A BOARD GAME ABOUT SPACE AND SOLAR SYSTEM FOR PRIMARY SCHOOL STUDENTS

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ABSTRACT
Visual elements that used in lessons are necessary because they make learning more permanent. Also the visuals that used in evaluation part of the lesson should decrease the anxiety of students and provide them with correct evaluation. The board games among the visuals which can be used in evaluation part are quite effective for getting feedback immediately. Standardizing and increasing the frequency of using games like this in evaluation part will provide evaluation more correct and more effective. In this direction with the aims of recognizing celestial objects in the space, universe, searchings about space, optical tools that used for observing space and evaluating the students' understanding level for planets' attributes.

In this study, there are parts such as preparation of the game, usage of it and the data gathered from semi-structured interviews. With this aim, interviews were conducted with 16 Science and Technology teachers and 40 7th grade primary school students. It was determined that teachers thought that the game activity in this study would increase the motivation of students and it could be used as an evaluation activity, also students enjoyed this game.
Key Words: Evaluation, board game, space and solar system, 7th grade students

INTRODUCTION

Games were described according to their different properties by different researchers. Dewey (1938) described the game as unconscious behaviors that weren't intended for a result. After all, Huizinga (1938) described the game as activities which were voluntary and in accordance with rules at a particular time and in a particular place. Game is preparation for later phases of life according to Gross (1919) and doing what is desired to do according to Gulick (1920). James and Mc Daugal indicated that games rely on instinctive motivations and for Patrick, it is activities that are done freely and spontaneously (as cited in Ergün, 1980). Accordingly, game can be described as pleasurable activities that are performed within particular rules, for a limited time and in place, in which individuals participate voluntarily, carried out with mental and physical abilities and gained some social behaviors.

Games are very important for physical, mental and emotional development (Egemen, Yılmaz&Akil, 2004). Children's abilities such as memorizing remembering, naming, matching and classifying develop while playing a game. They learn reasoning, relating cause and effect. Also they learn focusing, directing themselves to an aim, realizing the problems that appear in the game and finding solutions to these problems (Dağbaşı, 2007). Also children will recognize obeying the rules, learn winning, loosing and communicating with the other people. Some games which require certain moves, will help physical development (Altunay, 2004). Romine (2004) conducted a research study that compared the lessons thought by traditional methods and the lessons thought by using the games. Using games in lessons increases students' motivation as well as social and academic abilities. If teacher turns learning into a play, students are naturally motivated to participate (Baines&Slutsky, 2009). Games which were used for foreign language education had positive effects in different studies that were done with different age groups. Students who were taught with games were more successful than the students who were taught with traditional methods (Susüzer, 2006; Kaya, 2007). And it was found in another study that, games made foreign languages easy to learn and students enjoyed the lessons because of the games (Fırat, 2007). Different researchers developed different games for educational use and investigated how effective they could be. Aycan et al. (2002) used two games for teaching periodic table and elements and compared these games in a research study. It observed that students didn't get bored and they had fun through applications. Smith (2002) designed an educational card game for children between the ages 9-13 and intended to increase students'

knowledge about satellites with this game. After implementing this game in three schools, positive results were gained. Opinions were positive about using a game similar to this one for educational purposes and participants enjoyed this game. Also it was seen that most of the students' keeping information about satellites in mind rate increased. A board game about cell topic was used in a study which was done in Switzerland with high school students. Again the students enjoyed playing the game. Furthermore 56% of the students stated they learned new information that they didn't know (Cardoso et al., 2008). Cordona et al. (2007) adapted a game about cell to DNA topic, performed it with high school students in another study and afterwards they invoked teacher and student opinions. Participant teachers and students accepted the game and the researchers reached the result of the game can be used for educating complex topics. Moğol and Özçifçi (2003) have the opinion that the card game they developed for using to educate basic formulas in physics would make boring topics like this more enjoyable and would make learning them easier. Altunay (2004) found in her research that, lessons thought with games would increase the achievement of students and while students in the control group forgot the information that they learned, experiment group didn't forget what they learned with games. Also, Şaşmaz-Ören and Erduran-Avcı (2004) reached results as the games are more effective on students' academic achievement in science and technology course. It was found in Songur's (2006) research, students' remembrance level, attitudes and interests towards Maths lessons and their Maths achievement increased by the lessons which were taught with games.

Measurement and evaluation is an important part of the education process. Besides showing how effective the education was, evaluation helps to make decisions about students and informs about the way that would be used for changing the behaviours of them (Şimşek, 2000). When applications are taken into account, it is seen that evaluation is more devoted to product. So evaluation devoted to grade is kept in the foreground (Yelken, 2006). In this direction, traditional methods are used while evaluation activities actualized in our country. Gelbal and Kelecioğlu (2007) stated that teachers mostly preferred traditional methods for recognizing students and determining their achievement rates in their study which they intended to determine the evaluation tools and methods that teachers prefer to use. Şimşek (2007) investigated the strategies, methods and techniques that teacher candidates used for designing activities and found that very few of them prefers to use teaching with game method and they rarely use games in activities they designed.

Students' anxiety of getting a grade causes them to perceive evaluation as a threat and apprehension tool and to tend learning the information superficially (Gürses et al., 2002). For this reason, while the evaluation activity has to provide feedback for teacher and student, students can't express themselves exactly and we move away from realistic results. Using games as evaluation activities will provide to get more realistic results. Because there is a different field every student can be more successful and some of them will prove their knowledge while they are playing (Yelken, 2006). In a study that was done by Özsevgeç (2006) the result gained as games and puzzles that are used in evaluation stage attract students' attention and positively affects their learning.

In this direction, the aim of this study is to design a game that can be used in evaluation part of the education, to make inferences about availability of this game by gaining teachers and students' thoughts about it. Based on this basic aim the following problem and sub-problem statements defined:

Problem: What are the teachers' and students' opinions about designed board game?
Sub-problems

1. What are the teachers' opinions about using the game as an evaluation activity?
2. What are the teachers' opinions about the context of the game?
3. What are the students' opinions about using the game as an evaluation activity?
4. What are the students' opinions about the context of the game?

The Importance of the Study

As the literature analysing pointed out there are a few number of researches about this field in our country. Especially researches about using games as evaluation activities weren't found. However, if the benefits of using games as activities in education take into account, it will be realized the requirement of making studies about increasing the frequency of using games. For providing this, researchers have to develop game samples that teachers can use and to present the games as activities. This study has been done for supplying mentioned requirements.

METHODOLOGY

Qualitative methods were used, while gathering and analysing data in this study which was done for investigating 7th grade students' and Science and Technology teachers' opinions about the prepared game for

using in evaluation part of the lesson. A board game designed as containing all acquisition of the Solar System and the Further of It unit which was 7th grade curriculum programme. The game was applied after the unit was completed because of it was designed as evaluation activity and it contains all topics of the unit. While preparing the game, we benefited by an activity about cell in Walker and Wood's (1994) handbook which they gave place to science activities. Prepared game was introduced to teachers and their opinions were received by an interview. Also students had an interview after they played the game.

Information about the Game

There are a board that players move on it, a dice, 45 question cards, 10 puzzle parts that will be given the players if they answer the questions correctly, totally 4 puzzles for each of the players and 4 player pawns in the game which designed as board game (see figures 1and 2 in appendix).

"Space Hunters" (Turkish name; Gezegen Avcıları) is a board game which designed for evaluating students' recognizing level of celestial objects in the space, universe, searchings about space, optical tools that used for observing space and the understanding level for planets' attributes. Game was designed for 5 players. Questions of the game were formed by analysing the acquisitions of the Solar System and the Further of It unit and the activities in the textbooks.

Before starting the game,

1. Each player selects a spaceship (pawn) and put it on the space base (start) cell.
2. A player selected as space wise apart from the other 4 players. Space wise asks the randomly selected questions and gives the puzzle part, if the correct answer is given.
3. Each player throws the dice. The player who throws the highest number starts the game and the game continues at the clockwise.

While game starts, players throw the dice one by one and move their pawns as the number of dice. If there is a celestial object on the cell which one of the player's pawn stops, space wise asks a randomly selected space question. If player gives the correct answer, space wise will give the puzzle part which has the celestial object that players pawn on. Celestial object is put on the puzzle by player. If the player can't answer the question correctly, he/she won't be punished and it will be the other players' turn. If the celestial object was won before by a player, question isn't selected and again it will be the other players turn. According to the cell that player stops, one of the following must be done if the player stops on a cell:

- Giving one of the celestial objects to the player on the left
- Giving one of the celestial objects to the space wise
- Giving all of the celestial objects to the space wise
- Taking one of the celestial objects from the player on the right
- Taking a celestial object without answering a question from the space wise
- Waiting for two turns

When all of the puzzle parts are taken by players, the player who takes the most number of parts will be the winner and the game is over.

Pilot Study

The game was tried before the research with a group of students in a school apart from the sample for determining the problems that can appear and making a decision about the game time. After the applications we decided the time that game takes. The game takes average 20 minutes and a lesson time will be enough for completing game twice. When the game directed well, evaluating all of the students completes in a lesson time. Also some rules were added for organizing the playing process such as selecting space wise. During the pilot study, to be space wise was linked to the student's request. But most of the students wanted to be space wise. It was be difficult to select from among them. Therefore, it was thought that, it would be suitable to select students by chance. For the next applications, it was decided that students throw dice before starting the game. And the students that threw the highest number were selected as space wise. In this way, equal opportunities will have been given to all students.

Universe and Sample of the Study

This study's universe is 7th grade students who go to primary schools in Kocaeli and Science and Technology teachers who work in these schools. The teacher sample of the study is 16 Science and Technology teachers who

teach 7th grade and they were selected from ten primary schools that randomly selected through the central primary schools. The unit included to study, was the last unit of curriculum and most of the students didn't prefer going to school due to studying for SBS (Test of Determining Level). For defining student sample, two schools were selected among the ten schools which were selected before and 40 students were included to study from these schools. Because, these two schools could provide students to come to school, time for playing and evaluating the game.

Gathering Data

For gathering teachers' and students' opinions, two different interviews were prepared. Teacher opinions were got by 7 questions about the game, rules of the game, possible effects of it and their suggestions. Student interview consists of 8 questions about the evaluation activities they have done before, this game and the rules of it, the lessons and the units they wanted to play similar games. Prepared questions checked by an authority if they were relevant to and sufficient for the aim of this study. It was asked 16 teachers, if they accept the interview voluntary and different interview times and dates were determined, after the aim of the interview was explained and it was assured to be hidden their identities. Everything they said was recorded by using different enumeration forms for each teacher. All of the interviews were completed in 2007-2008 Education years, between 21st May and 5th June. Fist the game was introduced and then teacher opinions were taken during the interviews. Information was given about the game and the study and the meeting days with the students determined by going to schools before. When we went to schools in the days and at the times that determined, first the game was introduced to students and information about the game was given to them, and then game was started with the groups of five. After the game completed, semi-structured interview method was used and students' opinions were recorded by two different researchers.

Analysing the Data

While analysing the data, descriptive analysis method was used. The enumeration forms that were used during the interviews investigated one by one and similar answers were gathered in writing for each question. Afterwards, a coding key created by writing every different answer was under each question. For determining the reliability of the coding key, 5 forms were randomly selected from enumeration forms that fillet out while interweaving with 16 teachers and 40 students. Selected forms and coding keys were given to two different researchers for reading and analysing. It was found that there was an agreement between the researchers who carried out the study and the other researchers.

FINDINGS AND COMMENTS

There are findings obtained from the study which teachers' and students' opinions about the designed game were investigated in it.

Findings Obtained From Teacher Opinions

Because of the number of teachers who participated the research was very few, teacher opinions in the interviews were tried to be given as they were.

When it was asked to teachers that the difficulty ratio of the game rules, and if they would have difficulty in explaining the game rules to students, only 1 teacher said that she would have difficulty in understanding the rues, so it would take time students to understand them. Some teachers' statements about this finding are like these;

> "(Rules are) Easy. It won't take time to explain them to students. Students are familiar to games. They always play games in computers."
> "Children already accustomed to this type of games. I think it will attract their attention and they won't have difficulties"
> "We have to explain the game. It can be played after explaining it in a lesson time. Even I have difficulty in understanding it.

When their opinions about using the game as an evaluation activity were asked, 13 teachers stated that it could be used as evaluation activity, 2 teachers said that it could be used but it would be difficult to give a grade and 1 teacher said it wouldn't be suitable to use it as evaluation activity. Some teachers' answers to this question listed below.

> "It is interesting as an evaluation activity, but we can have difficulties. It is difficult to give grade."
> "It is also funny for me; I think children will enjoy it. But I had indecisions about giving grades. How the wise will be evaluated? Will it separately (be evaluated)?"

"I'm not committed to give grades to things like this. We use the evaluation activities at the end of the unit in the textbook for evaluating. I think (game activity) won't truth to life. Students who like playing games will be more successful."

When it was asked teachers to evaluate the activity with regard to time, availability of students' qualifications and quantities, problems that can appear while controlling the class and the cost of the game, almost all of them thought there wouldn't be any problems about time, but 1 teacher expressed it wouldn't be suitable in point of time. While 11 teachers stated, students' qualifications and quantities were suitable for the game, the others expressed their concerns like these.

"May be they can't cognize the placement and will place (the part) where they want."

"Students' playing qualification will change up to groups in class."

14 of the teachers expressed that they wouldn't have any problem and 2 of them said that they would have a little problem with controlling the class.

"Class control won't be a problem, anyway they prefer playing game."

"There will be a little chaos while controlling class, but it can be at any times. It is a thing that they can like, so there won't be a problem."

"I group the students and make little contests and there is loud noise. When I say if they were quiet they would get point, there isn't a problem. When there is a normal game, there is noise."

All of the teachers stated it is appropriate.

"It can be made with cheaper materials. I can prepare it with a pasteboard and a pen."

When their thoughts about preparing and making students to prepare a game like this asked, 10 teachers said that they could prepare, and they could make students to prepare it. 4 teachers said that they could prepare but they would prefer to make students to prepare it, 1 teacher said she could make students with a support and 1 teacher said she can't prepare and can't make students to prepare. Some teachers' thoughts about these are below:

"We prepare game cards sometimes. We prepared a card game about magnetizing. They prepare puzzles more."

"I prepare. I find it more appropriate making students to prepare it. They are more curious about thing like this."

"I do but I would prefer to make students to do. There isn't much time to do an extra thing."

"I can make student to do it by taking a support from technology teacher."

"I can't do it by myself. I will use it if it is ready-made. It seems loosing time to make students to prepare it. Anyway curriculum isn't finished in time."

When it was asked if the game was ready-made they could use it, all teachers answered as they would use the game.

"If I have chance, I will use. I won't do one of the evaluation activities and I can pull it ahead the other."

"If it comes ready-made, it will be easier. It will be an example for preparing mew material. But everybody can't reach it and doesn't try to."

"It is better, if it is ready-made. At least I will show it as an example and I will say to students that they can prepare it like this."

"It is difficult to prepare. It will take up time. If it is ready-made, it will be better."

"I don't believe that this game come to us ready-made."

When their thoughts asked about if it was a beneficial activity for students, all of the teachers stated it would be beneficial. But a teacher explained it would be more appropriate for smaller students.

"It will be beneficial, because they can learn easier when they see."

"It will be beneficial for students. Everything that is visual and relies on information is beneficial."

"They can be disinterested towards end of the year. It can attract their attention. There are troubles at school. Children are searching for differences. Games attract attention."

"Especially it is appropriate for smaller classes. It is a game that I can buy to my child if I see it in toy shop."

Teachers' suggestions about game are given below with their statements;

"Puzzle parts and pawns can be tree dimensional."

"An evaluation metric as rubric must be prepared for evaluating. It can be applied as performance assignment. A question bank can be started to prepare before."

"It can be used for activating the lesson. It can be used for reinforcement. Some of the students can distract after 15-20 minutes. After all, some of the students' level will be higher. It can be reduced for 4th, 5th and 6th grade students."
"Its parts are small, they can lose. They can be magnetic."
"Cards are always mixed thereby the rate of listening increases. If the number of the unknown questions noted, they can be checked over later. If unknown cards collected, they can be used for another activity. Also a different activity has to be prepared for the missing ones."
"While selecting wise, we must be careful. Students who are leader minded must be selected. Students (who will be space wise) can be changed."

Findings Obtained From Student Opinions

Eight questions were asked to students for determining students' opinions about the game. Students' answers were categorised according to their similarities and the tables below were arranged: Table 1 shows frequency and percentage distribution of the given answers to question by the students: "1. Which evaluation activities do your teacher use at the end of the topic?"

Table 1. Frequency and Percentage Distribution of the Answers Which Students Gave to First Question

Student Opinions	N	f	%
We do workbook questions and experiments.	40	20	50
Workbook, test and solving question.	40	10	25
We solve evaluation questions at the end of the unit and the questions for general review and we do activities rarely.	40	5	12.5
Generally evaluating with self evaluating form and questions at the end of the unit, source scanning	40	5	12.5
Total	40	40	100

When the answers that students gave to the "Which evaluation activities does your teacher use at the end of the topic?" question investigated, as seen on Table 1; 50% (f=20) of the students said they are evaluated with the questions in the workbook and with the experiments and 25% (f=10) of them said they are evaluated with the activities in the workbook, tests which were prepared by teachers and the solution of the questions. While 12.5% (f=5) of the students stated that they are evaluated by solving the questions for general review and rarely doing activities, 12.5% (f=5) of them stated that they are evaluated with self evaluating form and questions at the end of the unit. When the answer percentages were investigated, it is seen that traditional evaluation methods are used more.

Table 2 shows frequency and percentage distribution of the given answers to question; "2. How do you feel during the evaluation activities at school? Are you generally relaxed or do you feel anxious?" by the students.

Table 2. Frequency and Percentage Distribution of the Answers Which Students Gave To 2nd Question

Student Opinions	N	F	%
We want to be asked question.	40	13	32.5
We are very relaxed; we don't have anxiety of exam.	40	12	30
In order to I can't answer the question, I will get nervous.	40	8	20
I want to be asked question and also I am afraid for answering it wrong.	40	6	15
I feel anxious.	40	1	2.5
Total	40	40	100

On Table 2, according to distribution of the answers which students gave to "How do you feel during the evaluation activities at school? Are you generally relaxed or do you feel anxious?" question, 32.5% (f=13) of the students stated that they didn't feel disturbed to be asked question and they are willing to answer the questions. Also 30% (f=12) of them said they didn't feel anxiety of exam and they felt relax during the activities. On the other end, 20% (f=8) of them said they would get nervous in order to thought they couldn't answer the question, 15% (f=6) of them said they wanted to be asked question but they were afraid for answering it wrong and 2.5% (f=1) of them stated he feel anxious during the activities. Findings points out most of the students feel relaxed during the activities in class. But it is seen that 37.5% (f=15) of the students have negative emotions during the evaluation activities. When the answers are analyzed, it is conspicuous that students are evaluated with questioning activities.

Frequency and percentage distribution of the given answers by the students to question; "3.You were evaluated with "Space Hunters" game. How differences appeared between the feelings during the other evaluation activities and this one? Can you compare?" are shown on Table 3.

Table 3. Frequency and Percentage Distribution of the Answers Which Students Gave To 3rd Question

Student Opinions	N	f	%
We didn't feel anxious; we wanted the turn came to us quickly.	40	20	50
We weren't afraid of can't answering questions; we understood the topic much better.	40	7	17.5
It is relaxed and beautiful, it looks like Monopoly.	40	5	12.5
It is visual and enjoyable, it's not like exam.	40	5	12.5
I felt anxious in order to can't answering questions.	40	2	5
I didn't fell anxious, because there isn't any punishment.	40	1	2.5
Total	40	40	100

According to distribution of the answers -as seen from Table 3- which students gave to "You were evaluated with "Space Hunters" game. How differences appeared between the feelings during the other evaluation activities and this one? Can you compare?" question, 50% (f=20) of the students said they hadn't felt anxious and they had wanted the turn had come to them quickly. 17.5% (f=7) of them expressed they hadn't been afraid of answering questions and they had understood the topic much better, 12.5% (f=5) of them said they had been relaxed while they had played the game, the game was beautiful and looked like Monopoly, 12.5% (f=5) of them thought it was visual and enjoyable, it wasn't like having exam and 2.5% (f=5) of them she hadn't felt anxious because there weren't any punishment in the game. It is seen that 95% (f=38) of the students didn't have any negative emotion. But 5% (f=2) of them expressed that they feel anxious about can't answering the questions correctly.

Table 4 shows frequency and percentage distribution of the given answers to "4. Do you have difficulty in understanding the game rules? Which rules you don't like?" question by the students.

Table 4. Frequency and Percentage Distribution of the Answers Which Students Gave to 4th Question

Student Opinions	N	f	%
The rules were easy but I didn't like to give parts.	40	20	50
Rules are easy, giving parts is bad but taking them is good.	40	10	25
I didn't have any problem.	40	7	17.5
Easy. Giving parts and waiting for two turns are bad.	40	3	7.5
Total	40	40	100

According to answers that students gave to "Do you have difficulty in understanding the game rules? Which rules you don't like" question, it is seen on table 4 that students didn't have difficulties in understanding the rules. On the other hand 50% (f=20) of the students didn't like the traps which they have to give puzzle parts, 25% (f=10) of them didn't like giving parts but like taking them and 7.5% (f=3) of them again didn't like giving puzzle parts and waiting for two turns. 17.5% (f=7) of the students stated that they didn't have any difficulties in understanding the rules.

Frequency and percentage distribution of the given answers to "5. Do you have suggestions for the game?" question by the students are displayed on Table 5.

Table 5. Frequency and Percentage Distribution of the Answers Which Students Gave to 5th Question

Student Opinions	N	f	%
There will be more traps.	40	6	15
It can be designed for other topics.	40	5	12.5
Planets have to be bought with money.	40	5	12.5
Sound effects can be added.	40	5	12.5
The number of puzzle parts will be increased.	40	5	12.5
It will be better if the number of cell was increased.	40	5	12.5
Time for answering the questions can be limited.	40	5	12.5
There will be point and reward.	40	2	5
Waiting for two turns will be removed.	40	1	2.5

Every planet will have point and the one who falls in black hole go down to zero point.	40	1	2.5
Total	40	40	100

According to answers, that students gave for "Do you have suggestions for the game?" question, as seen on Table 5; while 15% (f=6) of the students suggested increasing the number of traps, 12.5% (f=5) of them said it can be prepared for other topics. 12.5% (f=5) of students suggested that some money would be added to game and planets had to be bought with money, 12%.5 (f=5) of them suggested that it could be sound effects which players would use when they wanted to answer the questions or when the answer wasn't right, 12.5% (f=5) of them wanted number of puzzle parts to be increased and 12.5% (f=5) of them wanted number of cells to be increased, 12.5% (f=5) of them thought that time had to be limited for answering, 5% (f=2) of them thought there would be point or reward in the game, 2.5% (f=1) of them suggested the trap which they have to wait for two turns would be removed and 2.5% (f=1) of them suggested that every planet would have a particular point and the player who fell in black hole would go down to zero point.

They are shown on Table 6 that; frequency and percentage distribution of the given answers to "6. Would you like to do it if this game is given you as a performance assignment?" question by the students.

Table 6. Frequency and Percentage Distribution of the Answers Which Students Gave to 6th Question

Student Opinions	N	F	%
I would like preparing it and also playing it.	40	18	45
I would like playing it more.	40	5	12.5
I would like. It is more beautiful than the other performance assignments.	40	5	12.5
We would like to do it in group. It would beautiful to making designs.	40	5	12.5
I would enjoy but I couldn't design it.	40	3	7.5
I couldn't design it.	40	2	5
It is enjoyable to prepare it as an assignment.	40	1	2.5
I would ask for help from another teacher.	40	1	2.5
Total	40	40	100

For the "Would you like to do it if this game is given you as a performance assignment?" question, 45% (f=18) of the students stated that they would like to prepare the game as assignment and also would like to play it as seen from Table 6. While 12.5% (f=5) of them said they would more like to play, 2.5% (f=1) of them said that preparing as an assignment would be more funny. 12.5% (f=5) of the students expressed if it was compared with the other assignments, this would attract their attention more, 12.5% (f=5) of them stated that if they had an assignment like this, they would more like to do it in groups, 7.5% (f=3) of them said they would enjoy it but they couldn't design it and 2.5% (f=1) of them said that while preparing it he could ask for help from another teacher.

Table 7 shows frequency and percentage distribution of the given answers to "7. Is this game have to be used in the lessons in your opinion?" question by the students.

Table 7. Frequency and Percentage Distribution of the Answers Which Students Gave to 7th Question

Student Opinions	N	f	%
It will be noisy but it is enjoyable and we can understand much better.	40	15	37.5
It will be noisy; it will be difficult to teach lesson.	40	5	12.5
If the total of class is less, it will be good. If not there will be noise and it can't be controlled.	40	5	12.5
It has to be used absolutely.	40	5	12.5
It must be lesson and after lesson game in order.	40	5	12.5
It can be applied at the end of the unit. Otherwise it is boring to play game always.	40	5	12.5
Total	40	40	100

When the answers of the students that they given for "Is this game have to be used in the lessons in your opinion?" question were investigated, it is seen on the Table 7 that; 37.5% (f=15) of the students said it would be noisy while playing the game in class but it would be enjoyable and they could understand the topics much better. 12.5% (f=5) of them thought it would difficult to teach lesson, because it would be noisy and 12.5% (f=5) of them said if the total of class was less the application would be easier, because there would be less noise.

12.5% (f=5) of the students thought that games like this absolutely had to be used, 12.5% (f=5) of them thought that they had to do a revising lesson before the lesson that they would play the game and 12.5% (f=5) of them thought that it would be boring when they played it except at the end of the units.

Table 8 shows frequency and percentage distribution of the given answers to question by the students; "8. Would you like this game to be applied to other units? Which units will it be applied to in your opinion? Why?"

Table 8. Frequency and Percentage Distribution of the Answers Which Students Gave to 8th Question

Student Opinions	N	F	%
Physics is already boring; it will be more enjoyable. It can be applied all of the lessons.	40	10	25
Physics, because it is difficult.	40	6	15
Human and Nature, The Structure of The Matter and Physics; because they are enjoyable and attractive.	40	5	12.5
Physics, because it is boring.	40	5	12.5
Human and Nature, Electricity, Acid- Base, Atom; because there are conceptions which need information.	40	4	10
Chemistry; it is difficult, because there are formulas.	40	4	10
Ecosystem, Maths and the other lessons, because it is largely about conceptions.	40	4	10
Biology; because it attracts my attention.	40	1	2.5
Chemistry; because it is enjoyable.	40	1	2.5
Total	40	40	100

On Table 8; according to distribution of the answers that students gave to "Would you like this game to be applied to other units? Which units will it be applied to in your opinion? Why?" question, it was found that 37.5% (f=15) of the students wanted it to be designed for Physics because they thought this lesson was boring and they also thought it would be good to design games like this about the other lessons. And it was found that 15% (f=6) of them wanted a game about Physics because it was difficult, 12.5% (f=5) of them wanted games about Human and Nature, The Structure of The Matter and Physics topics; because they thought these topics were enjoyable and attractive, 10% (f=4) of them wanted games about Human and Nature, Electricity, Acid-Base and Atom topics; because they thought there were conceptions which need information in these topics, 12.5% (f=5) of them wanted games about Chemistry for making easy to understand chemical formulas and finding this lesson enjoyable, 10% (f=4) of the students wanted games about Ecosystem topic and the lessons like Maths and 2.5% (f=1) of them wanted a game about Biology; because it attracted her attention.

RESULTS AND DISCUSSION

In this study, following results were gotten by gathering teachers' and students' thoughts about the "Space Hunters" game.

- It was found that teachers' opinions were similar about the evaluation activity which took place in this study would increase the students' motivation. Also Pinder (2008) determined that board games were very effective to increase students' motivation according to teacher thoughts in a study.
- Most of the teachers stated that this game could be applied during the lesson and be used for reinforcement. According to Güllü, Bozkurt and Bali's (2009) study, teachers thought that educational games could be used in lessons.
- Participating teachers stated that they didn't have difficulties in understanding games like this. But some teachers expressed they hesitated about how they could use it as an evaluation activity. It can be planned to develop a grading key for putting away teachers' this problem.
- It was found that presenting a game like this ready-made would increase the rate of usage. Then correspondents' attention must be called to this subject as soon as possible.
- It was found that traditional evaluating methods were usually used at lessons and some of the students couldn't express themselves because of their negative emotions during these activities. But it is seen that these negative emotions decreased during the activity with the game in this study.
- It was seen that students who played this game didn't have difficulty in understanding the rules and they quite enjoyed this game. It is the most important indication of this situation that students wanted the number of puzzle parts and the number of cells to be increased. Also in the other studies it was found that students were enjoy the game activities (Aycan et. al., 2002, Smith, 2002, Cordona et. al., 2008)

- While it was determined that most students weren't like some traps in the game, some students suggested to increasing the number of traps. This seems inconsistent, but it can be explained as students liked taking puzzle parts and didn't like giving them through the traps.
- The game can be adapted to the other topics and the other units in Science and Technology course as well as similar games can be prepared for other lessons. Especially preparing games for the units and topics that contains lots of abstract conceptions will make easy to teach these conceptions (Tatar & Cansüngü Koray, 2005). Also it will be beneficial that looking to students opinions while preparing the game.

It is the subject of further studies to develop the game according to teacher and student suggestions and to compare students' achievements in the game activity with their achievements in the other activities. Also, for making easier to evaluate student achievements, it can be thought to develop a rubric in other studies. It was seen that games increased the student motivation and results of a study about its effects on examination anxiety would be important.

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APPENDIX A

Figure 1. Question cards, puzzles and puzzle parts, spaceship (pawn)

Figure 2. All of pieces of "Space Hunters" game