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Investigation the Scientific Creativity of Gifted Students Through Project-Based Activities

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Abstract

In this research, it is aimed to identify the scientific creativity of gifted students through project-based activities. In accordance with this purpose, a study has been carried out with 13 gifted students studying in third and fifth grade**.** In the study, students have been informed about the project development stages and they have been asked project designs that would facilitate the daily life. Following the project designs, semi-structured interviews with the students and teacher observations in the process have been carried out**.** In addition, pictures of the students' project drawings have been taken. Interviews, observations and pictures have been subjected to content analysis. Categories have been defined depending on the size of scientific creativity which was suggested by Hu and Adey (2002). Within the context of the categories; proposals have been offered to researchers and people in concern. Activities can be enhanced for the development of different aspects of scientific creativity.

Key words: Gifted students; Project-based activity; Creativity

Introduction

Giftedness refers to the ability to create something special as different from their peers in terms of creativity, motivation and mental superiority and the combination of all these features (Koçak & İçmenoğlu ,2012). Gifted and talented students have different characteristics from their normal peers and it is important for teachers to pay attention to these features. For this reason, teachers should have qualities as recognizing various aspects of gifted students, responding to their different pedagogical needs, being experienced in project work and being efficient in content knowledge (Croft, 2003; Çepni, Gökdere, & Küçük, 2002; Gallagher, 1975, cited. Ravenna, 2008: Roger, 2009; Sisk, 1987; Tischler and Vialle, 2009). In learners' view, projects that students participate in according to their interests, the activities based on learning styles, designing training based on readiness, giving learners the opportunity to discuss learning activity, to give the chance to explain the pleasure they get. In view of program in creativity education, it is stated as which output will be obtained to what extent, making multi-faceted evaluation of the applications, what the content will be, level of difficulty, speed and helping learners' imagination (cited: Aslan, 2007; Akkas, 2013).

A different curriculum and process must be put into practice for education of gifted and talented students. In this regard, enrichment of teaching is an important strategy and project work is an important part of it (Tortop, 2015). To increase the importance of this, sharing the project expectations, environmental support, co-operation of the project components in the educational environment, providing an ongoing support to students, planning and positive feedback will increase students' interests and expectations and this will influence success positively (Calvert, 2010; Tortop & Özek 2013; Tortop; 2013). Johnsen and Gore (2009) indicate that teachers should aim to put forward new ideas in their project studies and repeating projects should be avoided. Otherwise, it is expressed that students can get bored of the repetitive projects, their interests and willingness will decrease. Therefore, it is necessary to make sure that project works are in the form of student activity and are based on experience. Sak (2012) points out that gifted and talented students like interest very much and that they need their success be noticed by others. And Ravenna (2008) points out that the motivation of gifted and talented students increases as they experience subjects and issues with proper difficulty in project studies (Özarslan & Cetin, 2015).

In addition, students' working together with their peers and adults when dealing on the project allows them to develop social skills, and it helps the development of such skills that they will need in later life as time management, personal responsibility, social skills, learning through experience and so on. (Saracaloğlu, Akmaca & Yeşildere, 2006). At the end of the projects, products, in which the things learnt are presented, are produced and are assessed by criteria that can also be determined by the students (Anonymous, 2003). Projects give students the opportunity to gain the ability to conduct scientific research and to learn by experience (Raghavan, the Coke-Regev and Strobel, 2001).

In project-based learning, students conclude their projects with a presentation by working together on a real issue or problem (McGrath, 2002; Wolk, 2001). As Solomon (2003) stated too, in project-based learning, students work in groups to solve problems that are authentic, relevant with program and mostly interdisciplinary. Learners themselves decide how to approach to the problem and what activities to do. They gather information from a variety of sources and reach information by making analysis, synthesis. Students understand the subjects better as they take more pleasure when working on projects and have opportunity to learn by living (Winn, 1997).

Project-based learning, which goes through processes based on specific scientific method and aims to produce a product, develops high-level cognitive skills that include the abilities of students such as data analysis, problem solving, decision making and etc. and it helps to improve their sense of responsibility towards the physical and social environment (Dori and Tal, 2000). When gifted students are considered, there is not a unique program and a teaching pattern or formula that can be applied to them. In general, a good program and teaching starts with a good program and teaching. Program and teaching should be well-structured, rich and of high-level (Tomlinson, 2005). All of the students will have the opportunity to learn according to appropriate level of readiness through a well-structured program and training (Kontaş, 2012).

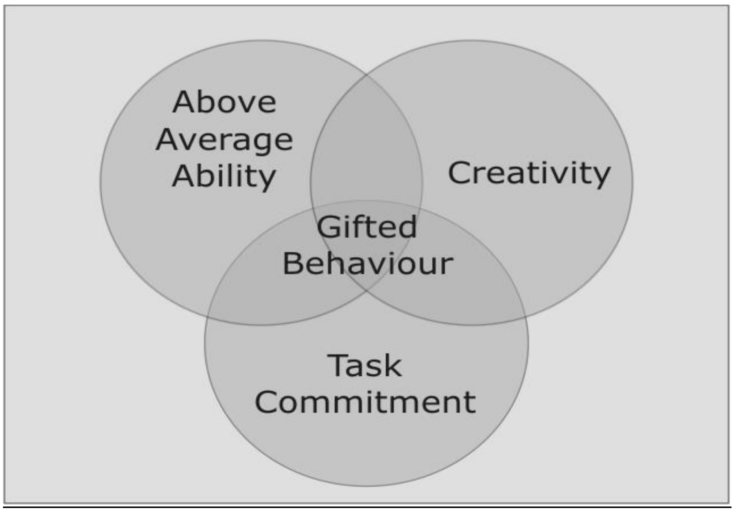

Figure 1. The talent pool resulting from the interaction of the components leading to being gifted (Renzulli, 1978)

According to the model in figure 1, individuals having these three circles are considered as gifted and expected to have special training (Akkanat, 2012). As seen in the model, creativity is an important component of gifted behavior features. "Creativity; instead of being a supernatural ability, a mystical and a random God’s gift power under the monopoly of a limited- number gifted people in society, is a mental and socio-cultural environment related skill found in all individuals at any age (Sung, 1997). "Creativity is composed of at least four basic components. These are; creative process, creative product, creative individual and creative case. Creativity is often an important aspect of scientific talent. Problem solving, generating hypotheses, designing experiments and technical innovations require a special form of unique creativity of science (Lin et al., 2003). If gifted students are to be helped to find their creative intersection, significant and fundamental changes must be made to the way that educators think about teaching and learning (Hennessey, 2004).

Aim of the Study

Whether the ideas are the product of creative thinking or not can be understood by three features (fluency, flexibility and originality) that define the character of creative ideas. And the creative thinking ability of an individual can be measured by looking for these three properties in his ideas (Hu and Adey, 2002). According to Fisher (1995), there are four aspects of creativity: the quick and fluent use of information that we keep in memory for immediate need refers to the aspect of fluency. In flexibility aspect, while solving any problem the individual acts with free thinking, out of the patterns in his mind. According to Hu & Adey (2002):

The three-dimensional Scientific Structure Creativity Model (SSCM) which arises from this analysis is shown in figure 2. The proposed structure is designed as a theoretical foundation on which the measurement of scientific creativity, research into scientific creativity, and the cultivation of scientific creativity may be based.

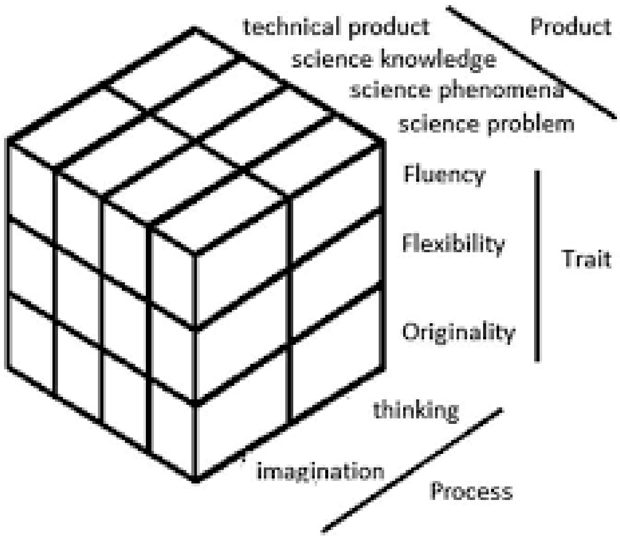

Figure 2. The Scientific Structure Creativity Model (SSCM)

Structure of scientific creativity according to the scientific structure creativity model (Figure 2):
Scientific creativity has three parts named product, trait and process. “Product” depends on technical product, science knowledge, science phenomena and science problem. Trait is evaluated by three structure named fluency, flexibility and originality. In a scientific creativity; process depends on imagination and thinking (Hu & Adey, 2002).

Fluency: It is to be able to generate many ideas that may be the answer to a problem. For example, finding different uses of a brick or finding suitable titles for a short story. Creative people can put forward a number of ideas as a solution to the problem (Hu and Adey, 2002). For example; a student producing 10 different solutions to a problem situation in 5 minutes has more fluency and greater creativity skill than a student producing 5 solutions at the same time (Rahman, 1999).

Flexibility: It is to be able to bring different perspectives on an issue, to reveal different dimensions, to generate ideas in different categories, to approach a situation from different perspectives. The more generated ideas deal the problem with different angles, the higher is the flexibility. Creative people offer solutions to problems from different angles (H and Adey, 2002). The flexibility of a student to move from one approach to another is related to the condition of using different intellectual strategies. A child with a very low level of flexibility shows a strict pattern of thinking. However, a child who has excessive flexibility can pass from one approach to another (Sungur, 1997).

Originality: It is the case of being unique in thought and action. It is considered that the fewer people think of the generated idea, the more original it is**.** Creative people generate original ideas (Hu and Adey, 2002). If
The main purpose of this study is to identify the creativity extent of gifted students through student opinions, teacher observations and project-based products. To accomplish this purpose; students have been asked to design projects and their adequacy to the extent of creativity has been determined. Adequacy of students’ project designs have been tried to be explained according to fluency subscale, originality subscale and flexibility subscale, which was defined by Hu and Adey (2002), through student views, teacher observations and project product pictures**.**

Method

As a qualitative research model, case studies are a distinctive approach used in searching for answers to scientific questions. (Büyüköztürk et al., 2014). In this research, "case study”, which is a qualitative research method, was preferred. In case studies, “a phenomenon, event, condition, individuals and groups " are tried to be studied thoroughly. With case-study methodology that includes some combinations of classroom observations, interviews, surveys, concept mapping, mathematics education researchers reach rich data set which is important for theory building (Philippe, 2007). In order to make a research, existence of a special case should be in question. Interrelated factors of a case are studied within an integrated framework. By using multiple data collection methods, it is expected that the data test and support each other (Yıldırım and Şimşek, 2008). In our research, as a pattern of case studies, design of "holistic single case design "has been used. "Holistic single case designs involve a single analysis unit such as an organization, a program, a school (Kaplan-Öztuna, 2013). In this study, gifted students studying in third and fifth grade have been selected as the unit of analysis.

Data Collection Tool

Making diversification in data collection tools, it was aimed to provide a rich content and perspective. In this context; in order to reveal the extent of the scientific creativity; "Semi-structured student interview form" and "teacher project process observation form" has been applied. Criteria of teachers' observation form can be seen at table 1. Also, drawings of the students' projects and visuals of products have been examined within the context of creativity and have been used as a data collection tool. According to Yıldırım and Şimşek (2008)"using the data obtained by different methods (interviews, observation and document analysis) in order to confirm each other increases the validity and reliability of the results." The interview questions in semi-structured interview form and to what aspect of creativity they belong are listed below:

1) What are the improvable parts of the project/product you made? What would you do if you were to make changes? (Flexibility)
2) What were the parts you had difficulty when making the product? (Flexibility)
3) Please specify the use of your project in daily life. (Fluency)
4) Which scientific methods you considered when preparing your product/project? (Fluency)
5) What do you think are the different and original aspects of your project/product than the others? (Originality)
6) What did making this project/product contribute to you? (Originality)

Teacher observation form has been prepared according to the process and product of the scientific creativity aspects.

Table 1. Criteria of teacher observation

1. Daily life relationship	**7.** Social benefits	**13.** Daily life problem
2. Aesthetic arrengement	**8.** Efficient (economical)	**14.** Relevant material
3. Relevant material	**9.** Sustainability	**15.** Compliance with problem solving
4. No importance	**10.** Difference	**16.** Product design
5. Comfort	**11.** Imagination	**17.** Use of scientific method
6. Unconventional use	**12.** Use of scientific knowledge	**18.** Self regulation

Working Group

Working group of this research constitutes 14 students studying in third and fifth grade and identified as gifted according to various tests. The kind of outstanding talent of these students falls into general mental ability groups. Their spatial, mathematical and verbal intelligences are high and scientific reasoning skills were determined to be advanced through testing. In this study, it will be provided that the characteristics specified by tests may also be defined through project-based process. Information about the study group is given in Table 2. (Ex: TP2: Third grade, Participant 2, FP4: Fifth grade, Participant 4).

Table 2. Features of the participants

Third Grade Students			**Fifth Grade Students**		
Participants	**Gender**	**Kind of Ability**	**Participants**	**Gender**	**Kind of Ability**
TP1	Female	General Mental Ability	FP1	Female	General Mental Ability
TP2	Female	General Mental Ability	FP2	Female	General Mental Ability
TP3	Female	General Mental Ability	FP3	Male	General Mental Ability
TP4	Male	General Mental Ability	FP4	Male	General Mental Ability
TP5	Male	General Mental Ability	FP5	Male	General Mental Ability
TP6	Male	General Mental Ability	FP6	Male	General Mental Ability
TP7	Male	General Mental Ability			
TP8	Male	General Mental Ability			

The Process Steps

Students have been primarily presented what the project is which process it goes through, the stages and examples. Working on sample projects designed to make everyday life easier; a brainstorming activity has been carried out on what features a project should have. In this way, students themselves have been able to determine the process of making a project and features that a project should have. The process steps of project-based activities are seen at table 3.

Table 3. The process steps of project-based activities

Process	***Features***	***Duration***
Description and characteristic of the project (what is project, what are the features, how is the relationship between daily life and etc.)	Teacher tried to uncover what the project is and its properties, depending on the students' prior knowledge. Within this process, it was tried to make students be able to explore how a project could be formed, how it could be related to daily life, how the idea of o project could come out, with the help of sample projects. At this stage, it was aimed that the students would have an idea about the project.	3 hours
Students' research process on the project	At this stage, with prior knowledge they gained, the students -by project-based thinking- tried to find solutions to the problems they experienced in every part of daily life using science. They made preparations to bring and present these solution proposals in classroom to their friends by reifying them with daily notes, drawings and examples.	Out of school (min. 3 hours)
Classroom discussions on project ideas with students	They brought presentations, drawings and daily notes that were prepared in the previous stages into the classroom and presented to friends. The presentations of others were evaluated within the aspect of applicability according to scientific creativity aspects (fluency, flexibility, originality). Organizing the missing parts according to the feedback given by the teacher and other friends, the students started the conversion process of the project into product and applying to daily life.	5 hours
Students' conversion stage to product (convenient for purpose-independent material selection, product creation steps, compliance with the project process)	In accordance with the feedback they received for drawing, presentation and examples, they implemented proper material selection and made product design appropriate to their project process.	Out of school and classroom (min. 5 hours)
Classroom discussions on project products with students	They received feedback from friends about the products they made.	2 hours
Giving the final form to the project products	Giving the final form to the products in accordance with the feedback received	Out of school (min. 2 hours)
Displaying the project products	Displaying final forms of project products in the classroom.	1-2 hours

Data Analysis

Answers of semi-structured interview form questions for students that make up the data set of the research, product drawings and pictures of the students, the class teacher observation form have been analyzed by using content analysis method in accordance with the codes and themes (sub-problems). Content analysis is a method that searches for the truth by making inferences about non-definite features of the content through definite features of the fact; and a research technique that is used to gain replicable and valid results from the data regarding its content (Krippendorff, 1980). In content analysis, it is important to organize and interprete the data, which is similar to each other, combining within the frame of certain concepts and themes and in a way those readers can understand (Yıldırım and Şimşek, 2008). In the content analysis, according to the context of the subjects studied, frequency analysis, categorical analysis, evaluative analysis, correlation analysis and etc. is performed by various techniques (Bilgin, 2006). In this study, extent of scientific creativity suggested by Hu and Adey (2002) has been coded as main category (characters, products and processes) and sub-category. Student opinions have been categorized under character codes and teacher observations and student products and drawings have been categorized under character, product and process codes. In addition, each category has been demonstrated in frequency tables in terms of students, observations and pictures. Two researchers, after reading, have grouped the responses given to open-ended questions under specific categories. In analyzing the data, the views of students have been coded separately by two different researchers and percentage of compatibility between these codings was calculated. Compliance percentage has been found to be 0.89 between two researchers.

Results and Discussion

At the table 4 it is seen all content analysis categories. Theoretical categories are taken from Hu & Adey (2002). Other categories and codes are constructed by the analyze of students' opinions, teacher observation and students' products. All the categories are discussed below.

Table 4. Categories according to content-analysis

Theoretical categories		Categories of data analysis		
Main categories	**Sub-categories**	**Categories of student opinions**	**Categories of teacher observation**	**Categories of students products**
Trait	Flexibility	C1. Functional additions C2. Aesthetic arrengement C3. Functional removing C4. No chenge C5. Lack of scientific knowledge C6. Comfort	C1. Daily life relationship C2. Aesthetic arrengement C3. Relevant material C4. No importance C5. Comfort	C1. Functionality C2. Aesthetic
	Fluency	C1. Social benefits C2. Practical use C3. Saving C4. Individual benefits	C1. Unconventional use C2. Social benefits C3. Efficient	C1. Social benefits C2. Practical use C3. Efficient
	Originality	C1. Sustainability C2. Difference C3. Individual imagination	C1. Sustainability C2. Difference C3. Individual imagination	C1. Sustainability C2. Difference C3. Individual imagination
Product	Technical Product Science Knowledge Science Phenomena Science Problem	-	C1. Use of scientific knowledge C2. Daily life problem C3. Relevant material C4. Compliance with problem solving C5. Product design C6. Use of scientific methods	C1. Use of scientific knowledge C2. Daily life relationship C3. Relevant material C4. Problem solving
Process	Imagination Thinking	-	C1. Self-regulation C2. Imagination	C1. Self-regulation C2. Imagination

The Results of Student Opinions

In this section, the content analysis results of semi-structured interviews conducted with 14 gifted students and opinions of the students take part. The reason for why opinion-frequency sum is higher than the number of students is that one student expressed more than one view. Results for the flexibility aspect of scientific creativity depending on students' opinions: Students have been asked two interview questions about the flexibility aspect of scientific creativity and below are presented the content analysis results of student opinions. The state of developability, changeability of the produced project and difficulties (Flexibility):

Table 5. Categories of flexibility aspect of scientific creativity (students' opinions)

Categories of student opinions	*Frequency of opinions*	*Percentage of opinions*	*Sample of student opinions*
C1. Functional additions	11	32,4	FP4:I could do the electrical and automatic toothpaste squeezer
C2. Aesthetic arrangement	8	23,5	TP2: I am aware of the measures to look good when decorating.
C3. Functional removing	4	11,8	TP4: I pulled the moving mechanism. Because constant mechanism more important.
C4. No change	2	5,9	FP1: My project was very nice. I do not need a change.
C5. Lack of scientific knowledge	5	14,7	TP5: I can't run the electric circuit. I think I did something missing
C6. Comfort	4	11,8	TP1: I designed a machine that is quite comfortable to use.
Total of opinions	34	100,0	-

After completing their projects, the students were asked questions of "What do you think are the parts of the project/product that can be improved?", "What would you do if you were to make changes? "And" What were the parts you had difficulty when making the product?” in order to find out the aesthetic aspect. In line with the answers received from the students, six categories have been formed as shown in table 5 ‘. The students have given responses regarding what they would add to and remove from their projects. It has been observed from some students’ responses that they give importance to being aesthetic as well as being scientific. For example, the student coded as TP2, stated that he “decorated his Project and gave importance to comply with the measures in doing so,”. And TP6 coded student stated that he “paid attention to the harmony of colors in his project". Two students pointed out that their project had no missing parts. Five students experienced difficulties in their projects due to lack of scientific knowledge. And four students stated that the uses of their projects are quite practical.

Results of the fluency aspect of scientific creativity depending on the students' opinions:

Students have been asked two interview questions about the fluency aspect of scientific creativity, fluency and the results of content analysis about the analysis of students' opinions are presented below:

Table 6. Categories of fluency aspect of scientific creativity (students’ opinions)

Categories of student opinions	*Frequency of opinions*	*Percentage of opinions*	*Sample of student opinions*
C1. Social benefits	10	26,3	TP6: It is used in the feeding of stray animals.
C2. Practical use	12	31,6	TP3: We used electricity
C3. Saving	7	18,4	FP6: We made all the flashlights by waste material.
C4. Individual benefits	9	23,7	FP4: I saw a lot of ease while brushing my teeth.
Total of opinions	38	100,0	-

The questions "Please specify the use of the project you have prepared in daily life" and "What scientific method did you consider when preparing your product / project?” in the interview, which was made after completing the project, have been asked to students to find out their fluency aspect. In line with the answers received from the students, four categories have been formed as stated in table 6. When talking about their relations with daily life; students focused on their projects’ social and individual benefits, how they make saving possible, and their practical use. Seven students mentioned that the project they made by using recycled and waste materials provide saving. And many students mentioned that the project they prepared provide both social and individual benefits. Many students talked about the practical use of their project.

Results of the originality aspect of scientific creativity depending on the students' opinions:

Students have been asked two questions about the originality aspect of scientific creativity and the results of analysis on the content analysis of students' opinions are presented below. The original aspect and the difference of the projects from the others, implications of the product for the students:

The questions “What do you think are the original and different side of your project from the others?” and “What did making this project/ product attribute to you?”, which were asked to students in the interview after completing the project, have been asked to reveal the originality aspect. In line with the answers received from the students, three categories have been formed as shown in table 7. When the students talked about the originality of their projects, the categories of sustainability, diversity and imagination ability were formed. Many students stated that the original sides of their projects were due to their imagination. They put forward their differences from other projects and ideas. They also stated that their projects were sustainable.

Table 7. Categories of originality aspect of scientific creativity (students’ opinions)

Categories of student opinions	*Frequency of opinions*	*Percentage of opinions*	*Sample of student opinions*
C1. Sustainability	7	25,0	FP5: Hat made in this project worn in all seasons.
C2. Difference	9	32,1	FP6: The difference from other projects is that I have made from recycled material
C3. Individual imagination	12	42,9	TP4: I realized this project using my own imagination.
Total of opinions	28	100,0	-

The Results of Teacher Observations

In this section, content analysis results of observations carried out by teachers in the process take part. The results of scientific creativity "characters, products and processes" which was suggested by .Hu and Adey (2002. In this content, the categories have been formed within the context of teacher observation form.

Table 8. Results of trait aspect (teachers' observation)

Main categories	Sub categories	Categories of observation form	*Frequency of opinions*	*Percentage of opinions*
Trait	Flexibility	C1. Daily life relationship	10	25,0
		C2. Aesthetic arrangement	11	27,5
		C3. Relevant material	9	22,5
		C4. No importance	6	15,0
		C5. Comfort	4	10,0
		Total of opinions	**40**	**100,0**
	Fluency	C1. Unconventional use	7	30,4
		C2. Social benefits	11	47,8
		C3. Efficient (economical)	5	21,7
		Total of opinions	**23**	**100,0**
	Originality	C1. Sustainability	8	26,7
		C2. Difference	12	40,0
		C3. Individual imagination	10	33,3
		Total of opinions	**30**	**100,0**

Student project products have been evaluated by the criteria in teacher observation form.. In this context, the categories in table 8, have been formed and the frequency and percentage of projects evaluated according to these categories have been stated. In the aspect of flexibility, while aesthetic settings came into prominence most for teachers; ease of use has been evaluated the least. And for the aspect of fluency, a vast majority of student projects has been thought to have social benefits. That the student projects are different and based on imagination has been realized in the aspect of originality.

Table 9. Results of product aspect (teachers' observation)

Main categories	Sub categories	Categories of observation form	*Frequency of opinions*	*Percentage of opinions*
Product	Science Knowledge Science Phenomena	C1. Use of scientific knowledge	9	30,0
		C2. Daily life problem	12	70,0
		Total of opinions	**30**	**100,0**
	Technical Product	C3. Relevant material	11	50,0
		C5. Product design	11	50,0
		Total of opinions	**22**	**100,0**
	Science Problem	C4. Compliance with problem solving	11	55,0
		C6. Use of scientific methods	9	45,0
		Total of opinions	**20**	**100,0**

Student project products have been evaluated by the criteria in teacher observation form. In this context, the categories in table 9 and table 10 have been formed and the frequency and percentage of projects evaluated according to these categories have been stated. Two categories have been formed in the aspect of scientific phenomenon and scientific knowledge, technical product aspect and scientific problem aspect. The most eye catching part in the aspect of scientific phenomenon and knowledge is the use of scientific knowledge. And in technical product category, the product design as well as the appropriate use of materials is seen with similar frequency. In the aspect of scientific problem, it has been seen that the projects are appropriate to solve scientific problems and have been prepared with scientific methods.

Table 10. Results of process aspect (teachers' observation)

Main categories	Sub categories	Categories of observation form	*Frequency of opinions*	*Percentage of opinions*
Process	Imagination	Self-regulation	8	40,0
		Imagination	12	60,0
		Total of opinions	**20**	**100,0**

Products of Students

At first step of project-based activities, students have carried out their drawings of project imagination and design. After design, they reported their projects' drawing to other friends and teachers. Friends and teacher gave feedback to each other. In accordance with the feedback they implemented the project design. After application, the products are evaluated according to the criteria in the form of observation by teacher and researcher. Projects and students' opinions are located below.

Figure 3. Drawing and picture of trino machine project

Student designed simple materials transport vehicle as seen figure 3. He added remote control after feedbaacks. It means that he made functional additions. According to student; his skills and imagination developed by this project activity.

> Researcher: In your opinion; What did making this project / product contribute to you?
> Student: My hand skills and imagination developed. In addition this product made easier my life.

Figure 4. Drawing and picture of animal feed machine project

Student designed animal feed machine as seen figure 4. Students want to make a product for animals. At first she drew her project scheme. While making product She is aware of the measures to look good when decorating. It means; he gave importance aestheticshe arrangment as well as scientific method.

> Researcher: Please specify the use of your project in daily life
> Student: I love animals too much. I said to myself; If I design a product it must be about animals. I thought to made animal feed machine.

Conclusion

There is a significant relationship between scientific process skills and scientific creativity, according to the results of Aktamış ve Ergin (2007)'s research (Türker, 2011; Ünal Çoban 2009; Arslan, 2013). According to Meador (2003), the idea to develop the scientific creativity of students open-ended scientific discovery-based applications can be associated with these findings. Students' scientific creativity was found low or intermediate at another studies (Kadayıfçı, 2008; Kılıç, 2011). At the study of Atasoy, Kadayıfçı ve Akkuş (2007) student drawings and descriptions, studied their creative thinking to imagine that in terms of process components. Gifted students are able to build logical reasoning and from the younger age due to early mental development and using their creativity can also easily produce solutions to complex problems (Cutts ve Moseley, 2001; Akt: Leana, 2005). In-depth learning in subjects that interested in the gifted and talented students, the application requests the new situations and everyday life what they learn, they love to discover and invent, are as independent as they do on research and projects (Çağlar, 2004; Johnsen, 2008; Ataman, 2009; Johnsen ve Goree, 2009; Trna, 2014).

Via the project activities of their choice subject or field of gifted and talented students, they investigate a current issue and they are working on real-world problems and presents a compelling opportunity to work and they get experience (Powers, 2008; İçelli, Polat ve Sülün 2007). At this study, students' project-based activities positively affect students' creativity. Project-based activities allow students to imagine this working, thinking and creativity levels were positively affected. Project works to research, critical thinking, problem solving, information such as logical thinking and cooperation, also contributes to the development of skills and abilities (Loveridge ve Searle, 2009). Sufficient knowledge and skills in project work of students; the planning of a successful project completion and helps to maintain student motivation (Erdem ve Akkoyunlu, 2002; Johnsen, 2008; Johnsen ve Goree, 2009; Tortop, 2013).

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