Improving of Creative Thinking Skill through Coding for all at Elementary Students

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ABSTRACT

This study explores the influence of coding for all on enhancing creative thinking skills among elementary students. 21st Century skills are essential abilities that help people work well with others, think of new ideas, speak clearly, and solve problems in this era world. It focuses in particular on the key soft skills competencies known as the "4Cs": creativity, critical thinking, collaboration, and communication. They are called "soft skills" because they are about working with people and ideas, not just using machines or following set rules. Creative thinking development is crucial for elementary school students as positively impacts their growth and learning process. According to Resnick et al. (2009), about the theory of coding for All, the aspiration to provide equal access and opportunity to the entire student population, regardless of their background or interests. This idea is based on the belief that coding for all is not only a technical skill, but also a powerful tool for stimulating creative thinking skill. The objective of this study is: 1. Identify Coding for all can increase the creativity of elementary students. 2. Improving of Creative Thinking Skill through Coding for all at Elementary Students. Following a search, a large amount of literature was found, and after selection, it included the following 5 sources about improving creative thinking skill by using coding for all. This study succeeded found 4 results from 5 article sources. The implication of this study is to provide socialization and innovation related to interactive learning media that supports the improvement of creative thinking in students with the aim of shaping student creativity and getting to know more intelligence in each student.

Keywords: *Creative Thinking, Coding for All, Elementary Student, 21st century*

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INTRODUCTION

21st Century skills are essential abilities that help people work well with others, think of new ideas, speak clearly, and solve problems in today's world. It focuses in particular on the key soft skills competencies known as the "4Cs": creativity, critical thinking, collaboration, and communication. They are called "soft skills" because they are about working with people and ideas, not just using machines or following set rules. Schools

teach these skills so that students can work well with others and use technology in smart ways, which is important for many jobs in this era (Thornhill-Miller et al., 2023).

Creative thinking development is crucial for elementary school students as positively impacts their growth and learning process. Abilities such as collaborating, communicating, and adapting, which are critical to success in the modern era, are built through creative thinking. Developing creative thinking in children helps them prepare for future challenges and opportunities by providing the skills necessary to succeed in this era (E et al., 2023). Fostering creativity in children is essential for their holistic development and prepares them for future challenges and opportunities.

According to Resnick et al. (2009), about the theory of coding for All, the aspiration to provide equal access and opportunity to the entire student population, regardless of their background or interests. This idea is based on the belief that coding for all is not only a technical skill, but also a powerful tool for stimulating creative thinking skill.

Technology and coding for all play an important role in developing computational thinking and creative thinking skills in students, preparing them for future challenges in the digital age (Lee et al., 2023). The use of technology by teachers is crucial to determine their optimism and innovation in teaching. Therefore, teachers should be encouraged to develop a range of skills and competencies to effectively use technology to support their teaching activities. Technology-enabled learning helps students understand better, find weaknesses, and improve problem-solving and critical thinking skills (Said, 2023). Based on the problems mentioned above, the study's objectives are as follows. Identify Coding for all can increase the creativity of elementary students. Improving of Creative Thinking Skill through Coding for all at Elementary Students.

METHOD

This study is used literature review method. A literature review is an investigation, reading, analysis, evaluation, and summary of academic literature (usually journals and papers) concerning a certain subject. In this research will have limitations. Therefore, the researcher has compiled a limitation i.e. using journal articles from 2020-2024. The findings of a literature review could include a whole report or article or they could be a section of a grant application, thesis, dissertation, or other piece of writing (Auraria, 2022). Moreover, literature evaluations assist writers in recognizing issues and gaps in their research. The steps and elements of literature review are:

1. Formulating the problem: Use questions to identify the subject and its elements.
2. Research Step: Locate relevant material to determine areas of weakness that can be filled.
3. Reading: perusing through articles or additional information sources.
4. Analyze: Determine the significance of the results.
5. Assess: ascertain the article's significance to the study and identify its main conclusions.
6. Synthesis: discuss the key discoveries and how the study is affected by them.

Additionally, this study will reduce the Four publicly reported research processes of a literature review to just five research steps, which are as follows.

1. Summarize subject, issue or theory under consideration. along with objectives of the review, that is coding for all, creative thinking skills, The relationship between coding for all and creative thinking skills and the development of creative thinking through coding for all.
2. Divide works under review into categories (e.g. proponents of a specific viewpoint, opponents, and proposers of completely other theories). The theory used in this study is the theory of Resnick et al. (2009) regarding coding for all.
3. Describe the similarities and Comparing coding for all, Creativity thinking, The relationship between coding for all and creative thinking from one article to another.
4. Conclude which sources are most persuasive in their ideas, have the strongest arguments, and add the most to our knowledge.

FINDING AND DISCUSSION

The first step of this study was to gather material on creative thinking with programming. The Google Scholar search engine was used, and the terms "creative thinking by using coding for all" with "correlation coding for all and creative thinking". Following a search, a large amount of literature was found, and after selection, it included the following 5 sources.

1. Zhang (2023), An innovative study on creative thinking development of elementary school students using multiple data integration.
2. Moraiti (2022), Coding with Block Programming Languages in Educational Robotics and Mobiles, Improve Problem Solving, Creativity & Critical Thinking Skills.
3. Dagyeom (2023), Productive Failure-based Programming Course to Develop Computational Thinking and Creative Problem-Solving Skills in a Korean Elementary School.
4. Wei (2021) The effectiveness of partial pair programming on elementary school students' Computational Thinking skills and self-efficacy.
5. Martínez (2020), Coding and educational robotics and their relationship with computational and creative thinking.

The five sources show the coding for all is influence to creative thinking student. Based on the identification results from these 5 sources. There are, 4 results that we find as follows.

Coding For All

Coding for all helps elementary students develop creative thinking by encouraging them to solve problems and design projects in new ways. The positive impact of coding self-Efficacy for elementary school students had greater creative self-efficacy in coding for all with Scratch, especially among primary school students. Teaching methods like creating digital stories with tools like Scratch can make learning coding for all concepts easier and more creative for young students. Incorporating information technology and coding education into elementary school curricula, with a focus on developing thinking skills, has been shown to effectively promote and popularize creative thinking. Computational thinking skills, which are

part of coding, can help students understand and use computers, thereby enhancing their ability to thinking creatively. In coding for all, making mistakes is part of learning, and when students fix their own errors, they get better at thinking creatively. The process of trying, failing, and then trying again in programming helps students learn that there are many ways to solve a problem, which is a big part of being creative skill.

Creative Thinking Skill

Creative thinking is a higher-order thinking skill that is essential for problem solving, which involves generating new and useful ideas. When students use creative thinking, they can better understand and learn other subjects due to improved reasoning skills. Encouraging creative thinking in students can lead to increased confidence in coding for all and a willingness to tackle more complex challenges. In education, especially at the primary school level, creative thinking is very important because it is a period in which children's thinking develops uniquely, and fostering these skills can lead to better personality development and the generation of new ideas.

Correlation between coding for all and creative thinking skill

Coding in schools helps students develop higher-order thinking skills like problem-solving, which is a key part of creative thinking. As students learn to code, they practice breaking down problems and figuring out the steps to solve them, which is a skill that can also make them better at creative thinking. (Lee & Lee, 2024) shows that children who learn to code by tackling difficult problems on their own have better creative problem-solving skills than children who simply follow what the teacher says. Coding for all and creative thinking skills according to the 5 articles are very related.

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Creative thinking skills are very important abilities for elementary school students because they provide a strong foundation for future problem-solving, innovation, and critical thinking abilities. In the context of the primary education curriculum, learning that encourages creativity will help students gain a deeper and thorough understanding of the subject matter. The use of coding as a learning tool can open the door to the development of creative thinking skills in elementary school students. When learning to code, students are given the challenge of solving problems and designing solutions, which strengthens brain connections and encourages creativity. By creating code, students learn to solve problems with an innovative approach by providing interactive learning media, one of interactive learning media is using coding for all.

LIMITATION AND MEANING OF FINDINGS

The limitations of this study that is only looks for Improving of Creative Thinking Skill through Coding for all at Elementary Students.

The implication of this research is to provide socialization and innovation related to interactive learning media that supports the improvement of creative thinking in students with the aim of shaping student creativity and getting to know more intelligence in each student. However, coding for all is more effective if it is carried out for talented elementary student and students who are able to apply Computational Thinking Skills. For an alternative

for other students, that is they must continue to be accompanied by teachers and parents until they are able to master their own Computational Thinking Skills.

CONCLUSION

This study succeeded found 4 results from 5 article sources about improving creative thinking skill by using coding for all. Coding for all helps elementary students develop creative thinking by encouraging them to solve problems and design projects in new ways. Creative thinking is a higher-order thinking skill that is essential for problem solving, which involves generating new and useful ideas. Coding in schools helps students develop higher-order thinking skills like problem-solving, which is a key part of creative thinking. Coding for all and creative thinking skills according to the 5 articles are very related. Creative thinking skills are very important abilities for elementary school students because they provide a strong foundation for future problem-solving, innovation, and critical thinking abilities.

Thus, the implication of this study is to provide socialization and innovation related to interactive learning media that supports the improvement of creative thinking in students with the aim of shaping student creativity and getting to know more intelligence in each student.

For the future research should look at whether coding for all can help improve collaboration and communication skills, as well as whether coding for all can fit as an intracurricular subject in elementary schools and not only being a learning media.

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