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SCAMPER: IMPROVING CREATIVE IMAGINATION OF YOUNG CHILDREN

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Abstract. Young children are accepted to have creativity abilities. Creativity is a feature that needs to be improved. Many techniques are used to improve creativity. SCAMPER (substitute, combine, adjust, modify/magnify/minify, put to other uses, eliminate, reverse/rearrange) is one of the techniques used to improve creativity. The aim of this study is to investigate the effect of SCAMPER in improving creative imagination of 5-year-old children attending kindergarten. For this purpose, 49 children from the age group of 5 year attending a kindergarten in the Southwestern part of Turkey participated in the study. There were an experimental group and a control group in the study. SCAMPER technique was applied to the children in the experimental group. The control group continued to the normal education program. The data were collected by using Test of Creative Imagination (Child Form), which was developed by Aysun Gündoğan in 2019. At the end of the study, it was found that creative imagination levels of the children in the experimental group receiving education with SCAMPER technique increased. Differences among children receiving SCAMPER education were found in the fluency sub-dimension of creativity. The SCAMPER technique was effective in improving the creative imagination. Therefore, techniques and activities that enable the development of creative imagination should be applied to individuals from an early age.

Keywords: creative imagination, creativity, imagination, kindergarten, SCAMPER, young children.

Introduction

It has been a matter of debate for many years whether creativity is inborn or it can be taught ((Eberle, 2008; Majid, Tan, & Soh, 2003; Poon, Au, Tong, & Lau, 2014). Creativity is inborn but it does not develop unless the proper environmental conditions are provided. Therefore, every individual is born with creativity (Majid et al., 2003; Poon et al., 2014). Every individual expresses his/her creativity in different ways.

Environmental conditions filled with rich stimuli are prerequisites for the individual to be creative. Enviromental conditions, which are full of rich stimuli, increase the creativity level of the individual, while weak environmental conditions decrease the creativity level of

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the individual (Lin, 2011). In addition to environmental conditions, the pressures made by adults to return to reality and adaptation to society, routine activities, authoritarian attitudes, expressions that harm children's self-worth are the reasons that prevent children's creativity (Eberle, 2008).

Young children are accepted to have the curiosity, imagination and creativity abilities and this type of creativity is called as little creativity (Craft, 2002). This kind of creativity, also called as creativity at the individual level, is concerned with solving the problems in everyday life. For example; a young child dressed in an unusual way is considered to be creative (Craft, 2002). Scientific discoveries and innovations in human and social sciences are called as big creativity. Big creativity is also considered as creativity at the social level (Shaffer, 1999; Sternberg & Lubart, 1999). For example; inventions of famous scientists are considered to be big creativity.

Creativity requires imagination. Playing with ideas, establishing unusual and new connections, and investigating different possibilities require the use of imagination (Duffy, 2006). Imagination is the ability to visualise something that does not exist at that moment (Gündoğan, 2019). Creative imagination is the ability to rearrange and manipulate existing information and convert it into unique and original mental images (Eberle, 2008; Lindqvist, 2003). Creative imagination is the visualisation of the unique and original ideas with mental images.

Many techniques are used to improve creativity. Gerald F. Smith (1998) determined 172 techniques: SCAMPER (Eberle, 2008; Khawaldeh & Ali, 2016; Majid et al., 2003; Mijares-Colmenares, Masten, & Underwood, 1993; Moreno, Yang, Hernández, & Wood, 2014; Poon et al., 2014), Creative Reversal Act (CREACT) (Sak & Öz, 2010), Cognitive Research Trust (CoRT) (Barak & Doppelt, 1999; Khawaldeh & Ali, 2016), Internet (Majid et al., 2003), six thinking hats (Vernon & Hocking, 2014; Vijayaratnam, 2009), mind mapping (Chen, 2007; Mundy & Gilmore, 2009) *etc.* In order to develop creative imagination, drama (Gündoğan, Arı, & Gönen, 2013) and role playing method (Karwowski & Soszynski, 2008) are also used. In CREACT technique, contradictions and contradictory metaphors are addressed to produce creative ideas. It consists of five steps as construction, segregation, opposition, combination and elaboration processes. For example; in a study with 10th grade students, students were given two opposite words. Then students were given the tasks to write poem and story using these words to form the main subject and to use these opposite words to form contradictory expressions in sentences. In the study, assessment was done by teachers and authors. CREACT technique increased students' creativity in language arts, while there was no similar increase in contradictory tasks (Sak & Öz, 2010). In the six hats technique, the hats in different colours emphasise different thinking techniques. As the hats change, so does the perspective of the individuals. For example, white hat focuses individuals to the realities and information. It answers the question of "What is the information available and how the appropriate information can be obtained?". The green hat emphasises creativity, alternatives and producing new ideas. In the red hat, problems are approached with intuition and emotions. Blue hat emphasises the process. Black hat is a criticism hat. Yellow hat looks at the positive aspects of the situation (Bono, 2000). In an on-line study using six hat techniques, adults were given a sample case showing how the technique was used. Then the basic problem was presented on the screen for 3 minutes. Participants were asked to diver-

sify their answers. At the end of the study, it was found out that the technique had benefits for the creativity of the participants in terms of fluency and originality (Vernon & Hocking, 2014). Mind mapping technique involves visualizing, combining and integrating concepts learned using lines, colors, symbols, keywords, numbers, images (Wang, Lee, & Chu, 2010). This technique focuses on an object or a question. The focus object is placed in the field. Children are asked to draw about this object or question. Then children are asked to make a connection between their drawings and the focus object. Objects related to the drawing are placed around the drawing. Group discussion is done about the display (Howitt, 2009). In a study conducted with university students, an example of how to do mind mapping technique is presented. Then the students were asked to create their maps starting from the central image. As a result, mind mapping technique has positive effects on each dimension of creativity (Malycha & Maier, 2017). CoRT technique is used to support problem solving, interpersonal and lateral thinking skills (Barak & Doppelt, 1999). CoRT consists of six parts: breadth, organization, interaction, creativity, information and action. CoRT trains the individual to look at a problem from different perspectives. For example; "What are the good points of an idea? Why do you like it?", "What are the possible factors that may affect you?", "What are the possible consequences" *etc.* (Alshurman, 2017). In a study, 10th grade gifted students received CoRT training for 7 weeks. At the end of the study, students scored high in creativity (Khawaldeh & Ali, 2016). In the Internet technique, individuals are allowed to search for information from the Internet to increase creativity. In a study using Internet technique, 5th grade students were given a passage and asked to read. Then they were given a subject and asked to create a story using their imagination. Students are allowed to use the Internet for one hour to search for appropriate information. Then they were asked to write stories individually. As a result, students improved in the fluency and the elaboration sub-dimensions of creativity (Majid et al., 2003).

The common feature of these techniques is that they use brainstorming technique to create new and unique products by stimulating the imagination (Michinov, 2012). It is aimed to produce creative ideas by addressing different questions and contradictions and conflicts. Telling every idea that comes to mind in the brainstorming without judging increases the production of creative ideas. It is stated that these techniques are effective in improving creativity (Barak & Doppelt, 1999; Chen, 2007; Khawaldeh & Ali, 2016; Majid et al., 2003; Mijares-Colmenares et al., 1993; Moreno et al., 2014; Mundy & Gilmore, 2009; Poon et al., 2014; Sak & Öz, 2010; Vernon & Hocking, 2014; Vijayaratnam, 2009). However, since there is no strong evidence, their effectiveness is a matter of debate (Nickerson, 1999). In this study, the effect of SCAMPER on improving the creative imagination of young children is investigated.

SCAMPER is an imaginary activity that helps to produce many ideas in make-believe world. It is composed of a series of questions stimulating and activating the individual to produce creative ideas. The questions were taken from the Idea Triggering Checklist developed by Alex Faickney Osborn (1963). The questions are clues for individual's imagination. The words starting from the letters of SCAMPER are: substitute, combine, adjust, modify/magnify/minify, put to other uses, eliminate, reverse/rearrange. SCAMPER is played with children 3 years or older and requires at least two people. Leader reads the script, reactions of the participants are observed during pauses (Eberle, 2008). In this study, firstly an activity

was performed with children, then SCAMPER questions were asked to increase the creative idea production of children. SCAMPER is particularly effective in making inventions (Hussain & Carignan, 2016) and animal adaptations (Rule, Baldwin, & Schell, 2009; Yuen, Tarique Azam, & Ang, 2015).

1. Method

Experimental method with experimental and control group with pretest-posttest was utilised in order to investigate the effect of SCAMPER in developing creative imagination of 5-year-old children attending kindergarten.

2. Participants

There were an experimental group and a control group in the study. The sample group consisted of children from age group of 5 years who attended two classes in an independent kindergarten in Denizli, Turkey. While there were 25 children in the experimental group (12 girls – 48%; 13 boys – 52%), there were 24 children in the control group (11 girls – 45.8%; 13 boys – 54.1%). Random assignment of children to experimental and control groups was determined by method of drawing lots after applying the pretest to all children in two classes and determining that there was no significant difference between the creative imagination mean scores of all children from the obtained results.

3. Instruments

Test of Creative Imagination (Child Form, TCI-CF) (Gündoğan, 2019) was designed for children in the age group of 5–6 years to make non-existing schematic formations by using 16 concrete shapes. The scoring of TCI-CF is like in Test of Creative Imagination (TCI). TCI-CF has three subscales: fluency, elaboration/transformativeness, originality. Fluency is the number of drawings drawn in accordance with the requirements of the test. Fluency is the sum of the constructions made within the given time. Elaboration/transformativeness are the visualisation of the drawing. Scoring is obtained by the number of shapes used in a drawing. In the originality subscale, the originality of the ideas that are drawn is evaluated. The originality score is obtained by the rater's assessment on the originality of the ideas. In the original version of the scale, the reliability coefficient calculated by using the analysis of variance was 0.75 (Gündoğan, 2019). In this study, the reliability coefficient was calculated to be 0.76.

4. Procedure

In the determination of experimental and control groups in the study, pretest was applied by the researcher to the children determined as TCI-CF study group. No significant difference was determined between the children in terms of pretest scores ($p > .05$). This result was interpreted as the fact that the children had similar characteristics before the experimental

study. In parallel to this result, children in two classes were randomly assigned to the experimental and control groups by drawing lots.

For the researcher to be familiar with the children, he/she participated in the activities of the children for a week. One week later, activities in the book entitled *SCAMPER: Creative Games and Activities for Imagination Development* by Bob Eberle (2008) were applied to the children in the experimental group for ten minutes three days within two weeks. Activities are aimed at improving children's imagination. The researcher read the activities out loud to the children and then children were given time to imagine. After two weeks, activities prepared by Gündoğan (2011) for improving creative imagination were adapted for young children and questions from SCAMPER technique were added at the end of these activities. Each activity lasted for about 40 minutes (see the Appendix). Activities were applied for two days a week for three months.

The control group continued to the normal education program. After the applications conducted for two days a week for three months, posttest were applied to the children in the experimental and control groups. One month after the posttest, permanence was evaluated with retention test re-applied to the children in the experimental and control groups.

5. Data analysis

The data were determined to show normal distribution as a result of pretest and posttest evaluations of experimental and control groups. Therefore, the difference between the pretest and posttest mean scores of the groups was determined with Paired-Samples T-Test. The Independent-Samples T-Test was used to examine posttest mean scores of the experimental and control groups.

6. Results

In this section, results about the pretest and posttest scores of the experimental and control groups are given.

Table 1. Paired Samples T-Test results of children in the experimental group concerning their pretest-posttest mean scores (source: created by author)

Test of Creative Imagination (Child Form)		n	$\bar{x}$	SD	t	df	p
Fluency	Pre-test	25	1.96	.61	–4.87	24	.00*
	Post-test	25	2.72	.67			
Elaboration/ transformativeness	Pre-test	25	13.96	4.59	–1.75	24	.09
	Post-test	25	14.70	3.72			
Originality	Pre-test	25	1.65	.21	–1.89	24	.07
	Post-test	25	1.73	.19			

*$p < .05$

As is seen in Table 1; when the pretest and posttest mean scores of the children in the experimental group were examined, a statistically significant difference was found in the favour of post-test in TCI-CF fluency subscale (t = –4.87, p < .05). No statistically significant difference was found in elaboration/transformativeness and originality subscales (p > .05).

Table 2. Paired Samples T-Test results for pre-test and post-test mean scores of the children in the control group (source: created by author)

Test of Creative Imagination (Child Form)		n	$\bar{x}$	SD	t	df	p
Fluency	Pre-test	24	2.00	1.47	–.58	23	.56
	Post-test	24	2.16	1.16			
Elaboration/ transformativeness	Pre-test	24	13.50	4.94	–1.34	23	.19
	Post-test	24	14.13	4.02			
Originality	Pre-test	24	1.62	.14	–1.77	23	.08
	Post-test	24	1.69	.21			

As is seen in Table 2, no statistically significant difference was found in TCI-CF fluency, elaboration/transformativeness and originality subscales (p > .05).

Table 3. Independent Samples T-Test results for post-test mean scores of the children in the experimental and control groups (source: created by author)

Test of Creative Imagination (Child Form)		n	$\bar{x}$	SD	t	df	p
Fluency	Experimental group	25	2.72	.67	2.03	47	.04*
	Control group	24	2.16	1.16			
Elaboration and Transformativeness	Experimental group	25	14.70	3.72	.50	47	.61
	Control group	24	14.13	4.02			
Originality	Experimental group	25	1.73	.19	.72	47	.47
	Control group	24	1.69	.21			

*p < .05

As is seen in Table 1; when posttest mean scores of the children in the experimental group and control group were examined, a statistically significant difference was found in the favour of experimental group in TCI-CF fluency subscale (t = 2.03, p < .05). No statistically significant difference was found in elaboration/transformativeness and originality subscales (p > .05).

After 4 weeks, a follow-up test was conducted to the children in the experimental and control groups. No difference was found between the posttest and follow-up test (p > .05).

7. Discussion

According to the results of this study investigating the effect of SCAMPER technique on developing creative imagination of the children attending kindergarten, when the posttest results of the children in the control group receiving normal education and the children in the experimental group receiving education with SCAMPER technique were examined, it was determined that creative imagination levels of the children in the experimental group increased. This showed that the SCAMPER technique was effective in improving the creative imagination. SCAMPER gives players a clue for fantastic and imaginary thinking. With existing information and life, different and various thinking is encouraged (Eberle, 2008). This result is consistent with the results by Poon et al. (2014), Khawaldeh and Ali (2016), and Majid et al. (2003). However, the effect of SCAMPER training was not observed in Torrance Test of Creative Thinking (Figural Form A in the study by Mijares-Colmenares et al. (1993). Perhaps, this result may be associated with the age of the children in the studies. In the study by Mijares-Colmenares et al. (1993), the children are in age group of 12–18 years. The children in this study were 5 years old. The imagination of young children is unlimited. This period is also called as magical thinking period (Loxton, 2009). The presence of imaginary friends seen in children during this period is also an indication of their rich imagination (M. Root-Bernstein & R. Root-Bernstein 2006; Taylor, Carlson, Maring, Gerow, & Charley, 2004; Pearson et al., 2001). In addition, presence of the increase in the fluency but not in the originality of the ideas in this study confirms this situation. It can be asserted that SCAMPER is influential in the flow of ideas. It has been shown that practices based on brainstorming exercises such as SCAMPER improve fluency (Byrge & Tang, 2015; Ulger, 2016). In a study, imaginary exercises were found to improve the children's imagination by 20%, creative thinking by 14%, and curiosity by 8% (Lieu Tran, Ho, Mackenzie, & Le, 2017).

It is stated that SCAMPER is effective in producing new and unique ideas (Moreno et al., 2014). However, a statistically insignificant increase was found in the originality of the ideas in this study. Perhaps, this may be caused by the fact that the young children have less experiences than adults.

A statistically insignificant increase was observed during the study in the control group. This situation showed that the development of the children's creative imagination increased together with their experiences (Gündoğan, 2019; Jankowska & Karwowski, 2015; Semenovich Vygotsky, 2004).

The following suggestions can be made in accordance with this study: other existing techniques can be applied to improve creative imagination of young children and new techniques can also be developed. In this study, before asking the questions from SCAMPER technique, different activities such as drama, telling story, and game were applied to the children. Thinking in different ways for the children was supported with SCAMPER questions. Different techniques improving creativity can be compared. For example; while Majid et al. (2003) found in their study that Internet was more effective compared to SCAMPER in creative writing; in their study Khawaldeh and Ali (2016) found that both CoRT and SCAMPER were effective in creative thinking. Techniques such as SCAMPER, CoRT, and CREACT can be taught to teachers through in-service trainings. Imaginary exercises should

be applied not only in early childhood but also in the education of older children. In fact, in a study, imaginary exercises were applied in mathematics, chemistry, history and language art classes and it was found that the imagination of the children increased mostly in chemistry class (Lieu Tran et al., 2017). This shows that the imagination can be used in all classes and reveals its positive effects.

Conclusions

Imagination is the greatest power given to humanity. Many benefits of positive usage of this power will be revealed. Therefore, techniques and activities that enable the development of creative imagination should be applied to individuals from an early age. This research demonstrates the positive effect of the SCAMPER technique in improving creative imagination. To teach individuals different thinking techniques from an early age, to provide rich stimulating environmental conditions, to accept the fact that imagination does not have limits and imagination should not be suppressed by reality will enable mankind to go further. The future of mankind will proceed in accordance with different discoveries and different ideas.

Appendix

SCAMPER activity case

Name of activity: Bubbles.
Material: Air bubble solution and a stick, camera.
Time: 40 minutes.
Age group: 48–60 months old.
Application: Students become partners. While one student becomes a balloon, the other student becomes wind. When the student who is wind touches the student who has become balloon with his/her index finger, the balloon goes away, when the touching stops, the balloon stops as well, the balloon turns to the right when the right shoulder is touched and the balloon turns left when the left shoulder is touched. When the top of the balloon is touched, the balloon goes back. Then the roles of the partners are changed.

Air bubble solution is made with the students. The educator blows an air bubble and asks what happened to the bubble after blowing. Bubble stick is given to each of the students. Students are warned not to blow bubbles on each other. Time is given to students to make explorations about air bubbles.

Students are divided into groups of four. The combination of the air bubbles that the students are blowing together is monitored and photographed. After taking photos of air bubbles of all groups, students' opinions are collected by the educator showing the photographs and asking "What do you think these photos look like?". Students are asked to create these photographs with their bodies in groups. Then, some of the following questions, which are planned based on the SCAMPER technique, are asked according to the conversation:

– What did we use to create air bubbles?

- What else could we use to create air bubbles?
- What do these air bubbles look like?
- What else do air bubbles look like?
- Which parts of our body did we use to create air bubbles?
- What other parts of our body could we use to create air bubbles?
- What kind of air bubble can you get if you combine different parts of your body?
- What did we use to view air bubbles?
- What could people use instead of photograph when there was no camera in the past?
- What can be used instead of photography in the future?
- How can we change the image, shape or colour of the air bubble?
- For which other purpose we can use air bubble stick?
- Which part of the air bubble stick can we remove and make a change?
- How would you do if you designed the air bubble stick?

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SCAMPER: MAŽŲ VAIKŲ KŪRYBINĖS VAIZDUOTĖS UGDYMAS

Aysun GÜNDOĞAN

Santrauka

Pripažįstama, kad maži vaikai turi kūrybiškumo gebėjimų. Kūrybiškumas – tai bruožas, kurį reikia ugdyti. *SCAMPER* (pakeisti, sujungti, pritaikyti, modifikuoti / padidinti / sumažinti, pasiūlyti kitus naudojimo būdus, pašalinti, pakeisti / pertvarkyti) – tai vienas iš metodų, taikomų kūrybiškumui ugdyti. Šio tyrimo tikslas – ištirti *SCAMPER* poveikį, ugdant 5 metų vaikų, lankančių vaikų darželį, kūrybinę vaizduotę. Šiuo tikslu tyrime dalyvavo 49 vaikai, priklausantys 5 metų amžiaus grupei ir

lankančių vaikų darželį pietvakarinėje Turkijos dalyje. Tai buvo tyrimo eksperimentinė grupė ir kontrolinė grupė. *SCAMPER* metodas buvo pritaikytas eksperimentinės grupės vaikams. Kontrolinėje grupėje buvo toliau vykdoma įprasta ugdymo programa. Duomenys buvo rinkti naudojant kūrybinės vaizduotės testą (vaikams skirtą versiją), kurį 2019 m. sukūrė Aysun Gündoğan. Tyrimo pabaigoje buvo nustatyta, kad eksperimentinės grupės vaikų, ugdomų *SCAMPER* metodu, kūrybinės vaizduotės lygis tapo aukštesnis. Skirtumai tarp vaikų, ugdomų *SCAMPER* metodu, buvo pastebėti kūrybiškumo sklandumo poaspekčiu. *SCAMPER* metodas buvo veiksmingas ugdant kūrybinę vaizduotę, todėl metodai ir veiklos rūšys, sudarančios galimybę ugdyti kūrybinę vaizduotę, turėtų būti taikomi asmenims nuo ankstyvo amžiaus.

Reikšminiai žodžiai: kūrybinė vaizduotė, kūrybiškumas, vaizduotė, vaikų darželis, *SCAMPER*, maži vaikai.