to use this technique in crowded classes should be more attentive when planning activities. The question jury technique can be a useful technique for teaching a new subject and reinforcement of a taught subject. Based on the observations made during the implementation process, the most enjoyable part of the activity for students was preparing questions and asking those questions to their friends. Teachers should be aware of this when applying the technique. We observed and experienced that students developed positive attitudes towards the subject, lesson and teacher, and they enjoyed the process and their motivation towards learning increased. We think that the use this technique by teachers will be beneficial.

In addition, the results of this study are limited to the studies conducted with 20 students studying in 5th grade of a secondary school located in a province in East of Turkey in second semester of 2015-2016 academic year and the sub-subjects which are "Let's Meet the World of Creatures", "The Essential of our Lives: Electricity" and "The Mystery of Earth's Crust" units, and the school, semester, class and sample and the applied data collection tools. Researchers will be able to contribute to more general comments about the effectiveness of this technique practicing in different subjects, in different classes for one semester or year.

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Author Information

Ibrahim Benek
PhD Student (Ministry of Education, Teacher)
Istanbul University-Cerrahpasa
Institute of Graduate Education
Department of Mathematics and Science Education
Istanbul, Turkey
Contact e-mail: *ibrahimbenek11@gmail.com*

Behiye Bezir Akçay
Prof. Dr.
Istanbul University-Cerrahpasa
Hasan Ali Yucel Faculty of Education
Department of Mathematics and Science Education
Istanbul, Turkey