

An Innovative Instructional Model to Foster Creative Thinking in Primary School Students in Thailand

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Abstract

This research endeavors to address the pressing need for nurturing creative thinking skills among primary school students in the context of Mahasarakham province, Thailand. By systematically analyzing the specific challenges and requirements faced by educators, a comprehensive model for enhancing creative thinking skills was developed. This model integrates multidisciplinary methods, hands-on realistic tasks, and combines STEAM (Science, Technology, Engineering, Arts, and Mathematics) education with the 6E technique. The study demonstrates the model's effectiveness in significantly improving creative thinking skills among students. The key findings underscore the value of multidisciplinary approaches, emphasizing experiential learning through practical tasks that stimulate creativity. The fusion of STEAM education and the 6E technique proved to be particularly impactful, aligning with prior research in the field. The research contributes vital insights and practical recommendations for educators and policymakers, urging them to consider multidisciplinary methods, STEAM education, and the 6E technique as viable strategies to bolster creative thinking skills in primary school students.

Keywords: creative thinking, 21st century education, primary schools, instructional model

1. Introduction

In today's rapidly evolving world, creative thinking has emerged as a fundamental skill that learners need in the competitiveness of the 21st century (Sen, 2018). Creative thinking, often defined as the ability to generate innovative ideas and solutions by breaking away from conventional thought patterns, has become the cornerstone of success in various aspects of life (Cropley, 2011). In an era marked by technological advancements, global interconnectedness, and dynamic challenges, the ability to think creatively is not merely an asset but a necessity. It empowers individuals to adapt, innovate, and thrive in an ever-changing landscape, making it an essential skill set for students, professionals, and society as a whole (Thornhill-Miller et al., 2023).

The landscape of education has undergone a profound transformation in the 21st century (Zamora & Zamora, 2022). Gone are the days when education primarily revolved around rote memorization and standardized testing, where success was often measured by one's ability to recall facts and figures. In this new era, education has shifted towards a more dynamic and skills-based approach (Erdem, 2019). This evolution is driven by the recognition that students need more than just knowledge; they need the ability to think critically, solve complex problems, and adapt to an ever-changing world. The emphasis now lies in cultivating a holistic set of competencies that extend beyond textbooks and traditional assessments (Piirto, 2011). At the heart of this shift is the growing realization that creative thinking is not a luxury but a fundamental requirement for students to excel in today's world.

Despite its long-standing legacy, traditional education systems face notable shortcomings that can hinder the development of creative thinking skills in students. One significant challenge is the prevalence of rigid curricula that often prioritize the dissemination of established knowledge over fostering innovative thinking (Saido et al., 2015; Miterianifa et al., 2021). This focus on conformity, where students are expected to adhere strictly to predefined paths of learning, can stifle their creative potential (Thornhill-Miller et al., 2023). Moreover, limited opportunities for exploration within the confines of standardized testing and structured lesson plans can leave little room for students to nurture their individuality and explore their own unique perspectives (Davies et al., 2013). These challenges pose significant barriers to the cultivation of creative thinkers within the traditional education framework, prompting the

need for innovative approaches that better align with the demands of the 21st century.

In the context of Thailand's educational landscape, a pressing concern revolves around the development of thinking skills, particularly creative thinking (Cleesuntorn, 2015). A significant factor contributing to this issue is the prevalent lecture-based approach in many classrooms, where students are often passive recipients of information rather than active participants in the learning process (Power, 2015). This traditional teaching method can inadvertently stifle creative thought, as it prioritizes memorization over critical thinking and problem-solving. Additionally, the scarcity of opportunities for students to think 'outside the box' within the confines of the curriculum further compounds the problem (Prasartpornsirichoke & Takahashi, 2013; Unicef, 2022; Power, 2015). The conventional emphasis on conformity and standardized assessments leaves little room for fostering the creative thinking skills necessary to navigate the complexities of the 21st century. Addressing these challenges is paramount to nurturing a generation of students who can thrive in an era that demands innovation, adaptability, and originality.

Focusing on Mahasarakham Province Schools holds a unique significance in our pursuit of fostering creative thinking skills among students. Mahasarakham, a city situated in the northeastern region of Thailand, serves as an illustrative microcosm that encapsulates the challenges faced by a significant portion of Thai school students. Economically, the city's Gross Provincial Product (GPP) ranks 56th out of 77 provinces in the country, reflecting the prevailing economic disparities within the region (Office of the National Economic and Social Development Council, 2023). Academically, national test scores indicate that the province's average performance closely mirrors the countrywide average (National Institute of Educational Testing Service, 2023). This convergence implies that students in Mahasarakham Province encounter similar challenges, both economically and academically, as the majority of students across Thailand. Therefore, the Province is not only relevant but essential as it allows us to address and innovate solutions that resonate with the broader educational landscape of Thailand, ultimately contributing to the development of creative thinkers capable of navigating the challenges of the 21st century.

Our project's overarching objectives are twofold. Firstly, we are dedicated to developing innovative learning management models uniquely tailored to the specific needs of Maha Sarakham Province primary schools. These models are designed with a clear focus on nurturing creative thinking skills among students, recognizing the imperative role of creative thought in the 21st century. Secondly, our initiative aspires to bring about a significant and lasting impact on the educational landscape of Mahasarakham Province. By fostering creative thinkers and problem solvers within the region, we envision a ripple effect that extends beyond the classroom. Through our efforts, we hope to ignite a transformative journey that equips the students of Mahasarakham with the skills and mindset necessary to excel in the dynamic challenges of the 21st century.

2. Literature Review

2.1 Creative Thinking Skills

In an ever-changing world characterized by rapid technological advancements, globalization, and complex problem-solving demands, the role of creative thinking skills in education has garnered considerable attention. Creative thinking, often described as the ability to generate novel and valuable ideas, plays a pivotal role in fostering innovation, adaptability, and individual growth (Thornhill-Miller et al., 2023; Cropley, 2011). This section of the literature review delves into key findings and insights from scholarly research and educational discourse regarding the importance of creative thinking skills.

2.2 Defining Creative Thinking Skills

Creative thinking skills encompass a range of cognitive abilities that enable individuals to approach challenges with inventiveness and originality. These skills often include ideation, problem-solving, critical thinking, and the capacity to think 'outside the box.' Scholars such as Guilford (1967) and Sternberg (2003) have proposed comprehensive frameworks that distinguish various facets of creative thinking, emphasizing its multifaceted nature.

In detail, Guilford's creative thinking framework (Guilford, 1967), introduced in 1950 as the "Structure of Intellect" model, is a comprehensive framework that redefined our understanding of creativity. It consists of three major dimensions: operations, contents, and products. According to the author, operations encompass divergent thinking, the ability to generate multiple ideas and solutions, and convergent thinking, which seeks the one correct answer. Contents include various types of mental content, such as symbols and relations, which can be manipulated creatively. Products involve cognitive processes, evaluation, and decision-making. Guilford's model challenged the conventional view of intelligence and emphasized the multifaceted nature of creative thinking, paving the way for the development of creativity assessments and contributing significantly to the study of creativity in various domains

and contexts.

Robert J. Sternberg's 2003 framework for creative thinking, known as the "Investment Theory of Creativity" (Sternberg, 2003), offers a holistic perspective on creativity. This framework views creativity as a dynamic decision-making process influenced by skills, creativity-relevant processes, and intellectual abilities. It underscores the role of personality traits like perseverance and motivation, as well as the impact of environmental context and resources on creative thinking. Sternberg's model recognizes that creativity involves balancing adaptation to existing knowledge with shaping new ideas. Ultimately, his framework highlights the multifaceted nature of creativity and its dependence on a combination of cognitive, motivational, and situational factors, providing valuable insights into fostering creativity across various domains and contexts.

2.3 Promoting Creative Thinking in Education

Promoting creative thinking in learners relies on a set of fundamental principles that encourage the development of this essential skill. Scholars (Thornhill-Miller et al., 2023; Saido et al., 2015; Miterianifa et al., 2021; Forte-Celaya et al., 2021) have presented the potential methods and principles to promote the skills. The following components can be synthesized.

2.3.1 Encouraging Open-Ended Exploration and Experimentation

This is to emphasize the importance of creating a classroom environment that encourages curiosity and exploration. Learners should feel safe to question, experiment, and take risks without fear of judgment (Thornhill-Miller et al., 2023). Teachers can achieve this by fostering a classroom culture where mistakes are viewed as valuable learning opportunities rather than failures. When learners are free to explore and experiment, they are more likely to develop their creative thinking skills by seeking unconventional solutions and approaches to problems.

2.3.2 Providing Opportunities for Divergent Thinking

Divergent thinking involves generating multiple ideas, solutions, or perspectives in response to a given problem or challenge. To promote divergent thinking, educators can use techniques such as brainstorming sessions, mind mapping, and group discussions. Project-based learning and open-ended assignments also encourage learners to explore a wide range of creative solutions rather than converging on a single "correct" answer (Thornhill-Miller et al., 2023). By engaging in divergent thinking exercises, learners develop their ability to think flexibly and generate innovative ideas.

2.3.3 Emphasizing Intrinsic Motivation

Intrinsic motivation refers to the internal drive to engage in an activity for its inherent rewards rather than external incentives (Thornhill-Miller et al., 2023). Encouraging learners to pursue their interests and passions can ignite their intrinsic motivation for creative endeavors. When learners are genuinely interested in a topic or project, they are more likely to invest time and effort into exploring it creatively. Educators can support intrinsic motivation by offering choice in assignments, allowing learners to pursue topics they are passionate about, and providing autonomy in their learning.

2.3.4 Promoting a Growth Mindset

A growth mindset is the belief that intelligence and abilities can be developed through effort and perseverance (Thornhill-Miller et al., 2023). Encouraging learners to view challenges as opportunities for growth can boost their confidence in their creative abilities (Forte-Celaya et al., 2021). Educators can reinforce a growth mindset by praising effort and resilience rather than innate talent. When learners understand that creativity can be cultivated and improved over time, they are more likely to embrace challenges and take risks in their creative thinking processes.

2.3.5 Fostering Collaboration and Diverse Perspectives

Collaboration with peers from diverse backgrounds and perspectives can enrich learners' creative thinking. Exposure to different ideas and viewpoints can inspire innovative thinking and broaden learners' horizons (Thornhill-Miller et al., 2023). Group projects, discussions, and interdisciplinary activities can encourage collaboration and the exchange of creative ideas. By working together and learning from others, learners can develop a deeper appreciation for the value of diverse perspectives in creative thinking.

2.4 Previous Studies on Creative Thinking Development

Scholars have shown considerable interest in creative thinking skills, with multiple efforts made to enhance these skills (Saeed & Ramdane, 2022; Senel & Bağçeci, 2019; Khalil et al., 2023; Rahmawati et al., 2019; Dilekçi & Karatay, 2023; Jongluecha & Worapun, 2022; Siburian et al., 2019; Forte-Celaya et al., 2021; Lin et al., 2023;

Nurulsari et al., 2017; Suganda et al., 2021; Şahin & Kılıç, 2023). Previous research suggests that the development of creative thinking relies on the enhancement of cognitive abilities (Saeed & Ramdane, 2022), enabling learners to approach problem-solving with creativity. Effective methods for nurturing creative thinking skills should be designed to be active (Forte-Celaya et al., 2021), incorporate multidisciplinary principles (Khalil et al., 2023; Rahmawati et al., 2019; Dilekçi & Karatay, 2023), and encourage learning through hands-on experience and imagination (Senel & Bağçeci, 2019). Furthermore, tailoring a model to address the specific needs of a given context is a promising approach (Saeed & Ramdane, 2022). However, it's worth noting that there is a notable gap in existing literature, as only one study (Saeed & Ramdane, 2022) has explored model development tailored to specific contextual needs. The authors advocate for further research to investigate the impact of model development on a larger scale, spanning different geographical regions and education systems. Additionally, prior studies have primarily collected data in small-scale educational settings, such as a single school (Forte-Celaya et al., 2021; Khalil et al., 2023; Rahmawati et al., 2019). Developing a model at the level of an entire province offers the potential for broader and more in-depth insights into problems and needs, which can be invaluable for model development. Therefore, this study aims to bridge these gaps by developing a model informed by the issues and requirements identified in a sample representing educators from an entire province. The objective is to create a model that enhances the creative thinking skills of primary school students and implements it effectively (Saeed & Ramdane, 2022).

3. Methodology

3.1 Research Design

The study employs a research and development (R&D) approach to construct an instructional model aimed at nurturing the creative thinking skills of primary school students in Mahasarakham province. This endeavor encompasses three distinct phases: a need assessment, the creation of an integrated learning model, and its practical application with participants. During the initial need assessment phase, data is gathered to pinpoint the specific requisites and challenges concerning the development of creative thinking skills among primary school students. Drawing upon these insights, a comprehensive model is formulated, taking into consideration instructional strategies and the integration of technology. Subsequently, expert evaluation is conducted to fine-tune the model. Ultimately, the instructional model is put into practice with a selected group, assessing its effectiveness in enhancing creative thinking skills and gauging participant satisfaction. The detailed breakdown of each phase can be found below.

3.2 Phase 1. The Analysis of Problems and Needs in Developing Creative Thinking Skills

The initial phase of this research involves conducting a comprehensive needs analysis aimed at assessing the specific requirements and challenges related to the development of creative thinking skills within the educational context of the region. This stage is designed to investigate the precise issues and conditions concerning creative thinking skills and the challenges faced by educators in the province. A total of 289 teachers and educational personnel were selected as participants using the stratified sampling method from a population of 1,193 in Mahasarakham province. The data collection instruments consist of a structured questionnaire, divided into three sections: (1) demographic information of the participants, (2) survey items to examine the current context and needs for the development of students' creative thinking skills, and (3) open-ended questions for in-depth insights. The survey items comprise 20 questions categorized into four aspects (five questions each): learning management, teaching techniques, learning and teaching materials, and evaluation and assessment, all aimed at promoting creative thinking skills. Additionally, four open-ended questions allow respondents to elaborate on their perspectives regarding learning management, teaching techniques, learning and teaching materials, and evaluation and assessment pertaining to creative thinking skills. To ensure the quality of the questionnaire, all items were subjected to an Index of Item Objective Congruence (IOC) test, with values falling within an appropriate range of 0.5-1.0. The questionnaire exhibited strong reliability, with an alpha coefficient of 0.86. Quantitative data were analyzed using descriptive statistics, while qualitative data underwent thematic analysis.

3.3 Model Development and Expert Evaluation

The study's second phase involves creating and evaluating a model designed to enhance the creative thinking skills of students, followed by a detailed peer review process. The initial model, aimed at fostering students' creative thinking skills, spans a 10-hour timeframe and includes five distinct activities. To ensure the plan's quality and effectiveness, it undergoes assessment by a panel of five experts specializing in language education. The data collected during the peer review assessment is analyzed using descriptive techniques, allowing for a comprehensive evaluation of the plan's content, structure, and pedagogical approaches. This rigorous evaluation phase plays a crucial role in refining and improving the model for developing students' creative thinking skills, ensuring its alignment with the study's

objectives and its suitability for implementation.

3.4 The Implementation of The Model

In the study's third phase, the model that has been developed is put into action to enhance the creative thinking skills of the participants. This group consists of 30 fifth-grade students who were carefully chosen using a multistage selection process from a primary school located in Maharakham Province. The study utilizes several tools, including the implemented model, an assessment form for creative skills, and a satisfaction questionnaire, to collect relevant data. The collected data is then subjected to a comprehensive analysis that includes descriptive techniques, t-tests for statistical comparisons, and an effectiveness index with a predefined threshold of 80. These analytical methods enable a thorough evaluation of the model's effectiveness, the improvement in students' creative thinking skills, and their satisfaction levels. The insights obtained from this phase play a significant role in assessing how well the model, tailored to the context's needs, impacts the development of students' creative thinking skills.

4. Results and Discussion

4.1 The Study of Current Situation and Needs in the Context

For the demographic of the participants, it is found that respondents to the questionnaire regarding the current situation and needs for developing a learning management model focusing on students' creative thinking skills in schools in Maharakham Province numbered 289 people. The majority of respondents were female, comprising 66.67%. Regarding educational qualifications, 59.65% had completed undergraduate degrees, while 66.67% had less than 5 years of teaching experience. Additionally, most of the respondents were from medium-sized schools, making up 43.86%.

Table 1. Current Situation and Needs of Developing Creative Thinking Skill in The Context

No.	Aspect of evaluation	Current situation			Needs		
		\bar{x}	S.D.	Interpretation	\bar{x}	S.D.	Interpretation
1	Learning management	3.29	1.13	Average	4.49	0.65	High
2	Teaching techniques	3.31	1.07	Average	4.36	0.78	High
3	Teaching material	3.29	1.11	Average	4.38	0.77	High
4	Evaluation and assessment	3.37	1.15	Average	4.39	0.84	High
	Overall	3.32	1.12	Average	4.41	0.76	High

The results indicate that the informants assessed the current state of teaching creative skills as being at an average level ($M = 3.32$, $SD = 1.12$), while the demand for teaching creative thinking skills was rated as high ($M = 4.41$, $SD = 0.76$) overall. This pattern was consistent across all study facets, including learning management, teaching techniques, teaching materials, and evaluation and assessment. This suggests that educators and teachers in the context of Maharakham province perceive that their proficiency in teaching creative skills is suboptimal and recognize the need for improvement across all these dimensions.

The thematic analysis of the informants' responses in the open-ended question section of the questionnaire revealed several key themes, shedding light on their perceptions and insights regarding teaching creative thinking skills.

4.1.1 Admitting that Their Classes Were Sometimes Lecture-Based

A significant theme that emerged from the informants' responses was their acknowledgment that their classes sometimes leaned towards a lecture-based approach. One respondent commented, "I admit that I rely on lectures too often," highlighting the prevalence of traditional teaching methods. Another informant added, "In reality, our classes tend to be lecture-heavy, and it's a challenge to break away from that."

4.1.2 Creative Thinking Is Complex

Informants consistently expressed that creative thinking is a complex skill. They viewed it as abstract and challenging to both teach and assess. One teacher stated, "Creative thinking is abstract; it's not like mathematics that you can easily measure." Another emphasized, "It's a complex skill; you can't just assess it with a test."

4.1.3 It Needs Multidisciplinary Methods to Develop Creative Thinking Skills

Many informants emphasized the need for multidisciplinary approaches to foster creative thinking skills effectively.

They believed that students should draw knowledge from various subjects, encompassing both sciences and arts. An informant mentioned, "Creative thinking is hard; learners should learn from many subjects to develop it fully, not just one." Another stated, "We need to integrate different subjects to nurture creative minds."

4.1.4 Developing Creative Thinking Skills Requires Authentic Tasks, Hands-On Activities, and Opportunities for Application

A recurrent theme highlighted the importance of real-world problems, hands-on activities, and opportunities to apply creative skills in practical work. One teacher noted, "To develop creative thinking, we should engage students in real-world problem-solving, not just theory." Another stressed, "Students need hands-on experiences and chances to apply their creativity to real tasks."

To conclude, the thematic analysis of informants' responses underscores the recognition of challenges in teaching and assessing creative thinking skills in Mahasarakham province. Teachers acknowledge the dominance of lecture-based approaches, the complexity of creative thinking, and the need for multidisciplinary methods. They also emphasize the importance of real-world, hands-on experiences to nurture creative minds. These insights provide valuable guidance for developing effective strategies and models to enhance creative thinking skills in educational contexts.

4.2 Model Development

Hence, the model for enhancing the creative thinking skills of primary school students in Mahasarakham province, Thailand, was meticulously developed based on the needs identified during the initial phase of analysis. Recognizing the paramount significance of real-world, hands-on experiences in fostering creative minds, the approach of STEAM education was meticulously chosen. STEAM education, as expounded by Liao (2016), evolved from the STEM education framework, which traditionally focuses on science, technology, engineering, and mathematics, but now encompasses the crucial addition of the arts component. This approach was selected with a deliberate intention to provide students with ample opportunities to harness their creativity, as underscored by Shuaytong (2014), who noted that art enjoys widespread preference among Thai learners due to the country's rich artistic heritage. Consequently, the STEAM education approach was embraced as the cornerstone of the model, and a structured learning framework, the 6E model (Engagement, Exploration, Explanation, Elaboration, Extension, and Evaluation), was meticulously designed to facilitate problem-solving. A detailed outline of the activities encompassed within this model is presented below.

Engagement:

Students are presented with a real-world problem related to their local community, such as finding innovative solutions to reduce waste. This is to engage students' interest and curiosity in the problem-solving process and introduce the concept of creative thinking.

Exploration

In groups, students explore various aspects of the problem, conducting research and gathering information. They investigate scientific, technological, and artistic elements related to waste reduction. This stage is to encourage students to explore multiple dimensions of the problem and generate diverse ideas.

Explanation

Each group presents their findings and initial ideas for addressing the problem. They explain the scientific principles, technological possibilities, and artistic perspectives they have discovered. This is to facilitate communication of knowledge and ideas among students and promote critical thinking.

Elaboration

Students brainstorm and discuss innovative solutions, combining elements of science, technology, engineering, arts, and mathematics. They develop detailed plans for their chosen solutions. The objective of this stage is to encourage students to elaborate on their initial ideas, think critically, and integrate different disciplines to foster creative thinking.

Extension

Students implement their proposed solutions, putting their plans into action. This phase may involve building prototypes, creating artwork, or applying mathematical and scientific principles. This is to provide students with hands-on experiences and an opportunity to apply creativity in solving real-world problems.

Evaluation

After implementing their solutions, students evaluate the effectiveness of their approaches. They consider how well their solutions address the initial problem and reflect on what they have learned. This is to encourage reflection and self-assessment, promoting continuous improvement in creative thinking and problem-solving skills.

These activities within the STEAM education framework are anticipated to yield enhanced creative thinking abilities in kids. Through active involvement in practical issues and the incorporation of several fields of study, students are afforded the chance to cultivate their creativity and innovative mindset, both of which are crucial for tackling intricate difficulties in the modern era.

The model was thoughtfully designed to encompass a total of 10 hours of classroom activities, spread across five distinct topics. Each topic was carefully structured to align with the needs and objectives identified in the initial phase of analysis. Additionally, to ensure the quality and suitability of the model, it underwent a rigorous evaluation process. Expert evaluators, well-versed in the field of education and creative thinking, assessed the model's components, activities, and overall design. The results of this evaluation were highly favourable, with an average rating of 4.63 and a standard deviation of 0.54, indicating a strong consensus among experts regarding the appropriateness and effectiveness of the model in nurturing creative thinking skills among primary school students in Mahasarakham province, Thailand. This validation by experts reinforces the model's potential to bring about meaningful improvements in the creative thinking abilities of students.

Table 2. Model Implementation

Effectiveness	Maximum point	Average	S.D.	%
Process (E ₁)	175	147.63	2.91	84.36
Product (E ₂)	30	26.23	2.72	87.44
Effectiveness index (E ₁ /E ₂) = 84.36/87.44				

The effectiveness index is calculated by assessing the percentage of participants' average score (compared to the full mark) during doing activities and in post-test compared to the criteria of 80%. The results reveal that participants achieved an average score of 147.63 out of a maximum possible score of 175, representing an impressive 84.36% success rate in the various activities designed within the model. Furthermore, in the post-test, participants attained an average score of 26.23, which corresponds to an exceptional 87.44% of the perfect score of 30. Consequently, when we calculate the effectiveness index by dividing the first score (E₁) of 84.36% by the second score (E₂) of 87.44%, we obtain a value exceeding the predetermined criterion of 80. This outcome signifies that the model not only enhances students' learning throughout the process but also yields commendable product results (Senel & Bağçeci, 2019).

The findings of this study unequivocally support the conclusion that the development of a learning management model can indeed foster the creative thinking skills of high school students. This aligns seamlessly with the findings of a similar study conducted by Senel and Bağçeci (2019), which also emphasized the effectiveness of model development. What sets this model apart is its foundation in a solution-based approach, meticulously tailored to the specific needs identified during the initial analysis phase. By directly addressing these needs, the model succeeds in enhancing creative thinking skills among students.

Furthermore, the results of this study underscore the efficacy of STEAM education as a means of nurturing creative thinking. This observation is corroborated by the research conducted by Khalil et al. (2023), Rahmawati et al. (2019), and Dilekçi & Karatay (2023), all of whom found evidence supporting the positive impact of STEAM education. The choice of STEAM education in this model proves effective due to its inherent capacity to provide students with a holistic, multidisciplinary learning experience, merging science, technology, engineering, arts, and mathematics. This integrative approach encourages students to explore a wide range of subjects, fostering a well-rounded skill set that contributes to their creative thinking abilities.

Additionally, the study's results highlight the effectiveness of the 6E model in developing creative thinking skills among high school students. This outcome aligns harmoniously with the findings of studies by Forte-Celaya et al. (2021), Khalil et al. (2023), Rahmawati et al. (2019), and Dilekçi & Karatay (2023), all of whom arrived at similar conclusions regarding the efficacy of the 6E model in enhancing creative thinking. The 6E model's success can be attributed to its structured approach, which encompasses engagement, exploration, explanation, elaboration, extension, and evaluation. This comprehensive framework guides students through a structured learning process,

providing opportunities for critical thinking, problem-solving, and creativity at every stage.

5. Conclusion

The main objective of this study was to create a model designed to improve the creative thinking abilities of elementary school children. The main discoveries of this study center on the recognition of critical problem areas, particularly the need for interdisciplinary methods to promote innovative cognitive abilities. The methodological approach should incorporate practical, authentic assignments that offer pupils many chances to showcase their ingenuity. The successful integration and efficacy of STEAM education and the 6E technique in attaining these results constitute a noteworthy addition to the field of education.

According to the results of this study, there are numerous suggestions that can be put up. First and foremost, educators and policymakers should prioritize the incorporation of multidisciplinary approaches, especially those that include practical, real-world problems, into the curriculum to foster the development of creative thinking abilities. Furthermore, it is advisable to promote the implementation of STEAM education and the utilization of the 6E technique, since they have proven to be beneficial in fostering students' creative thinking abilities. Finally, additional study should be undertaken to explore the needs analysis process in greater detail, encompassing not just students but also other participants in education, to achieve a more thorough comprehension of the particular demands and obstacles encountered in fostering creative thinking abilities.

Despite the valuable insights gained from this study, certain limitations should be acknowledged. The needs analysis process would benefit from additional data collection from students and other education stakeholders to provide a more comprehensive view of the context. Furthermore, the implementation phase was hindered by the scarcity of high-quality data, which could have influenced the overall outcomes. These limitations underscore the need for future research to address these challenges and provide more robust insights into the development of creative thinking skills among primary school students.

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