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## Research Article

# The Effectiveness of SCAMPER Technique on Creative Thinking Skills

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### Abstract

Current study assumes that SCAMPER is a convenient technique to develop creative thinking skills. In this respect it is aimed in the study to investigate the effect of SCAMPER on developing creative thinking skills. For this purpose, the main research question is: How much is SCAMPER effective in increasing sophomores' Test for Creative Thinking - Drawing Production (TCT-DP) scores? A one-group pretest-posttest design was used in this study. A total of 14 participants were assigned to receive the experimental training. A unique program developed by the researcher for the experimental group. The findings of the study reveal that SCAMPER training significantly increased TCT-DP scores.

### Keywords

SCAMPER, creative thinking skills, teaching, divergent thinking, TCT-DP

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## **Introduction**

The studies show that creative potential can be nurtured (Kolloff & Feldhusen, 1984; Baer, 1993; Meissner, 1999; Feldman and Benjamin, 2006; Freiman, 2009; Huang, 2009; Smith & Smith, 2010). There are various approaches to enhance creative potential or to turn creative potential to creative performance. Some of them are (a) to enable some incentives, (b) to support for acquisition of expertise, (c) to organize group interactions to stimulate creativity, (d) to create an appropriate school climate and culture, (e) to provide career development experiences, (f) making trainings to enhance/actualize creative potential. The last option –making trainings to enhance/actualize creative potential- is a recommended and a frequently preferred approach (Scott, Leritz & Mumford, 2004). Researches, indeed, show that creativity training affect creativity positively of individuals from all ability levels, especially for gifted students (Rose & Lin, 1984; Baer, 1996; Scott, Leritz & Mumford, *ibid*).

Creativity literature introduces several elements influencing creativity, including (a) characteristics, (b) motivation, (c) career strategies, (d) luck, (e) environmental factors, (f) cognitive skills/processes (Scott, Leritz & Mumford, *ibid*). Each one of the approaches for enhancing creativity mentioned in the former paragraph bases at least one of these elements. Training approach, which was used in this research, bases environment and cognitive skills/processes. So teaching creative skills and arranging the environment both cognitively and affectively to develop creativity are the main purposes of all creativity trainings.

While some creativity trainings focus on general creativity theories like lateral thinking, creative problem solving, productive thinking, others focus on creative thinking strategies and techniques like brainstorming and metaphors. There are also trainings which aim to develop discipliner creativity due to the perspective that discipliner knowledge and skills are vital for creative performance (Nickerson, 2009). Smith (1998) claims that the criteria for deciding which theory or technique would be focused on the training should be the creative thinking skill/s to be taught. It is important to use the adequate technique which is suitable for development of the desired creative thinking skill. There is not a “one size fits all” technique. Usually creative thinking techniques focus on specific creative thinking skills and processes. And there are several creative thinking skills and processes. Divergent thinking, discipliner thinking and associative thinking are some of those (Sak & Oz, 2010). Divergent thinking is the most common cognitive process used in researches, studies and assessments.

Divergent thinking refers to produce various and numerous ideas/answers. The effectiveness and qualification of divergent thinking as a creative thinking

process have always been discussed. Its effect to creativity is always compared with critical thinking and convergent thinking. Nevertheless, data which have been collected almost for 50 years refers to positive and significant influence of divergent thinking on creative problem solving and creative performance (Cliatt, Shaw & Sherwood, 1980; Glover, 1980; Scott, Leritz & Mumford, 2004). Because of this supportive literature, most of the creativity training programs include divergent thinking.

There are some techniques to enhance divergent thinking and SCAMPER is one of them. SCAMPER is an acronym which was developed by De Bono (2000). Every letter refers to a specific thinking process. S as substitute refers to figure out alternative ideas/objects instead of the existing idea/object. The main question of this letter is: "What else can use instead of the idea/object already used?". C as combine refers to form novel ideas by combining various and connected-disconnected ideas. The main question is: "Which ideas/objects can be combined?". A as adapt/adjust refers to use/modify former ideas to create new ones. The main question is: "How can I modify the existing object to adapt to the changing circumstances?". M as modify/minify/magnify refers to make changes on the present object by magnifying, minifying, modifying it. The main questions are: "How can I have a novel idea/object by magnifying, minifying, modifying this object?"; "What if I magnify/minify this object?". P as put to other uses refers to use an object in a different and preferably an unexpected concept/situation/place. The main questions are: "How can I use this object in a different concept? For what other goals can I use this material?"; "Where else can I use this material?". E as eliminate refers to eliminate a part of the existing object on behalf of creating a better version of it or of figuring out the consequences of elimination. The main questions are: "Is there anything I can eliminate to have a better/more beautiful/ more useful thing (glass)?"; "What happens if all bees in the world are suddenly vanished?". Lastly R as rearrange/reverse refers to rearrange or reverse present status/situations/orders/patterns with the aim of considering alternative ends, practices, ideas. The main question is: "What can I reverse in the system? How can I rearrange the present order?" (Sak, 2024)

SCAMPER technique was preferred, firstly because it basically aims to create numerous ideas which is expected from divergent thinking process (De Bono, 2000). Second, although there have so many studies about creative thinking strategies in creative literature (MacKinnon, 1978; De Bono, 1992; Baer, 1993; Feldman & Benjamin, 2006; Smith & Smith, 2010), there are only a few studies about teaching creativity via SCAMPER. Third, SCAMPER provides an enjoyable environment for thinking creatively.

Besides, Scott, Leritz & Mumford (2004) emphasized in their meta-analysis that techniques which were more open, exploratory, provided less guidance with regard to the application of information presented were inefficient to obtain success from the training. On the other hand, techniques where people were guided about working with given information in a systematic approach were found efficient and effective in terms of accomplishment of the training. SCAMPER is an example of the latter one since it presents a concrete system to think to be creative with its leading questions as it was suggested in the Scott, Leritz & Mumford's (2004) research.

In consequence, researches display that creative thinking can be nurtured (Torrance, 1972; Rose & Lin, 1984; Bull, Motgomery & Baloch, 1995; Smith, 1998; Scott, Leritz & Mumford, 2004). However systematic studies are needed to indicate which creativity processes effect (e.g. associative thinking, divergent thinking and etc.) on creative thinking (Nickerson, 2009). By this means, the current study was aimed to search the effect of divergent thinking on creative thinking with SCAMPER technique, since there is limited study about it. It is aimed to explore whether SCAMPER technique is effective as a divergent thinking tool for creative thinking training or not. In this context the purpose of this study was to investigate the effect of SCAMPER technique on enhancing creative thinking skills for sophomores. Participants were specifically chosen from undergraduate students who were gifted teacher candidates. There were two reasons for doing this. First, most of the studies about teaching of creativity was carried out by elementary school students. However, it is believed by the author that creative potential can be enhanced even in adults with adequate trainings. Second it is important to be understood by the prospect teachers of gifted students that creativity can/should be nurtured, since they will meet future creators. Hence the study was guided by the following research question:

- How much is SCAMPER effective in increasing sophomores' Test for Creative Thinking - Drawing Production (TCT-DP) scores?

## **Method**

### **Sample**

The study was conducted with 14 undergraduate students (female =11; male = 3) who were at second grade. All of the participants are enrolled in Gifted Teacher Training Program at Istanbul University. The participants' mean age was calculated as 22.43 with standard deviation 1.54. Gifted Teacher Training Program is the first undergraduate program of teacher training for gifted elementary students, which was established in 2002 at Istanbul University. The

curriculum of the undergraduate program specifically includes teaching of higher level thinking skills to be able to meet the gifted students' intellectual and academic needs. Therefore, Teaching Creativity class is in the core curriculum of the program.

### **General Procedures**

A pre-test-post-test design without a control group was used in this study. The study took six weeks of training (three and a half hours per week) and two weeks of testing. TCT-DT form A was used as pre-test and form B was used as post-test. Pre-test was administered a week before the training, and post-test was administered a week just after the training. The author developed and carried out the training program, which included SCAMPER technique. The training put its focus solely on creative thinking via SCAMPER.

### **Instruments**

The aim of the training was to develop creative thinking by using SCAMPER technique. Test for Creative Thinking - Drawing Production (TCT-DP) (Urban and Jellen, 1996) was used to evaluate the increase of creative thinking. TCT-DP was developed to identify creative potentials of individuals. It can be applicable from 5 to 95 years age range. Since it asks for a drawing production, it is culture-fair. It has 14 evaluation criteria. It has 2 parallel forms. Maximum 15 minutes is given for each form to complete. Can and Yaşar (cited in Yaşar & Aral, p. 140) found .99 correlation for test-re-test reliability and a Cronbach alpha coefficient of .77 for internal consistency of form A and B. Similarly, internal consistency of the test had a Cronbach alpha coefficient of .73 in Rudowic's (2004) study. The Cronbach alpha coefficient was reported as .70 for form A, and .88 for form B for the sample of the current study.

### **Training**

If one assumes that cognitive processes are important for enhancing creative potential, then s/he has to figure out how cognitive skills can be infused to creative thinking training. Scott, Leritz & Mumford (2004) offers a method to enable this confluence. According to this method a creativity training has firstly to include cognitive skills which have supportive data regarding to their relation with creativity. After that training should be as long and comprehensive as possible. It is better to comprise various creativity skills. Besides, training should have encouraged participants to exploration. Trainers should explain the effect of all the steps and procedures on creativity. This is important for metacognition. When the training of basic skills and techniques is accomplished, real-life implementations and examples of those skills and techniques should be presented to participants via materials (e.g. books, images, presentations, videos, case studies, people). Eventually, participants should be provided opportunities

to practice and explore the strategies and skills they learn in real and extensive contexts.

A similar method was used in the current study. Divergent thinking as the creative cognitive process was chosen because it has supportive data regarding to its relation with creativity. Then participants were introduced with divergent thinking and SCAMPER as the technique for enhancing divergent thinking. Divergent thinking and its relation to creative thinking was explained with details. SCAMPER was profoundly and systematically studied with real life examples and practices. All practices and examples were discussed from the standpoint of SCAMPER and divergent thinking. Every week one or two letters were introduced. In every lesson, participants were asked to discuss which learned SCAMPER letters might have directed the creator to those creative products. The main questions of the current letter were underlined and the participants were encouraged to ask those questions properly. It was also discussed which example was the most creative. The examples were chosen from advertisements, science and technology, art, engineering, cartoons and nutrition. The participants were asked to create at least three novel ideas/products by using the letters studied during the week. At the very end participants dealt with a problem they chose by using SCAMPER. Enabling/enhancing creative potential was aimed by including creative thinking skills, techniques, metacognitive thinking to real-life practices with a systematic and cognitive approach by this means. The training continued for six weeks.

### Data Analysis

Paired-sample t-test was used to test the significance between participants' pre and post test scores on TCT-DP. The magnitude of the treatment effect (effect size of differences between pre and post test) was calculated using Cohen's *d* with pooled standard deviations (Cohen, 1988).

### Results

Since the normality Shapiro-Wilk test was  $SW_{(14)} = .923, p > .05$ , paired samples t-test was used to test the significance of differences between student's pre-test and post-test scores on TCT-DP. As seen in Table 1, participants' post-test scores on TCT-DP differed significantly from the pre-test scores (pre-test mean=23.21, post-test mean=42.93,  $p = .000$ ). The Cohen's *d* analysis showed that the magnitude of the difference between the mean of pre-test and that of the post-test also was large ( $d = 1.8$ ). That is students' creative thinking ability was improved greatly in 6-week instruction that could be attributed to the use of SCAMPER technique.

Table 1. Pre-test and post-test scores, t-test results and effect size

Table 1. Pre-test and post-test scores, t-test results and effect size.

Variables	N	Pre-test		Post-test		Paired Sample t-test					
		Mean	SD	Mean	SD	Mean	SD	t	df	p	d <sup>a</sup>
TCT-DT	14	23.21	7.83	42.93	13.40	-1.97	8.29	-8.90	13	.000	1.8

\*\*\*p<.001

<sup>a</sup>Note: Cohen's d.

## Discussion

In this research study, the effect of SCAMPER technique on undergraduate students' creative thinking ability was investigated. The findings of the study indicate that using SCAMPER in creative training enhances participants' creative thinking abilities especially for divergent thinking which was parallel to the literature (Torrance, 1972; Rose & Lin, 1984; Scott, Leritz & Mumford, 2004).

It was the author's hypothesis that once participants learn how to think divergently with SCAMPER technique, they will start to use it in their creative thinking process. It was, indeed, validated by this study. In this manner the results were also in line with Smith's (1998) idea who claimed that the effectiveness of creativity training required alignment between creative technique studied –SCAMPER for the current study- and creative thinking skill aimed to developed with this technique –divergent thinking for the current study-.

It was also the second hypothesis that a systematic approach of creative teaching in which people were shown how to work with the information was positively related to the success of training (Scott, Leritz & Mumford, 2004). This hypothesis was also confirmed.

The results also show us that creativity training is valuable and effective not just for gifted and talented students and K-8 graders, but also undergraduate students as Scott, Leritz and Mumford (2004) mentioned. This is important for considering that it is never late to enhance creative potential.

Three limitations peculiar to most experimental studies should also be mentioned here. First of all, one group pre-test – post-test research design was used, because there was no matching group. Second, the training lasted in six weeks which can be a limitation as a matter of maturation. However, results show that participants' development of creativity has occurred even in 6 weeks. Another limitation of the study was the representation issue. Participants of this study were undergraduate students and this is a limitation to apply the finding to all age groups.

Based on the results and training process it can be suggested that SCAMPER can be used in a variety of settings like school and companies. The first reason of that, SCAMPER provides an enjoyable environment for

practicing creative thinking for all ages. Also the leading questions in the technique present a concrete system to think flexible and fluent. Even it mainly serves to divergent thinking, its use also involves a variety of cognitive skills like gathering information, making research, making combinations, flexible thinking, original thinking and problem solving. For example, R letter of SCAMPER as Rearranging or Thinking Reversely involves flexibility in thinking, since it requires thinking reverse of the present order or rearranging present patterns. Those are the examples of thinking out of the box. So, students are encouraged to gain new and various perspectives via SCAMPER (Kerr, 2009).

It can also be suggested that new and novel systematic creative training programs and models can be developed as future studies which include other creative thinking techniques separately or integrated. Or new teaching techniques including basic creative thinking skills may be developed.

As a conclusion the results of this study reveal that teaching a creative thinking technique may affect creative potential positively. There are surely other elements like characteristics, motivation, luck, climate of family/school, culture besides cognitive processes, as mentioned earlier in the introduction part. However, if creativity is considered as a cognitive process, it can not be ignored that there is notable data which points out that the innate creative thinking ability of individuals can be stimulated and nourished through education.

### **Biodata of the Authors**



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