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Systematic Literature Study on Challenges and Efforts to Develop Critical Thinking Skills of Elementary School Students

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Keywords

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Abstract

Critical thinking skills for elementary school students are very important to face challenges in the era of globalization. Without realizing it, many young people, especially elementary school children today, have very low critical thinking skills, which causes them to be unable to think critically to solve the problems they are facing. This study aims to analyze the various challenges and efforts to foster critical thinking skills in students in elementary schools presented in previous research articles. The method used in this research is the SLR (Systematic Literature Review) qualitative method. The results of the research obtained were 10 journals that were reviewed based on reference sources, sample types, research methods, interventions provided to the results of the journal review. The conclusion obtained is that the growth of critical thinking skills can be done through learning model interventions such as problem-based learning, project-based learning, discovery learning, inquiry, and jigsaw in learning. Through these learning models, students become more active in learning so that they gain real experience to solve problems at school and in the surrounding environment. Thus, the utilization of these learning models in the learning process can help students to train and improve their critical thinking skills. This shows that the writing of this article is relevant and urgent as an effort to answer the needs of education in the era of globalization which requires students to have high-level thinking skills from an early age..

1. Introduction

Critical thinking skills are one of the essential skills that elementary school students must have in facing the challenges of the 21st century. In an ever-evolving world, students are not only required to memorize information, but also to be able to analyze, evaluate, and solve problems independently. Data on the condition of students critical thinking skills is important. This is because research related to critical thinking has pedagogical implications and offers solutions for the development of critical thinking (Liang & Fung, 2021). The importance of critical thinking skills is expressed by (Luritawaty et al., 2022) that students need critical thinking skills to solve several problems that involve thinking logically, interpreting, analyzing, and evaluating the information provided so as to enable a person to make accurate and valid decisions.

Elementary Education is the initial stage in the formal education system, and is a very important time in the formation of the fundamentals of academic understanding and skills. Today, critical thinking is becoming a comprehensive educational innovation to teach 21st century skills (Manassero-Mas et al., 2022). Critical thinking is an important component in today's learning process, especially in the era of information and technology that demands in-depth analytical skills. The role of critical thinking skills is also increasingly recognized in the development of education as one of the aspects that must be possessed by students. Education that integrates critical thinking plays a role in producing a young generation that is not only academically intelligent, but also able to make the right and responsible decisions, both for themselves and for society. Therefore, it is important to develop critical thinking and effective communication skills from an early age.

In fact, critical thinking skills have not been accustomed in Indonesian schools, only a small number of schools have accustomed their students to critical thinking. As a result, students critical thinking skills in Indonesia are still low. In practice, there are still many elementary schools that have

not optimally implemented learning methods that can encourage critical thinking skills in students. According to the results (OECD, 2024), it shows that students thinking skills in Indonesia are still low. Where Indonesia is ranked 70 out of 77 countries that took the test. This is in accordance with the research conducted (Wijayanti & Siswanto, 2020) which obtained the results of achieving students critical thinking of 46.97% or categorized as low.

However, efforts to hone critical thinking skills in elementary school students do not always go smoothly. The challenges in fostering critical thinking skills in the elementary school environment are quite diverse. One of the main obstacles is that the curriculum still focuses on the low-cognitive aspects, such as memorizing and repeating information, compared to independent problem-solving. Students low critical thinking skills pose challenges that require a teacher to develop and implement a mathematics learning model (Idris & Khaulah, 2020). The lack of use of discussion, exploration, and problem-solving learning models causes students to be less trained to think critically in understanding a concept.

Through project-based learning, teachers are more capable of nurturing critical thinking because of the constructivist theory. The integration of project-based learning in education encourages the motivation of social interaction, learning, and reflection. It enables children to immerse themselves in the learning process. Both paradigms ensure a shift from knowledge acquisition and learning to a more profound, reflective, and deeper thinking engagement. Sadly, in Indonesia, these methods are not common, especially in primary education, which tends to be dominated by a more traditional, teacher-centered, and passive pedagogical approach (Wulandari et al., 2025).

The education system has widely recognized the need to foster critical thinking skills, but in the case of Indonesia, the emphasis is placed on secondary and tertiary levels. Very little, if any, has been directed to the elementary level in terms of teaching strategies and practical application of learning. Most studies concentrate on the application of particular learning models and very few underscore the pedagogical barriers in the teaching contexts and the opportunities of teaching critical learning in elementary contexts (Komalasari et al., 2021). Furthermore, other barriers such as the prevalence of talk-and-chalk teaching style, low understanding of critical thinking approaches by educators, and lack of teaching materials are major contributors to the reverse holistic development of these critical thinking skills (Kusuma et al., 2024). Therefore, there is a need to study not only the strategies of teaching and learning but also the contextual barriers in the teaching gap of incorporating critical thinking in foundational teaching.

This research aims to identify various challenges in fostering critical thinking skills in elementary school students and analyze strategies and efforts that can be made to overcome these challenges. In this study, critical thinking indicators were used according to (Faradisa et al., 2022). Based on this, the indicators used in this study are interpretation, analysis, evaluation, and inference.

Table 1. Indicators of Critical Thinking Ability

Aspects Critical Thinking	Sub Skill
Interpretation (understanding of the problem)	Have knowledge of relevant information and the requirements of the problem and are able to explain in their own words.
Analysis (planning/modeling of solutions)	Planning a problem solution involves the process of transforming the problem into a mathematical model.
Evaluation (model implementation)	Able to explain points clearly. Follow the troubleshooting process in sequence and perform precise, comprehensive, and accurate calculations to solve the problem.
Inference (drawing conclusions)	Draw appropriate conclusions and provide accurate answers by following the methods required in problem solving.

Based on the above statement, critical thinking skills are important skills that must be developed from the elementary school level. In the midst of the challenges of the 21st century, students are not only memorized, but also required to analyze, evaluate, and solve problems independently. Unfortunately, students critical thinking skills in Indonesia are still relatively low due

to the lack of application of learning methods that support the development of these skills. A curriculum that tends to focus on low cognitive aspects and a lack of discussion-based learning and problem-solving are the main challenges. If this challenge is not overcome immediately, then theyounger generation will have difficulty in making logical and responsible decisions. However, there are few systematic reviews that categorize challenges and solutions based on real intervention-based learning approaches. Therefore, this article was written to identify challenges and find appropriate efforts to foster critical thinking skills in elementary school students.

A number of studies show that learning practices in elementary schools still face various obstacles in fostering students' critical thinking skills. These obstacles include teacher-centered learning, lack of active student involvement, low courage to ask questions, and not optimal application of problem-solving-based learning models (Herlina et al., 2022). In addition, teachers also face challenges in mastering and choosing learning models that are appropriate to the context and characteristics of students. The socio-cultural context and students' low self-learning skills also exacerbate this condition.

In response to these challenges, various cooperative and participatory strategies have been developed to activate students' reasoning and foster their critical thinking skills. These strategies include the implementation of Problem Based Learning, Project Based Learning, Discovery Learning, Guided Inquiry, Think Pair Share, and Jigsaw cooperative techniques. These models are proven to encourage students to actively discuss, ask questions, evaluate opinions, and develop solutions logically and collaboratively. Thus, cooperative-based learning strategies not only improve conceptual understanding, but also foster critical thinking skills essential for 21st century life (Rosdiati, 2023).

One of the learning models that is considered the most effective in improving students' critical thinking skills is Problem Based Learning (PBL). This model places students as the center of learning and encourages them to be active in finding solutions to real problems given by the teacher. Through the stages of orientation, investigation, discussion, and reflection, students are trained to develop analysis, evaluation, and inference skills systematically (Nashiroh et al., 2024). The application of PBL is also proven to be able to increase student activeness in group discussions and train them to think logically and argumentatively in solving problems. The results showed that students who studied with the PBL model showed a significant increase in critical thinking skills compared to students who studied using conventional methods. Therefore, PBL is one of the strategic approaches that can be integrated in learning in elementary schools to foster high-level thinking skills early on.

2. Method

This research uses the SLR (Systematic Literature Review) qualitative method, which is carried out by collecting, identifying, reviewing, recording, assessing, and managing information and findings from previous research. Researchers used an electronic database in the form of Google Scholar, to search and collect articles that had been published in the range of 2020 to 2024. This research uses sources from previous articles that are relevant to the purpose and title of the research, namely articles that discuss various challenges and present efforts in fostering critical thinking skills in elementary school students that vary from one article to another. The keywords used in the search for articles were “critical thinking of elementary school students”, “challenges of critical thinking in elementary school”, and “efforts to improve critical thinking”, with the selection process carried out through screening titles, abstracts, and the suitability of the article content with the research focus. This method is chosen based on the purpose of the researcher who wants to obtain information and data. Not to test hypotheses, but to get information about the challenges and efforts to foster critical thinking skills in elementary school students.

This study also followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to facilitate the article search and selection process. PRISMA is an evidence-based guideline designed to assist researchers in compiling and reporting the results of systematic reviews and meta-analyses in a thorough and transparent manner. This procedure is carried out systematically by following a predetermined protocol, so that the literature review process runs more focused and objective. The PRISMA guidelines include four main stages, namely identification (identifying all relevant articles), screening (filtering articles based on inclusion and exclusion criteria), eligibility (determining the eligibility of articles in more depth), and included

(determining which articles to analyze). These stages help researchers select articles more accurately and ensure that each article analyzed is relevant to the focus of the study and has sufficient credibility (Sastypratiwi & Nyoto, 2020).

The criteria relevant to this study consists of scholarly articles published during the date range of 2021-2024 with the specific focus of employing learning techniques and teaching critical thinking to elementary school students. Selected articles must also employ clear research methods such as action research, quantitative, or mixed method research, and must be available through official online access via digital libraries or national journal repositories. On the contrary, articles published before the year of 2021 are not considered because they do not capture the present-day educational climate and pedagogical advancements. Moreover, reviews from journals that lacked peer review or did not detail methodology, samples, and findings were also omitted from this review. This methodology is aligned with systematic literature review methodology in elementary education, which prioritize the context and relevancy of the data as the primary reasons for inclusion (Ngatminiati et al, 2024).

For the details, the steps of the PRISMA method in this study can be seen in Figure 1 below:

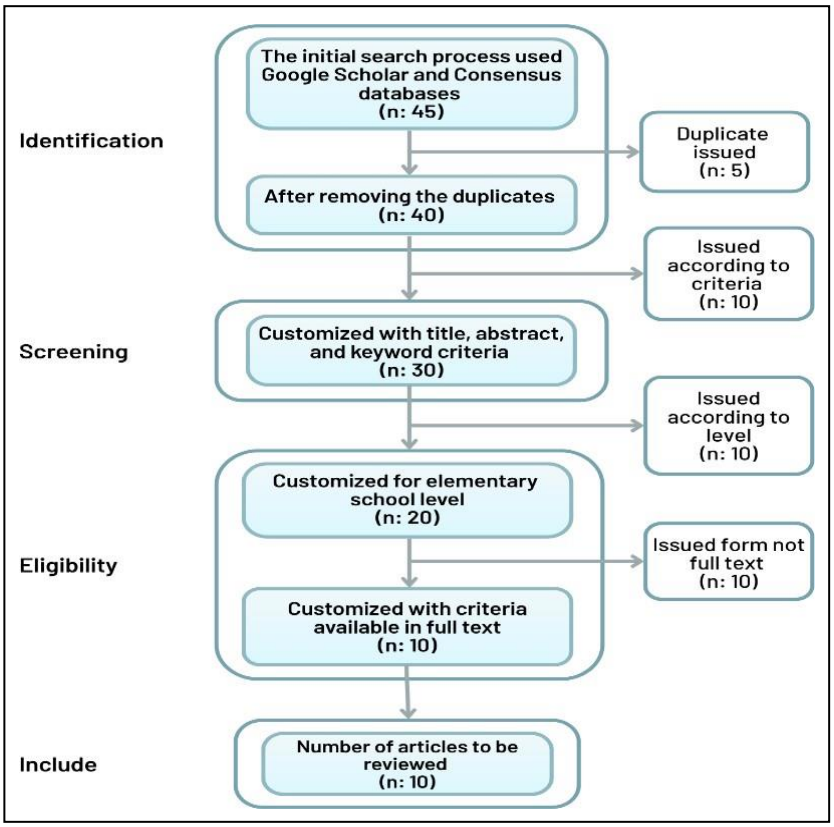

Figure 1. PRISMA research method flow

The articles obtained through the stages of the PRISMA method in the flowchart above were then further analyzed and presented in tabular form. The aspects listed in the analysis table include important information from each article, such as the title and year of publication, the research methods used, as well as the main findings and efforts offered related to the development of critical thinking skills of elementary school students. The purpose of preparing this table is to facilitate comparison between articles and identify patterns or differences in the approaches used, so that researchers can draw more comprehensive and meaningful conclusions from the results of the literature review.

As a follow-up to the article comparison process, the next thing to do is to apply thematic analysis to the selected articles in order to identify their key overarching themes. This involves a thorough reading of each article to identify the central challenges, the defined processes, and the pertinent results concerning the issues and the efforts in the articulation of reasoned thought. Those emerging themes are classified and grouped based on the similarities of contents, approaches of

learning, and contexts of application. After the key themes are defined, there is an inter-article comparison done in terms of similarities and differences between the articles in regard to learning models used and the effectiveness of the administered interventions. The result of such analysis is integrated to produce an overall summary of the patterns, challenges, and the multi-angled solutions that have been applied across the span of primary education.

3. Results and Discussion

3.1. Challenges of Fostering Critical Thinking Skills in School

In fostering critical thinking skills, students often still experience challenges. The challenges experienced by students at school are a sign of a discrepancy between the expected academic achievement and the actual academic achievement. There are challenges among students in learning activities, which can potentially hinder the learning process (Nuraeni & Syihabuddin, 2020). These challenges can cause students to fail or not succeed in meeting their learning goals. However each student has different knowledge, so they will all have different challenges and also academic success.

Not only that, fostering critical thinking skills in schools will challenge education practitioners, especially teachers. In this section, findings related to several challenges related to the application of critical thinking including socio-cultural, theoretical and practical, methodological, and technical issues are presented. First of all-, critical thinking has a relationship with socio-cultural factors. This can be seen in the real example of Asian students, such as Japanese students, often having difficulty reflecting the concept of critical thinking in English writing. This difficulty arises because of the difference in thinking orientation between Western educational culture that emphasizes critical thinking and Eastern educational culture which has a different approach. In addition, critical thinking is not only a cultural issue, but it is also hardly taught to students socially. As conveyed (Sadeghi et al., 2020), critical thinking is a difficult term to define even though it exists in social practice. Then critical thinking is also considered a new way of thinking, but it should not confuse students in relation to a new way of seeing the world through new conceptual or methodological tools in analyzings.

Then, one of the factors that plays the most role in the application of critical thinking skills is the ability of educators to present topics that suit the needs and level of understanding of students related to critical thinking. A good understanding of the topic is thought to support the development of reasoning skills, which are an important part of critical thinking. This is in line with research (Rahmadani et al., 2023) that shows that learning approaches that relate material to real context can improve students critical thinking skills, as they more easily understand and analyze information relevant to everyday experiences. Therefore, teachers need to pay high attention to contextualizing and positioning themselves on the socio-cultural values set out in the teaching of critical thinking in diversity.

Next, education practitioners, including teachers and institutions, are challenged to design and choose the right learning model in teaching critical thinking in schools. There is no denying that some teachers have not mastered the selection of the right learning model to integrate in learning. This is supported by research (Khalid et al., 2021) that reveals that teachers face barriers in promoting critical thinking skills in the classroom, including a lack of background knowledge about critical thinking and a lack of adequate resources. This highlights the importance of professional development programs that support teachers in implementing effective learning models to improve students critical thinking skills.

In addition to student challenges, teachers also face significant obstacles in implementing critical thinking learning models. One of the main obstacles is the lack of in-depth training related to the implementation of models such as Project-Based Learning, which makes it difficult for teachers to systematically organize activities (Wardhani et al., 2024). In addition, limited supporting facilities such as contextual learning media and limited preparation time also affect the effectiveness of implementation. Excessive administrative workload limits the amount of creativity and strategic planning teachers do concerning rigorously intellectual exercises. Thus, teachers need to receive and to be given the proper materials and resources so that they may engage properly in training during

the learning processes where they motivate students to think critically and independently as early as possible and at an appropriate developmental stage.

The challenges that have been explained in fostering critical thinking skills in schools come from various factors, both from the side of students and educators. Students experience obstacles due to the mismatch between academic expectations and actual abilities. On the other hand, teachers also face difficulties in choosing and implementing the right learning model. Therefore, a contextual approach and professional support are needed so that the critical thinking learning process can take place effectively.

3.1.1. Results and Discussion 3

If we talk about critical thinking skills, perhaps this can be grown through the right learning stimulation, even through the intervention of certain learning models. Then what if the ability to think critically has not appeared in elementary school-age children? The researcher has conducted a literature review study, which is to identify 10 articles that are relevant to the article title. These articles were then analyzed further and 10 articles were selected that discussed efforts to foster critical thinking skills in elementary schools. The selected articles will be re-screened to be discussed in categorization according to the purpose of writing and the title of the article. The article selection strategy carried out by the researcher can be seen in Table 2. The following:

Table 2. Article Selection Strategy

No	Discussion Categories	Search Engines	Search Results
1.	Search year 2020- 2024	Google Scholar and Consensus	45
2.	Relevant titles		30
3.	Presenting different solutions		10
	Results discussed		10

The articles chosen to be discussed are articles that are in accordance with the categorization determined by the researcher, which focuses on the findings in the form of challenges and efforts to foster students' critical thinking skills in elementary school. The twelve articles selected were articles that had differences in the use of learning models to foster critical thinking skills. The articles selected in the categorization are then presented in the form of Table 3. The following are the results of the analysis of relevant articles related to the challenges and efforts to foster students' critical thinking skills in elementary schools:

Table 3. Challenges and Efforts to Cultivate Critical Thinking Skills

Article	Method Research	Findings	Attempt
Application of Problem Based Learning (PBL) Model to Improve Critical Thinking Skills in Class IV in Mathematics Subjects to the Elementary School. (Nashiroh et al., 2024)	Research Class Action	Based on the results of observations, the researcher of the article found challenges in fostering the critical thinking skills of elementary school students at SD Muhammadiyah Plus Malangjiwan Colomadu. The challenges found were that students still had difficulty in solving problems, were less active during the learning process, were not used to group assignment activities, and had low critical thinking skills in solving story problems. The article stated that the cause of these challenges is a learning model that is still teacher-centered, only channeling information without encouraging students active participation in discussions or questions, as well as learning that is less relevant to real life so that students tend to only memorize concepts without understanding their application.	This article utilizes the application of the Problem Based Learning (PBL) learning model as the main solution to foster the critical thinking skills of elementary school students. In this case, the PBL learning model is applied with five main steps or syntax, namely: orientation of students to problems, organizing students to learn, guiding investigations, developing and presenting results, and analyzing and evaluating problem-solving. In its implementation, teachers provide contextual story questions, divide students into groups, guide discussions, and encourage students to present and evaluate the solutions they find. The results of the application of the PBL model show a change in learning that is more student-centered, as well as an increase in students activeness, collaboration, and critical thinking skills in solving mathematics problems.
Project-Based Learning in improving students critical thinking. (Herlina et al., 2022)	Descriptive Qualitative	The researcher has conducted research on SD No. 8 Benoa. In the elementary school, there are two challenges in fostering the critical thinking skills of elementary school students, namely challenges in student-centered learning and challenges in independent learning skills. Challenges in student-centered learning include: students are not used to being the center of learning because so far learning has been more focused on teachers. Challenges in students' self-study skills include: students are not yet able to learn independently, are not used to finding, managing, and solving problems through projects.	This article suggests several efforts: 1.) teachers actively involve students in learning projects such as making dance props, jumputan batik, and art performances as a form of applying the Project-Based Learning model; 2.) The teacher directs students to work in groups so that they can exchange ideas, discuss, and make decisions together to solve problems; 3.) teachers get students used to reading books in the reading corner of the classroom before learning begins to enrich vocabulary and foster curiosity; 4.) teachers provoke students to actively ask questions through video shows, reading texts, or other media, to encourage the use of logic in thinking; 5.) the teacher provides open-ended questions so that students are able to see and convey different points of view in solving a problem; 6.) The teacher assesses the results of the project and the collaboration process in the group by using the assessment rubric to find out how students work together and are responsible in the learning process.
Implications of the Sponsor Technique Cooperative Jigsaw Type Against Critical Thinking Skills of Elementary School Students in the District Banyuwangi. (Rahaju et al., 2023)	Quantitatie (Statistical Test)	This article argues that students low critical thinking skills are exacerbated by the conventional learning system that is still predominantly used in schools. The teacher delivers the material in one direction without reciprocity from the students, which causes students to not get used to facing problems that are not exemplified before. As a	This article suggests that the application of jigsaw-type cooperative teaching techniques is one of the effective efforts to foster the critical thinking skills of elementary school students. In this technique, students are actively involved in learning through group division and responsibility for mastery of certain subtopics which are then redistributed to the group

Article	Method Research	Findings	Attempt
		result, students cannot think outside of the way of completion that has been taught. This is strengthened by data that more than 60% of grade IV students at SDN 4 Penganjuran Banyuwangi obtained an exam score below 70 and solved the questions in a uniform way, even though there are more than two possible ways to solve them. These findings point to a major challenge in fostering students critical thinking skills	of origin. This process encourages students to analyze information, communicate, evaluate opinions, and conclude the results of discussions, which are part of critical thinking skills. The jigsaw technique also creates a participatory and collaborative learning atmosphere, where students learn not only from teachers but also from their peers.
Discovery Learning Model to Improve Capabilities Critical Thinking of Students on the Content of Indonesian Lessons in Primary School. (Eriansyah & Baadilla, 2023)	Quantitative (Experimental)	Reporting from the Edukasiana article, there are elementary school students at SDN Srengseng Sawah 11 whose critical thinking skills are still low in learning Indonesian. Students are suspected of having difficulty developing these abilities because the learning approach used is still conventional. Students are not actively involved in the learning process. As a result, students are less able to think logically and critically when facing problems. The researcher uses the discovery learning model as a solution. Students are given space to explore and discover knowledge independently. Students showed a significant improvement in critical thinking skills after participating in learning with the model.	This article argues that the Discovery Learning model has an important role in fostering students critical thinking skills, especially in Indonesian language learning at SDN Srengseng Sawah 11. Teachers should create a learning atmosphere that encourages students to actively explore information and discover knowledge independently, and guide them to think logically and analytically in solving problems. Teachers also need to act asfacilitators who provide a learning environment that supports inquiry and reflection. If learning is only done conventionally without actively involving students, then students critical thinking skills will be difficult to develop.
Effect Size of Guided Inquiry Learning Model on Critical Thinking Ability of Elementary Students. (Nugraheni et al., 2021)	Descriptive Qualitative	Based on the findings in the article, one of the main obstacles in developing critical thinking skills of elementary school students is the low application of these skills in the teaching and learning process. The results of interviews with fourth grade teachers in elementary schools in Gugus XII and XIII Buleleng District revealed that many students have not been able to understand material that requires critical thinking, are less active in learning, and learning is still dominated by traditional methods that do not support the growth of critical thinking skills. In addition, observations show that some students are less focused, less enthusiastic, and have difficulty in understanding cognitively challenging material.	This article relies on the application of guided inquiry learning model as the main approach in improving students' critical thinking skills. The implementation is carried out by actively involving students in the learning process, such as formulating problems, making temporary conjectures, conducting experiments, processing data, and concluding results. Learning activities are designed in a supportive atmosphere and directed by the teacher so that students do not experience confusion. The success of this approach is evidenced by the results of a meta-analysis which showed that the average effect size value reached 1.79, which is classified as a large influence on improving students critical thinking skills at the elementary school level.
Application of Read Answer Discuss Explain And Create (RADEC) Learning Model to Improve Students Critical Thinking Ability in Elementary School. (Sapitri et al., 2023)	Classroom Action Research	This article reveals that efforts to improve students critical thinking skills face various obstacles at UPT SD Negeri 012 Gading Sari. One glaring issue is the lack of active involvement of students in the learning process; they are more often silent and passive, even when given the opportunity to ask or answer questions. In addition, students	This article offers the application of the RADEC (Read, Answer, Discuss, Explain, and Create) learning model as a solution to foster students critical thinking skills. This model is designed to encourage students active involvement in all stages of learning, from reading material, answering questions, discussing, explaining back understanding, to creating a work or solution. Through

Article	Method Research	Findings	Attempt
		have difficulty in determining the core of the problem, evaluating information, and formulating conclusions appropriately. This condition is exacerbated by the monotonous learning approach that is still dominated by the lecture method, which does not support the development of higher order thinking skills. As a result, many students do not achieve the targeted minimum score, reflecting the low mastery of critical thinking skills.	this approach, students are trained to think logically, reflectively, and analytically gradually. The results showed that the use of the RADEC model significantly improved students critical thinking skills from the pre- action stage to the second learning cycle, with the percentage of learning completeness increasing from 35% to 87%, so this model is considered effective in developing critical thinking skills in the elementary school environment.
The Effectiveness of Using Blended Learning Models on Learning Motivation and Social Studies Learning Outcomes. (Puspitasari et al., 2022)	Quantitative	This article argues that the challenge in developing students critical thinking skills lies in the lack of maximum utilization of technology by teachers in the learning process. As explained in the article, many teachers still use conventional methods such as lectures which are considered monotonous and less interesting, so that students become less motivated and learning outcomes are low. This happens at SDN 1 Gambasan and SDN Plumbon, where teachers have not fully integrated technology in learning, especially in social studies class IV.	The article utilizes a blended learning model assisted by Google Classroom, which combines face-to-face and online learning synchronously and asynchronously. This model provides flexibility and wider opportunities for students to interact with teachers, learning materials and peers, both inside and outside the classroom. Through this approach, students are not only required to understand the material passively, but also actively explore, ask questions, and solve problems, thus encouraging the development of critical thinking skills. In addition, the utilization of technology that is familiar with students lives today is expected to increase learning motivation and curiosity, which are important foundations in critical thinking.
The Effect of Think Pair Share Learning Model on Cooperation and Critical Thinking Ability of UPTD Students at SD Negeri Longkek 4 Galis. (Prasetya et al., 2023)	Quantitative	Based on the findings in the article, the process of developing students critical thinking skills at SD Negeri Longkek 4 Galis still faces serious challenges. The learning system that is still teacher-oriented makes the classroom atmosphere monotonous and does not stimulate students active involvement. As a result, many students experience boredom and difficulty in absorbing the subject matter optimally. This condition has a direct impact on their low ability to answer questions that require high-level reasoning. The lack of a variety of creative teaching methods also worsens the situation, as seen from the dominance of student learning outcomes that are below the passing standard, especially in the type of description questions that demand analytical skills and in- depth thinking.	This article applies the Think Pair Share (TPS) learning model. This model provides space for students to think independently, then discuss with a partner, and finally share the results of their thinking with the group or class. This process not only trains students in processing and conveying information, but also builds skills in analyzing, evaluating, and composing arguments based on facts and logic. The results of the research on grade V students of UPTD SD Negeri Longkek 4 Galis showed that the application of the TPS model significantly improved students critical thinking skills, which was reflected in the increase in the average score after treatment and a significance value of 0.001 <0.05.
Improving Critical Thinking Ability of Elementary School Students through Problem Posing Learning Model. (Faidah et al., 2022)	Research Classroom Action	Researchers have conducted research at SD UPTD Baengas I Bangkalan. In this elementary school, there are challenges in fostering the critical thinking skills of elementary school students, namely their low	This article suggests an effort to foster students critical thinking skills at SD UPTD Baengas I Bangkalan through the application of the problem posing learning model, which has proven effective in encouraging students to think more

Article	Method Research	Findings	Attempt
		active participation in the learning process, which is reflected in the lack of courage of students to ask questions or express opinions in class. Many students are still passive, tend to copy their friends' work without understanding the material deeply, and have difficulty in formulating and solving problems independently. Teachers are also faced with the challenge of having the skills to assess the relevance of students questions and ascertain the relevance and depth of their thinking.	actively and deeply. In this model, students are invited to formulate problems based on the material they have learned, either individually or in groups, then solve these problems independently or with classmates. This model is designed to build basic critical thinking skills such as analyzing arguments, asking questions, answering, concluding, and evaluating observations. In addition, teachers also play an important role in guiding students thinking processes through stages such as providing elementary clarification, supporting students arguments (basic support), and encouraging the development of problem-solving strategies (strategies and tactics), all of which aim to form reflective and logical thinking habits.
The Effect of Teams Games Tournament Assisted by Sticky Notes Media on Critical Thinking Skills of Elementary School Students. (Vista et al., 2023)	Quantitative	Based on observations, researchers found that classroom learning has not utilized models and media that are interesting and student-oriented, especially in order to foster critical thinking skills. During teaching and learning activities, teachers tend to deliver material in one direction through the lecture method, which makes students less excited and not actively involved due to the lack of constructive interaction. In addition, the absence of the use of creative and relevant learning media causes students to feel less interested in participating in lessons. As a result, many students consider that learning is only limited to memorizing information, not as a process of understanding and developing deeper thinking skills.	This article relies on the Teams Games Tournament (TGT) learning model to foster critical thinking skills supported by sticky notes media which is used as an alternative to the monotonous lecture method. The TGT model was chosen because it is able to actively involve students through fun academic game activities, thus increasing enthusiasm for learning and encouraging students to think critically in solving challenges. The sticky notes media was used as a tool for students to express ideas, arguments and solutions in a concise and creative manner, facilitating them to develop ideas logically and systematically. The combination of this model and media creates a collaborative learning atmosphere and stimulates students to analyze, conclude and evaluate information more deeply.

Based on the ten selected articles, it is known that there are various kinds of efforts implemented to improve students critical thinking skills in elementary schools. As explained in the table, these challenges include the dominance of the lecture method, low active participation of students, lack of use of interesting media, and weak independent learning skills. This table also focuses on categorization by solution. The eight selected articles highlight different alternative solutions. In the results of the discussion, these eight articles have more than one alternative solution. In the various alternative solutions discussed in each article, there is one solution that is the same, namely the use of innovative learning models based on student activities. In this context, teachers play a very important role as facilitators, motivators and evaluators in learning, which can significantly improve students critical thinking abilities (Risandy et al., 2024). This shows that the role of the teacher is very influential on students critical thinking abilities.

Critical thinking skills are an important aspect in the learning process that must be instilled from an early age in elementary school. If students are not trained to think critically, they will have difficulty dealing with complex problems in real life. This inability will have an impact on low understanding of concepts, lack of ability to solve problems, and low overall learning outcomes. Therefore, implementing innovative and participatory learning

models is very important to encourage students active involvement in the learning process. Learning models such as Problem Based Learning, Project-Based Learning, Discovery Learning, and Think Pair Share and Problem Posing techniques are several examples of approaches that have proven effective in improving students critical thinking abilities. With the right approach, students can be directed to not only receive information, but also analyze, evaluate, and create ideas independently and collaboratively.

While various learning models have been mentioned, there is no clear explanation of how each model impacts students' critical thinking skills. The PBL model has the advantage of systematically developing critical thinking skills through the resolution of real-world problems,however this model requires teachers to be prepared to facilitate open discussions and effective classroom management (Nashiroh et al., 2024) and PJBL emphasizes active student involvement in collaborative projects that enhance evaluation and creativity skills, but the challenge is the limited time and resources in elementary schools (Herlina et al., 2022). Discovery Learning model excels helps students generate inferences with independent discoveries, but it is less optimal when applied if students are not yet accustomed to learning autonomously, and Guided Inquiry helps students answer their own question or draw conclusions based on data and bolster their logic, but the process can take longer (Eriansyah & Baadilla, 2023; Nugraheni et al., 2021). Other models, such as Think Pair Share, have been documented to improve the ability to critically argue and reason through organized student discussions (Prasetya et al., 2023). Therefore, learning objectives set with intended critical thinking skills, level of mastery, developmental objectives, and learner traits in mind.

To further understand how each learning models being mentioned contributes to critical thinking development, several studies have given us more detailed information. The PBL model enables students to analyze solutions and reflect on them in a systematic manner and PJBL fosters evaluation and problem-solving through authentic projects (Nashiroh et al., 2024; Herlina et al., 2022). Discovery Learning helps students generate inferences with independent discoveries, and Guided Inquiry helps students answer their own questions, draw conclusions based on the data, and bolster their logic (Eriansyah & Baadilla, 2023; Nugraheni et al., 2021). Other models, such as Think Pair Share, have been documented to improve the ability to critically argue and reason through organized student discussions (Prasetya et al., 2023). Therefore, learning objectives set with intended critical thinking skills, level of mastery, developmental objectives, and learner traits in mind

3.2. Conclusion

Reflecting upon previous observations, it is evident that critical thinking is an essential skill for students, especially those in elementary school, to have. This skill is useful in coping with various problems in an appropriate manner. However, in Indonesia is struggling with a major problem in nurturing critical thinking skills in elementary school students. Factors such as overreliance on the lecture method, low student engagement, and lack of effective media to capture students' attention need to be tackled urgently to avoid stifling students' critical thinking development. The dominant solution that has been provided in previous literature to promote critical thinking skills in primary education is the use of innovative student-centered learning approaches, including Problem Based Learning, Project-Based Learning, Discovery Learning, and the Think Pair Share strategy. This model of learning enables educators to be involved as motivates, guides, and assessors, fostering active student participation and developing critical thinking skills. As a follow-up, it is essential to carry out more comprehensive studies on the impact of diverse innovative learning approaches in different contexts and then offer comprehensive workshops for teachers so that every learning strategy aimed at developing critical thinking skills is employed. Researchers in the future are encouraged to use experimental or longitudinal designs to assess the enduring impact these strategies have on the students' critical thinking over time. Moreover, concrete guidelines tailored to the daily activities of the teachers should include contextualized lesson and essential learning scenario templates as well as model-specific classroom management techniques. Through proper support and guidance, teachers will efficiently encourage critical thinking in students throughout the various learning activities.

Author Contributions

Aulia Kartika Sari: Conceptualization, Methodology, Formal analysis, Writing - original draft. Candra Utama: Supervision, Validation, Writing - review & editing.

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