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Effectiveness of a Training Program Based on SCAMPER for Developing Creative Thinking among Kindergartners in Jordan

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Abstract

Recently, numerous training programs have been proposed to enhance children's creative abilities. This study aimed to examine the impact of a SCAMPER-based training program on developing creative thinking among kindergartners in Jordan. The intervention is expected to provide evidence that could serve as a foundation for fostering creative thinking in young children and helping them express their creative abilities. SCAMPER encompasses seven thinking skills: Substitute, Combine, Adapt, Modify, Put to Another Use, Eliminate, and Reverse/Rearrange. The program consisted of 20 interactive games where participants were encouraged to think in novel ways through playful questioning, fostering diverse thinking skills. This quasi-experimental study utilized the Jordanian version of the German Test for Creative Thinking-Drawing Production, with its psychometric properties verified for kindergartners. Data were gathered from one kindergarten, with a sample of 62 children randomly assigned to two groups: an experimental group of 30 children and a control group of 32 children. Means and standard deviations were calculated for the pre- and post-test results, and an analysis of covariance was conducted to investigate the effectiveness of the intervention at the 5% significance level. The findings revealed a statistically significant effect of the intervention on creative thinking development among the experimental group. Based on these findings, interventions aimed at enhancing creativity in early childhood are recommended.

Keywords: *Children, creative thinking, kindergarten, Jordan, SCAMPER strategy, training program*

Introduction

The rapid advancements, cognitive revolutions, and continuous discoveries across all fields today are driven by creativity rather than traditional thinking. To address the challenges arising from ongoing cognitive and technological development, it is essential to shift the focus of education from merely imparting knowledge to cultivating thinking styles and refining each learner's ability to think critically and creatively, make informed conclusions, and acquire diverse thinking skills (Fikriyatii et al., 2022;

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Rrustemi & Kurteshi 2023; Shao et al., 2022). Moreover, integrating thinking style-based teaching from an early age through educational programs and strategies developed specifically for children.

Creativity is defined as the interaction between ability and process, leading to outcomes or products that are both novel and useful. The practical application of creativity involves developing creative behaviors that guide individuals toward future success. Hence, creativity is necessary for helping children adapt to and thrive in a technologically advanced society. Most researchers agree that creativity must meet two key criteria: modernity and utility (Hafni et al., 2020; Leggett, 2017; Öcal Dörterler & Akay, 2022). The early years are critical for brain development, which significantly influences creativity later in life. Research indicates that the first decade of life is a particularly sensitive period for neural development, during which children exhibit signs of creativity (Leggett, 2017).

Creative thinking impacts various aspects of an individual's life. According to Kettler et al. (2018), creativity plays an essential role in supporting mental health, adaptability to change, and overall emotional development. In addition, it helps students effectively solve problems in both educational and personal contexts, addressing academic and personal challenges successfully (Handayani et al., 2020; Plucker et al., 2004; Pu et al., 2019). Furthermore, Craft (2003) suggests that individuals who think creatively are better equipped to take control of their lives, use their creative abilities for self-fulfillment, and reach their fullest potential.

Research highlights creativity as one of the most important skills for the 21st century. Lehmkuhl et al. (2021) confirmed that creativity, along with critical thinking and problem-solving, is crucial in our globalized world (Lorencová et al., 2019; Shao et al., 2022; Thonney & Montgomery, 2019). Creative thinking is the cognitive process that drives creativity—the ability to generate original ideas, solutions, or concepts (Cadle, 2015). Accordingly, creativity plays a significant role in K-12 education, with many curricula worldwide explicitly identifying it as a key learning outcome (Pu et al., 2019; Voogt & Roblin, 2012).

Efforts to promote creative thinking among children in kindergarten or school are linked to their cognitive development, which enhances their environmental awareness; emotional development, which increases their maturity, self-awareness, and problem-solving abilities; and social development, which improves their capacity to interact and communicate with their immediate environment (Al-Shanwani, 2015). Fostering creativity in children also boosts their motivation to develop innovative solutions to problems (Al-Shanwani, 2015; Shao et al., 2022). Research indicates that specific teaching

methods can enhance creativity in children (Gülay Ogelman et al., 2023; Kefi, 2023). For instance, Garaigordobil and Berrueco (2011) investigated the impact of a play program on preschoolers' creative thinking and found that it encouraged creative behavior.

One of the primary strategies for enhancing children's creativity during early childhood is to establish it as an educational objective for this developmental stage. Providing early childhood educators with training on how to teach creativity, along with innovative learning and teaching tools for kindergartens, is essential. Utilizing educational creativity programs, brainstorming strategies, creative questioning techniques, and emphasizing creativity as a future skill are also vital (Aminolroaya et al., 2016; Chimbunde et al., 2023; Gcabashe, 2024).

Instructional methods in kindergarten, along with the educational tools provided, are largely play-based. Children engage in exploration, questioning, and applying prior knowledge to develop cognitive constructs. All information presented to kindergarteners is designed to stimulate critical thinking, moving away from traditional methods and indoctrination. These approaches help to enhance creative thinking skills such as originality, fluency, and flexibility. Creativity, as the production of ideas within social contexts (Leggett, 2017), also serves as a means for children to express themselves effectively (Yarmohammadian & Keshtiaray, 2016), making kindergarten an ideal environment for cultivating creativity.

Extant educational literature outlines numerous programs and strategies designed to develop various forms of thinking, ranging from simple to more detailed and complex approaches. Concerning thinking strategies, Eberle (1996) developed the SCAMPER program, one of the most significant techniques for fostering creative thinking by generating ideas. SCAMPER builds on Osborn's concepts and methods for expanding and finding alternatives to ideas, particularly through brainstorming (Altiparmak & Eryilmaz, 2021; Osborn, 1963).

SCAMPER involves a series of procedural steps based on short, intentional questions that typically lead to the generation of new ideas. These ideas are further developed and improved by integrating various skills represented by the acronym SCAMPER: (S) Substitute, (C) Combine, (A) Adapt, (M) Modify, (P) Put to other uses, (E) Eliminate, and (R) Reverse/Rearrange (Eberle, 1996). According to Eberle (1996), innovation and creativity result from the organization and combination of new ideas, a viewpoint reflected in the SCAMPER framework (Al-Hussaini, 2016; Celikler & Harman, 2015). The

program also enhances students' decision-making and creative thinking abilities by encouraging them to think outside the box.

In the current era of global interconnectedness and information abundance, children face the challenge of navigating vast amounts of information. They must be equipped with thinking skills and tools to select the appropriate knowledge at different educational levels. Therefore, creative thinking skills are among the most essential life skills (Prat-Sala & van Duuren, 2020). The kindergarten stage is particularly crucial for the development of thinking skills, as it marks the initial stepping stone into the educational process. Educators and others involved in the teaching-learning process have a responsibility to carefully prepare and focus on developing educational plans for this age group (Polat, 2015).

This study is important because it highlights kindergarten education, a foundational stage for learning and acquiring thinking skills. The research aims to enrich the literature and inspire further investigation into methods that enhance creativity and thinking skills among kindergarten children. It also aims to support researchers and teachers who are focused on early childhood education. In this context, the study aims to answer the following question: How effective is the SCAMPER strategy in developing creative thinking among kindergarten children in Jordan?

The following hypotheses were tested:

(H1) Significant differences exist in the average creative thinking scores between the experimental and control groups of kindergarten children, resulting from the use of the SCAMPER program compared to the traditional teaching method.

(H2) Significant differences exist in the average creative thinking scores between the experimental and control groups of kindergarten children due to the interaction between the training program and gender.

(H3) Significant differences exist in the average creative thinking scores within the experimental group of kindergarten children between the post-test and follow-up assessments, attributed to the sustained impact of the SCAMPER program.

Methods

Research Design

A quasi-experimental approach was employed to test the study's hypotheses, as it aligns well with the nature and objectives of the research. In this study, the dependent variable is the training program based on the SCAMPER strategy, while the independent variable is creative thinking among kindergarteners. The study utilized a pre-test post-test only design, which includes "two variants of design: without control group and with control group" (Bairagi & Munot, 2019, p. 82). Two groups were randomly selected: an experimental group and a control group. Both groups were administered a pre-test at the same time. Subsequently, the experimental group participated in the SCAMPER-based training program for 10 weeks. After the intervention, a post-test was simultaneously administered to both groups. According to Bordens and Abbott (2022), the performance of the control group participants provides a baseline against which the experimental group's performance can be compared. A follow-up test was conducted for the experimental group one month after the post-test to assess the program's sustained effects.

Sample

The study was conducted at Toyor Aljannah Kindergarten and School, randomly selected in Zarqa, a city where children mainly come from middle socio-economic status families. The sample consisted of 62 boys and girls in their second year of kindergarten, with first-year kindergarteners excluded. The participants were aged between 5 and 6 years. They were divided into two classes, with one class randomly assigned as the control group (n = 32) and the other as the experimental group (n = 30). The gender distribution was balanced to ensure that gender did not confound the results, as shown in Table 1.

Table 1

Distribution of Study Participants by Group Allocation and Gender

Study group	Girls	Boys	Total
Experimental group	15	15	30
Control group	15	17	32
Total	30	32	62

Before the study commenced, information was provided to the principal, teachers, and parents or guardians. They received a written information letter and verbal explanation detailing the study. Participation required the parent or guardian to sign a written informed consent form, and children were verbally asked to provide informed assent. Additionally, they were informed of their right to refuse participation or withdraw from the study at any time. This study was approved by the Ministry of Education, and official permission was obtained from the Department of Private Education.

Experimental Procedures and Instruments

To accomplish this study's objectives, both a measuring tool and a specialized training program for kindergarten children were utilized.

Training Program

A training program was designed to enhance thinking skills in kindergarten children, with the SCAMPER strategy serving as the key developmental method. The goal of the program was to foster creative thinking among the participants. After completing the training sessions based on the SCAMPER strategy, kindergartners were expected to be able to:

- Practice various idea generation methods through playing games and activities.
- Deal skillfully with various situations and problems.
- Think generally and engage in productive thinking specifically.
- Generate creative ideas by using their imagination.
- Integrate thinking skills directly within a specific content.
- Gain positive attitudes toward imagination and creativity.
- Work in a manner based on team spirit.
- Engage in divergent thinking when unleashing new ideas.
- Increase their passion, curiosity, and desire to explore.
- Take risks in a manner that values complexity and intuition.
- Raise their level of ambition and enhance their overall self-concept.
- Generalize the acquired experiences to different contexts.

Program's Face Validity

The face validity of the training program was examined by five professors from Jordanian universities, all of whom specialize in educational psychology with a focus on early childhood development. These experts provided feedback on several aspects, including: (a) the program's scientific and linguistic

accuracy; (b) the appropriateness of the texts used to develop creative thinking in children; (c) the suitability of the texts for children across different age groups; and (d) the number of sessions required for each training activity.

Program's Duration

The training activities were conducted in 30-minute sessions, four days a week, over 10 weeks. A total of 41 sessions were held, including an introductory session between the trainer and the children and a concluding session after the last activity. The sessions took place in various locations, such as the kindergarten classroom, an exhibition hall, outdoor yards, and a garden. The control group, however, participated in the usual activities in traditional settings.

Test for Creative Thinking-Drawing Production (TCT-DP)

The effectiveness of the training program was evaluated using pre-, post-, and follow-up tests, specifically the Test for Creative Thinking-Drawing Production (TCT-DP). The TCT-DP, originally developed in German by Urban and Jellen (1996), is a non-verbal, non-quantitative test designed to be culturally and linguistically fair. It uses drawing activities to measure creativity and serves as an instrument for assessing respondents' creative abilities. A user guide published in 1996 was derived from various samples, the largest of which included 2,519 students, both male and female, aged 4 to 16 years, collected between 1988 and 1993. The guide's findings reveal that the test accurately measures developmental performance, with creativity improving as age increases.

The TCT-DP comprises two equivalent forms (A and B), each consisting of a single sheet of paper. The test can be administered individually or in groups, and overall performance is evaluated based on 14 criteria and 14 sub-tests. The test criteria were designed to be applicable across different societies. The TCT-DP has been translated into Arabic, and its guide has also been adapted for use with Jordanian students by Abbas and Zaza (2018). Their study, conducted with a sample of 1,370 students aged 6 to 18 years, confirmed the reliability of the TCT-DP in the Jordanian context. However, it is important to note that while the original test targeted children aged 4 to 6 years, the Arabic version focused on those aged 6 to 16 years (Abbas & Zaza, 2018). Given these differences, it was necessary to determine the psychometric properties of the scale for the 5 to 6 age group using a pilot sample of 50 students, both male and female.

The effectiveness of the subtests in measuring creativity was verified by examining the correlation coefficients between each subtest and the overall score. All correlation coefficients exceeded 0.30, indicating statistical significance at the 5% level. This suggests that performance on the subtests was positively correlated with performance on the overall scale among the pilot sample, demonstrating strong construct validity.

The scale's discriminant validity was also assessed by comparing the performance of the pilot sample group (aged 5) with participants from a prior study by Abbas and Zaza (2018), who were 6 years old. A *t*-test (one-sample *t*-test) was conducted to determine the average differences between these age groups. The results showed statistically significant differences at the 5% level, reinforcing the scale's construct validity and indicating that creative abilities tend to increase with age.

Inter-rater reliability was evaluated by applying the test to the pilot sample and calculating the correlation coefficients between the results of different raters. The inter-rater reliability coefficient ranged from 0.696 to 0.976. Additionally, the internal consistency was measured using Cronbach's alpha, which ranged from 0.547 to 0.678, and the reliability of alternate forms was calculated, ranging from 0.652 to 0.875.

Data collection

Data were collected by administering pre- and post-tests to both the experimental and control groups. First, both groups completed a pre-test. The experimental group participated in a 10-week training program based on the SCAMPER strategy. Following this, both groups were administered a post-test simultaneously. A follow-up test was conducted one month later, but only for the experimental group.

Data Analysis

Analysis of covariance (ANCOVA) was employed to investigate the impact of the intervention and determine its statistical significance at the 5% level ($p = 0.05$). The first two hypotheses (H1 and H2) were tested using data collected and analyzed using SPSS.

Findings

The means and standard deviations of the participants' performance in both the experimental and control groups on the pre- and post-tests were calculated and found to be normally distributed, as presented in Table 2.

Table 2

Means and Standard Deviations of the Scores of the Experimental and Control Groups on the TCT-DP for Kindergarten Children

Creative thinking	Control group (N = 32)		Experimental group (N = 30)	
	M	SD	M	SD
Pre-test	12.81	4.11	14.60	4.36
Post-test	10.88	4.40	40.37	7.11

As shown in Table 2, initial differences were observed between the control and experimental groups in the pre-test, with the control group having a mean score of 12.81 (*SD* = 4.11) and the experimental group having a mean score of 14.60 (*SD* = 4.36). However, these differences were minimal compared to those in the post-test. The small variances between groups support the homogeneity assumption for ANCOVA. The experimental group's mean post-test score on the TCT-DP for kindergarten children was 40.37 (*SD* = 7.11), significantly higher than the control group's mean post-test score of 10.88 (*SD* = 4.40). These results indicate a clear difference in the effectiveness of the training programs used between the two groups, supporting the first hypothesis (H1), which proposed significant differences between the experimental and control groups' performance on the creative thinking scale among kindergarten children due to the SCAMPER program compared to the usual method.

Differences were also identified between boys and girls, with boys having an average performance mean of 40.07 (*SD* = 6.56) and girls having a slightly higher average performance mean of 40.67 (*SD* = 7.83). To determine whether these differences were statistically significant at the 5% level, ANCOVA was employed, with the results presented in Table 3.

Table 3

Results of Analysis of Covariance of the Effect of the Training Program Based on the SCAMPER Strategy on the TCT-DP Scores of Kindergarten Children

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pre-test	210.282	1	210.282	6.704	0.012	.105
Based on group	12044.951	1	12044.951	384.022	0.000	.871
Based on gender	8.521	1	8.521	.272	0.604	.005
Based on group*gender	44.018	1	44.018	1.403	0.241	.024
Error	1787.820	57	31.365			
The corrected total	15533.694	61				

a. R2 = .885 (Adjusted R2 = .877)

Table 3 indicates no statistically significant differences ($p \leq 0.05$) resulting from the interaction between the program and gender, with a statistical significance of $p = 0.241$. Therefore, the program proved effective and appropriate for use with both boys and girls in schools. The findings demonstrate that the program's effect was statistically significant (sig. = 0.00) and highly effective (partial eta squared = 0.871). The balanced gender distribution ensured that gender did not confound the results. To further verify this, the adjusted means and standard errors of the performance of the experimental and control groups on the TCT-DP were calculated, as shown in Table 4. These results also support the second hypothesis (H2), confirming significant differences in the average performance of the experimental and control groups on the creative thinking scale among kindergarten children due to the interaction between the training program and gender.

Table 4

Adjusted Means and Standard Errors of the Scores of the Experimental and Control Groups on the TCT-DP

Study group	Adjusted mean	Standard error
Control group	11.35	1.00
Experimental group	39.94	1.04

As shown in Table 4, the adjusted mean score on the TCT-DP for the experimental group was significantly higher than that of the control group. Specifically, the post-adjusted mean for the experimental group was 39.94, with a standard error of 1.04, while the control group's post-adjusted mean was 11.35, with a standard error of 1.00, resulting in a difference of 28.59 between the experimental and control groups. This indicates that the SCAMPER-based training program effectively enhanced the creative thinking levels of kindergarten children in the experimental group. The impact of the training program was also statistically significant, with an eta squared value of 0.871, as presented in Table 3. This suggests that 87.1% of the variance in creative thinking among the children was attributable to the SCAMPER training program, underscoring its effectiveness.

To test the third hypothesis (H3), the means and standard deviations of the experimental group's TCT-DP scores from the post-test and follow-up test were calculated, with the results shown in Table 5. Table 5 indicates that the mean score for the experimental group in the post-test was 43.00 ($SD = 9.15$), while the mean score in the follow-up test was 40.37 ($SD = 7.11$).

Table 5

Means and Standard Deviations of the Experimental Group's Scores on the TCT-DP in the Post- and Follow-up Tests

TCT-DP	Study group	No.	M	SD
Post-test	Experimental	30	43.00	9.15
Follow-up test	Experimental	30	40.37	7.11

A paired sample *t*-test was conducted to determine whether the mean difference between the post-test and follow-up test scores was statistically significant. The results revealed statistically significant differences ($p \leq 0.05$) between the average performance of the experimental group on the creative thinking scale in the post-test and follow-up test ($t = 1.75$, $p = 0.091$). This suggests that the SCAMPER-based training program led to a sustained increase in creative thinking skills among kindergarten children, with the program's impact continuing over time. These results support the third hypothesis (H3), demonstrating significant differences in the experimental group's performance on the creative thinking scale at the post-test and follow-up, reflecting the enduring effects of the SCAMPER program.

Discussion, Conclusion and Implications

This study examined the impact of a SCAMPER-strategy-based training program on enhancing creative thinking among kindergarten children. The findings revealed statistically significant differences ($p \leq 0.05$) in the variables targeted by the program. Testing the first hypothesis showed significant differences between the experimental and control groups' average performance on the creative thinking scale, demonstrating that the SCAMPER program significantly improved the creative thinking skills of children in the experimental group. The ANCOVA results confirmed the program's effectiveness, as evidenced by a notable improvement in the post-test scores of the experimental group compared to their pre-test scores. Therefore, the program was deemed successful in developing creative thinking skills, aligning with the findings of previous studies that have validated the effectiveness of the SCAMPER program across different variables (Kaytez & Aytar, 2016; Qassem, 2018).

Additionally, Al-Shanwani (2015) recommended incorporating SCAMPER program tools and skills into the kindergarten curriculum due to their effectiveness and significant impact on fostering creativity. The theoretical literature on the SCAMPER program also emphasizes its primary objective

of developing thinking skills, particularly creative thinking (Ozyaprak, 2016). This supports the program's objectives, reinforcing the idea that creative thinking comprises skills that can be trained and learned, as highlighted by Al-Atom (2016) and further supported by Altiparmak and Eryilmaz (2021).

The positive outcomes of this study may be attributed to the SCAMPER strategy-based program's enrichment activities, which are designed to meet the developmental needs of young children across various domains (social, physical, mental, and emotional). The program's activities encourage children to imagine and express their ideas fluently and authentically. The creative practices and activities within the program sessions stimulate children's fluency and ability to generate creative ideas.

The tools and materials used in the kindergarten class also contributed to the positive results, as they allowed the children to engage in games designed according to the SCAMPER strategy in a fun, engaging, and intellectually stimulating manner. The activities were tailored to be age-appropriate and aligned with the children's developmental needs. This observation is supported by Dababneha et al. (2010), who highlighted that the classroom environment plays a crucial role in fostering imagination and creativity among children. Their study emphasized the importance of creating attitudes and situations that support and nurture creativity in kindergartners. These findings align with those of previous studies, such as Altiparmak and Eryilmaz (2021).

The results of this study also revealed significant differences between the experimental and control groups' average performance on the creative thinking scale, influenced by the interaction between the training program and gender. These findings are consistent with previous research, such as Al-Hussaini (2016), who examined the impact of the SCAMPER program on developing innovative thinking skills (fluency, flexibility, and authenticity) among primary school students of both genders. Similarly, Brahimi (2017) explored the effectiveness of the SCAMPER program in enhancing creative thinking among fourth-grade students by applying the TORRANCE test.

Furthermore, our study's results are in line with those of previous studies (Kaytez & Aytar, 2016; Ozyaprak, 2016), which also found the SCAMPER strategy effective in developing creative thinking skills. For example, Ozyaprak (2016) found that the SCAMPER-based experimental training significantly improved second-grade students' scores on the TCT-DP.

Additionally, these findings are consistent with Al-Zuwainy (2019), who investigated the impact of the SCAMPER strategy on enhancing creativity and achievement among fifth-grade students in rhetoric. Al-Zuwainy (2019) recommended the SCAMPER strategy for its effective role in fostering creative thinking. Similarly, Gundogan (2019) found that the SCAMPER strategy positively influenced the creative imagination of 5-year-old kindergarten children and proved beneficial when applied to young children in general.

We also observed statistically significant differences in the means of the experimental group between the post-test and follow-up test on the TCT-DP. This outcome can be attributed to the SCAMPER strategy-based program's effective role in maintaining consistency in creative thinking skills among children. Throughout the 41 training sessions, the children engaged in daily, continuous, and repetitive activities that were not only enjoyable and filled with fun, suspense, and meditation but also involved meaningful play. These activities fostered and sustained their use of creative thinking skills while encouraging them to think outside the box and continually question the various situations they encountered.

In addition, the teaching approach in kindergarten throughout the school year, along with the educational materials provided, emphasizes learning through hands-on activities, play, exploration, and the use of questioning tools (e.g., What do you observe? How? Where?). This approach leverages prior knowledge to support each child's cognitive development, presenting information in a thought-provoking manner rather than relying on traditional indoctrination methods. These factors enhance children's creative thinking skills, including originality, fluency, and flexibility. Creativity involves generating ideas within social contexts that support important environmental factors (Leggett, 2017) and is a process through which a child expresses themselves. This expression both develops and thrives in environments that encourage creativity (Aminolroaya et al., 2016). Such an environment should be actively promoted within the kindergarten educational setting.

The findings of this study are consistent with those of Dababneha et al. (2010), who confirmed that the tools and materials used in kindergarten classrooms significantly impact these results. These tools allow children to interact with SCAMPER-based games that are engaging, thought-provoking, age-appropriate, and aligned with their developmental needs. The results highlight the critical role of the classroom environment in nurturing children's creativity and imagination and underscore the importance of fostering supportive, creativity-enhancing attitudes in kindergarten settings.

These findings also align with those of Al-Masoudi (2012), who identified the effectiveness of a SCAMPER-based training program in developing cognitive curiosity among gifted kindergarten children. Similar samples, such as kindergarten children, were used in many previous studies (e.g., Al-Masoudi, 2012; Dababneha et al., 2010; Gundogan, 2019). Other studies focused on older age groups, such as primary school students (Al-Husseini, 2016; Brahimi, 2017). The findings are similar to those of Al-Husseini (2016) and Brahimi (2017), who investigated the impact of the SCAMPER program on developing innovative thinking skills, fluency, flexibility, and originality, although they worked with an older age group, as Al-Husseini (2016) applied the program to primary school students.

Creative thinking in children, whether in kindergarten or school, is closely linked to cognitive development, which enhances their awareness of their environment; emotional development, which fosters maturity and self-awareness, as well as awareness of others; problem-solving abilities; and social development, which strengthens their capacity to interact and communicate within their environment. The SCAMPER program employed in this study proved effective, significantly improving the creative thinking skills of children in the experimental group. Furthermore, it provided kindergarteners with fun, engaging, and thought-provoking opportunities through SCAMPER-based games.

Although the present study reveals important findings, it has several limitations. The research involved participants from only one school in Zarqa, with a small sample size of children from a middle socioeconomic status, which may introduce bias and limit the generalizability of the findings. Further studies are needed to assess the effectiveness of other thinking programs and their impact on developing creative thinking among kindergarten children. Comparative studies should explore different thinking models and their overall effects on fostering creative thinking at various educational stages. Additionally, more research is necessary to verify the effectiveness of the SCAMPER program on other variables relevant to the kindergarten stage, such as academic achievement and social efficiency.

The current findings suggest that incorporating creativity development into the curriculum could better prepare learners for an ever-evolving world beyond their education. Future research should consider investigating the long-term effects of the SCAMPER training program, involving larger and more diverse samples across different age groups.

There is a need to emphasize enrichment activities and their inclusion in kindergarten curricula to promote creative thinking in young children. It is essential to train and qualify kindergarten teachers to use SCAMPER tools and adopt teaching strategies based on thinking programs and educational models, equipping them with the necessary skills. Curriculum developers should also focus on the significance of creative thinking skills in early education. Organizing practical workshops to train teachers and educators on developing students' creative thinking skills during the elementary education stages could also be highly beneficial.

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