
د. أشواق أحمد حمود المذن

Elementary teachers' conceptions of the effects of using SCAMPER method on strengthening students' understanding

د. أشواق أحمد حمود المذن

Dr. Ashwag Ahmed Hammod Almethen

أستاذ مساعد بقسم المناهج وطرق التدريس - كلية التربية - جامعة الملك فيصل

Assistant Professor at Curriculum & Instruction Department-
College of Education in King Faisal University

Abstract:

SCAMPER is one of the many techniques used by teachers to help enhance understanding among students. Given that teachers are involved in aspects of its utilization in class, the current study sought to determine their perspectives on the impact it has in strengthening students' understanding. Semi-structured interview questions were used to collect data from 15 elementary school teachers from Saudi Arabia who were selected using randomly sampling technique. The data was analyzed using thematic analysis to identify the themes. The themes were compressed into eight main sections (S1-S8) which were used for the discussion and conclusions. Results indicated that the majority of the teachers had long experiences using the technique and generally had a positive perspective of it. Some of the benefits reported include increased student engagement and enhanced creativity which were said to help improve understanding. Some teachers have noted some difficulties with implementing SCAMPER, such as student misunderstanding. Generally, however, the majority of instructors said that SCAMPER is a great tool to enhance student understanding. Using the results, a few recommendations were made in the conclusion which might be of benefit to teachers interested in implementing the technique to boost student understanding.

Key words: SCAMPER- students' understanding- teachers' perspective.

تصورات معلمي المرحلة الابتدائية لتأثير استخدام طريقة سكامبر على تنمية فهم الطلاب

ملخص الدراسة:

سكامبر هي إحدى التقنيات العديدة التي يستخدمها المعلمون للمساعدة في تعزيز الفهم لدى الطلاب. نظرًا لأن المعلمين يشاركون في جوانب استخدامها في الفصل، سعت الدراسة الحالية إلى تحديد وجهات نظرهم حول تأثيرها في تعزيز فهم الطلاب. تم استخدام أسئلة المقابلة شبه المنظمة لجمع البيانات من 15 معلمًا في المرحلة الابتدائية في السعودية وتم اختيارهم باستخدام أخذ العينة العشوائية وتم تحليل البيانات باستخدام التحليل الموضوعي لتحديد الموضوعات الرئيسية. وقد تم حصر الموضوعات في ثمانية أقسام رئيسة وأُستُخدمت للمناقشة والاستنتاجات. وقد أشارت النتائج إلى أن غالبية المعلمين لديهم خبرات طويلة في استخدام التقنية وكان لديهم بشكل عام منظور إيجابي عنها. تتضمن بعض الفوائد التي تم الإبلاغ عنها زيادة مشاركة الطلاب وتحسين الإبداع الذي قيل إنه يساعد في تحسين الفهم. وقد أبلغ بعض المعلمين أيضًا عن بعض التحديات لاستخدام سكامبر، مثل الارتباك بين بعض الطلاب. وبشكل عام، أظهرت آراء أغلبية المعلمين أن سكامبر أداة فعالة في تعزيز فهم الطلاب. وبناء على تلك النتائج، تم تقديم بعض التوصيات التي قد تكون مفيدة للمعلمين المهتمين بتطبيق هذا الطريقة لتعزيز فهم الطلاب.

الكلمات المفتاحية: سكامبر - فهم الطلاب - رأي المعلمين.

Introduction:

As cognitive scientists have discovered, the birth of every new idea is rooted in prior knowledge and experiences (Chan, Dow, & Schunn, 2018). Recognizing this cognitive principle, the SCAMPER method emerges as a powerful brainstorming technique, capitalizing on individuals' existing knowledge and experiences to foster novel ideas and problem-solving strategies. Particularly relevant within the field of education, SCAMPER, an acronym for Substitute, Combine, Adapt, Magnify/Modify, Put, Eliminate, and Rearrange, presents a structured approach to idea generation (Khawaldeh & Ali, 2016). Developed by Bob Eberle in 1971, SCAMPER stands as a versatile tool embraced by industries to fuel innovation, create new products and services, and tackle challenges (Altıparmak & Mustu, 2021).

While SCAMPER's adaptability extends to diverse sectors, its application in education has garnered substantial attention. Teachers have harnessed SCAMPER's cognitive power to promote high-order thinking, enhance productivity, and foster problem-solving skills among students (Altıparmak & Mustu, 2021; Khawaldeh & Ali, 2016; Serrat, 2017). Notably, SCAMPER is not merely a creative technique; it serves as a conduit for strengthening students' comprehension and knowledge acquisition (Khawaldeh & Ali, 2016). By guiding students through a sequence of steps—Substitute, Combine, Adapt, Magnify/Modify, Put, Eliminate, and Rearrange—SCAMPER encourages them to revisit existing knowledge and experiences, facilitating the generation of innovative ideas (Khawaldeh & Ali, 2016). This process forms a bridge that propels learners from one level of understanding to the next, with their prior knowledge acting as the bedrock upon which new insights are constructed.

Altıparmak and Mustu (2021) emphasize SCAMPER's ability to liberate thinkers from the confines of established ideas through a series of probing questions designed to elicit fresh perspectives. This shift in perspective equips students with the tools to approach familiar knowledge and experiences from novel angles, culminating in the creation of new ideas and novel solutions (Altıparmak & Mustu, 2021). Khawaldeh and Ali (2016) corroborate this, asserting that SCAMPER empowers students to engage deeply with their existing understanding, catalyzing the development of fresh insights that are uniquely their own. By nurturing this cognitive dexterity, SCAMPER emerges as an educational catalyst, facilitating the journey from conventional knowledge to innovative mastery.

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At the heart of the educational landscape, SCAMPER has evolved into a quintessential tool for nurturing thinking and creativity among students. Research conducted by Özyaprak (2016), AL Zayat (2014), and Al-Zuwaini (2019) has underscored SCAMPER's efficacy in fostering thinking skills and creativity among kindergarten and elementary students. Additionally, a growing body of evidence suggests that SCAMPER plays a pivotal role in deepening students' grasp of complex concepts and materials (Mahfouz, 2019; AL Zayat, 2014; Hussain & Carignan, 2016). While numerous studies have explored the impact of SCAMPER on students, this study takes a unique perspective, delving into teachers' perceptions of its potency in enhancing students' understanding.

In view of these insights, this study seeks to illuminate the conceptions held by elementary school teachers regarding the effects of the SCAMPER method on bolstering students' comprehension. By focusing on educators' perspectives, the study also aims to enrich our understanding of SCAMPER's role within the dynamic realm of primary education, shedding light on how teachers harness this technique to cultivate cognitive growth and empower students with lasting learning experiences.

Problem Statement and Significance of Study

Mattox (2019) writes in an essay published on Edutopia that students are more likely to become involved when they understand how to learn. As a result, students can understand what they are learning and build on it. A variety of strategies have been implemented and tested to help encourage active participation and understanding/comprehension and thus enhance overall learning outcomes. SCAMPER, which is still relatively new, enables students to consider multiple alternative ideas through seven major steps. Based on a number of studies, it has been shown to help improve critical thinking which is an important component of comprehension. As Idek (2016) suggests, critical thinking is also regarded as deep understanding according to the Structure of Observed Learning Outcomes. Although SCAMPER has been shown to improve understanding by enhancing critical thinking and creativity, some studies have identified a number of important challenges that can hinder this outcome. According to Wulandari and Santoso (2019), implementation is one of the most common obstacles when it comes to using the technique. In other reports, SCAMPER has been said to be confusing and consequently time-consuming (Kwawaldeh, 2018). These issues can create a negative perception of the approach and thus further affect students' understanding. Given that teachers spend a lot of time engaging with students, implementing, and utilizing such

methods, it is important to understand their conceptions of how it affects students' understanding.

Based on a variety of studies, SCAMPER has many advantages and applications. However, these studies and other reports have identified several weaknesses and limitations that can affect its usefulness. Aside from challenges involving its implementation, Istamova (2021) notes that it may require a specific atmosphere that promotes its use. Elementary school teachers are directly involved in every facet of SCAMPER's implementation – from their own learning of the method to guiding students in applying it to their learning experiences. This unique position empowers them to not only understand how the SCAMPER method functions but also to witness its impact firsthand within the classroom environment. By tapping into the insights of these educators, this study aims to shed light on several crucial aspects, namely, effectiveness of scamper, main challenges, solutions and improvements, and thus be in a position to positively contribute to existing literature and practices.

Effectiveness of SCAMPER: By understanding how teachers perceive the effects of using the SCAMPER method, it might be possible to gain valuable insights into its practical outcomes. This knowledge can consequently guide educational practitioners in making informed decisions about integrating SCAMPER into their teaching strategies.

Challenges: Teachers, through their intimate involvement in the SCAMPER process, are uniquely positioned to identify specific challenges that may arise during its implementation. These challenges span a spectrum, from addressing student engagement to adapting the method across various subjects, and even navigating cognitive barriers faced by students. Additionally, by working closely with students during SCAMPER exercises, teachers gather firsthand accounts of the aspects that students find challenging. These observations serve as a solid foundation for the development of targeted interventions aimed at addressing these challenges and enhancing students' understanding.

Solutions and Improvements: By being at the forefront of implementing SCAMPER, teachers are uniquely positioned to propose strategies and solutions to tackle the identified challenges. Their input can foster an ongoing cycle of improvement, making the SCAMPER method more effective over time.

By highlighting teachers' conceptions of the effects of using the SCAMPER method to bolster students' understanding, the study has the potential to contribute to the

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larger discourse on innovative pedagogical approaches and provide actionable insights that can be applied by educators to enhance their teaching methodologies. As such, the study can serve as a foundation for future research and aids educators in their continuous efforts to elevate the quality of education through innovative techniques like SCAMPER.

Study Question

What are the teachers' conceptions of the effects of using SCAMPER method to strengthen students' understanding?

Purpose of the Study

Given that teachers are involved in all aspects of SCAMPER use, the study aimed to determine their conceptions of its effect on strengthening students' understanding. As the party that has experience with this technique and spends more time with students in school, teachers are more likely to be aware of these effects. The study also offered insights on the benefits and challenges of SCAMPER in school and how the teachers have responded to the challenges in an attempt to maximize the overall benefits.

Definitions of Terms

SCAMPER: The SCAMPER method, an acronym that stands for Substitute, Combine, Adapt, Magnify/Modify, Put, Eliminate, and Rearrange, serves as a structured approach for generating innovative ideas. Rooted in creative thinking, SCAMPER prompts users to systematically revisit existing knowledge and experiences to produce novel concepts. Within the Saudi Arabian primary school context, SCAMPER is not only a theoretical construct but also a practical tool that engages both teachers and students. By substituting, combining, adapting, and rearranging elements, primary school teachers encourage students to explore their cognitive capacities and cultivate inventive thinking. This method aligns with Saudi Arabia's emphasis on nurturing creative problem-solving skills among students, preparing them for the challenges of a rapidly evolving world (Khawaldeh & Ali, 2016).

Comprehension: Comprehension, as elucidated by Duke (2003), is a multifaceted process wherein primary school students in Saudi Arabia construct meaning by actively engaging with textual content. This interactive process involves amalgamating their prior knowledge and experiences, the textual information at hand, and their personal perspectives. For primary school teachers in Saudi Arabia, fostering comprehension

involves not only imparting reading skills but also guiding students to relate textual content to their own contexts and understandings. The application of comprehension strategies within Saudi Arabian primary education is a dynamic interaction that seeks to create proficient readers who can critically engage with diverse texts and thoughtfully derive meaning from them.

Theoretical Framework

This study was guided by the constructionist theory. Developed by Seymour Pappert, constructionism holds that knowledge is better gained when learners are involved in the construction of knowledge (Xerou, Papadima, Sophocleous, & Parmaxi, 2016). As Resnick (1996) points out, "it asserts that learning is an active process, in which people actively construct knowledge from their experiences in the world" (Par. 7). The theory, therefore, places greater emphasis on the active participation of individuals in the construction of knowledge rather than simply acting as passive recipients of the same. Resnick (1996) adds that individuals are likely to construct new knowledge more effectively when they are involved in its construction than those who do not actively participate. The theory is therefore ideal for this study and will help explain how active participation/engagement using SCAMPER can help strengthen understanding among students. In his description of constructionism, Resnick (1996) mentions that learning is an active process through which knowledge is constructed from past experience. This is in line with the concept of SCAMPER which aims to enhance knowledge and the creation of new ideas from existing knowledge and experiences. This is related to an important aspect of constructionism known as distributed constructionism. As Resnick (1996) explains, this aspect recognizes that the development of cognition and intelligence arises from interactions between individuals and their surroundings. These surroundings may include other people or artifacts that surround them. This is also an important viewpoint of the theory that can further inform the study of the role of SCAMPER in enhancing students' understanding.

Literature Review

Popularity of SCAMPER

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First suggested by Alex Osborn, the SCAMPER technique was further developed by Bob Eberle, an educational administrator (Serrat, 2017). According to Serrat, SCAMPER was designed for the purpose of increasing interest in imagination, creativity, and perception among children. Einstein (1998), on the other part, notes that it is an important tool when there is a need to change direction in an idea-generating session, looking for breakthrough ideas, need to speed up the pace of generating new ideas, consider new and varied perspectives, and stretch group thinking and help a group move away from their current assumptions and past experiences. For these reasons, the technique is used in many industries across the globe for innovation and the creation of new products and services.

Although not as common as some of the other techniques used to enhance learning around the world like mind mapping, SCAMPER is still used around the world. However, it is also more prevalent in some parts of the world than in others. In a study conducted in Jordan on the impact of SCAMPER on improving writing skills, Al Qudah (2018) describes it as a recent strategy for promoting thinking skills. However, the author also highlights some of the other countries in which the technique has been studied which imply that it is popular to some extent in these countries. These include Egypt, Saudi Arabia, Hong Kong, Turkey, and Singapore. In these regions, SCAMPER was found to have a positive impact on creative thinking. Gündoğan (2019) also reports that SCAMPER is one of the many techniques that are commonly used to improve creativity among children. This is further supported by Radziszewski (2017) who notes that "SCAMPER has been used for brainstorming by teachers in elementary technology classes, utilized in innovation training at interdisciplinary conferences, and embraced by companies such as McDonalds" (p. 8).

With respect to education, many studies and reports have focused on the benefits and its uses among children. According to Serrat (2017), the technique was primarily developed to enhance the creativity, imagination, and perceptive abilities of children. Gündoğan (2019) also notes that SCAMPER is common among children three years old and older while Einstein (1998) highlights some of the benefits it can have to help children learn about disposing of household trash or designing curricula. However, according to Kocatepe, Haşiloğlu, and Kurt (2019) studies have shown that the technique is rarely used in at the secondary level both in Turkey and abroad. These findings indicate that the technique is largely used to help children in their learning process and in various industries around the globe.

Utilization and variations of SCAMPER

Because it serves to produce new ideas and create knowledge from existing experiences, SCAMPER has many applications in business, education, and other aspects of life. As Einstein (1998) explains, it is very useful when new ideas and perspectives are needed, innovation and breakthroughs, and helping groups move away from the assumptions and experiences that they currently hold. In education, it is particularly used to boost creative thinking and thus boost overall performance (Gündoğan, 2019; Radziszewski, 2017; Kocatepe, Haşiloğlu, & Kurt, 2019). By enhancing creative thinking, SCAMPER can help foster an inventive mindset among students while also encouraging predictive and forecasting activities (Einstein, 1998). As Gündoğan (2019) explains, "Creative imagination is the ability to rearrange and manipulate existing information and convert it into unique and original mental images" (p. 316). This approach allows young people to not only create or invent but also develop a vision through which they can predict and forecast based on what they currently know. These are all important areas of utilization of SCAMPER.

Although SCAMPER has a set of steps to be followed (Substitute, Combine, Adapt, Modify/Magnify, Put, Eliminate, Reverse/Rearrange), it is flexible in that it allows users the freedom to utilize various steps in a number of ways. According to Einstein (1998), the letter "R" in SCAMPER can be used to represent Reverse, Rotate, Revolve, and Revive. As a result, users have the freedom to use it in a creative manner how they see fit in order to create new ideas or solve problems. This point is supported by Ozyaprak (2016) who points out that the leading questions in the technique promote flexibility and fluency in thinking. This means that different types of students can use the technique in many different ways to achieve different goals and objectives.

Advantages and disadvantages of SCAMPER

Flexibility is one of the biggest advantages of SCAMPER. This allows it to be used in various environments where creativity is needed (Ozyaprak, 2016). As Einstein (1998) explains, "Each of the words associated with the letters suggests a number of questions that can support the word and trigger the flow of options. These questions often help open up a wide range of possibilities" (p. 5). Radziszewski (2017) also raises an important point, noting that SCAMPER is dependent on cues that allow students to connect ideas from a variety of domains, explore their random combinations, and consequently reduce mental blocks. In a study investigating students' perspective of SCAMPER, participants that

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through the seven-idea generating process, they gained a much clear design path than they did with mind mapping (Ang & Yuen, 2016). In another study, the flexibility of the technique was shown to help students develop new ideas that were reflected in their respective designs (Kamis et al., 2020).

Another major strength of SCAMPER is that it fosters self-regulated learning (Özyaprak and Taşçılar, 2019). Through the seven major steps, students are involved in the actual process of knowledge construction and consequently gain new and varying perspectives. This is an important aspect of the technique that can greatly strengthen students' understanding given that students would be in a better position to know and remember the steps they followed in the construction of new ideas. As Özyaprak and Taşçılar (2019) point out, "This process can be organized and adapted according to the learning environment. Thus, learning is regulated by the person individually and becomes permanent" (p. 17). On the other hand, by creating an enjoyable environment in which learners actively participate, SCAMPER eliminates the monotony of passive learning (a traditional mode of learning) thus enhancing the overall learning processes. In a study that was conducted by Ang and Yuen (2016), students became more interested in the technique after using it for the first time citing enhanced creativity as the primary reason. As one of the students disclosed "I would prefer to use SCAMPER rather than Mind map because I can draw and see the graphics" (p. 5). This can be viewed as the opportunity or an invitation for students to actively participate and express themselves through the main steps and observe their creation become a reality through this process.

Although SCAMPER has various benefits, there are also several challenges that affect its effectiveness. One of the main challenges is uncertainty. As some of the students have pointed out, it can be difficult to know how to start. As a result, this could result in a creativity block (Ang & Yuen, 2016). However, they also mentioned that with the right assistance following implementation, it gradually becomes easier and enjoyable to use the technique. While SCAMPER is recognized for its ability to influence creativity, Al-Wahaibi (2013) points out that this is not the case. This, according to Al-Wahaibi, is because the technique requires an environment that truly inspires creativity. Without this, it fails to be as effective as it should be. This can be a big disadvantage, especially in a scenario where the user fully relies on the technique to become creative. Al-Wahaibi notes that "It is difficult to come up with ideas if one is not provided much of creative influence," (p. 11). Therefore, without some creative input or influence, creativity might be foiled.

Luckily, students can engage their teachers or access a variety of sources on the internet to start.

Adoption and Long-Term Use

According to Serrat (2013), every problem invites a solution. The implementation, adoption, and long-term use of SCAMPER is therefore largely dependent on the problem being solved. This also means that the solution should be appropriate for the problem it is aimed at solving. For Serrat (2013), a problem is generally perceived when the concerned party becomes aware of the significant difference that exists between what is desired and what currently exists. In this case, SCAMPER becomes the ideal solution given that it involves the use of what is available (knowledge or experiences) to build new knowledge or ideas. This approach can greatly benefit students who show signs of stagnation by encouraging them to try building on to what they know through this process. Similarly, it can be an excellent avenue for talented and gifted students with special abilities to put their creativity into practice. As Khawaldeh (2018) observes, it is of great importance to enhance the special abilities, ideas, and creativity of these students which calls for creative thinking programs like SCAMPER. Therefore, the general adoption of the program should be guided by the need to enhance creativity and knowledge development. The long-term use of the technique would also be driven by the continued need to continue building onto existing knowledge and experiences on the part of the students in order to continue achieving new goals.

Methodology

Qualitative Research

The current study aimed to determine the teachers' conceptions of the effects of using SCAMPER to strengthen students' understanding and will therefore benefit from a qualitative approach. Busetto, Wick, and Gumbinger (2020) define qualitative research as "the study of the nature of phenomena and is especially appropriate for answering questions of why something is (not) observed" (p. 1). It gives focus to various aspects of a phenomenon including their quality, manifestations, the context in which they appear, as well as the perspectives from which they are perceived (Busetto, Wick, & Gumbinger, 2020). In this case, the study focused on the context from which the phenomenon is

perceived in order to understand the effects of SCAMPER with respect to strengthening students' comprehension. Consequently, the data informing the subject matter emanated directly from the viewpoints of the participants.

Qualitative research was characterized by flexibility, openness, and responsibility to both the context and steps of data collection (Busetto, Wick, & Gumbinger, 2020). These were important aspects of the methodology given that it is not possible to predict what the participants will share regarding the subject matter. By being flexible and responsive, qualitative research allows the researcher the freedom to deeply explore the topic based on the responses provided. As new and relevant information was provided, the researcher asked additional questions and even formulate new questions that can be used in follow-up studies/research. While it was not possible to predict what the participants will say, it was expected that they will have much to share based on their experiences which makes qualitative research ideal for the study.

Study population and sample selection

The study's population comprised of elementary school teachers in Saudi Arabia. The sample for the study consisted of 15 teachers who will be selected randomly. This allowed the study population an equal chance of being selected to participate and thus eliminate bias on the part of the researcher. Moreover, this approach allowed for varying views and opinions to be gathered thus effectively representing diverse perspectives of the target population. According to Busetto, Wick, and Gumbinger (2020) purposive sampling allowed researchers to pre-define the participants they want for the study. Although this approach was beneficial in that participants selected are likely to be more knowledgeable about the subject matter and provide relevant data, it prevented the study from gathering diverse perspectives.

Confidentiality and independence were made clear to the participants from the onset of collecting the data. All participants consented to participate in the study. Their consent was formally recorded using a form and a participant information sheet was given to them.

Sources of data

Data for this study was collected through semi-structured interviews. This method was ideal for the number of participants in the study because it is neither too restrictive nor overly unstructured. The use of semi-structured interviews had been shown to be ideal

when the researcher intends to use probing questions and find out the independent thoughts of the participants (Adams, 2015). As mentioned, participants were asked additional or follow-up questions to expound on certain points of interest when they arise. Therefore, semi-structured interviews were suitable because they allow room for further probing to inform the study.

Data collection procedure

After the sample was selected and consent forms are signed, the interviews were carried out face-to-face at a time that is convenient for the participants. This ensured that they are comfortable answering the questions without rushing. Given that interviews generated a significant amount of data, these interviews were recorded using the appropriate tools. During the interview, participants were asked a total of 15 semi-structured questions with follow up questions whenever required. All the data then was transcribed later in preparation for analysis. According to Sutton and Austin (2015), all the data must be transcribed verbatim before analysis because they will be required during coding and theming. This also transforms data into a form that is searchable and accessible to the relevant parties. To verify the validity of the interview, the questions were presented to specialists in teaching for their opinion. After the teachers were selected, a detailed description was given to them regarding the study sample, the mechanism of choice, and the procedures of preparing and conducting the interview. The teacher's interview lasted 30 minutes. All interviews were digitally recorded and transcribed immediately after each interview. The participating teachers were encouraged to give accurate answers, and their responses were analyzed and interpreted in depth. To verify the reliability of the interview, the interpretation of each interview was presented to the interviewed teacher to ensure that his point of view was correctly understood.

Data analysis

Data for the study was analyzed via thematic analysis. This is a five-step process that comprises data familiarization, initial code generation, theme searching, a review of themes, and reporting. The first step of data analysis involved data transcription. This was an excellent way of not only converting data into a text format but also becoming familiar with the data. The transcripts were read again and initial ideas are written down. During the initial code generation phase, data that pertained to each specific code was chosen.

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Once initial codes had been generated, they were collated into potential themes. All the data were then read again several times to narrow down the codes and group them into identifiable themes. In the fourth step, a review of the themes helped determine whether the themes align with coded extracts. Moreover, MAXQDA was used to identify patterns and draw thematic maps. In this thematic analysis, common themes for the reasons were identified, and these themes were then turned into categories. Lastly, important features that represent the data was extracted to make a report.

Ethical considerations

Adhering to ethical norms in research was important for two main reasons. First, it ensured that a research study and researcher remain truthful and avoid an error. Secondly, these standards promoted values that are crucial to collaborative work. These included values like mutual respect, fairness, and accountability (Resnik, 2020). To adhere to these standards, this study ensured that there is fairness when selecting participants. This was especially important given that the conclusions should represent the general views of the target population. Secondly, the personal data of participants was not collected or shared. This ensured during the recording process as well as the transcription of recorded data. Lastly, all the data was backed up in different locations (Cloud, external memory, Laptop) to prevent data loss. Also, all teacher were treated anonymously and named by Teachers 1, 2, 3 etc.

Data Analysis

Focus questions (S)	Themes (T)
Teacher first impression of SCAMPER	<ul style="list-style-type: none">• Majority have known about it since college• A few since high school• Positive first impression for the majority
Usage in class	<ul style="list-style-type: none">• Majority of teachers have used it in class (irregularly)• A few use it regularly• Majority plan to continue using where applicable Majority of teachers prefer it over other techniques
Main motivation to use SCAMPER and student attitudes	<ul style="list-style-type: none">• To promote student creativity• Motivate student

	engagement/participation • Majority of students enjoy using it
Advantages identified	• Increased student engagement/participation • Enhanced creativity and freedom to brainstorm Generally easy to use
Challenges	• Requires environment fostering student-centered learning Confusion may arise - difficulty organizing ideas
Implementation process and school support	Generally simple/enjoyable Majority of schools support teachers
Has it strengthened understanding?	Yes - for most students
Teacher expectation met and recommend?	• Yes – For majority of teachers • Somewhat - for a few teachers • Majority of teachers recommend it Views of other teachers vary but mostly positive

Table 1

Analysis

A total of 15 questions were presented to 15 participants in the study. Common themes were identified during data analysis, and the questions compressed into eight main sections (S). These sections include:

S1 - Questions regarding history of use and teachers' first impressions.

S2 - Question regarding SCAMPER utilization in class and how it compares to other methods.

S3 - Motivation for SCAMPER utilization and students attitudes towards it.

S4 - Main advantages identified by the teachers.

S5 - Main challenges identified by the teachers.

S6 - Question regarding the implementation process and the institution's role.

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S7 -The impact of SCAMPER on students' understanding.

S8 - Teachers' expectations and technique recommendation.

Major themes (T):

S1-T1 - Majority of teachers had a long experience with SCAMPER and generally positive impressions.

S2-T2 - Usage varies between teachers. But most teachers use it regularly. It is also preferred over other techniques and most teachers plan to continue using it accordingly.

S3-T3 - Creativity and student engagement were the primary motivators for use. Most students enjoy using it.

S4-T4 - Main advantages include enhanced student engagement, creativity and freedom to brainstorm as well as ease of use.

S5-T5 - Confusion among some students and the type of environment are some of the challenges.

S6-T6 - Most schools provide support and the implementation process is generally enjoyable and simple.

S7-T7 - SCAMPER generally improves understanding.

S8-T8 - SCAMPER has met expectations of most teachers and they would recommend it.

Study Results

In the study, a substantial majority of teachers demonstrated a profound familiarity with the SCAMPER technique. Testimonies from participants illustrated the longevity of their exposure to SCAMPER. Teacher 1, for instance, encountered the technique seven years prior, while Teacher 6 had been acquainted with it since high school. Others reported encountering SCAMPER during their college years, with positive perspectives consistently prevailing. This well-established awareness was accompanied by a strong inclination towards its practical utilization within their classrooms. The teachers' reported usage of SCAMPER varied, with some integrating it periodically, and others incorporating it more consistently, underscoring its perceived value as a pedagogical tool. These attitudes and

practices aligned with their comparative views on SCAMPER in relation to other instructional techniques.

Parallels emerged between teachers' perspectives and students' responses, affirming SCAMPER's efficacy. Students, much like teachers, appreciated the creative license that SCAMPER offered. For instance, Teacher 1 noted that students enjoyed the freedom to brainstorm using SCAMPER, and Teacher 2 highlighted that certain students held an affinity for it. Teacher 3 reported that students embraced SCAMPER adeptly. This shared sentiment extended to Teachers 4, 6, 7, 8, 10, 12, 13, and 14. Notably, numerous teachers found SCAMPER instrumental in augmenting student understanding. Teacher 2 attributed SCAMPER's ability to enhance understanding to its promotion of creativity. Teacher 3 expressed confidence in SCAMPER's potential to fortify understanding, while Teacher 4 noted the dual benefits of engagement and improved comprehension. These observations were echoed by Teachers 7, 8, 10, 12, 13, and 14. This cumulative evidence underscores why many teachers would recommend SCAMPER to their colleagues.

Discussion

The outcomes of this study resonate with constructivist principles, particularly the constructionist theory posited by Xerou, Papadima, Sophocleous, and Parmaxi (2016). This theory contends that knowledge acquisition is optimally facilitated when learners actively participate in constructing knowledge. This holds true for SCAMPER as teachers such as Teachers 4, 8, 9, 10, and 14 elucidated. One of SCAMPER's merits lies in its ability to stimulate students to engage and participate more actively in the learning process. Additionally, the technique is hailed for its capacity to nurture creativity among students, transforming them into dynamic participants who can infuse creativity into their contributions. This is closely aligned with the constructionist theory's emphasis on active student participation in knowledge construction. Importantly, SCAMPER's application was consistently linked to improved student understanding, substantiating the theory's assertion that participation and contribution are pivotal to enhanced knowledge acquisition.

Despite the numerous benefits highlighted, some teachers reported a number of challenges. As Teacher 1 elucidated, SCAMPER's effectiveness hinges on cultivating an environment where students are motivated to become active participants in the learning process. This observation resonates with the constructionist theory, underscoring how inadequate student engagement can impact the learning experience. Instances where

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students embraced their roles as active knowledge constructors were shown to correlate with a positive perspective of SCAMPER and a subsequent deepening of understanding.

Overall, the study's results offer a comprehensive understanding of SCAMPER's multifaceted impact. Teachers and students alike mentioned its positive influence, highlighting its potential to foster active and constructive learning environments. The alignment with the constructionist theory enriches our comprehension of SCAMPER's role in promoting participatory learning and enhancing comprehension. These insights provide educators with a powerful pedagogical tool that resonates with modern educational theories.

Limitations

One of the biggest limitations in this study is that it was not possible to use a larger sample. A larger sample is generally suitable given that it better represents the target population. However, due to resource and time constraints, the study could only accommodate 15 participants who were selected using purposive sampling. A larger sample is therefore recommended for future studies with more representation from different institutions across the country. Compared to some of the other methods of data collection, interviews do not allow for anonymity. As a result, some of the participants may not respond as they would if they were more anonymous and feeling free to fully express themselves. This could prove to be a limitation that affects the quality of results obtained. To minimize this possibility, it was important to maintain a professional attitude throughout the process of data collection.

Conclusion

This study has shed light on the profound implications of integrating the SCAMPER method into the realm of education, particularly within the context of student-centered learning. As the insights from participating teachers have revealed, SCAMPER's efficacy thrives in environments that prioritize active engagement and participatory learning. When students are encouraged to take the reins of their own learning process, as advocated by constructivist principles such as the constructionist theory posited by Xerou, Papadima, Sophocleous, and Parmaxi (2016), SCAMPER emerges as a catalyst for transformative education.

A resonating theme among the study's findings is the symbiotic relationship between SCAMPER and students' proactive involvement in knowledge construction.

Educators who embraced SCAMPER, such as Teachers 4, 8, 9, 10, and 14, underscored its prowess in igniting student participation and energizing learning environments. This harmony between active engagement and knowledge development echoes the tenets of the constructionist theory, which champions the notion that learners flourish when they contribute actively to the process of knowledge creation.

Also more importantly, the study has underscored that SCAMPER's impact transcends the boundaries of creativity and extends to the realm of comprehension. The technique's consistent association with heightened understanding validates the constructionist theory's assertion that students' contributions are pivotal to robust knowledge acquisition. This correlation reinforces the significance of promoting learning experiences that encourage students to be dynamic participants in constructing their own understanding.

While this study illuminates the manifold benefits of SCAMPER, it also acknowledges the challenges that educators encounter in implementing this approach. Teacher 1's insight emphasizes that the effectiveness of SCAMPER hinges on nurturing a learning environment where students are intrinsically motivated to partake actively. This observation resonates with the core tenets of constructivism, highlighting the importance of student engagement in shaping the educational journey. Overall, the outcomes of the study unveil the approach as a pedagogical gem that aligns harmoniously with modern educational paradigms. By blending constructivist principles with SCAMPER's active engagement techniques, educators would be in a good position to cultivate participatory learning spaces and empower students as co-creators of knowledge. As we navigate the educational landscape, these insights serve as a testament to SCAMPER's transformative potential and its synergy with contemporary educational theories, further enriching our understanding of progressive pedagogies.

Recommendations

Promotion of Student-Centered Learning Environments

Building on the findings that SCAMPER's effectiveness is closely tied to student engagement, it is recommended that educational institutions and policymakers prioritize the cultivation of student-centered learning environments. Professional development programs for teachers can include strategies for fostering active participation and student

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agency, ensuring that techniques like SCAMPER can be optimally integrated into the curriculum.

Incorporation of Creative Thinking across Subjects

The study's correlation between SCAMPER and enhanced creativity highlights the need to weave creative thinking into various subjects. Teachers and curriculum designers could collaborate to integrate SCAMPER-like approaches in subjects beyond the obvious realms of art and innovation, allowing students to develop holistic problem-solving skills across disciplines.

Continuous Monitoring and Feedback

Educators should adopt a practice of continuous monitoring and feedback to gauge the effectiveness of SCAMPER implementation. Regular assessments of students' comprehension levels and creativity could provide insights into the areas where SCAMPER is making the most impact and where adjustments are needed.

Future research avenues could expand upon the positive correlation observed between SCAMPER and enhanced comprehension. One potential direction involves delving into the long-term effects of SCAMPER on knowledge retention, where a longitudinal study tracking students' academic progress over several years could elucidate whether the understanding fostered by SCAMPER endures and contributes to cumulative learning. Additionally, to amplify the study's observation that SCAMPER is particularly effective in student-centered learning environments, a comparative analysis could be undertaken. This research would delve into the nuances of SCAMPER's impact, examining its variations between classrooms fostering student agency and those aligned with teacher-centered learning paradigms. Moreover, recognizing the diverse learning styles among students, a prospective study could explore the adaptability of SCAMPER to cater to distinct learner preferences. By investigating how SCAMPER techniques can be tailored to suit various cognitive styles, this inquiry could yield insights for optimizing its benefits across a broader student spectrum.

References

- Adams, W. (2015). Conducting semi-structured interviews. *Handbook of Practical Program Evaluation*. Jossey-BassEditors.
- Anderson, C. (2010). Presenting and evaluating qualitative research. *American journal of pharmaceutical education*, 74(8), 1-7. <https://doi.org/10.5688/aj7408141>
- Ang, K. Y., & Yuen, M. C. (2016). A student's perspective of scamper technique used for multimedia asset creation. *2nd International Conference on Creative Media, Design, and Technology (REKA 2016)*. Penang: Malaysia.
- AL-Wahaibi, H. S. (2013). *Creativity and innovation BM006-3-2-CRI individual assignment*. Creativity and Innovation, Asia Pacific University of Technology & Innovation.
- Altıparmak, T., & Eryılmaz-Mustu, Ö. (2021). The effects of SCAMPER technique activities in the 8th grade simple machines unit on students' academic achievement, motivation and attitude towards science lessons. *International Journal of Educational Methodology*, 7(1), 155-170. <https://10.12973/ijem.7.1.155>
- Al-zuwaini, I. S. (2019). The Impact of scamper's strategy in developing creative thinking and achievement for fifth graders in the field of eloquence and application. *Indian Journal of Public Health Research & Development*, 10(6), 1274-1279. <https://10.5958/0976-5506.2019.01470.0>
- Al Qudah, F. (2018). The effectiveness of using generate ideas (SCAMPER) strategy on improving ninth grade students' writing skills at Wadi El Sir schools in Jordan. *Journal of Education and Practice*, 9(25), 53-58.
- Al Zayat, N. M. (2014). The development of creative thinking in preschool teachers: The effects of SCAMPER program. *Psycho-Educational Research Reviews*, 6(3), 84-90.
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and practice*, 2, 1-10. <https://doi.org/10.1186/s42466-020-00059-z>
- Chan, J., Dow, S. P., & Schunn, C. D. (2018). *Do the best design ideas (really) come from conceptually distant sources of inspiration?* In *Engineering a Better Future*, 111-139. Springer, Cham. DOI:10.1007/978-3-319-91134-2_12
- Duke, N. (2003). *Comprehension instruction for informational text*. Presentation at the annual meeting of the Michigan Reading Association, Grand Rapids, MI.
- Einstein, A. (1998). SCAMPER: Creativity unbound. Retrieved from <http://jpowellcreativitysite.weebly.com/uploads/1/9/2/2/19223947/scamperinfo.pdf>

- Gündoğan, A. (2019). SCAMPER: improving creative imagination of young children. *Creativity studies*, 12(2), 315-326. DOI:10.3846/cs.2019.11201.
- Hussain, M., & Carignan, A. (2016). Fourth graders make inventions using SCAMPER and animal adaptation ideas. *Journal of STEM Arts, Crafts, and Constructions*, 1(2), 48-66.
- Idek, M. (2016). Measuring the application of SCAMPER technique in facilitating creative and critical thinking in composing short stories and poems. *Malaysian Journal of Higher Order Thinking Skills in Education*, 2, 30-53.
- Istamova, D. S. (2021). Ways of using scamper technology during foreign language lessons. *Current Research Journal of Pedagogics*, 2(12), 149-155. DOI: <https://doi.org/10.37547/pedagogics-crjp-02-12-30>
- Kamis, A., Kob, C. G. C., Hustvedt, G., Saad, N. M., Jamaluddin, R., & Bujeng, B. (2020). The effectiveness of SCAMPER techniques on creative thinking skills among fashion design vocational college. *EurAsian Journal of BioSciences*, 14(2). 4109-4117.
- Khawaldeh, M. H., & Ali, M. R. (2016). The effect of SCAMPER program on creative thinking among gifted and talented students. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*, 30(2), 48-58.
- Khawaldeh, H. M. A. (2018). *The effectiveness of SCAMPER and CoRT programs on creativity among gifted and talented students*, Doctoral dissertation, Universiti Utara Malaysia).
- Kocatepe, O., Haşiloğlu, M. A., and Kurt, M. (2019). Middle school 6th grade science course academic achievement of scamper technique on reproduction, growth and development in plants And animals. *IOSR Journal of Research & Method in Education*, 9(2), 64-73.
- Mattox, J. (2019). Easy ways to build metacognitive skills. Edutopia, George Lucas Educational Foundation. Retrieved from <https://www.edutopia.org/article/easy-ways-build-metacognitive-skills>
- Mahfouz, M. A. (2019). The effectiveness of using SCAMPER strategy in developing English critical reading skills for first year secondary school students. *Journal of Research in Curriculum Instruction and Educational Technology*, 5(4), 149-174.
- Özyaprak, M., & Leana-Taşçılar, M. Z. (2019). The effectiveness of self-regulated learning on teaching SCAMPER technique of creativity. *Talent*, 9(1), 16-31.
- Özyaprak, M. (2016). The effectiveness of SCAMPER technique on creative thinking skills. *Journal for the Education of Gifted young scientists*, 4(1), 31-40. DOI:10.17478/JEGYS.2016116348

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- Radziszewski, E. (2017). SCAMPER and creative problem solving in political science: insights from classroom observation. *Journal of Political Science Education*, 13(3), 308-316. DOI:10.1080/15512169.2017.1334562
- Resnick, M. (1996). Distributed constructionism. *International Conference on the Learning Sciences Association for the Advancement of Computing in Education*. Northwestern University. Rederived from <https://web.media.mit.edu/~mres/papers/Distrib-Construc/Distrib-Construc.html>
- Resnik, D. B. (2020). What is ethics in research and why is it important?, *National Institute of Environmental Health Sciences*. Rederived from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm?links=falseWijava>
- Serrat, O. (2017). *The SCAMPER technique*. *Knowledge solutions*, 311-314 Springer, Singapore. https://doi.org/10.1007/978-981-10-0983-9_33
- Serrat, O. (2013). *A Guide to the SCAMPER Technique*. Chicago School of Professional Psychology.
- Sutton, J., & Austin, Z. (2015). Qualitative research: Data collection, analysis, and management. *The Canadian journal of hospital pharmacy*, 68(3), 226-231. doi: 10.4212/cjhp.v68i3.1456. PMID: 26157184
- Tenny, S., Brannan, G. D., Brannan, J. M, Hopko, N. C. (2022). Qualitative study. [Updated 2022 May 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: <https://www.ncbi-nlm-nih-gov.newproxy.downstate.edu/books/NBK470395/>
- UNICEF (2017). *The twelve core life skills: Creativity*. Life Skills and Citizenship Education Initiative Middle East and North Africa.
- Wulandari, R., & Santoso, R. E. (2019). Measurement of student's learning interests in fluid mechanics subject through project based learning model using SCAMPER strategies. In 2nd International Conference on Vocational Education and Training (ICOVET 2018) (pp. 215-218). Atlantis Press.
- Xerou, E., Papadima-Sophocleous, S., & Parmaxi, A. (2016). A social constructionist approach to teaching and learning vocabulary for Italian for academic purposes. Retrieved from <https://ktisis.cut.ac.cy/bitstream/10488/10671/2/611.pdf>