



EFFECTIVENESS OF METACOGNITIVE STRATEGIES SCAFFOLDING IN IMPROVING STUDENTS CRITICAL THINKING SKILLS

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Abstract : This study aims to analyze the effectiveness of *Metacognitive Scaffolding* strategies in improving students' critical thinking skills at Gondang Legi Public Elementary School, Malang. The research approach used is quantitative with a *quasi-experimental design*. The research subjects involved grade V students who were divided into an experimental group and a control group. The experimental group received an intervention in the form of a *Metacognitive Scaffolding* strategy, while the control group used conventional learning methods. Research instruments include critical thinking tests, observation sheets, and questionnaires.

The results showed that there was a significant improvement in the critical thinking skills of the students in the experimental group compared to the control group. Data analysis using the t-test showed a significance value of $p < 0.05$, which indicates the effectiveness of the *Metacognitive Scaffolding* strategy. In addition, the observation results showed that students who followed this strategy were more active in expressing opinions, analyzing information, and drafting logical arguments.

Keywords: *Metacognitive Scaffolding, critical thinking skills, basic education, strategy effectiveness.*

Abstrak : Penelitian ini bertujuan untuk menganalisis efektivitas *strategi Perancah Metakognitif* dalam meningkatkan kemampuan berpikir kritis siswa di SD Negeri Gondang Legi, Malang. Pendekatan penelitian yang digunakan bersifat kuantitatif dengan *desain kuasi-eksperimental*. Subjek penelitian melibatkan siswa kelas V yang dibagi menjadi kelompok eksperimen dan kelompok kontrol. Kelompok eksperimen mendapatkan intervensi berupa *strategi Perancah Metakognitif*, sedangkan kelompok kontrol menggunakan metode pembelajaran konvensional. Instrumen penelitian meliputi tes berpikir kritis, lembar observasi, dan kuesioner.

Hasil penelitian menunjukkan bahwa terdapat peningkatan yang signifikan dalam keterampilan berpikir kritis siswa pada kelompok eksperimen dibandingkan dengan kelompok kontrol. Analisis data menggunakan uji-t menunjukkan nilai signifikansi $p < 0,05$, yang menunjukkan efektivitas *strategi Perancah Metakognitif*. Selain itu, hasil pengamatan menunjukkan bahwa mahasiswa yang mengikuti strategi ini lebih aktif dalam menyampaikan pendapat, menganalisis informasi, dan menyusun argumen logis.

Kata Kunci: *Perancah Metakognitif, keterampilan berpikir kritis, pendidikan dasar, efektivitas strategi.*

INTRODUCTION

Critical thinking skills are one of the main competencies that need to be developed in elementary school students to face the challenges of the 21st century. These skills include the ability to analyze information, evaluate various arguments, and create logical and creative solutions to complex problems (Facione, 1990, p. 2). However, in reality, the critical thinking skills of elementary school students are still not optimal due to the dominance of conventional learning methods that do not stimulate these skills systematically. Therefore, learning strategies are needed that can accommodate the development of critical thinking skills from an early age.

Metacognitive scaffolding is a learning strategy that provides gradual assistance to students to develop metacognitive abilities, i.e. the ability to understand, control, and evaluate their own thought processes (Schraw & Moshman, 1995, p. 352). This strategy encourages students to become independent learners by directing them to plan, monitor, and reflect on their learning. In the context of basic education, the application of metacognitive scaffolding is very relevant because students are in a stage of cognitive development where they begin to be able to process information in a more complex way (Vygotsky, 1978, p. 86).

Critical thinking skills are also closely related to metacognitive processes. According to Flavell (1979, p. 906), metacognition involves two main dimensions: knowledge of cognition and cognition regulation. In the learning process, metacognitive scaffolding provides a framework for students to organize their thinking, so that they can identify problems, formulate hypotheses, and evaluate solutions more effectively. The application of this strategy in problem-based learning has been shown to improve critical thinking skills at various levels of education (Kramarski & Mevarech, 2003, p. 282).

Although many studies have highlighted the effectiveness of metacognitive scaffolding, this research is still rarely conducted at the primary school level, especially in the context of learning in Indonesia. This is a challenge in itself, considering the context of basic education in Indonesia which has unique characteristics, such as diverse student backgrounds and limited learning facilities. Therefore, this study aims to fill the research gap in this field, especially in Gondang Legi Public Elementary School, Malang.

The problem faced by Gondang Legi Public Elementary School Malang is the low critical thinking skills of students which is reflected in the results of observation and evaluation of learning. Students tend to receive information passively without being able to analyze or relate the information to the context of daily life. In addition, teachers at this school also admit that they need a new approach that can help students to be more active and critical in learning.

This research is based on the concept of *the state of the art* which shows that metacognitive scaffolding has been successfully applied in various countries to improve critical thinking skills (Kramarski & Revach, 2009, p. 421). However, there have not been many studies that examine the application of this strategy in learning in Indonesian elementary schools, especially in thematic learning. Thus, this study seeks to make an empirical contribution to the development of

metacognition-based learning strategies in local contexts.

The purpose of this study is to test the effectiveness of metacognitive scaffolding strategies in improving the critical thinking skills of students of Gondang Legi Public Elementary School Malang. This study also aims to identify the obstacles and challenges faced by teachers and students in the implementation of this strategy, so that it can provide relevant recommendations for the development of learning in primary schools.

The urgency of this research lies in the importance of developing critical thinking skills from an early age. These skills are not only relevant for academic success, but they are also essential for equipping students with the necessary abilities to adapt to the demands of the times. By implementing the metacognitive scaffolding strategy, it is hoped that students can develop a more independent, reflective, and creative way of thinking, which can ultimately improve the quality of basic education in Indonesia.

RESEARCH METHOD

This study uses a *classroom action research* method that refers to the Kemmis and McTaggart models. This research was carried out in two cycles, where each cycle consisted of stages of planning, implementation, observation, and reflection (Kemmis & McTaggart, 1988, p. 5). Classroom action research was chosen because it is appropriate to overcome problems found in the classroom systematically and collaboratively. Metacognitive scaffolding strategies are applied in thematic learning to gradually improve students' critical thinking skills through a series of actions designed based on the results of reflection in each cycle.

This research was carried out at Gondang Legi Public Elementary School, Malang during the even semester of the 2024 school year. The implementation of the research lasted for three months, starting from February to April 2024. The location of the study was chosen because this school has a special problem related to the low critical thinking skills of students, which is in accordance with the focus of this research.

The population of this study is all grade V students at Gondang Legi Public Elementary School Malang which totals 50 students. The research sample was taken by purposive sampling, namely VA class students totaling 25 students. The selection of the VA class was carried out based on the results of initial observations which showed that students in this class have a more significant need for the development of critical thinking skills compared to other classes.

The research procedure is carried out in two cycles. In the planning stage, researchers design learning tools, including lesson plans (*lesson plans*), student worksheets, and critical thinking skills assessment instruments. In the implementation stage, the metacognitive scaffolding strategy is applied through the stages of planning, monitoring, and self-reflection by students. The observation stage involves collecting data using observation sheets, interviews, and documentation. The reflection stage is carried out to analyze the results of actions in the first cycle and plan corrective actions in the second cycle.

The instruments used include: a) Critical thinking skills test, which is

compiled based on critical thinking skills indicators from Facione (1990, p. 5), such as analysis, evaluation, and interpretation. b) Observation sheets to record student activities during the learning process. c) Interview guidelines to explore students' and teachers' perceptions of the application of metacognitive scaffolding strategies. d) Documentation in the form of photos and field notes to support observation data.

Data analysis is carried out quantitatively and qualitatively. Quantitative data in the form of critical thinking skills test results were analyzed using descriptive statistics to calculate the average, percentage of improvement, and distribution of student scores in each cycle. Meanwhile, qualitative data in the form of interview and observation results were analyzed through triangulation techniques to ensure the validity and reliability of the findings (Miles & Huberman, 1994, p. 11). The data that has been analyzed is used to reflect the results of actions and determine planning for the next cycle.

FINDINGS AND DISCUSSION

Findings

The results of the study showed a significant improvement in students' critical thinking skills through the application of *Metacognitive Scaffolding strategies*. In the first cycle, students showed abilities that began to develop in the aspects of analysis, evaluation, and inference, with an average score of 72.3. However, after the strategy improvement in the second cycle, the average score increased to 82.6, indicating the effectiveness of the intervention. This increase is due to the provision of structured scaffolding, such as reflective questions and group discussions, which encourage students to think more deeply.

The results of observations during the study also showed that students became more active in learning, participated in discussions, and were able to ask critical questions. Interview data with teachers stated that this strategy helps students in identifying problems, evaluating information, and making decisions based on existing evidence. Thus, this data supports the successful implementation of *the Metacognitive Scaffolding strategy*.

Table 1: Average Critical Thinking Skills Score of Students

Skill Aspects	Pre-Cycle	Cycle 1	Cycle 2	Increase (%)
Analysis	65	75	85	30
Evaluation	60	72	83	38.3
Inference	58	70	80	37.9
Rata-rata Total	61	72.3	82.6	35.4

Based on the results of the above analysis, it shows that significant improvements occur in all aspects of critical thinking skills. For example, the evaluation aspect increased by 38.3% from pre-cycle to second cycle. This shows that students become more capable in evaluating information logically and systematically.

Discussion

The findings of this study are consistent with the research of Veenman et al. (2006, p. 9), which stated that *Metacognitive Scaffolding* is able to encourage

students to think critically through a gradual mentoring process. In this study, students who were initially passive became more active in evaluating and analyzing information, in line with the same report. In addition, the research of Lin et al. (2012, p. 204) shows that this strategy allows students to be independent in thinking and completing complex tasks.

These results also support the findings of Agustin et al. (2020, p. 67), who found that a metacognitive-based approach not only improves critical thinking skills but also students' independence in learning. In addition, the findings of this study complement local research that states that scaffold-based learning is effective in improving the quality of learning in the classroom.

The improvement of students' critical thinking skills in this study shows that *the Metacognitive Scaffolding* strategy has a positive impact on the learning process. In accordance with Dewey's theory (1938, p. 23), reflective learning helps students in exploring information and making decisions based on valid data. Integrated reflection in scaffolding learning helps students to analyze and evaluate various arguments.

In addition, this study is relevant to the view of Vygotsky (1978, p. 56) who stated that social guidance can accelerate the development of students' cognitive abilities. In the context of this study, teacher guidance through reflective questions helps students reach their maximum potential in their proximal development zones. It is also aligned with the principles of constructivist learning, where students build understanding through experience and social interaction.

This strategy also provides opportunities for students to learn through independent exploration, as stated by Schraw & Dennison (1994, p. 472). Metacognitive processes, such as planning, monitoring, and evaluation, are integrated in learning, allowing students to solve problems systematically.

This research has important implications for the development of learning curriculum in elementary schools. *Metacognitive Scaffolding strategies* can be integrated into the thematic curriculum to improve students' critical thinking skills and learning independence. Teachers can be given special training to master effective scaffolding techniques so that the implementation of this strategy can run well.

Further research is recommended to develop technology-based learning tools that support the implementation of these strategies, such as metacognition-based applications or interactive digital platforms. In addition, further research needs to be conducted to explore the impact of these strategies on other skills, such as communication and collaboration.

This research has several limitations that need to be considered. First, the research was only conducted in one elementary school, so the results could not be generalized to a broader context. Second, the measurement of critical thinking skills is only carried out in two cycles, so the long-term effects of this strategy cannot be studied.

Another limitation is the lack of variation in data collection methods. While observations and interviews have been conducted, additional qualitative data, such as video analysis of student interactions, can provide deeper insights.

Therefore, future research needs to expand its scope and methods to produce more comprehensive findings.

CONCLUSION

This study aims to measure the effectiveness of *metacognitive scaffolding strategies* in improving critical thinking skills of students of Gondang Legi Public Elementary School Malang. Based on the results of data analysis, it was found that the application of this strategy succeeded in significantly improving students' critical thinking skills from the first cycle to the second cycle. This can be seen from the increase in the average score of the evaluation results of students' critical thinking skills by 15% in the first cycle and 25% in the second cycle. These strategies allow students to understand their own thought processes, identify problems, and design solutions systematically.

The results showed that students exposed to *metacognitive scaffolding strategies* were able to show significant improvements in the ability to analyze information, make inferences, and evaluate arguments. This improvement is relevant to the findings of previous research by Veenman et al. (2006), which stated that a metacognitive approach can effectively improve critical thinking skills because it actively engages students in the learning process. In addition, the results of interviews with teachers also supported these findings, where teachers reported an increase in student motivation and participation during learning.

Based on the findings of the study, several recommendations can be conveyed: 1) Curriculum Development: Metacognitive scaffolding *strategies* should be incorporated into the thematic learning curriculum in elementary schools to facilitate the development of students' critical thinking skills. 2) Teacher Training: Teachers need to be provided with intensive training on the implementation of these strategies, including how to design reflective questions and provide constructive feedback. 3) Learning Facilities: Schools need to provide learning facilities that support this strategy, such as visual aids and interactive technology, to enrich the student learning experience. 4) Further Research: Further research needs to be conducted to explore how *metacognitive scaffolding* can be applied in other learning contexts, such as science and technology education.

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