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An Activity to Improve Creative Thinking Skill: Take Out One, Add One

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ABSTRACT

In this study, it is aimed to present an activity to develop students' creative thinking skills. To that end, 'Take Out One-Add One Activity' has been implemented. The activity has been applied to six gifted and talented students attending the Individual Talent Recognition Program at the Science and Art Center. In the first stage of the activity, students have been given visuals showing the change of headphones over the years. Students were provided to see the change and development in the headphones. Then, a pencil has been chosen as an object to use in the activity. An activity form has been handed out to the students. Students have been asked to remove a tool or feature from the pen and add a new tool or feature. Written opinion form has been used to determine the opinions of the students about the activity. The observations of the supervisor teacher have also been taken into account. Content analysis has been performed on the obtained data. The reliability among encoders was determined as .85. At the end of the activity, it has been concluded that the students liked the activity and that the activity contributed to the development of creative thinking skills.
Keywords: thinking skills, gifted and talented student, innovative thinking, creative thinking

Yaratıcı Düşünme Becerisini Geliştirmeye Yönelik Bir Etkinlik: Bir Çıkar Bir Ekle

ÖZ

Bu araştırmada, öğrencilerin yaratıcı düşünme becerilerini geliştirmeye yönelik bir etkinlik ortaya koymak amaçlanmıştır. Bu amaçla Bir Çıkar Bir Ekle etkinliği uygulanmıştır. Etkinlik bir Bilim ve Sanat Merkezinde Bireysel Yetenekleri Farkettirme Programına devam eden altı üstün zekâlı ve yetenekli öğrenciye uygulanmıştır. Etkinliğin ilk aşamasında öğrencilere kulaklığın yıllara göre değişimini gösteren görseller verilmiştir. Öğrencilerin kulaklıktaki değişim ve gelişimi görmeleri sağlanmıştır. Daha sonra etkinlikte kullanmak amacıyla nesne olarak kalem seçilmiştir. Öğrencilere etkinlik formu dağıtılmıştır. Öğrencilerin kalemden birer aparat veya özellik çıkarmaları ve yeni bir aparat veya özellik eklemeleri istenmiştir. Öğrencilerin etkinlik ile ilgili görüşlerini belirlemek için yazılı görüş formu kullanılmıştır. Gözlemci öğretmenin gözlemleri de dikkate alınmıştır. Elde edilen veriler üzerinde içerik analizi yapılmıştır. Kodlayıcılar arasındaki güvenirlik .85 olarak belirlenmiştir. Etkinlik sonunda öğrenciler, etkinliği beğendiklerini, etkinliğin yaratıcı düşünme becerisinin gelişimine katkı sağladığını vurgulamışlardır.
Anahtar kelimeler: Düşünme becerileri, üstün zekalı ve yetenekli öğrenci, yenilikçi düşünme, yaratıcı düşünme

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INTRODUCTION

As in the twentieth century, there are skills that stand out in education in the twenty-first century. One of these skills is creative thinking. According to Dow (2017), creativity is the creation of a new and useful product or idea in a social context. Creative thinking is the association of objects or ideas that have not previously been associated with each other (Rawlinson, 2017). Analyzing the thoughts and products previously produced by others is important in the development of creative thinking skills (Üstündağ, 2020). In this case, some of the resulting products differ only slightly from previous products, while others are subject to major changes (Sak, 2020). This shows the importance of previous ideas and products for creative thinking. In this activity, an apparatus or feature of an existing product is removed and a new one is added. In other words, the activity enables differentiation in an existing product. This reveals the importance of the activity for the creative thinking process.

Creative thinking basically consists of four sub-dimensions. These sub-dimensions are fluency, flexibility, originality and elaboration. Briefly, fluency refers to the number of relevant responses, flexibility refers to the categories of responses, originality to the uniqueness of the idea or product, and elaboration to the amount of elaboration (Torrance, 1972). Developing these four sub-dimensions in students means developing creative thinking skills. With this activity, the fluency, flexibility, originality and elaboration sub-dimensions of students' creative thinking skills were activated. Thus, it is thought that creative thinking skills of gifted and talented students will be improved.

Creative thinking skills are important for gifted and talented students. Because creativity is one of the important components of being gifted and talented (Clark, 2015; Guilford, 1967; Renzulli, 2016; Sternberg, 1997). In addition, creative thinking skills are among the 21st century skills that individuals should have for the development of societies (p21.org). The education of these students aims to develop their existing potential and to raise creative individuals. Lack of interest in the development of creative thinking skills will cause students to lose their creative thinking skills over time (Renzulli, 1993; Simonton, 1999). Therefore, students' creative thinking skills should be adequately supported and taken into account in their education. One of the aims of the social studies course, whose main purpose is to raise effective and democratic individuals, is to enable students to be aware of problems in different fields and to find solutions to these problems. In this respect, it can be said that the social studies course is closely related to the development of creative thinking skills. According to Turan and Yıldırım (2019), students are expected to grow up as effective and democratic individuals who are sensitive to environmental and social problems and have universal values. It can be said that this situation makes it necessary to educate students who can think creatively. In this respect, it can be said that there is a close relationship between the social studies course and creative thinking skills.

Creative thinking skill is one of the skills included in the social studies curriculum. According to the program, creativity is the basis for entrepreneurs to acquire more original knowledge and skills. In this respect, creative thinking is closely related to initiative and entrepreneurial competence. In addition, especially in the learning area of global connections, emphasis is placed on the acquisition of creative thinking skills. Innovative thinking is one of the twenty-seven skills aimed to be acquired through the Social Studies Curriculum. This skill is aimed to be acquired in the fourth grade science, technology and society, fifth grade production, distribution and consumption, sixth grade science, technology and society, sixth grade production, distribution and consumption learning areas. The outcomes related to the activity (MoNE, 2018) are as follows:

SB.4.4.2. Compares the past and present uses of technological products.

SB.4.4.3. Investigates the inventors of the technological products they use and the development of these products over time.

SB.4.4.4. Develops ideas for designing unique products based on the needs in the environment.

SB.5.5.5. Develops new ideas based on production, distribution and consumption through cooperation.

In the social studies curriculum of science and arts centers, the Support Education Program includes learning outcomes for creative thinking skills in the learning areas of individual and society, change, my expanding environment, map knowledge, discoveries and explorers, cultural heritage. In the program to recognize individual talents, creative thinking skills are included in the themes of environment and ecology, population, social studies and science, culture and heritage. With the educational services offered in science and art centers (SAC), it is aimed for gifted students to gain creative thinking, discovery, invention and innovation skills and develop projects. Among the principles of the education and training programs to be implemented in SACs, it is aimed to raise individuals who can think creatively and make inventions (MoNE, 2021). In this respect, the achievements related to the activity in the SAC social studies curriculum (MEB, 2022) are as follows:

1. Evaluates the effects of change and continuity over time.

2. Analyzes the historical development of communication tools. (Examples of communication tools are given.)

3. Discusses the impact of technological developments on transportation and communication tools.

4. Designs an original transportation and communication tool taking into account the change in technology.

As mentioned above, the activity is related to the social studies course and was implemented in the social studies course. However, it can be said that the activity has a feature that can be applied in different courses in terms of purpose and content. In this respect, it can be stated that the activity can also contribute to project development studies that require creative thinking skills in different courses. Creative thinking skill is one of the important skills in students' project preparation process. In particular, TUBITAK 2204 project competitions and TUBITAK 4006 Science Fairs are among the projects in which middle and high school students participate. These projects increase the interaction between science and technology and aim to enable students to gain different skills by enabling them to conduct research, investigation and design projects (Çolakoğlu, 2018). In the studies conducted, it was concluded that teachers and students had problems in finding project topics (Artvinli, Çetintaş, & Terzi, 2020; Öztuna Kaplan & Diker Coşkun, 2012; Tortop, 2013; Torun & Akpınar, 2021). One of the problems encountered is that teachers focus on information rather than focusing on the problem during the project process (Oğuz Ünver et al., 2015). In addition, teachers' inadequacy in making models and models during the project process is another problem (Torun & Akpınar, 2021). It is thought that this activity can be a solution to these problems experienced during the project process and can provide a perspective to look at an object or idea from different angles. The aim of this study is to design an activity to develop students' creative thinking skills and to reveal the results of the implementation.

IMPLEMENTATION OF THE ACTIVITY

In this study, an activity called take out one add one was prepared to develop students' creative thinking skills. The activity was carried out with six students attending an individual talents awareness program at SAC. Four of the students are girls and two are boys. The students attend SAC in the general intellectual field. The duration of the activity is two class hours. The activity was implemented by the researcher and

the SAC social studies teacher took part as an observer teacher. The observer teacher's opinions were included in the evaluation phase of the activity. The following tools were used in the activity.

- One headset

- Visuals (Headset visuals, primitive pencil visuals, stylus visuals)

- Take out one add one activity form

- Interactive board

Photo 1. Students during implementation

The teacher entered the classroom with a headset in his hand. He drew attention to the students by saying “Today we will do an activity about headphones” and informed the students about the objective. The teacher gave short explanations about the implementation of the activity. In the explanations, it was emphasized that the students should be comfortable, express their ideas clearly, and not make fun of any answer. This phase lasted approximately 5 minutes.

In the first stage of the activity, students were asked when the first headphones might have appeared. After the answers received, the headphone visuals with different years and features in Photograph 2 were opened on the interactive board to show how the headphones had changed. Students were asked to examine the headphones by year and were asked the following questions.

1. What changes have headphones gone through?

2. Why might these changes have occurred?

This stage of the activity lasted about 5 minutes.

Photo 2. Visuals of the headphones used in the activity

In the second stage of the activity, students were shown the primitive pencil visual in Photograph 3. The students were asked for which purpose the pen was mainly used. Then the pencil in Photograph 4 was shown. They were asked which apparatuses were added to the first version of the pencil for what purpose and what kind of development was achieved. Students gave answers such as push apparatus, tip, eraser, clip, paint, writing. This phase lasted approximately 3 minutes.

Photo 3. Primitive pen image

Photo 4. Image of a nib pen

Students were given a Take Out One Add One Activity Form. Students were asked to remove an apparatus or feature from the pencil and add a new apparatus or feature. They were asked to write on the form the apparatus or feature removed or added and why. Each student was asked to read what they wrote. This situation continued in four cycles as indicated on the form.

Photo 5. Students filling in the activity form

In the final stage of the activity, students were asked to identify an apparatus or feature that they would like to remove or add as a final decision. Students thus made their final decision and wrote their reasons on the form. Each student then explained their decision and reasons. This section lasted 15 minutes. During the rest of the lesson, students were asked to fill in the written opinion form about the activity. The worksheet section with examples of students' final decisions is presented in photograph 6. Photograph 6 is taken from the worksheet of S2 in the first round, S3 in the second round, S4 in the third round and S1 in the fourth round.

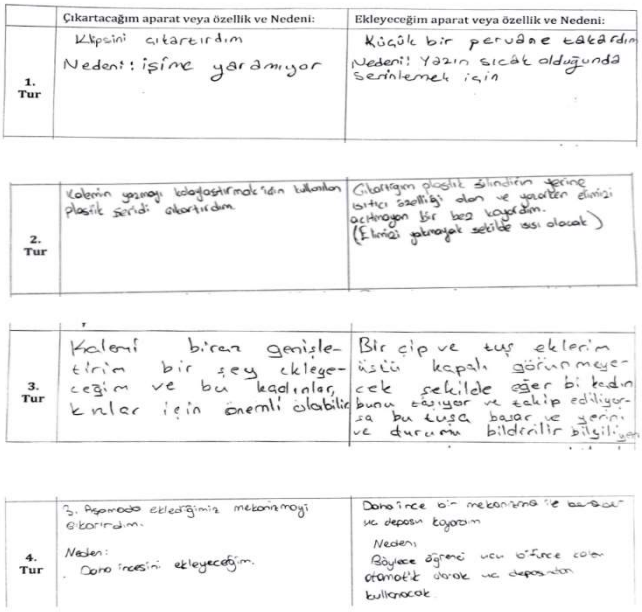

Photo 6. Student responses

EVALUATION OF THE ACTIVITY

A written opinion form prepared by the researcher was used to determine the opinions of the students about the activity. After the form was prepared, it was examined by at least one PhD level education program expert and one expert who has studies in the field of creative thinking. The observations of the observer teacher about the activity were also taken in writing. The observer teacher has experience with creative thinking. Content analysis was performed on the data obtained from the student written opinion form. For this purpose, the answers were computerized and read three times in detail. Then, codes were determined and themes were identified based on the codes (Yıldırım & Şimşek, 2016). In order to calculate the reliability of the codes, the reliability formula suggested by Miles and Huberman (2015) was used. As the second coder, a program development expert with at least a PhD level who had previously conducted content analysis was identified. The reliability between the coders was calculated as .85. This result reveals that there is a consensus among the coders and internal consistency is realized. The first question asked to the students in the written opinion form was whether they liked the activity

or not. Four of the students (S2, S3, S4, S5) stated that they liked the activity, one (S6) did not like it and one (S1) was undecided. Students who liked the activity found it fun (2), beautiful (2), creative (2), and thought-provoking (1). The undecided student found the activity tiring and useful, while the student who did not like it found it thought-provoking. Therefore, it can be said that students who were undecided and did not specify the activity also stated that the activity contributed to creative thinking. Students expressed their opinions as follows:

"*It helped me to push my imagination and come up with something new, but it was a bit tiring and boring*." Ö2

"*It was fun and leads to thinking and innovation.*" Ö4

The second question asked to the students was whether the activity contributed to thinking of new ideas and products. Five of the students (T1, T2, T3, T4, T5) stated that the activity contributed to thinking new ideas and products, while one of them (T6) was undecided. Four of the students stated that the activity encouraged originality and two of them stated that it encouraged thinking. One of the students stated that he did not like the activity because it did not contribute to producing new ideas and products. Students expressed their opinions as follows:

"*It encouraged me to constantly think about things and produce new products.*" Ö1

"*I had never thought of designing a flying pen before."* Ö3

The third question asked to the students was whether the activity contributed to generating more ideas. All of the students stated that the activity contributed to generating more ideas. The students stated that the activity enabled them to produce more ideas by producing original ideas and products (3), using imagination (1), thinking fast (1), enriching (1) and encouraging innovation (1). Students expressed their opinions as follows:

"*Yes, I thought faster and different ideas*." S2

"*The activity encouraged me to use my imagination and produce products, but it would be better if the other activities I do are based on production*." S3

The fourth question asked to the students was whether the activity enabled them to look at the given object from different angles. All of the students stated that the activity helped them look at the given object from different angles. Students stated that the activity contributed to looking at the given object from different angles (2), functionality (1), enrichment (1), and prompting thinking (1). Students expressed their views as follows:

"*I applied it to different cases and added different things."* S4

"*It made me think about the pencil from different aspects and clearly enabled me to do the activity."* S6

The fifth question asked to the students was whether the activity enabled them to add and remove new features to the pen. All of the students stated that the activity contributed to adding and removing new features to the pen. Students state that this is achieved through enrichment (5) and originality (1). Students expressed their views as follows:

"*I added and subtracted*." Ö5

"*This is what we aimed for in the activity*." Ö6

In addition, students were also asked about what the activity provided them with other than what they stated. Students stated that the activity contributed to the development of creative thinking skills by providing mental visualization (5), creative self-confidence (4), innovation (3), belief in change (1) and quick thinking (1). Students expressed their opinions as follows.

"*It taught me that I can use my imagination even on an object like a pen. It taught me that even my absurd ideas have a logical side. At the same time, I realized that even a pencil is an object that can be improved."* S1

"*It made me realize that I can produce new things by pushing my imagination and that my ideas can make sense even if they are absurd*." S3

According to the teacher observer, four of the students participated in the activity willingly, while two were not. However, the reluctant students had positive opinions about the activity at the end of the activity. The observer teacher expressed this situation as follows.

"*Our students who participated in the application reluctantly, at the end of the activity, they expressed that they were glad they participated in the activity."*

According to the observer teacher, the activity contributed positively to the development of students' creative thinking skills. The observer teacher expressed this situation as follows.

"*First they took something out of these objects and then they added something and they did this many times and in the end they came up with very interesting objects. They even benefited from each other. ... We have seen that the relationship that our students will establish with objects in the outside world will help them to reach accurate information and develop their creative abilities in the future. ... This activity allowed our students to look at the selected objects from a different perspective. When the activities in which the students participated were analyzed, it was seen that very creative ideas emerged."*

According to the observer teacher, the activity also contributes to project and utility model studies. The observer teacher expressed this situation as follows.

"*It is clear that this practice will make a great contribution to their project and utility model work. ... This practice will increase the number and quality of projects in TÜBİTAK and TEKNOFEST competitions across the country. When the program of science and art centers was examined, it was seen that the activity was very suitable for the goals to be achieved in students.*"

CONCLUSION AND SUGGESTIONS

In this study, it was aimed to develop an activity to improve students' creative thinking skills. At the end of the implementation, it was concluded that the activity could contribute to the development of students' creative thinking skills.

The majority of the students expressed that they liked the activity. This was also stated by the observer teacher. Almost all of the students thought that the activity contributed to the originality sub-dimension. All of the students stated that it contributed to fluency, flexibility and elaboration sub-dimensions. Thus, it was concluded that the activity contributed to the development of creative thinking skills.

During the activity, what the students wanted to remove and add was written on the board. This situation enable students to be influenced by each other's ideas. This situation enables students to mobilize each other and support collaborative approaches (Avcu, 2014). For example, after S1 mentioned the idea of adding an end storage, S2, S3 and S6 also stated that they would add an end storage. However, each student brought out a different apparatus or feature to add a nib storage. Thus, the pen was provided with different features.

In the final decision stage of the activity, students were asked to give the final form to the selected object, but they were not asked to draw a visual reflecting the final form of the object. According to Magner (2017), students should be given the opportunity to express their creativity through their experiences and technology. However, in the activity, students may be asked to draw the final version of the selected object. If there are students who can draw with computer programs, they can be allowed to draw with computer programs.

In the activity, students were asked to remove or add an apparatus or feature from the given object. This may cause students to think individually. For this reason, the student whose turn it is in the activity can also make a suggestion to the next student after the

apparatus subtraction and addition. Students' suggestions can help them think in different dimensions and make the activity more fun.

This activity allows students to extract new apparatuses and properties from existing objects and add new apparatuses and properties to objects. In this respect, the activity can be used to carry out patent, utility model, trademark and design studies.

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APPENDİX 1

BİR EKLE BİR ÇIKAR ETKİNLİK FORMU

Adı Soyadı: **Grubu:** B2

Seçilen Nesne: Kalem

	Çıkartacağım aparat veya özellik ve Nedeni:	Ekleyeceğim aparat veya özellik ve Nedeni:
1. Tur	Kalemin Arkasındaki silgiyi çıkarttırdım.	Çıkarttığım silginin yerine küçük bir bıçak koydurdum. Çünkü çizdiğim şeyleri kolay bir şekilde başka bir alete ihtiyaç duymadan düzeltebilmek için. Ve o bıçağın küçük bir kapağı olacak. Ve o kapak daha güvenli olacak kötü amaçlarda kullanılamayacak.
2. Tur	Kalemin yazmayı kolaylaştırmak için kullanılan plastik şeridi çıkarttırdım.	Çıkarttığım plastik silindirin yerine ısıtıcı özelliği olan ve yazarken elimizi acıtmayan bir bez koydurdum. (Elimizi yakmayacak şekilde ısı olacak)
3. Tur	Kalemin yakaya takmak için olan klipsini çıkarttırdım.	Çıkarttığım klips yerine iki küçük kanat koydurdum. Ve onu çalıştıracak bir mekanizma olacak çünkü yazma işimiz bittiğinde o mekanizmayı çalıştıracak ve kalemimiz yere düşmeden havada aslı duracak ve kaybolmayacak.
4. Tur	Kalemin ucunun olduğu kapağı çıkartıp küçültürdüm ve bir boşluk açılırdı.	Boşluk açılan yere küçük bir metal bir küpkoydurdum. Çünkü kalem kanatlar sayesinde havada uçarken dururken rüzgârdan etkilenmeden rahat bir şekilde aslı durması için. Ayrıca kalem yere düştüğünde yerinde yuvarlanmadan durması için
Son Karar	Kalemin arkasına eklemiş olduğum maket bıçağını çıkarttırdım. Çünkü öğrenciler bıçağı yanlış kullanabilirler.	Onun yerine içine uç deposu eklerim.

APPENDİX 2

One Subtract One Add One Activity Form

Name Surname: Group:

Selected Object:

	Apparatus or feature I will remove and Reason:	Apparatus or feature I will add and Reason:
Round 1		
Round 2		
Round 3		
Round 4		
Final Decision		