

The Integration of Scamper and CPS Models in Developing Creative Thinking Skills Among Gifted Students in Kurdistan-Iraq

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ABSTRACT

Educational programs that foster creativity play a crucial role in developing these skills, particularly among gifted students who have the potential to become future leaders and innovators. The study sought to explore the efficiency of creating a training program based on the Integration of SCAMPER and CPS models to strengthen the creative thinking skills of talented pupils. The training program is applied to 26 talented male and female students. The findings of the investigation showed statistically significant differences between the pre-test and the post-test for creative thinking. The results indicated that the impact of the training program according to Cohen's index (D) in creative thinking and its skills exceeds (1.3), which means that the degree of the effect of implementing the training program for developing creative thinking skills (originality, fluency, and flexibility) is very high, as creative thinking was estimated. The overall degree of creative thinking was (1.75), and the impact degree of originality skill was at a degree of (1.53), followed by the skill of fluency at a degree of (0.80), and finally the skill of flexibility at a degree of (0.77). This means that the degree of impact of implementing the developed program for developing creative thinking skills, in general, is high. Researchers point to this improvement as the fact that the training sessions incorporated the advantages of the creative problem-solving model and the advantages of the SCAMPER model in developing new ideas, which is likely to enhance students' abilities to produce new and original ideas.

KEYWORDS: Creativity, Thinking Skills, SCAMPER Model, Problem-Solving, CPS Models

1. INTRODUCTION

In the contemporary world characterized by rapid and relentless change, creativity is increasingly important. It allows for interdisciplinary connections and leads to innovative ideas in varied aspects. A nation's success, whether in industry or education, is ultimately measured by its economic competitiveness (Friedman, 2005; Florida, 2014).

This requires creative thinking that gives rise to product and service innovations. Different studies over the previous five decades have illustrated that the trend in the decline of creativity begins in the elementary school

years and reaches significant depth in the years of high school education (Engzell et al., 2021; Moscoviz & Evans, 2022). If these declining trends in creative thinking are widespread and continue into higher education years, the foundation of a nation's future increasingly depends on the development of individuals skilled in creative thinking. A primary mission of teacher preparation programs is to graduate individuals with the best practices to teach in America's schools. With these significant roles of creativity and teaching educators, the primary goal becomes to develop in students the skills and passion needed to support their success. The standards criteria list critical thinking and creative thinking skills that teachers should possess. Faced with the challenge of identifying methods to develop these skills in their students, the researcher concluded that attributing critical thinking levels to any student requires assessment and, therefore, suggests that we may apply the same approach to creative thinking (Minarti et al., 2022). According to experts in education from many

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countries, the methodology most suitable for developing creative thinking is based on experimentation, which stimulates divergent thinking. However, no research has been conducted to expound the relationship between assessment and the development of student creative thinking (Yulianci et al., 2021). Based on applicable evidence in other educational fields, the general belief is that assessment is presumed to direct the behavior of students and determine their focus. Therefore, implementing a measure that not only guides students toward improvement but also motivates those who receive positive evaluations while enhancing their evaluative standards can prove highly effective.

Evidence indicates that current lifestyles deplete the capabilities of our planet in various fields (Graham & White, 2016), which results in human inability to confront urgent problems and requires finding exceptional solutions based on distinct creative ideas. The educational obstacles and problems of contemporary education include the application of traditional teaching methodologies, the limitation of diverse teaching methods, the minimal use of modern technology, and the inability to effectively discover and invest in talents. All these issues represent part of the negative educational balance we have in the Arab and Muslim countries, which requires quick creative solutions (Mohammed, 2019). Classical methods still control the teaching process, which makes their educational output fall short of matching the requirements of the era of knowledge explosion and confronting contemporary problems effectively and efficiently. The integration of creative problem-solving skills into educational curriculum for gifted students, along with providing them with specialized training, has become an essential educational priority. This highlights the urgency of moving away from traditional teaching methods, as emphasized by the recommendations of the 13th International Scientific Conference for the Gifted. "Towards a Global Vision for Gifted and Talented Care" Which was held in Egypt in 2019, and the preparation of a strategic plan during the next three years in the Arab countries, in which focus must be placed on priorities according to the needs of the Arab region in the field of talent and excellence, through identifying the gifted and building tests, standards, curricula and enrichment programs for the gifted students at various levels of study (RTISC Gifted and Talented, 2019). Among the recommendations of that conference were also supporting the activities, programs, and production of gifted people in all Arab countries; developing enrichment programs in educational curricula for all levels of education; and focusing on preparing educational packages and training workshops for the gifted and talented students.

The researcher has noticed, by daily living and direct access, that the educational reality in Iraq in general and

in the Kurdistan region in particular, does not provide gifted students with sufficient opportunities to show their talents and abilities. Perhaps the primary cause is a lack of interest in teaching creative thinking in educational curricula and the teaching methods used, and this is according to the recommendations of the National Development Plan (2018-2022), as it indicated that the successive challenges and crises that Iraq in general and the Kurdistan region, in particular were exposed to have exacerbated and deepened the problems. In terms of impact and result on the educational process, and for this reason, one of the proposals of the five-year plan was the necessity of early detection of gifted students, attracting them to schools for the gifted, and providing appropriate care and programs to develop their capabilities. This requires reconsidering the nature of the current educational programs and developing them because there is a huge gap between the current programs and what we seek in terms of a positive change in developing the creative abilities of the gifted. The aim of the study is to explore the impact of a training program based on the SCAMPER and CPS models in developing creative thinking skills among students of Qalla College for the Gifted. The findings of the study suggest the benefits of applying a training program for creativity.

1.2. The Scamper Model

The SCAMPER idea generation model emphasizes that teachers should employ a variety of strategies in their teaching methods, ensuring they align with the content of the educational material, rather than relying on a single approach. In addition, he must raise the astonishment of the students and stimulate their curiosity in various ways, including explaining the questions and allowing them to present their ideas without hesitation or fear of coming up with distinctive innovative ideas. Some modern strategies and methods encourage students to raise their questions and develop their thinking and problem-solving skills, such as the SCAMPER strategy, which is the use of many brainstorming questions that stimulate thinking among students to come up with new components, whether for new things or modifying or deleting existing ones to come up with a new idea (Eberle, 2008).

The SCAMPER model was developed, as previously mentioned, by Alex Osborne in 1953, especially in the part of generating ideas, which benefits students by promoting thinking and the principles on which the idea of generating ideas is built. The program's concept is found on the assumption that innovation is a modification of something that already exists (Michalko, 1991). SCAMPER model is considered a catalyst for generating innovative ideas, and its strategies can be used in any order or sequence, and it is not necessary to run all

of them in finding a creative solution to one problem (Vernon et al., 2016) .

2. THE THEORETICAL BASIS OF THE PROGRAM AND THE PROCEDURES FOR PREPARING THE TRAINING PROGRAM

First: the theoretical basis

The construction of the training program relied on two main theories; those theories formulated the philosophy, objectives, scientific content, and ways to select the different activities incorporated in the training program. The first theory is the constructivism theory of Guilford, which consists of a three-dimensional model of the structure of the mind (Guilford, 1988). The training activities within the program were built on that basis. The type of interaction that is supposed to be available between the trainer and the trainees on the one hand, and the interaction of the students with the content and activities of the training program on the other hand, was also determined on its basis. The constructivist theory is predicated on the premise that the learner creates awareness from his previous educational experiences, rather than only acquiring it from tangible items that the teacher places in front of him, and that there must be opportunities for the learner to develop the information himself through an active interaction between his prior awareness or convictions and the new information. (Fosnot, 2013).

The second theory adopted by the proposed training program is Sternberg's Triarchic Theory (Sternberg, 2001). According to this theory, three abilities are required, and at a high level, that represent characteristics of the gifted, which are considered in constructing the content and activities in the training program. The three intended abilities are analytic intelligence, creativeness, and applied intelligence (Sternberg, 2018).

Second: Procedures for preparing the training program:

Building the training program in developing the creative thinking skills of gifted students went through stages:

1. Reviewing educational literature and previous studies concerned with developing or building Arab and international training programs to develop creative thinking skills (e.g. Obeidat, 2018; Al-Qadhi et al., 2019; Jamal & Saqr, 2018; Al-Youssef, 2019; Al-Hussein i's, 2016; Al-Yami's, 2020).
2. Determine the needs of the target group by reviewing the curriculum of Qalla College for the Gifted.
3. Preparing a set of activities and training situations based on the SCAMPER model and the creative problem-solving model, which develop creativity skills.

4. Presenting the program to a group of authorities with experience in the ground of education, teaching methods, and curricula to express their opinions on the program in terms of:

a. The extent to which the program axes are comprehensive and cover both the SCAMPER model and the creative problem-solving model.

b. The diversity of educational goals and strategies, the means used, and their suitability for students' tendencies and different abilities.

c. The appropriateness of the knowledge content presented in the training program, including information, examples, and training activities.

d. Appropriateness of evaluation tools and their suitability for what is intended to be measured.

e. Appropriate and sufficient time allotted for the training program sessions.

Appropriate modifications have been made to the training program after consulting the supervising professor, according to the remarks and suggestions of the arbitrators.

3. METHODOLOGY

This chapter deals with the methodology used in the study, including defining the study population and sample, data collection tools in the study, validity, and reliability. In addition, an explanation of the steps of the experimental study, which includes the pre- and post-measurement stages, then the procedures for building and applying the training program, and then determining the methods. The statistical methods used in analyzing the results of the study are also presented. Below is a detailed overview of these procedures.

3.1. The Design

To effectively achieve the study's objectives, the researcher adopted a quantitative approach and utilized a quasi-experimental design with one group, applying it to the experimental group through a pre-test and post-test. The justification for the researcher's use of the quasi-experimental approach is due to the failure to use random assignment as is known, and to not facilitate the use of the true experimental design (Singh, 2021). The researcher's reliance on the quasi-experimental approach with a pre-post-design is due to the nature of the current study represented in selecting the sample in a purposive Sample manner and to recognize the impact of the training program that investigates developing creative thinking skills among students of Qalla College for the Gifted in Erbil, Kurdistan / Iraq.

First: To study the effectiveness of a training program based on the integration of Scamper & CPs models in developing creative thinking skills among gifted students.

Second: The quantitative approach of a quasi-experimental approach to answer the first and second questions was used. It is one of the most appropriate scientific approaches to discover and know the facts related to studies of effectiveness or impact, through which the researcher can know the effectiveness of the (independent variable) on the result (the dependent variable)

So, the research aims to answer two questions:

1. What is the effect of the training program on developing creative thinking skills (fluency, flexibility, originality) of the gifted students in the preparatory stage in Kurdistan/Iraq?

2. Are there statistically significant differences between the mean scores of the experimental group in the pre and post measurement in the skills (fluency, flexibility, originality) of gifted students in the preparatory stage in Kurdistan / Iraq?

Hypotheses of the study:

In order to answer the second research question, these hypotheses were formulated:

1. There are no statistically significant differences at the level (0.05) between the mean scores of the research sample of gifted students in the pre-test and their average scores in the post-test in the originality skill on the creative thinking skills scale.

2. There are no statistically significant differences at the level (0.05) between the mean scores of the research sample of gifted students in the pre-test and their average scores in the post-test in the skill of fluency on the scale of creative thinking skills.

3. There are no statistically significant differences at the level (0.05) between the mean scores of the research sample of gifted students in the pre-test and their average scores in the post-test in the flexibility skill on the creative thinking skills scale.

3.2. Study Sample

The sample was chosen intentionally in Qala College for the Gifted, that is, the students of the tenth and eleventh grades were chosen. The research sample's age ranged from 15 to 17 years. The number of participants reached (26) students from the total number of the two stages because the college policy accepts only a limited number of students.

3.3. Measures

To examine the study objectives, two tools were used to test the extent of the development of creative thinking skills, in addition to building a training program, based on theoretical framework and literature review. Therefore, the tools of the current study are as follows:

First: Testing the verbal creative thinking ability of Torrance and Baron, which was modified by the researcher to suit the Kurdish environment.

Second: A training program to develop creative thinking skills.

3.4. Preparation Procedures For Each Tool

1. Verbal creative thinking ability test for Torrance and Barron

The Torrance test is suitable for many purposes, and therefore, it has been used in many studies, including those related to identifying gifted people (Rababah, 2018; Trisnayanti et al., 2019). Because Torrance's creative thinking tests are among the most common and used tests, they have been translated into many languages, including Arabic, and standards have been derived for them in more than one Arab country (Jarwan, 2013, p. 151). The researcher relied on testing the ability of verbal creative thinking, which was modified to suit the Iraqi environment by Al-Hakak (2010). The researcher made some substantive modifications in terms of changing some words in the test questions to suit the Kurdish environment, and he also translated it into Kurdish.

3.5. Reliability & Validity

First: the validity of the test

Validity refers to how accurately the test measures the sample's ability to think creatively. This accuracy can be estimated by comparing the results with other relevant data or theories. As is known, sincerity includes three types: structure, content, and criterion. The validity of the content was extracted in this study, which is to ensure that the test has covered all aspects of the concept being measured.

1. Face validity

An honest test is one that measures the trait it purports to measure and nothing else. In other words, the test measures what it is intended to measure (Tyler & Walsh, 1979, p.29). To ensure the validity of the test, the researcher presented the scale (testing the ability of the sample to think creatively) in its initial form to (5) arbitrators specialized in the field of education, curricula and teaching methods (see Appendix No. (1) who work at the International Islamic University Malaysia and the University of Salahaddin /Erbil, and Koya University in Kurdistan/Iraq, and they expressed their opinions on the contents of the test in terms of:

- Appropriateness and clarity of test instructions.
- The clarity of the test questions.
- The appropriateness of the linguistic formulation of the test questions.
- The appropriateness of the paragraphs for the level of gifted students.
- The scientific validity of the content of the questions.

For the purpose of conducting translation validity to test creative thinking skills, the Arabic version was presented to a language expert at Koya University to translate it into Kurdish, and then compare with the

original Arabic version. The expert recognized the credibility of its translation. The test appeared in its final form after the researchers took these opinions (see Appendix 3). 111

2. Internal consistency validity: The validity of the internal consistency of the creative thinking skills test was verified by applying it to an exploratory sample from outside the study sample, by calculating the Pearson correlation coefficient between the sub-scores of the respondents on the test questions (multiple and unfamiliar uses, situations, implications, improvements, association of ideas) that they got on the test and the total score on the test. The values of the correlation coefficients ranged between the sub-scores of the respondents and the total score of the test as a whole between 0.621 and 0.794. The following table (Table 1) presents the results of calculating the internal consistency coefficient of the test.

Table 1

The correlation coefficient between the scores of the creative thinking ability test questions and the total score of the test

Test questions	Correlation coefficient
Unusual uses	0.742
Situations	0.706
Consequences	0.621
Product improvement	0.737
Association of ideas	0.794

It is clear from the table that the test has an internal validity degree at the significance level (0.01).

Second: The Reliability of the test

a. Reliability in the split-half method in which reliability is calculated by calculating the correlation coefficient between the two halves of the test (the scores of the individual items and the scores of the even items) and the correction using the Spearman-Brown equation. And after calculating the reliability of the current scale in this way on the scores of the survey sample responses, the reliability scores were extracted for the different factors (fluency, flexibility, originality) separately using the split-half method by calculating the correlation between the scores of the odd units and the scores of the even units in the test, as they ranged rate The reliability coefficients of the test dimensions are between 0.77 and 0.85, which are high values. As for the test reliability coefficients, they ranged between 0.55 -0.95 in several studies that used this test (Khairallah, 1981, p. 11). The following table (Table 2) explains that:

Table 2

The results of calculating the reliability of the dimensions of the creative thinking ability test using the split-half method

Skill	Originality	Flexibility	fluency	Total test
Reliability coefficient	0,77	0,80	0,79	0,85

Reliability coefficient

b. Inter-rater reliability: The scorers' agreement method is one of the best-known methods for calculating the reliability coefficient of a test. In this method, the test reliability coefficient is calculated by calculating the correlation coefficient between the evaluations of the raters for the same group of individuals (Middleton, 2021).

To verify the reliability of the correction according to the previously mentioned criteria, the researcher chose the students' responses (the exploratory sample), then trained another researcher on the correction criteria, and each paper was corrected twice. once by the researcher and once by the second researcher.

3.6. Test Components

This test consists of two parts:

The first was derived from one of Torrance's batteries of creative thinking termed as The Minnesota Tests of CT, about the University of Minnesota where he worked. The Torrance battery consists of four sub-tests:

1. Uses: The sub-test consists of six items, in which the examinee is asked to mention the largest possible number of uses that he considers unusual and unfamiliar uses so that these things become more useful and important, and the time allotted for answering in each unit is three minutes.

2. Consequences: This sub-test consists of three items in which the examinee is asked to mention what would happen if the order of things changed and became a certain way, and three minutes were allocated for each situation.

3. Situations: This sub-test consists of three situations, and the subject is asked to indicate how he behaves in unfamiliar situations, and the time allotted for answering in each unit is three minutes.

4. Development and improvement: This test consists of six units, in which the examinee is asked to suggest several methods for some things to become better than they are, provided that he does not suggest a method that is currently used to improve and develop this thing and that he is not concerned with the question of whether it is possible to apply his proposal at the current time, and the time allotted for answering each unit is three minutes.

The second test is Barron's test, known as Barron's Test of Anagrams. In this test, the examinee is asked in each unit to form new words from the letters of the given word so that they have an understandable meaning, with the possibility of repeating one letter more than once in one word. The test consists of five words, and the student is given three minutes for each of these words to form new words with an understandable meaning.

3.7. Method For Evaluating Creative Thinking Abilities Test

The method of evaluating this test was divided into four sub-tests so that each subject was assigned 4 degrees: a degree for intellectual fluency, a degree for flexibility, a degree for originality, and a total score as follows:

a. **Fluency:** tested by the capacity to mention the largest possible number of appropriate answers in a certain period by providing a point to each accurate response for the largest number of appropriate responses within its period of time. A random response that is not based on scientific logic or is inappropriate to the requirements of reality is excluded.

b. **Flexibility:** It is tested by the capacity to diversify relevant replies by assigning a score to each group of solutions based on their affiliation with the greatest number of fields. If the feedback was diverse and belonged to different fields, it would have a higher degree.

c. **Originality:** It is determined by the capacity to mention answers that are not prevalent in the group to which the individual belongs, giving the highest score to the rarest and least frequent responses after converting the frequencies of all answers into percentages, and then comparing their degree according to Torrance estimates of originality see table 1:

Table 1

shows Torrance estimates of originality by frequency percentages

NO.	The percentage of idea recurrence %	degree of authenticity
1	less than 20%	4
2	From 21-40	3
3	From 41 – 60	2
4	From 61-80	1
5	From 81-100	0

Khairallah (1981) believes that no matter how great the degree of repetition of the category is in a way that does not allow distinguishing every creative idea, even in this case each category expresses the ability to think creatively. Therefore, Khairallah considered modifying the estimate in the sense that there is no zero, as proved in the following table:

Table 2

shows the degree of originality

Repeating the idea	Degree of originality
1-9	10
10-19	9
20-29	8
30-39	7
40-49	6
50-59	5
60-69	4
70-79	3
80-89	2
90-99	1

a. The total score: It is measured by fluency, flexibility and originality scores in the test units. That is, by adding the total fluency in the Torrance battery to the fluency in the Barron test, the total fluency score is obtained. As well as for each of the flexibility, originality and overall degree. In this case, the total score is an expression of the subject's creative ability, that is, the individual's ability to produce, a production considered by the highest degree of rational fluency, spontaneous flexibility, and originality, in response to a problem or an exciting situation. For these grades to be assessed, you must:

Inappropriate ideas and random responses that are not based on scientific logic or reasonableness appropriate to the requirements of the realistic environment are first excluded.

Each idea is rated one degree for fluency and one degree for flexibility. As for originality, it is determined based on the degree of repetition and is compared according to its estimates in the previous criteria table.

3.8. Test description as finalized:

The test of verbal creative thinking ability in the current research consisted of (5) questions or domains (unusual uses, consequences, situations, product improvement, and association). Each of them has a number of vocabulary and paragraphs, all of which amounted to (23) single items that represent the test. The answer to the test is corrected by assigning a degree to the ability of fluency for each idea, giving a degree to the ability to be flexible for each idea, and giving a degree to the ability of originality in calculating repetitions of ideas according to their rarity so that the sum of all these degrees represents the total score of the test. The answer depends on the respondent's ability to think creatively. They are open answers that are not specified by a number but rather by a specific time. It has been proven that the test has high validity and the test has a good reliability coefficient by the split-half method and marked by the Spearman-Brown equation. Thus, the test achieved good psychometric properties that make it ready for use and application by the researcher.

3.9. Exploratory study

Two training sessions were implemented from the training program on an exploratory sample of this study to achieve two purposes:

Checking the psychometric characteristics of the study tools that were used, namely, the Torrance-Baron test, arabicized by Sayed Khairallah, adapted to the Iraqi environment by Al-Hakak (2010), and modified by the researcher. This includes ensuring the clarity of test instructions, questions and vocabulary; calculating the time required to conduct the test, and its ease of absorption and the possibility of answering its vocabulary without confusion.

Accordingly, the scale was applied in its final form on a random sample other than the field study sample of gifted students in the twelfth grade, and their number reached 8 students. The researcher made sure of the integrity of the psychometric characteristics by enabling all the respondents to answer the test questions. The average time required to answer the entire scale was 75 minutes, starting from reading the instructions and understanding the questions and answering them, and thus the scale became ready for the required research purpose.

Checking the level to which the training program can be applied to gifted students, discovering the difficulties that may be faced in the course of implementing the program, the extent to which students comprehend the steps of the program and their response to it, the suitability of the program topics for them, and the adequacy of the time allotted for each training session, which is estimated at 60 minutes. This exploratory study enabled the researcher to make adjustments and improvements to the training program, as the discussions he held with the students about the ease or difficulty of the topics, and the appropriateness of the activities and training methods allowed him to be reassured about the integrity of the program, as the students did not express fundamental objections to the contents of the training program. Desire and motivation to learn the topics presented confirm the program's suitability for gifted students.

3.10. Basic study procedures

The main procedures for applying for the study were as follows:

- Obtaining a letter from Salahaddin University / Erbil addressed to the administration of Qalla College for the Gifted to facilitate the researcher's mission to implement the training program.

- Coordinating with the administration of Qalla College for the Gifted to provide a space in the student's academic schedule to be devoted to presenting and implementing the program, during the academic year (2022-2023). The number of classes allocated to the

program was estimated at one session per week, with a total of 12 sessions.

- Obtaining a list of the names and numbers of tenth and eleventh-grade students at Qalla College for the academic year (2022-2023). (See Table 5)

- The researcher conducted a pre-test to evaluate the verbal creative thinking abilities of the study sample. The researcher carefully assessed and scored the pre-test responses following the standardized correction guidelines, ensuring accuracy and consistency in the evaluation process.

- The experimental group students have received the content and activities of the training program, starting from the date (4/10/2022) and ending on (30/12/2022). The program included 12 training sessions. Each session was 60 minutes.

- After completing the program, the researcher applied the post-test to the group to measure the level of their creative thinking skills.

- The researcher corrects the post-test for the group, and monitors grades according to the correction rules for estimating grades, to determine the program's efficiency in fostering creativity skills.

3.11. The Characteristics Of The Study's Training Program

The training program was built to obtain the creative skills of gifted students based on theoretical foundations and access to programs. When building the program, it relied mainly on the SCAMPER model and creative problem-solving model. This training program defines the roles of both the trainer and the trainee and is characterized by accuracy and organization. Each training session has a specific time and objective. See table 3:

Table 3
Training session contents

The session	Topics of the training subjects	Time
First	- Introduction - Instructions - Application of the pre-test	90 mins
Second	Creativity and characteristics of creators	60 mins
Third	Creative Thinking	60 mins
Fourth	Elements of creative thinking	60 mins
Fifth	SCAMPER model with examples _	60 mins
Sixth	SCAMPER model with examples	60 mins
Seven	CPS model: Creative problem-solving	60 mins
Eighth	Integrating creative problem solving (CPS) and SCAMPER models	60 mins
Ninth	Creative problem solving (Global warming)	60 mins
Tenth	Creative problem-solving (Addiction to technology)	60 mins
Eleven	Creative problem-solving (Traffic Accident Victims)	60 mins
Twelve	Application for the post test	90 mins
The total		13 Hours

3.12. Achievement of objectives

The program sought to achieve its objectives through the following methods:

- The scientific content provided: This content and the included experiences were determined to be in line with the objectives of the training program.
- The training strategies used in the program, such as the use of brainstorming strategies, discussion, dialogue, imagination, self-learning, and other strategies that develop creative thinking among students.
- Various collective and individual training activities that stimulate students' abilities to think creatively as a means of developing imagination and a spirit of competition.

3.13. Program content

The training program includes scientific content, and it has been organized, selected, and designed to meet the demands of the target group in the context of predetermined goals, as well as the SCAMPER and creative problem-solving models that take into account students' mental qualities. By the needs of the target group, we mean that the current curriculum for the preparatory stage for the gifted lacks these programs, especially since this stage is considered the stage of forming mature intellectual processes and is also considered an academic, cultural, and social transformation stage that precedes the university study stage.

3.14. Organizing program content topics

The researcher structured the program content based on the creative problem-solving (CPS) model, which consists of the following stages: understanding challenges, generating ideas, formulating solutions for implementation, and planning actions. The program incorporated both convergent and divergent thinking tools and integrated the SCAMPER model specifically during the idea generation stage. (See Figure 1) Especially the creative problem-solving model. These topics were as follows:

- Creativity and its characteristics.
- Creative thinking skills.
- SCAMPER Strategies.
- creative problem-solving Model.

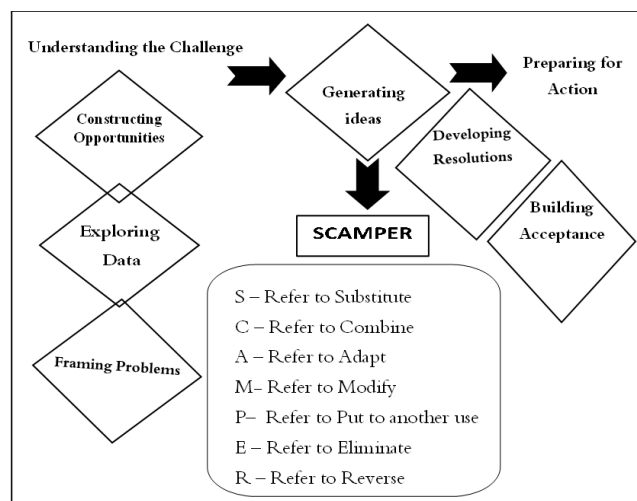


Figure (1)

Shows both SCAMPER model and creative problem-solving model that used to develop the program

The third section: the implementation of the program This theme included the strategies for implementing the training sessions as well as the training activities used in the program sessions.

First: The used strategies in the training implementation

These are the methods and activities utilized during the training sessions to equip students with creativity skills. The implementation of the training program activities relied on a range of educational and training strategies that served as a fundamental component of the program. These strategies were chosen for their effectiveness and ease of use, making them accessible for both the trainer and the trainees. The following is a procedural description of the strategies used in the training program:

- Using the Creative (Problem-Solving) Model (CPS) (V 6.1) when solving problems, and proceeding according to this model dynamically and flexibly, according to its three components and the six stages, according to the formed situation as we discussed in Chapter Two.
- Using the divergent thinking strategies included in the SCAMPER model, which consists of the strategies of Substitute, combination, adaptation, modification, putting in other uses, eliminating, and rearranging, to generate creative ideas .
- Use the convergent thinking tools included in the creative problem-solving model, including the matrix for evaluating creative solutions.
- Using the training activities to increase experience and deepen the creative skills included in the program.
- Using the dialogue and discussion strategy, in which the role of the trainer is to encourage the trainees

to present their ideas and points of view and to respect the ideas of others.

f. Adopting a cooperative learning strategy in which students are divided into groups of 3 to 5 heterogeneous individuals, and they exchange cooperative learning roles among themselves in an organized and purposeful manner, by performing the goals assigned to each individual in a way that leads to achieving the desired learning outcomes under the slogan: Either we survive all or we all drown.

g. Using a brainstorming strategy that assumes that there is a problem or a confusing situation that must be solved through a process of brainstorming or generating ideas by students collectively, in an attempt to produce the highest amount of ideas or solutions, and then recording them on the board, regardless of their type, on the assumption that quantity begets quality. This strategy requires postponing evaluation judgements at the beginning of brainstorming and then evaluating solutions and ideas based on certain criteria agreed upon by the group.

h. Adopting a meditation strategy that requires giving students enough time to think about the stimuli they were exposed to, to deal with them in depth, in the hope that it will create a kind of non-hasty thinking that leads to superior results.

i. Using the imagination strategy through which the trainee is encouraged to build new knowledge and express it through drawing or oral discussion through the installation of mental images.

Second : The training activities follow in the program sessions

Training activities are intellectual exercises or motor applications aimed at acquiring knowledge, skills, abilities, and opinions of some kind. Whether it is to improve the performance and skills of the trainees or to advance their career, as indicated by Winterbotham et al., 2011. The researcher designed and coordinated the content of the training program sessions through several activities that were mentioned in programs specialized in developing creative thinking skills, (eg. Al-Husseini, 2008; Al-Hailat, 2015) based on the SCAMPER model, and the Al-Wamda program (Buhiji, 2007). They are the skills of fluency, flexibility, originality, and detail. The activities and scientific material were divided in the form of business cards (the information card and the training activity card). The title of the training activity, the required skill, the requirements for the activity, and the time of the activity were determined.

Thiurd : Evaluation Methods in the training program

The evaluation of the trainees in this program was based on the following:

a. Tribal evaluation method: This was applied before starting the program implementation to recognize the availability of creativity among gifted students, which the

training program seeks to develop. This was done by asking questions and presenting some drawings and practical presentations that would stimulate the learners' motivation and motivate them to receive the new topic, as this evaluation helps to identify the learners' previous experiences that are related to the subject to be presented.

b. Structural evaluation: through which the performance of the trainees was observed during the implementation of the sessions of the program, the follow-up of the various activities, and the evaluation of the performance of the gifted students on the activity sheets, in addition to providing feedback, and the continuous follow-up of the performance of the trainees. When the program is presented, the evaluation process is continuous during the presentation of the topic, and it takes place through asking oral questions and writing activities assigned to the trainees. They are judged by looking at their answers to the questions and observing the extent of their participation and performance in the lecture in general, which reflects the extent of their mastery and familiarity with the elements and concepts of the subject.

c. The final evaluation approach was used to determine the extent to which gifted children had acquired creative thinking skills by the end of the program implementation. At the end of each topic, participants were required to answer a series of targeted questions designed to assess their understanding. Additionally, a creative thinking skills test was administered to evaluate their progress and application of the skills learnt.

Forth : Program implémentation timeline

The training program consisted of 12 training sessions, one training session per week. The sessions were applied over 12 weeks. See Table (3), which explains in detail how to apply the training sessions of the trainig program).

4. THE STUDY RESULTS

Regarding the first question:

What is the effect of the training program on developing creative thinking skills (fluency, flexibility, originality) of the gifted students in the preparatory stage in Kurdistan/Iraq?

First : the results of the (T) test for fluency

The results of Table 4 show the significance of the differences between the mean scores of the students in (fluency skill) in the pre and post-tests for two related samples. See table 4:

Table 4

Results of the (T. Test) to examine the differences between the average scores of students in the pre-post-test in the creative thinking test (fluency skill)

Creative Thinking Test	Sample Size	Pre-post test scores			T	Sg
			Mean	SD	SE	
Fluency Skill	26	pre	48.15	15.91	3.12	3.288 0.05
		post	60.96	23.178	4.54	

Based on the values contained in Table (4), it is clear to us that there are substantial differences between the mean scores of the students in the pre and post-test of the creative thinking test for the skill of fluency, as the value of (T) (3.288) is significant statistically at level (0.05). The average score of the pre-test fluency skill in this test was (48.15), though the average score of the students in the post-test was (60.96)

Second : The (T) test results for flexibility skill

The results of the (T) test were analyzed to investigate the differences between the mean scores of gifted students in the pre-test and post-test of the creative thinking test (flexibility skill) for two related samples, aiming to measure the effectiveness of the intervention program. See table 5:

Table 5

T-Test Results Comparing Pre- and Post-Test Scores on Creative Thinking (Flexibility)

Creative Thinking Test	Sample Size	Pre and post test scores			T	Sg
			Mean	SD	SE	
Flexibility Skill	26	pre	42.46	15.32	3.005	2.397 0.05
		post	54.31	21.93	4.03	

Based on the values contained in Table (5), it is clear that there are statistically significant differences between the mean scores of the students in the pre and post-test of the creative thinking test for the flexibility skill, as the value of (T) was (2.397), and it was found to be a function at the level of Significance (0.05). The average score of the pre-test for the skill of flexibility was (42.46), while the average score of the students in the post-test was (54.31).

Third : The results of the (T) test for the originality skill

significance of T-test results for differences in mean scores of gifted students in the pre- and post-test of the creative thinking test (originality skill) for two related samples. See table 6:

Table 6

The differences between the mean scores of the students

Creative Thinking Test	Sample size	Pre and post test scores			T	Sig
			Mean	SD	SE	
Original Skill	26	pre	48.27	14.63	2.87	4.58 0.05
		post	70.65	23.44	4.59	

Based on the values contained in Table (6), it is clear that there are statistically significant differences between the mean scores of the students in the pre and post-test of the creative thinking test of the skill of originality, as the value of (T) was (4.578), and it was found to be at the level of Significance (0.05). The average score on the pre-test of the originality skill in this test was (48.27), while the average score of the students in the post-test was (70.65).

Fourth : T-test of total Creative thinking results

The application shows that the T-test for two interrelated samples to study the differences is significant in the average of total creative thinking and its skills (fluency, flexibility, and originality) between the pre- and post-measurements of the creative thinking test. See table 7:

Table 7

The pre- and post- test of overall creative thinking skills

Thinking Test	Pre-post test		Degree of originality	df	Statistical Sig
	Mean	SD			
Total Creative Thinking Skill	Pre-test	138.88	26.83	25	0.05
	Post-test	185.92	50.37		

The data presented in Tables (4), (5), (6), and (7), along with the results of the T-test for two related samples, reveal significant differences in the overall creative thinking scores and its dimensions (fluency, flexibility, and originality) between the pre- and post-test measurements. These differences are statistically significant at the 0.05 level), as the computed and equal (T) values, respectively: total creative thinking (5.20), fluency skill (3.28), flexibility skill (2.39), and originality

skill (4.57) are greater than the tabulated and equal (T) value (2.060), which means that the average of total creative thinking in the post-test (185.92) is greater than the average of total creative thinking in the pre-test (138.88). The average fluency skill in the post-test (60.96) is greater than the average fluency skill in the pre-test (48.15). The average skill of flexibility in the post-test (54.31) is greater than the average skill of flexibility in the pre-measurement (42.46). The average skill of originality in the post-measurement (70.65) is greater than the average skill of originality in the pre-measurement (48.27). Thus, it turns out that the average of creative thinking in its dimensions related to the skills (fluency, flexibility, and originality) in the post-measurement is greater than in the pre-measurement, which confirms the existence of an influence of the proposed training program in developing the creativity skills of Qalla College of Gifted Students.

The results of applying Cohen's equation to study the size effect of correlated samples

Thus, we can safely say that the training program had a significant (high) impact on developing creative thinking skills (fluency, flexibility, and originality) for gifted students at Qalla College for the Gifted /Kurdistan-Iraq. Are there statistically significant differences between the mean scores of the experimental group in the pre- and post-measurement of the skills (originality, fluency, flexibility) of gifted students in the preparatory stage in Iraqi Kurdistan. See table 8:

Table 8

Applying Cohen's equation to study the effect size of correlative samples

Creative thinking Skill	Sample	Cohen's "d"	ES
Creative thinking total	26	1.75	Very high
Creative thinking (Originality Skill)	26	1.53	Very high
Creative thinking (Fluency Skill)	26	0.80	High
Creative thinking (Flexibility Skill)	26	0.77	High

The first hypothesis results, "There is no statistically significant difference at the level (0.05) between the mean scores of the research sample of gifted students in the pre-application and their average scores in the post-application in the originality skill on the scale of creative thinking skills." To deal with this hypothesis, the arithmetic means and standard deviations were removed in the pre-application and the average scores in the post-application in the skill of originality on the scale of creative thinking skills, and the (T-test) test was applied for correlated samples. See table 9:

Table 9
T-Test Results for Differences in Pre- and Post-Test Scores on Creative Thinking (Originality Skill)

Creative Thinking Test	Sample size	Pre and post-test scores			T	Sig
		Mean	SD	SE		
Originality Skill	26	pre	48.27	14.63	4.578	0.05
		post	70.65	23.44		

It appears from Table 9 that the value of (T) for the skill of originality amounted to (4.578), and this value is a function at the level ($0.05 \leq (\alpha)$), which shows the existence of significant differences between the mean scores of the pre-test and post-test on a test scale. The ability to think creatively. This means rejecting the first accepting null hypothesis and alternative hypothesis, where there is a statistically significant difference at the level (0.05) between the mean scores of the research sample of gifted students in the pre-application and their average scores in the post-application in the skill of originality on the scale of creative thinking skills. The difference was in favor of the post-test, as evidenced by the higher arithmetic mean of 70.65 than the pre-test arithmetic mean of 48.27.

The results related to the answer to the second hypothesis: "There is no statistically significant difference at the level (0.05) between the mean scores of the research sample of gifted students in the pre-application and their average scores in the post-application in the skill of fluency on the scale of creative thinking skills."

To deal with this hypothesis, the arithmetic means and standard deviations were extracted in the pre-application and the average scores in the post-application in the fluency skill on the scale of creative thinking skills, and the (T-Test) test was applied for correlated samples, See table 10:

Table 10
T-test for correlated samples for fluency skill

Creative Thinking Test	Sample size	Pre-post-test scores				T	Sig
			Mean	SD	SE		
Fluency Skill	26	Pre	48.15	15.91	The session	Topics of the training sessions	First
		Second	Creativity and characteristics of creators	60 mins	Third		

It appears from Table No. (10) that the value of (T) for the fluency skill amounted to (3.288), and this value is a function at the level ($\alpha \leq 0.05$), which indicates the existence of statistically substantial variations between

the mean scores of the pre-test and post-test on the capability test scale Creative thinking This means rejecting the second null hypothesis and accepting the alternative hypothesis, where there is a statistically significant difference at the level (0.05) between the mean scores of the sample of gifted students in the pre-application and their average scores in the post-application in the fluency skill on the creative thinking skills scale. The post-test had a higher arithmetic mean (60.96) than the pre-test arithmetic mean (48.15).

5. DISCUSSION

The findings proved that the size of the impact of applying the training program to enhance creativity skills is extremely large. To measure the size of the effect of implementing the training program on growing creative thinking skills for related samples (pre-measurement - post-measurement). The effect size of the total creative thinking was extremely high, and this is due to the high size of the effect of each of the sub-skills. The effect size of the originality skill was also remarkably high, followed by the skill of fluency, whose effect size was high, and finally the skill of flexibility, whose effect size was medium. This means that the size of the effect of implementing the training program to develop creative thinking skills was high.

The researcher attributed this increase to the design of the training situations, which were developed based on the SCAMPER and creative problem-solving models. These models provided learners with the freedom to express themselves and actively engage in proposing innovative and unconventional ideas. During the training process, students were encouraged to build upon each other's ideas, fostering collaboration and the generation of diverse creative solutions. This collaborative approach placed students at the centre of the educational process, promoting group participation over individual efforts, which resulted in the production of more innovative ideas. These findings align with the studies by Paulus and Coskun (2013) and Paulus et al. (2012).

The training activities in the program also included problems related to the environment and appropriate to the level of development of gifted students, which allowed studying these problems in depth, collecting data and developing proposed solutions through SCAMPER's thought-provoking questions, as well as issuing judgments on the results and finding solutions to these problems, which led to an increase in enthusiasm learners' motivation and motivation to practice creative thinking skills in different situations. The training program included training activities for the development of creative thinking, which were dominated by discussion and dialogue, in-depth thinking, and positive feelings, all of this led to an increase in the learners' ability to attain

the maximum conceivable number of answers associated with a stimulus, which are characterized by diversity and originality, reflected on their performance in testing the ability to think creatively (Hirt et al., 1997; Paulus et al., 2012). These findings agreed with the findings of Al-Yousef, 2019; Al-Husseini 2016; Lim et al. 2018; Al-Yami 2020) all of which agreed that the impact of the applied programs was high. This agreement is most likely because the training on creative thinking skills was done independently. In each of these studies, a model of developing creative thinking was used, and this in turn had an impact on the growth of creative thinking skills. In addition, in the current study, two models of creative thinking were combined instead of one model.

The post-measure average score for the originality skill was high, followed by the post-measure average score for the fluency skill, and then the post-measure average score for the flexibility skill. We conclude from this that the gifted students acquired the skill of originality with a high degree. As for the fluency skill, it was medium and statistically significant. As for the flexibility skill, it ranked third, but it was statistically significant. The primacy of the skill of originality in the first place can be explained by the combination of the advantages of the creative problem-solving model and the advantages of SCAMPER in the field of developing new ideas; this is expected to improve pupils' ability to generate new and innovative ideas, as indicated by Radziszewski (Radziszewski, 2017). Also, we can interpret these results because the training program contains diverse and challenging activities, fun exercises concerned with thinking outside the box, the strength of the problems presented in the daily lives of students, and the delivery of ideas and training in a creative way by the coach and his continuous encouragement to students, as the coach can play a significant role in improving creativity skills in numerous subjects, as mentioned by Idek (2016) and Lindmark, & Nilsson (2014). Students' enthusiasm for the training program, the uniqueness of their introduction to the models for the development of creativity for the first time, and the evidence for this is their continuous participation and commitment to participate in the training activities that were prepared in all sessions of the training program, which consisted of (12) training sessions.

These results can also be explained by basing the training program on the interesting SCAMPER model. Whereas the SCAMPER model opened up great horizons for gifted students in developing things through strategies (replacement, merging, adaptation, modification, enlargement /reduction, putting in other uses, deletion, reversal/rearranging), because these strategies focus on developing creative imagination. As well as training activities based on creative thinking models and strategies, such as a creative problem-solving

model that stimulates thinking differently by breaking out of the ordinary and thinking outside the box. This result agreed with the findings of Al-Youssef 2019; Al-Husseini 2016; Lim et al. 2018; Al-Yami 2020; Al-Yousef 2019; Apriliani et al. 2016; Radziszewski 2017; Khalid et al. 2020.

6. CONCLUSIONS

The implemented training program had a significant (high) impact on developing the creativity skills (flexibility, fluency, and originality) of Qalla College students. In addition, the growth rate of creative thinking skills (flexibility, fluency, and originality) was high among a sample of gifted students at Qalla College for the Gifted.

Study Limitations

Notwithstanding the study's encouraging results, several caveats must be noted. Initially, there were just 26 students in the sample, which may have limited the data's applicability to broader demographics. Second, there was no control group in the study's quasi-experimental design, which might create biases and make it more difficult to completely isolate the training program's effects. Furthermore, the study only included gifted children from one school, which could not accurately represent the diversity of exceptional individuals in other areas or educational contexts. Lastly, additional validation may be necessary to guarantee the accuracy and dependability of the assessment instruments in gauging creative thinking abilities, even though they have been tailored to the local environment. These limitations suggest the need for future research with larger, more diverse samples and rigorous experimental designs.

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