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SCAMPER as a Creative Idea Generation Method: Case Study on Graphic Design Students

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Abstract: There are several methods that were developed to produce more ideas and broaden the range of solutions. I focused on SCAMPER because it is the most comprehensive one, as it collects seven simple techniques contained in one approach. Also, it is still one of the most used techniques, both in advertising and in teaching, to develop and create creative ideas and images. Its name is an acronym that stands for seven sub-techniques. The current paper aims to explore the value of utilizing SCAMPER to generate ideas simultaneously as a step for improving students' creative potential. This will be through students' projects in one of the curriculums within the graphic design discipline. The study follows the descriptive approaches in its theoretical aspect, and the qualitative approach based on process of observation for its practical aspect. Finally, the study reflects the teacher's observation, and the development of students' knowledge and perception. The results of the study showed that using SCAMPER has positive effects and impacts on the graphic design students, provides them with a more direct method and systematic approach to ensure ideation, so it sped up the process in generating ideas. Also, it provides an enjoyable environment to practice creative thinking.

Keywords: Creative thinking, SCAMPER technique, Idea generation techniques, Creative problem-solving, Graphic design.

1 Introduction

Creativity is an extremely important facet of life and is a feature of many of the tasks we do every day. It can occur in a multitude of situations ranging from work to pleasure, from artistic portrayals (music compositions, new media art) to technological innovation [1]. Although creativity can be hard to measure, it is understood as a vital area of research in a wide variety of disciplines [2]. Educational psychologists have affirmed the necessity to support creativity in all contexts of the learning process; this includes developing learning and teaching strategies with the purpose of enhancing creativity in classrooms [3].

Creativity (Creative thinking)

Creativity is defined by Ellis Paul Torrance as “the process of sensing gaps or disturbing, missing elements; forming ideas or hypotheses concerning them; testing these hypotheses; and communicating the results, possibly modifying and retesting the hypotheses” [4], [5]. Creativity; also called creative thinking; is expected to help generate innovative ideas, to develop an original product or solutions for problems; which means that these ideas should include new concepts, methods, and systems [6]. Lynn and Douglas Newton [7] regard creative thinking as an important tool to enhance perception, develop action plans and produce various substitute interpretations. They also suggest that creativity increases the ability to fully understand a situation, solve problems and even abstain from lying in the solutions developed for these problems. Creativity is an expression of divergent thinking which can be evaluated by four factors which are: fluency (number of answers), flexibility (answer categories), originality (answer uniqueness) and elaboration (subtlety and ornamental answers) [7]. Torrance's conception of creativity includes some main components, i.e., skills, which include sensitivity, fluency, flexibility, originality, elaboration, penetration, psychological openness, synergy, internal visualization, synthesis and redefinition [8], [9].

Creative problem-solving (CPS)

Any creative problem-solving method commonly includes some; or all; of the following procedures:

- Orientation: defining and indicating the problem.
- Preparation: collecting data.

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- Analysis: Breaking down the relevant material or information.
- Ideation: generating ideas for possible solutions.
- Incubation: take a pause to summon illumination.
- Synthesis: putting the pieces together.
- Evaluation: proving the empirical solutions.

The problem-solving process doesn't necessarily follow the above order of procedures; as the actual practice may start with making guesses even during the preparation stage, also; the incubation stage may be followed by more analyzing for facts which weren't taken into consideration at the beginning [10].

Ideation (Ideas Generation)

Any technique of idea generation can be identified as “a plausibly effective prescription expressing more than common knowledge” [11]. Idea generation, or the act of generating novel, applicable ideas, is an important stage among several other stages in the process of creative problem-solving (CPS) [12], [13]. Ideas generation is an open search or inspection for ideas, which encompasses producing many ideas (fluency in thinking), which should be varied and with new perspectives (flexibility), also; such ideas have to be new or uncommon (originality). Afterwards, these generated ideas should be identified according to their potentials to be refined, improved, and utilized [13].

To conduct a successful and fruitful idea generation process, several methods were developed by researchers to induce creative thinking, produce more ideas and broaden the range of solutions [14]. Smith [11] identified 172 idea generating techniques such as Osborn's [15] Brainstorming and SCAMPER (substitute, combine, adapt, modify, put to other use, eliminate, rearrange). Smith then distilled these techniques into a smaller set of active ingredients that represent the core functionality behind each technique.

SCAMPER (direct brainstorming) Technique

SCAMPER is one of amazing brainstorming tools one of creativity tools, it is an activity-based thinking process; it can be used to generate a flow of ideas or to encourage thinking from another perspective; particularly when its user feels confused or uninspired. This technique can be used in almost any domain; and can be followed almost instinctively when addressing any problem [16]. SCAMPER uses a set of controlled idea-spurring questions to propose an addition to; or an adjustment of; something which already exists. It is a much-recognized learning tool which promotes perception, vitality, fluency, flexibility, and originality. This stimulation process is conducted by asking questions which are not normally posed, leading to changes in the thinking process [17].

SCAMPER was originally proposed by Alex Faickney Osborn in 1953; he found that most innovations are modifications of things which already exist and that significant improvements can be accomplished with precise alterations. Subsequently, he developed groups of what is called idea-spurring questions which he used in his brainstorming sessions [16],[18]. Eberle (1971) selected a number of the questions from Osborn's list that he considered particularly evocative (or provocative) and formed the key words for them into the acronym, SCAMPER. the acronym stands for (S)ubstitute, (C)ombine, (A)dapt, (M)aximize or minimize, (P)ut to other uses, (E)liminate, and (R)earrange or reverse [16], [19].

The changes that SCAMPER stands for are:

- (S) Substitute (e.g., components, elements, materials)
- (C) Combine (e.g., mix, merge with other compositions, integrate)
- (A) Adapt (e.g., alter, adjust, use part of another element, change function)
- (M) Magnify/Modify/Minify (e.g., increase or reduce in scale, adjust shape, modify features)
- (P) Put to other uses
- (E) Eliminate (e.g., remove elements, simplify, decrease to core functionality)
- (R) Rearrange/Reverse (e.g., turn inside out or upside down) [17], [20].

Table 1: SCAMPER Technique Help Guide [21]

Substitute	Consider replacing part of the process or product with another element or component
	Typical questions: What else? Who else as an alternative? What other materials, components, processes, power, sounds, approaches, or forces can be replaced? Which other places?
Combine	Consider integrating two or more parts of the process or product to develop something new or to improve synergy

	Typical questions: What ideas, objectives, units, or demands can be combined?
Adapt	Think about the parts of the process or product which can be adjusted; or how to change the nature of the process or product.
	Typical questions: Does the past present an equivalent? What else is alike? What other idea does this propose? What can be adjusted to use as a solution? What can be imitated? Who might be taken as a model?
Magnify, Modify	Consider changing part; or all; of the process or product or diverging it in an uncommon way.
	Typical questions: What other meaning, color, motion, sound, smell, form, or shape can be used? What can be added?
Put to Other Uses	Think about how to use the process or product in another manner; or how to reuse something from another place.
	Typical questions: What new manners can this be used? Can this be used in another place? Which other people can be approached? What other uses can this be put to if modified?
Eliminate	Think about what might happen if parts of the product or process are eliminated; and consider what to do in this case
	Typical questions: What can be minimized? What can be eliminated? What can be organized? What can be smaller, lower, shorter, or lighter?
Rearrange, Reverse	Consider what should be done if parts of the product or process worked in reverse or were sequenced in a different manner.
	Typical questions: What can be rearranged? What other pattern, layout, or sequence can be adopted? Can components be exchanged? Should pace or schedule be altered? Can positives and negatives be exchanged? Could roles be reversed?

2 Methodologies

This study was based on a qualitative methodology to collect data by observation. This study regarded as case study since there are likely other higher education institutions that utilizing SCAMPER in their design related classes.

This is the third time the researcher has taught the creative thinking curriculum to graphic design students, taught at the program's tertiary level. The academic year in which this research was conducted witnessed the transformation of the university programs to the quadrennial program system, thus; the number of study weeks was decreased to 10 weeks only. This is the first attempt by the researcher to utilize SCAMPER to generate ideas simultaneously as a step for improving students' creative potential; in which a practice was given to five groups (in each group, there is 5 students), a total of 25 students have participated in this practice as a classroom study. All the participants were in their 3th semester with age ranged from 19 to 20 years old. From College of Designs and Arts, Umm al-Qura University. The study was in first semester, academic year 2022- 2023. The students have been informed about the study's objectives and methodologies, agreed, participated voluntarily, and signed the consent form.

The students have previous experience about brainstorming and mind map techniques:

Brainstorm: Brainstorming involves generating a large number of solutions to a problem (idea) with a focus on the quantity of ideas. During this process, no ideas are evaluated; in fact, we encourage unusual ideas. Ideas are often combined to form a single good idea [15]. Brainstorming can be used by groups as well as individuals [23]. Since brainstorming was the first idea generation technique created, it is often referred to as, "the mother of all idea generation techniques" [24].

Mind Map: According to Budd [25] "a mind map is an outline in which the major categories radiate from a central image and lesser categories are portrayed as branches of larger branches". In Mind Map, the hierarchies and associations flow out from a central image in a free flowing, yet organized and coherent, manner. Major topics or categories associated with the central topic are captured by branches flowing from the central image. Each branch is labeled with a key word or image, to give highly organized, colorful, and memorable pictorial representation which corresponds with the normal method by which the brain functions [25].

At the beginning of the practice, and because the participating students hadn't attended the advertisement design curriculum yet; they were provided with a summarized explanation of the concept of advertisement, the importance of the visual language to convey the message and its role in attracting the recipient's attention and transmitting the advertising ideas and media content. Afterwards, SCAMPER was explained in order, for the students to design rapid advertisement sketches; the goal was to design social media advertisements for a recreational season which includes many unique and special activities, adventures, and experiences of the imagination. Each group of students had to choose one activity and advertise it; noting that it wasn't required to unify the season identity for all groups. The students were given two hours

over two weeks to generate seven ideas; and they had to finish the seven required sketches by the end of these two weeks.

Student's projects using SCAMPER

After learning and applying the concepts of SCAMPER. Figures 1,2,3,4,5 are the students' designs. Each group of students had to choose one activity and advertise (create seven designs). each design reflects the application of one of SCAMPER techniques; the designs are arranged alphabetically in the same order as the letters in SCAMPER. Each group approached the project idea differently; each one applies his own imagination. Five projects are represented below, showing the idea of the project, how to apply SCAMPER and the teacher's observation.

First project:

Advertisements designed for “The music space stage”; a unique idea about holding a musical event in space. This campaign aims to attract audiences to the space stage where the “Chilly Gonzales” music fills up their surroundings. Several advertising phrases are used in this campaign, such as; Travel with us to a world of music, Music at the center of the moon, let the music carry you to an unlimited space.



Fig. 1: advertisements designed for “music space.”

Fig (1- a) the light emitting from the UFO is substituted with a flow of musical tones. Fig (1- b) the stage is combined with the moon and outer space is its background. Fig (1- c) This advertisement applies the “adapt” technique, as the musicians are performing on the ring which spins around the planet. Fig (1-d) the musician is magnified in comparison to the moon, also; a planet is modified as the head of the musician. Fig (1- e) This advertisement utilizes the “put to another use” technique; by using the light of the UFO as a stage-light. Fig (1-f) part of the planets is removed, and their surfaces were simplified to function as the stage-floor. Fig (1-g) an attempt to apply reverse technique; the function of the moon is reversed to become a source of music, instead of light.

Second project:

Advertisements designed for “Planets Fun” which is an imaginary theme park located in space; the idea revolves around a unique journey to a space theme park; it targets children and uses the advertising phrase “Seize the opportunity for a new experience”.

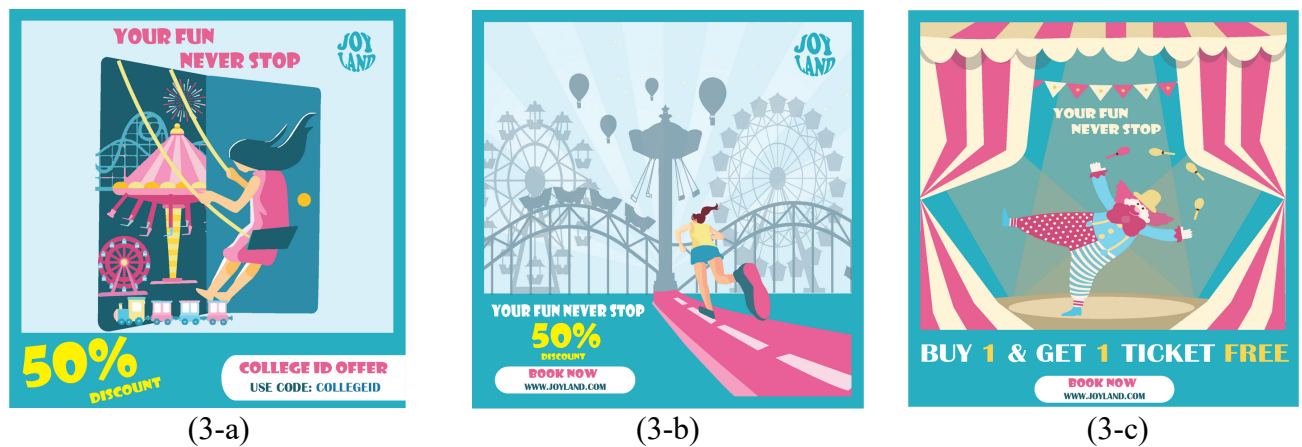


Fig. 2: advertisements designed for “Planets Fun.”

In Fig (2- a) the ticket-booth is substituted with a spaceship. Fig (2- b) wandering in the space is combined with riding a unicorn. Fig (2- c) an attempt to apply adapt technique as train is orbiting around a planet to demonstrate the sense of excitement and adventure. Fig (2-d) an attempt to apply “modify / magnify” technique, as a UFO was used in the Ferris wheel also, Ferris wheel is magnified compared to the size of the planet. Fig (2-e) UFO is put to another use as the issued twice in the swing-around ride; in both the rotating center and the passengers’ cars. Fig (2-f) an attempt to apply eliminate technique. Fig (2-g) In the last advertisement; the students attempted to apply the “reverse” technique as the journey has ended and it is time to go back home; the child astronaut is riding a moon and descending to earth using a few balloons.

Third project:

Advertisements designed for “The Joy Land” event; the idea is based on a theme park with many different games, rides and shows; which provides its visitors with a special experience full of joy, happiness, and excitement; the utilized advertising phrase in this campaign is “Your fun never stops”.



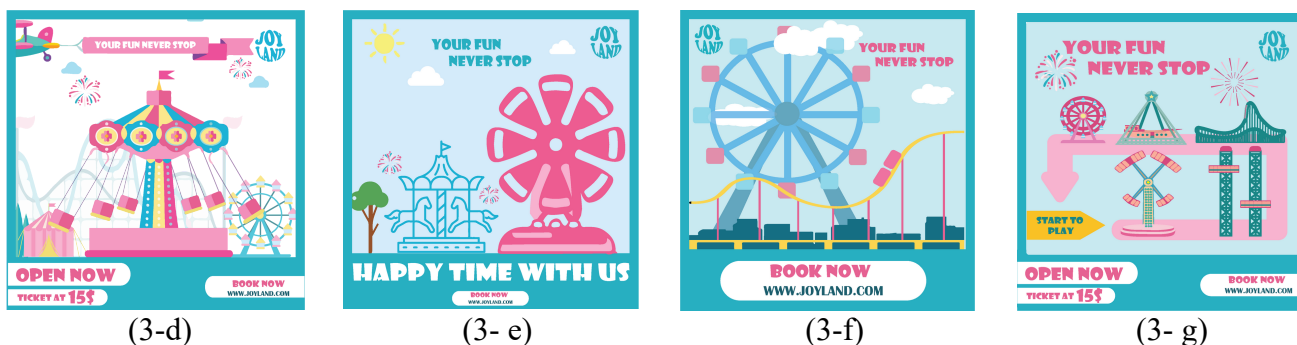


Fig. 3: advertisements designed for “Joy Land.”

Fig (3- a) an attempt to substitute the doorway to the girl’s room with a swing and she is riding it to enter the fun world of the theme park. Fig (3- b) the girl who is wearing an athletes clothe is running on colored road towards her world. Fig (3- c) the adapt technique is represented by the clown’s show in the circus; to give a sense of fun and enjoyment. Fig (3- d) the size of the swing-around ride is magnified in comparison to the other games in the park. Fig (3- e) the shape of the electric fan is put to other use as the Ferris wheel to give the feeling of the ongoing fun in the theme park. Fig (3- f) an attempt to eliminate elements of both the Ferris wheel and the Roller coaster to indicate their core functionality. Fig (3-g) Rearranging the games from the hardest to the easiest to indicate the various options which the theme park provides; to achieve a different exciting experience.

Fourth project:

Advertisements designed for “Marathon City” event, which includes various races suitable for all society members. The races are held in Jeddah and Al-Ula cities in the Kingdom of Saudi Arabia; with the purpose of practicing physical activities and participating in sport events. Several advertising phrases are used in this campaign, such as be ready, in the sea and on the land, be the strongest, stop and watch, stay motivated, 123 go, choose right.

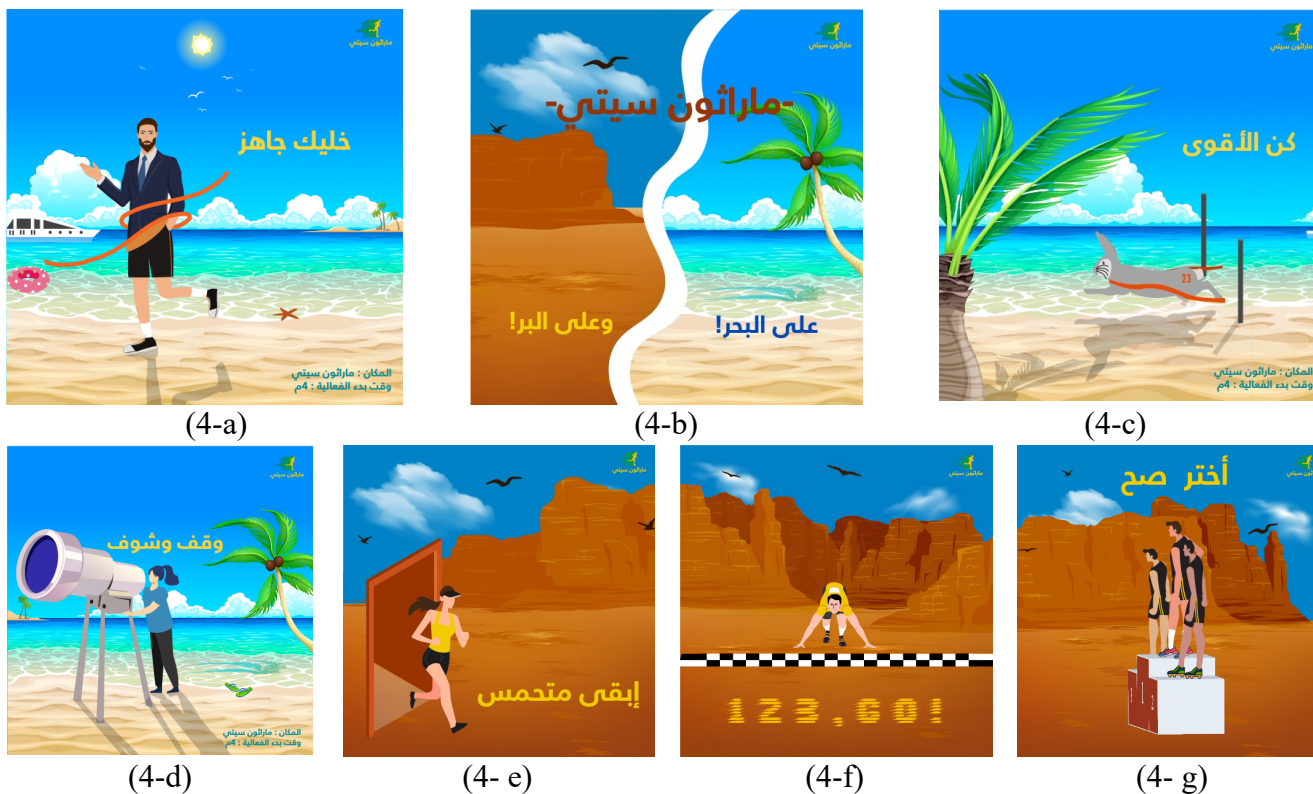


Fig. 4: advertisements designed for “Marathon City.”

Fig (4- a) a part of the working attire is substituted with sport wear; to express the meaning of the phrase “be ready”. Fig

(4- b) the sea and land were combined to show the places in which the event will take place. Fig (4- c) an attempt to apply the adaptation technique by using a rabbit as a contestant. Fig (4- d) the spyglass was magnified to express the phrase “stop and watch” to follow the contestants. Fig (4- e) an open door is put in the middle of the desert; and a female contestant is coming out of it to start the race. Fig (4- f) the road details are eliminated and summed up in a starting line at which a contestant is taking the get-ready pose. Fig (4- g) an attempt to apply rearrange technique.

Fifth project:

Advertisements designed for “Wonka World” event; the idea is based on the “Willy Wonka and the Chocolate Factory” film; it represents a city full of sweets and candy, the campaign uses the advertising phrase “Where sweets and dreams come true”.



Fig. 5: advertisements designed for “Wonka World”

Fig (5-a) the place of the circus in the ground is substituted with another place in the sky. Fig (5-b) mountains and stars are combined with candy to indicate that the door is open to enter the Wonka World. Fig (5-c) This advertisement adapts the concept of virtual reality to give the feeling of entering a world full of sweets. Fig (5-d) the circus is magnified. Fig (5-e) chocolate is put in other use as river instead of real water. Fig (5-f) the Ferris wheel is subtracted and simplified to indicate that the Wonka world is an out-of-this-world experience. Fig (5-g) An attempt to apply the rearrange technique.

As a teacher observing the classroom, I noticed that students were able to use all sub-techniques under SCAMPER. They were able to create ideas in a simple and more systematic way. Although some students were still unable to fully grasp SCAMPER, but the majority managed to apply the sub-technique in their designs, using only one in each design. There were sub-techniques that were easier to apply in students’ designs, and others were harder for them to apply. Considering SCAMPER is comprehensive approach, collects seven simple techniques contained in one approach. I noticed that the students who cannot apply one sub-technique can easily skip it completely and return to it later, which gives students the flexibility without feeling the pressure to stay with one. Also, working in groups contributed to enhance creative idea generation, in case of cooperation and organization among team members. Students after SCAMPER were able to generate ideas characterized with fluency, flexibility, and moderate level of originality. Finally, the practice did not raise students’ awareness in a new ideation technique only, but it gave them more confidence, and more comfortable with taking risks and experimenting with their ideas. In addition to providing an enjoyable environment for practicing creative thinking.

3 Results

During the application of SCAMPER, it was noticed that:

- SCAMPER provides the students with direct method to create designs. Also, it promotes systematic approach to ensure creative and original thinking.
- SCAMPER adds to the students existing knowledge of brainstorming and mind mapping (the female students who participated in the practice were able to put the sketches more rapidly after learning SCAMPER). Students were able to use all the techniques under SCAMPER to create and cultivate idea. There were sub-techniques that were easier to apply in students' designs, such as Combine, Magnify/Modify/Minify, Substitute and Put to other uses techniques. On the other hand, the Adapt, Eliminate and Rearrange, as well as the Reverse techniques were harder for them to apply. Therefore, it may be better to gradually apply a few different sub-techniques, taking into consideration which techniques are easiest and more comprehensible for the students.
- The questions asked; and answered, during the application provide a concrete foundation for a flexible and fluent thinking. Majority of students able to generate ideas characterized with fluency, they produced a variety of ideas concerning possible solution to design problem at the specified time. Most of students were able to generate ideas characterized with flexibility, they were able to adapt changing instructions, to be free from inertia of thought, and to use a variety of approaches. Some students were able to generate ideas characterized moderate level of originality. Hence; they should have been given more time to do their research and broaden their knowledge to create more-sophisticated designs, and allow them to apply more than one sub-technique in each design. Generally, SCAMPER has positive effects and impacts on the graphic design students; regarding improving and expanding their creative-thinking skills. Finally, SCAMPER provides an enjoyable environment for practicing creative thinking.

4 Discussions

SCAMPER provides the students with a more direct method to follow in their attempt to create unique designs (advertisements in this case). Which was parallel to the literature (M. C. Yuen, and others, 2015) [20]. Also, it promotes systematic and practical approach to ensure a creative and original thinking. Students also can think deeper to deliver creative idea in designing sketches. Which was parallel to the literature (R.E. Glenn, 1997) [26]. SCAMPER adds to the students existing knowledge of brainstorming and mind mapping (the female students who participated in the practice were able to put the sketches more rapidly after learning SCAMPER), Which was parallel to the literature (M. C. Yuen, and others, 2015) [20]. The sub-techniques that most of the students found easiest to apply in their designs are Combine, Magnify/Modify/Minify and Substitute techniques. Which was parallel to the literature (M. C. Yuen, and others, 2015) [20], on the other hand, the Adapt, Eliminate and Rearrange, Put to other uses, as well as the Reverse techniques were the hardest for them to apply.

SCAMPER has positive effects and impacts on the graphic design students; regarding improving and expanding their creative-thinking and problem-solving skills. which was parallel to the literature (S. M. Rittera and N. M. Mostert) [27]. SCAMPER provides an enjoyable environment to practice creative thinking, which gives students the opportunity to use their imagination on a wider scale. Also, the questions asked; and answered, during the application of SCAMPER provides a concrete foundation for a flexible and fluent thinking. which was parallel to the literature (FERNANDO MARUGÁN SOLÍS) [28], (M. Özyaprak) [29].

Finally, In the sessions for idea generation, which were held to develop creative ideas; students sometimes reached a point where they couldn't generate new ideas. Therefore, it may be better to gradually apply different techniques, taking into consideration which techniques one uses in the idea generation process. which was parallel to the literature (S. M. Rittera and N. M. Mostert) [27]

5 Conclusions

There are several methods were developed to produce more ideas and broaden the range of solutions. These methods have an important role in improving creativity, thus; learning these tools can positively improve the creativity potentials of the students. I focused on SCAMPER because it is the most comprehensive one, as it collects seven simple techniques contained in one approach. SCAMPER has positive effects and impacts on the graphic design students, it provides the students with a more direct method to follow in their attempt to create designs, and it promotes systematic approach to ensure creative thinking. SCAMPER gave them more confidence, and more comfortable with taking risks and

experimenting with their ideas Finally, it provides an enjoyable environment to practice creative thinking, which gives students the opportunity to use their imagination on a wider scale.

6 Recommendations

The research recommends that SCAMPER can be effectively used in the creative thinking study courses for graphic design programs.

Conflicts of Interest Statement

There are no conflicts of interest declared by the author for the publication of this paper.

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