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Scamper project teaching: Assessing Creative Self-Efficacy (CSE) and Creative Personal Identity (CPI) to foster creativity in elementary school

Abstract

This study examined the impact of SCAMPER project teaching on CSE and CPI. Using a quasi-experimental design, 131 elementary students engaged in seven weeks of project-based learning. Data collection was conducted using the SSCS to measure CSE and CPI, while student project outcomes were evaluated with the CPSS to assess creativity in terms of novelty, resolution, and elaboration and synthesis. The findings revealed statistically significant improvements in both CSE and CPI ($p < 0.05$), indicating that SCAMPER project teaching effectively enhances students' creative potential. Additionally, students demonstrated the ability to produce original and meaningful work, reflecting well-rounded creative thinking.

Keywords: creativity, creative self-efficacy, creative personal identity, elementary education, elementary students, SCAMPER project teaching

Introduction

Creativity is a crucial skill in the 21st century, essential for personal development, academic success, and future career opportunities (Lou et al., 2017). A crucial aspect of fostering creativity in students is developing their creative self-concept, which refers to their belief in their creative abilities and potential. According to Karwowski (2015), creative self-concept is a multifaceted construct consisting of two key components: creative self-efficacy (CSE) and creative personal identity (CPI). CSE represents a student's confidence in their ability to successfully engage in tasks that require creative thinking and problem-solving. When students believe they are capable of generating creative ideas, they are more likely to approach challenges with an open mind and persist through difficulties (Bandura, 1977). On the other hand, CPI refers to the degree to which creativity is embedded in a student's self-identity. It involves how students perceive themselves in relation to creativity and how much they value being seen as creative individuals (Karwowski, 2015). Students who identify as creative are more likely to seek out opportunities to express their creativity, both academically and personally, and are often more resilient in the face of challenges.

One effective strategy for fostering students' creativity is the SCAMPER strategy, a structured approach designed to stimulate innovative thinking by guiding students through a series of creative techniques (Gündoğan, 2019). SCAMPER stands for Substitute, Combine, Adapt, Modify, Put to Another Use, Eliminate, and Reverse, each of which encourages different aspects of creative thought (Tharwa, 2019). Several studies have examined the effectiveness of the SCAMPER method in enhancing students' creativity across different educational contexts. For instance, a previous study found that students who participated in SCAMPER-based activities showed significant improvements to generating creative ideas (Hussain, 2017). The study highlighted the method's potential in fostering creative problem-solving abilities and enhancing students' engagement in learning tasks through form and function analogy activities. Another study investigated the impact of SCAMPER on students' creativity (Talebi et al., 2020). Through a series of classroom interventions, the study demonstrated that students exposed to SCAMPER techniques reported higher confidence in their creative abilities. Moreover, Radziszewski focused on the application of SCAMPER in a middle school science curriculum (Radziszewski, 2017). This study implemented SCAMPER-based projects with creativity-building techniques to generate ideas for managing post-conflict stability. The

results indicated that implementation of SCAMPER-based projects developed students' creative problem-solving skills. In a different context, Poon explored the SCAMPER integration on the workshop framework for practitioners to design their own short creativity programs (Poon et al., 2014). SCAMPER techniques were presented to 74 senior secondary students. Student feedback revealed high satisfaction with the workshop and enjoyment of its creativity-enhancing components. These studies collectively underscore the effectiveness of SCAMPER in improving students' creativity across various educational levels and contexts.

Although previous research has demonstrated that SCAMPER can enhance creativity in educational settings, it is important to recognize that SCAMPER, as a thinking strategy, cannot function effectively in isolation. To maximize its impact, SCAMPER should be integrated with a structured learning model that provides clear and sequential learning stages. One such model is Project-Based Learning, which is well-suited for combining with SCAMPER due to its focus on creativity and hands-on exploration. This study focuses on evaluating the effectiveness of SCAMPER Project Teaching in enhancing students' creativity and analysing its relationship with students' CSE and CPI, as well as exploring the relationship between these two constructs in the context of elementary education. The significance of this research lies in its potential to provide empirical evidence on the effectiveness of the SCAMPER Project Teaching in elementary education. Enhancing students' CSE and personal identity can lead to improved academic performance, better problem-solving skills, and greater overall development. This research could inform educational practices and policies, promoting the integration of creativity-focused curricula in schools. The research questions guiding this study are:

1) How does the SCAMPER project teaching influence elementary students' CSE and CPI?
2) What impact does the SCAMPER project teaching have on elementary students' creativity?

Literature Review

Creativity and Its Assessment

Creativity is widely recognized as a complex, multidimensional construct, typically defined by two core attributes: originality and usefulness (Runco & Jaeger, 2012; Sarsani, 2005). Originality refers to the novelty and uniqueness of an idea (Mangion & Riebel, 2023), while usefulness pertains to its relevance or practi-

cal application (Tan et al., 2019). Beyond product-based definitions, creativity also includes cognitive, personal, and environmental dimensions, making it a holistic construct (Guilford, 1986). A common framework for understanding creativity is the 4P model: Person, Process, Product, and Press (Lou et al., 2017). Various instruments have been developed to assess these dimensions. The Short Scale of Creative Self (SSCS) measures creative self-efficacy and identity (Karwowski, 2015), while KEYS and Assessing the Work Environment for Creativity (AWEC) focus on environmental influences (Amabile et al., 1996). The Torrance Tests of Creative Thinking (TTCT) assess divergent thinking skills like fluency and flexibility (Torrance, 1988), and the Creative Product Semantic Scale (CPSS) evaluates the novelty and effectiveness of creative products (Besemer, 1998) (see Table 1). This study focuses on the Person and Product dimensions, reflecting an interest in both internal creative potential and the tangible outcomes of students' project-based learning.

Table 1. Four key dimensions of creativity theory and instrument

4P	Description	Instrument
Person	Distinctive personality traits, including knowledge and behavioural motivations, that drive their ability to think creatively and approach problems with innovation	SSCS
Press	influence of external pressures or environmental factors that motivate an individual to generate creative solutions or products	KEYS and AWEC
Process	Identifying or solving problems through innovative thinking strategies, ultimately leading to the production of creative outcomes	TTCT
Product	Ability to develop something both novel and appropriate, showcasing originality and practical value in its final form	CPSS

Creative Self-Concept

Karwowski's concept of creative self-concept explains how individuals perceive their creativity, highlighting its developmental nature. Young children, especially under age 10, often see creativity as external actions rather than part of their identity. Creative self-concept consists of two components: Creative Self-Efficacy (CSE), the belief in one's creative ability, and Creative Personal Identity (CPI), the extent to which creativity is part of one's self-image (Karwowski, 2015). Teachers can strengthen students' CSE by setting manageable challenges, providing encouragement, and recognizing small creative achievements (Christensen-Salem et al., 2021). Meanwhile, CPI affects students' motivation to express creativity authentically. Those with a strong CPI are more likely to

express original ideas and value creativity in both academic and personal contexts (Puente-Diaz & Cavazos-Arroyo, 2021; Snyder et al., 2021). Supporting both CSE and CPI enables students to approach creativity not just as a skill, but as a part of who they are. Integrating these concepts into education fosters a classroom climate that values creativity. Research shows that students with high CSE are more effective problem-solvers, and those with strong CPI are more likely to view creativity as a lifelong pursuit (Lee, 2022; Newman et al., 2018). By nurturing both constructs, educators can help students engage more deeply, persist through challenges, and take ownership of their creative growth.

Research Methodology

Research Design

This study adopts a quasi-experimental design with a one-group pre-test and post-test design to evaluate the impact of SCAMPER project teaching on students' CSE and personal identity in elementary schools. In this design, a single group of students will be assessed before and after the intervention, allowing for the measurement of changes resulting from the SCAMPER teaching method. The one-group pre-test and post-test design enables the comparison of baseline and post-intervention data to determine the effectiveness of the intervention. While this design lacks a control group, it provides valuable insights into the potential benefits of SCAMPER-based teaching on enhancing students' creativity and related self-concepts.

Setting and Participant

The study involved 131 elementary students from grades 2 to 6, aged 9 to 12, enrolled in public schools in Yogyakarta, Indonesia. This age group was chosen as it represents a key period for cognitive and creative development, ideal for assessing the impact of creative teaching methods. A stratified random sampling technique ensured a representative sample across grades and demographics. Ethical compliance was maintained through school consent and child assent. The study was conducted in schools using the Indonesian Curriculum, which organizes learning outcomes into Phase A (grades 1–2), Phase B (grades 3–4), and Phase C (grades 5–6), with projects aligned to the Indonesia Curriculum for each phase. Project themes and participant numbers per phase are shown in Table 2.

Table 2. Number of participants and project themes in each phase of elementary school

Phase	Grade	Range of students' age	Project Themes	Number of participants		
				Male	Female	Total
A	1–2	7–8 years old	Artificial environment	12	14	26
B	3–4	8–9 years old	Water cycle	16	14	30
		9–10 years old	Cultural diversity	13	13	26
C	5–6	10–11 years old	Creative economy	14	12	26
		11–12 years old	Solar system	10	13	23
Total of participants				65	66	131

Procedures

This study involved five project themes: artificial environment, water cycle, cultural diversity, creative economy, and solar system (see Table 3). In the artificial environment project, students recreated basic components needed for life, such as water, air, and plants, to explore how ecosystems are formed. The water cycle project visualized key processes like evaporation, condensation, and precipitation, deepening students' understanding of water circulation. The cultural diversity project highlighted traditional foods, clothing, and houses from different Indonesian regions, fostering cultural appreciation. In the creative economy project, students repurposed waste materials (e.g., newspapers) into useful items like photo frames and pencil holders, promoting sustainability. Lastly, the solar system project had students build interactive models of planetary orbits, reinforcing their grasp of astronomy concepts.

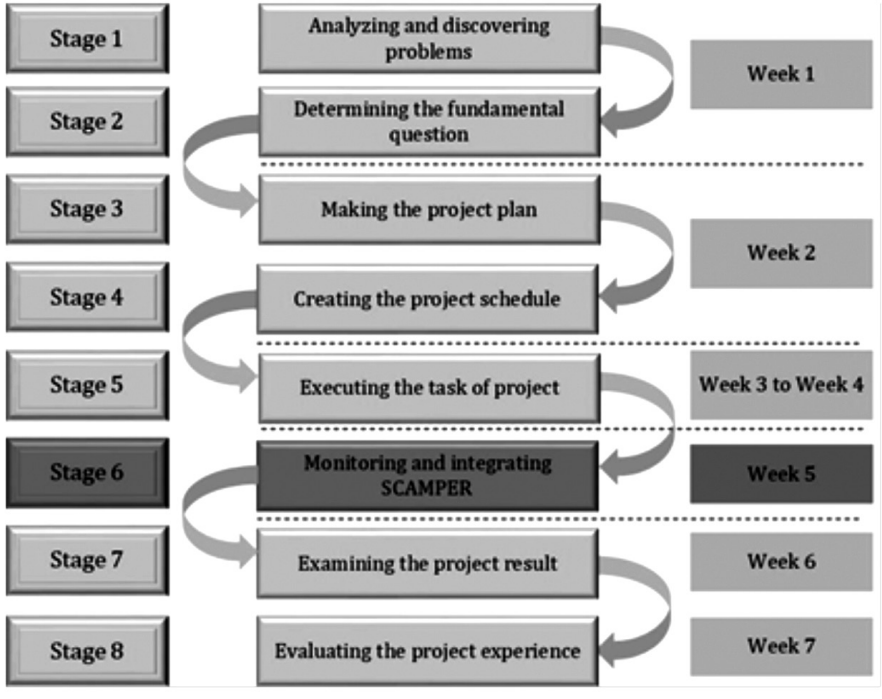
Table 3. Description of Students' Project

Project	Description
Artificial environment	This project replicates the environment required by living things by incorporating essential components such as water, plants and air.
Water cycle	This project illustrates the continuous circulation of water in the Earth's atmosphere, covering processes such as evaporation, transpiration, condensation, precipitation, and infiltration.
Cultural diversity	This project represents the cultural elements of West Sumatra, including typical food, traditional clothing, and traditional houses.

Project	Description
Creative economy	This project showcases students' ability to create useful items from unused materials. In this case, they made a photo frame, bank box and pencil case from newsprint.
Solar system	This project illustrates the solar system with the sun at the center and the planets orbiting around it.

The selection of themes for the project is carefully aligned with the learning outcomes outlined in the Indonesian curriculum. Each theme is designed to integrate critical knowledge areas such as science, culture, and sustainability, providing a holistic learning experience. The project spans a duration of seven weeks, with students dedicating 105 minutes per week to collaborative, hands-on activities. This structured time frame allows students to deeply engage with the material, gradually developing their understanding while applying the SCAMPER method to refine their ideas and solutions. The learning process in this study follows eight distinct stages, as illustrated in Figure 1.

Figure 1. Learning stages of SCAMPER project teaching



Before the intervention, students were divided into groups of 5–6 (artificial environment = 5 groups; water cycle = 6; cultural diversity = 5; creative economy = 5; solar system = 4). The SCAMPER project teaching followed structured stages, beginning with problem analysis, defining a central question, and planning project goals, tasks, and roles. Students then developed schedules, executed their plans through data collection, prototyping, and implementation, while applying the SCAMPER strategy—Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Rearrange—to enhance creativity. To support this, students received seven guided instructions (see Table 4). The Guided Instruction supports students in applying the SCAMPER strategy to enhance creativity during project work. Rather than using all strategies, students select those most relevant to their project. Each instruction is evaluated for suitability, and irrelevant ones can be skipped. For example, in the solar system project, students might substitute materials (e.g., clay for foam balls), add rotating features, adapt models to represent different planetary systems, modify planet sizes for accuracy, find new uses for the model, eliminate unnecessary parts, or reverse planetary sequences to spark discussion.

Table 4. Guided instructions for improving product quality through SCAMPER.

SCAMPER Element	Description
S – Substitute	Identify materials, resources, roles, ingredients, methods, or procedures that can be replaced with better alternatives to enhance the product's quality and efficiency.
C – Combine	Explore the potential for merging ideas, materials, features, processes, or resources to create a more effective or multifunctional product.
A – Adapt	Look at other successful products or ideas that can be adapted to improve your product. Consider how the product can be adjusted for different markets, audiences, contexts, or environments, and how its design or layout can be altered to better fit specific needs.
M – Modify	Think about how you can change the product's size, shape, appearance, color, texture, material, functionality, features, name, or branding to make it more appealing, versatile, or efficient.
P – Put to another use	Identify additional uses or applications for the product, possibly in different industries or fields. Consider repurposing the product or its by-products for new functions or recycling leftover materials.
E – Eliminate	Determine which parts of the product can be removed without affecting its functionality. Simplify the design or process, reduce the number of features to focus on the core function, and eliminate any harmful or non-eco-friendly components.

SCAMPER Element	Description
R – Reverse	Explore the possibilities of reversing the order of processes or steps, turning problems into advantages, reversing the product's use or direction, and rethinking assumptions about the product and its market to uncover new opportunities.

Data Collection

Data were collected over seven weeks, with students' CSE and CPI measured before and after the intervention using the Short Scale of Creative Self (SSCS) (Karwowski, 2016). The 11-item SSCS assesses CSE and CPI on a 5-point Likert scale and has strong reliability (CSE $\alpha = 0.72$; CPI $\alpha = 0.91$). Inter-item correlations ranged from 0.31 to 0.76, supporting its validity for measuring creative self-concept (Wahyudi et al., 2023). Students' project outputs were assessed using the Creative Product Semantic Scale (CPSS), which evaluates creativity across three dimensions: novelty, resolution, and elaboration/synthesis. The 16-item scale demonstrated high internal consistency in this study (novelty $\alpha = 0.82$; resolution $\alpha = 0.82$; elaboration/synthesis $\alpha = 0.85$), with inter-item correlations ranging from 0.83 to 0.99, confirming the CPSS as a reliable tool for evaluating creative products (Besemer, 1998).

Data Analysis

To analyze the mean differences between pre- and post-intervention, we utilized descriptive statistics for each item, including the mean and standard deviation for the pre-test, post-test, and N-gain. Q-Q plots were employed to visually assess the normality of the data distributions, which indicated that the data for N-gain were normally distributed pre- and post-intervention. The Kolmogorov-Smirnov test with Lilliefors correction was used to verify the normal distribution. For comparing group means, t-tests with equal variance assumptions were applied. When the assumption of equal variances was violated, Welch's t-test was employed to determine statistical differences. Additionally, for significantly different group sizes (1.5-fold difference), the nonparametric Wilcoxon sign-rank test was used. Statistical significance was determined with a threshold of $p<0.05$ for all tests. All statistical analyses were performed using a statistical package program.

Results

Influence of SCAMPER Project Teaching on CSE and CPI

The first aim of this study was to enhance students' CSE and CPI through SCAMPER project teaching. CSE reflects confidence in one's creative ability, while CPI relates to how creativity is integrated into one's self-concept. Using the 11-item SSCS (5-point scale), results showed an increase in both CSE and CPI across all project themes (Table 5). For CSE, mean scores rose notably—for example, from 3.07 to 3.28 in the Artificial Environment project and from 2.99 to 3.40 in the Solar System project. Similarly, CPI scores improved, with the Solar System project showing the largest gain from 2.95 to 3.33. These findings indicate that SCAMPER teaching effectively strengthened students' creative confidence and identity.

Table 5. Descriptive data result for pre- and post-intervention of students' CSE and CPI in each project

Projects	Pre-Intervention		Post-Intervention	
	CSE	CPI	CSE	CPI
Artificial environment				
Mean (5-scales)	3.07	2.85	3.28	3.02
SD	0.28	0.24	0.29	0.30
Water cycle				
Mean (5-scales)	3.01	2.93	3.35	3.03
SD	0.45	0.39	0.45	0.52
Cultural diversity				
Mean (5-scales)	3.02	2.85	3.12	3.01
SD	0.28	0.37	0.26	0.41
Creative economy				
Mean (5-scales)	3.05	2.98	3.14	3.07
SD	0.31	0.28	0.36	0.30
Solar system				
Mean (5-scales)	2.99	2.95	3.40	3.33
SD	0.34	0.40	0.24	0.25

Table 6. Wilcoxon paired sample test for CSE and CPI between pre- and post-intervention

Projects	CSE	N	Mean	Z value	p	Cohen's d
Artificial environment*	Pre-Intervention	26	3.07	4.679	0.000	1.037
	Post-Intervention	26	3.28			
Water cycle*	Pre-Intervention	30	3.01	4.812	0.000	1.072
	Post-Intervention	30	3.35			
Cultural diversity*	Pre-Intervention	26	3.02	3.097	0.002	0.496
	Post-Intervention	26	3.12			
Creative economy*	Pre-Intervention	26	3.05	1.687	0.000	0.357
	Post-Intervention	26	3.14			
Solar system*	Pre-Intervention	23	2.99	3.735	0.000	1.929
	Post-Intervention	23	3.40			
Projects	**CPI**	**N**	**Mean**	**Z value**	**p**	**Cohen's d**
Artificial environment*	Pre-Intervention	26	2.85	3.256	0.001	0.880
	Post-Intervention	26	3.02			
Water cycle*	Pre-Intervention	30	2.93	2.388	0.017	0.307
	Post-Intervention	30	3.03			
Cultural diversity*	Pre-Intervention	26	2.85	2.913	0.004	0.587
	Post-Intervention	26	3.01			
Creative economy*	Pre-Intervention	26	2.98	1.681	0.000	0.411
	Post-Intervention	26	3.07			
Solar system*	Pre-Intervention	23	2.95	2.920	0.004	1.627
	Post-Intervention	23	3.33			

*Differences between pre- and post-intervention are significant ($p<0.05$).

Although all projects showed increases in CSE and CPI, significance testing was needed. Prerequisite tests indicated that the data were not normally distributed (Q-Q plot and Kolmogorov-Smirnov test, $p < 0.05$) and not homogeneous (Levene's test, $p < 0.05$). Thus, parametric tests were not suitable, and the Wilcoxon Sign-Rank Test was used to analyze pre- and post-intervention differences (see Table 6). The Wilcoxon test showed significant improvements in CSE and CPI across all projects ($p < 0.05$). Effect sizes varied, with the Solar System project showing the highest impact (CSE $d = 1.929$; CPI $d = 1.627$), while the Creative Economy project showed moderate gains (CSE $d = 0.357$).

These variations suggest that although all projects were effective, some had a stronger influence on students' creative development.

Influence of SCAMPER Project Teaching on Students' Creativity

Student projects—artificial environment, water cycle, cultural diversity, creative economy, and solar system—served as benchmarks for assessing creativity over a seven-week period. These projects align with Indonesia's elementary curriculum and encourage hands-on learning. For instance, the artificial environment project applied ecosystem knowledge; the water cycle explored earth science concepts; cultural diversity promoted cultural appreciation; the creative economy fostered innovation through recycling; and the solar system deepened understanding of astronomy. Table 7 showed the SCAMPER strategy of the students' project outcomes. Each project integrated SCAMPER strategies to boost creativity and understanding. The artificial environment used simulated natural elements; the water cycle employed symbols to simplify processes; cultural diversity visualized West Sumatran culture; the creative economy reused newspapers for functional products; and the solar system modeled planets using play dough. These activities show SCAMPER's role in making complex ideas accessible and stimulating creative thinking.

Table 7. Description of sample student products from each project with the use of SCAMPER strategy

Project	SCAMPER strategy	Final Product
Artificial environment	1. Combine: They combined various elements such as water, plants and air to create a comprehensive artificial environment. 2. Modify: Dimensions or aspects of the natural environment may have been modified to suit the needs of the project. 3. Put to another use: Artificial materials are used to represent natural elements. 4. Eliminate: Non-essential elements of the natural environment have been removed to focus on the essential components.	
Water cycle	1. Substitutes: Students substitute various symbols to represent different phases of water from scrap materials. 2. Combine: Different stages of the water cycle are combined into one illustration. 3. Eliminate: Complicated details are removed to simplify the product. 4. Reverse: The flow of the water cycle can be shown in reverse to explain the continuous nature of the cycle.	

Project	SCAMPER strategy	Final Product
Cultural diversity	1. Substitute: Symbols or icons have been replaced to represent cultural elements. 2. Combine: Various cultural aspects were combined into one comprehensive map. 3. Adapt: Cultural elements were adapted into a visual format. 4. Eliminate: Non-essential cultural details have been omitted.	
Creative economy	1. Substitutes: Newsprint is used to replace the photo frame material. 2, Combine: the product combines a photo frame, pencil case and bank box 3. Adapt: Unused items were adapted into a functional new product. 4. Modify: The shape or structure of the newsprint has been modified to create a frame.	
Solar system	1. Substitute: Replaced the sun by incorporating a glowing light and changing planetary symbols with play dough for size customization. 2. Combine: Various elements of the solar system are combined into one illustration. 3. Modify: The size or scale of the planets may have been modified for clarity. 4. Eliminate: Unimportant details were removed to focus on key elements.	

Descriptive data in Table 8 showed highlights the significant impact of SCAMPER project teaching in cultivating creativity. SCAMPER, a creative thinking technique, encourages students to reimagine ideas by exploring different perspectives and modifying existing concepts to generate innovative solutions. The resolution dimension had the highest mean (6.27), followed by elaboration/synthesis (6.18), and novelty (5.53). These results suggest that SCAMPER not only encourages students to think divergently and creatively but also guides them in refining their ideas into coherent and practical solutions. The technique's ability to engage students in creative problem-solving while enhancing their capacity to produce detailed, innovative, and effective projects underlines its potential as a powerful tool for enhancing creativity in educational settings.

Table 8. Descriptive data result for assessment of creativity product

Products	Novelty	Resolution	Elaboration and synthesis
Artificial Environment			
Mean (5-scales)	5.80	6.23	6.27
SD	0.72	0.62	0.69

Products	Novelty	Resolution	Elaboration and synthesis
Water Cycle			
Mean (5-scales)	5.89	6.43	6.28
SD	0.79	0.38	0.48
Cultural Diversity			
Mean (5-scales)	5.28	6.21	5.97
SD	0.35	0.73	0.80
Creative Economy			
Mean (5-scales)	5.17	6.21	6.19
SD	0.76	0.42	0.63
Solar System			
Mean (5-scales)	5.50	6.29	6.17
SD	0.66	0.39	0.56

Discussion

The SCAMPER project teaching method has proven highly effective in enhancing students' CSE and CPI. By immersing students in hands-on creative tasks, SCAMPER allows them to experiment, adapt, and refine ideas. This active engagement builds confidence in their creative abilities (CSE) and helps them see themselves as creative individuals (CPI). These findings align with Bandura's self-efficacy theory, which emphasizes that belief in one's capabilities directly influences motivation and performance (Stolz et al., 2022). SCAMPER encourages students to take creative risks, solve problems, and explore multiple solutions. These repeated experiences help students internalize creativity as a learnable, evolving process rather than a fixed trait (Chen et al., 2022). As students succeed, their confidence grows, reinforcing a positive feedback loop of motivation and engagement (Çelikler & Harman, 2015). Moreover, SCAMPER's focus on combining, modifying, and adapting ideas promotes deeper involvement and supports the development of originality.

Previous studies have shown that creativity-focused interventions can significantly boost CSE and CPI. Jaussi et al. (2007) found that individuals with higher creative self-beliefs were more likely to participate in creative activities. Puozzo and Audrin (2021) similarly demonstrated that engaging students in creativity-enhancing tasks leads to stronger self-efficacy and better creative outcomes. Lou et al. (2012) added that higher CSE supports students in taking creative risks, resulting in more innovative work. However, not all students respond equally. Du et al. (2019) noted that some students may struggle if they

feel unprepared or unsupported, highlighting the importance of scaffolding in creativity-based instruction.

In this study, SCAMPER was applied across multiple student projects. In the solar system project, for example, students used SCAMPER strategies like "Substitute" by replacing the sun with a glowing light and traditional planet models with custom-shaped playdough. They used "Combine" to merge features into a cohesive illustration and "Modify" to adjust planetary sizes for better understanding. By applying "Eliminate," they removed irrelevant details, improving focus and clarity. These applications demonstrate not only creativity but also critical thinking and a deeper engagement with content. Based on assessments using the CCPS, students achieved high creativity scores, particularly in novelty and resolution. For example, the water cycle project scored 5.89 for novelty and 6.43 for resolution. The artificial environment project also performed well, with novelty at 5.80 and elaboration at 6.27. These results align with Torrance's theory of creativity, which highlights originality and fluency in idea generation (Al-Moosawi, 2019). SCAMPER's emphasis on divergent thinking clearly supports these creative competencies. High elaboration and synthesis scores suggest that students could effectively integrate multiple ideas into cohesive outcomes. This reflects Amabile's componential theory of creativity, which views creativity as combining knowledge in novel ways (Kukkonen & Bolden, 2022). SCAMPER strategies such as "Combine" and "Adapt" appear especially effective in promoting this integrative thinking. However, novelty scores were slightly lower for the cultural diversity (5.28) and creative economy (5.17) projects, suggesting that SCAMPER's potential may be underutilized in more abstract topics. Repeated and varied applications of the method, as recommended by Chen et al. (2022), could help address this and encourage more unconventional thinking in such areas. In summary, SCAMPER supports students' creative growth by boosting their confidence, strengthening their creative identity, and enhancing their ability to produce original, well-developed work. These findings not only validate SCAMPER as an effective teaching tool but also extend theoretical models of creativity by showing how structured pedagogical strategies can foster innovation across diverse learning contexts.

Conclusions

The study found that the SCAMPER Project Teaching method significantly improved elementary students' CSE and CPI. Post-intervention scores showed increased confidence and stronger integration of creativity into students' self-concept, supporting the value of structured creative strategies in education.

These results align with prior research and the componential theory of creativity, which emphasizes novelty, resolution, and practical synthesis. While SCAMPER was broadly effective, its impact could be strengthened through more targeted applications to encourage original thinking. However, the study had limitations. The quasi-experimental design without a control group limited causal conclusions, and the short seven-week duration may not reflect long-term effects. The sample was also restricted to specific groups in five schools, limiting generalizability. Including all students across different phases (A, B, and C) would offer broader insights into SCAMPER's effects across developmental stages. Future research should incorporate longer follow-up periods and more diverse samples to better understand the method's sustained impact.

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