

Positive correlation between glocal-based metacognition and Improving critical thinking skills: A study on elementary school students



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Abstract The connection between glocal-based metacognition and critical thinking abilities plays a crucial role in education and the cultivation of essential skills for the 21st century. As global interconnectedness continues to grow, it is essential for students to grasp not only the dynamics of their immediate surroundings but also to evaluate broader international challenges with a critical lens. By engaging in glocal metacognitive practices thinking reflectively about both local and global perspectives learners develop a mindset that is both flexible and comprehensive. This approach nurtures advanced thinking skills, empowering individuals to tackle complex issues, make thoughtful choices, and participate effectively in diverse social and cultural settings. This research investigated the relationship between glocal-based metacognition and the critical thinking abilities of elementary school students. Glocal-based metacognition refers to how students consciously reflect on and manage their thinking by combining global perspectives with insights rooted in their local culture. As critical thinking becomes increasingly essential in today's education landscape, it is important to understand what factors help nurture this skill. This study used a quantitative correlational approach and included 140 fifth-grade students from different elementary schools in Bangkalan, Indonesia, who were chosen through purposive sampling. Data were obtained through a metacognitive awareness questionnaire and a critical thinking assessment and were analyzed via Pearson correlation. The findings revealed a strong and statistically significant positive relationship ($r = 0.78$, $p < 0.05$), suggesting that students with heightened glocal metacognitive awareness also demonstrate greater critical thinking proficiency. These results underscore the value of integrating global and local cultural perspectives into metacognitive instruction to support deeper, more reflective, and culturally informed thinking skills.

Keywords: glocal-based metacognition, critical thinking, elementary students, cultural awareness, education

1. Introduction

In today's globalized world, where the exchange of ideas across cultures is constant and perspectives are increasingly diverse, critical thinking has become a key skill that students must develop (Arifin et al., 2025; Tuxtayevich et al., 2024). However, this ability does not emerge in isolation; it depends heavily on one's capacity to recognize and manage one's own thinking processes, a concept known as metacognition (Merkebu et al., 2024). Within a glocal framework, metacognition involves more than just self-awareness in thinking; it also requires an understanding that thought processes are shaped by cultural influences, local traditions, and interactions with global viewpoints (Purwaningsih, 2024).

Critical thinking skills are students' mental processes and strategies for analyzing and evaluating ideas, choices and concepts to make decisions (Iman & Arjo, 2022; Ridwan, 2020; Sugiharto et al., 2021). Students' critical thinking skills are very important because, in general, real problems in the world today are not simple. Critical thinking in the field of education can help students solve problems faced in the learning process (Muslimah & Hardini, 2023; Prayitno & Sugiharto, 2017; Wardhani, 2023). The critical thinking process causes students to be able to solve problems rationally and be able to make decisions to solve these problems efficiently. However, in reality, teachers often use the lecture method during the learning process.

Apart from that, when discussion activities take place in the learning process, students are less than optimal in carrying out a series of critical thinking skills because, in discussion activities, many students are still passive and do not express opinions so that the ongoing learning process is not able to facilitate students' ability to think critically and be challenged in problem-solving efforts. This proves that there are still many students who do not pass the minimum graduation criterion (KKM) in daily test assessments, which are only at levels C1 to C3. This finding indicates that the existing learning and assessment process has not been able to encourage students to think critically. A learning process that is less than optimal hampers students' critical thinking ability. This is because teachers are sometimes still confused about how to apply innovative and creative learning models. Therefore, the ongoing learning process does not encourage students to improve their critical thinking skills and problem-solving abilities and play an active role in learning. In the ongoing



learning process, many students are passive. Students tend to accept the information presented by the teacher or written in books; as such, students are also passive in answering questions about the problems raised and do not express opinions to solve these problems.

To overcome the above, efforts need to be made to improve the quality of the learning process by innovating in learning. The innovation in question can be in the form of approaches, strategies, methods and learning models that can create active, creative and enjoyable learning conditions. The selection of appropriate learning strategies by teachers is necessary to ensure that students learn more effectively, think more critically and participate more in the teaching and learning process.

One way to improve critical thinking skills is to use metacognitive strategies. Metacognition is knowledge about higher thought processes involving control, control or active regulation in learning (Ismaimuza, 2011; Setyawati et al., 2022; Wanahari et al., 2022). Metacognitive abilities are believed to play an important role in many types of cognitive activity, including communicating information orally; oral persuasion; oral comprehension; reading comprehension; writing; language proficiency; perception; attention; memory; problem solving; social cognition; and various types of self-instruction and self-control (Fadilla & Purwaningrum, 2021; Ibnu, 2020; Zaswita et al., 2023).

The ability of students to increase their critical thinking competency is directly proportional to the increase in learning knowledge or information that can be used as material in solving learning problems. Knowledge or learning information consists of information that is global and local (glocal). Students are invited to gain global insight but act locally according to the needs of the surrounding community. A glocal approach to education can be understood in terms of how educational institutions successfully transfer an understanding of global realities, opportunities and challenges in relation to local contexts and how educational institutions adapt missions to meet local needs while addressing global realities and working at the level of global aspirations (Aminah, 2022; Rahmadani & Nasriyah, 2022; Riadi et al., 2022). Actions that are locally focused and have global awareness must be utilized through recognition, funding and efforts to provide greater networking opportunities (Pasaribu & Kurniawan, 2023; Srirahayu & Adi, 2022). A glocal teaching and learning environment organizes space, places, and people to enable students to learn how to address real-world sustainability problems in local and global contexts (Masloman et al., 2023; Rosanti, 2023; Astuti et al., 2023). The glocal concept is a new concept of education and learning that stabilizes values at the local level with glocal insights and skills as real actions to improve quality (Alamsyah, 2023; Ruitan et al., 2023). On the basis of this statement, students who have metacognitive skills will be able to control their own learning activities and can find answers to questions that arise, which will later improve their critical thinking ability.

Understanding how glocal-based metacognition connects with critical thinking is key to shaping individuals who can navigate and reason well in today's interconnected world. Using metacognition in a glocal context provides a foundation for individuals to evaluate how they think and learn, both in broader (global) and more specific (local) contexts. It also enables them to develop sharper and more relevant critical thinking skills in dealing with the complex challenges that exist in society. The importance of understanding this relationship becomes more apparent as more challenges emerge in the world of education and the world of work, which require a more open, adaptive, and integrated approach to thinking (Ahdhianto et al., 2020; Merkebu et al., 2024; Purwaningsih, 2024). Therefore, understanding how glocal-based metacognition can support the development of critical thinking skills is highly relevant in creating individuals who are not only intellectually intelligent but also have the ability to make wise decisions in an ever-changing global and local context.

While numerous studies have explored the connection between metacognition and critical thinking skills, research focusing specifically on metacognition in a glocal context (glocal-based metacognition) remains scarce, particularly within the scope of elementary education in Indonesia. Most existing research tends to be conceptual or address metacognition in isolation without considering the influence of both global and local cultural factors that interact during the learning process. Furthermore, few studies have examined how aspects of glocal metacognition, such as awareness of cultural differences, reflection on local values, and the adaptation of thinking strategies in a global context, are linked to critical thinking indicators such as analysis, evaluation, inference, and reflection. Therefore, this study aims to fill this gap by providing empirical evidence on the relationships among these elements, offering a foundation for the development of curricula and teaching models that are more aligned with the needs of students in today's globalized world. This research is particularly important in light of the growing need for 21st-century learners to not only engage in deep, logical thinking but also cultivate cultural awareness and openness to diverse viewpoints. By exploring the relationship between glocal-based metacognition and critical thinking, this study can guide educators and policymakers in creating instructional strategies that nurture both critical thinking and a strong sense of multicultural understanding. On the basis of the background above, this study aims to determine the correlation between glocal-based metacognition and improving critical thinking in elementary school students.

2. Materials and Methods

2.1. Research Design

This study employs a quantitative approach utilizing a descriptive correlational method. The aim of this research is to explore the relationship between global-based metacognition and critical thinking abilities among elementary school students in various schools within Bangkalan Regency. The study will assess whether a significant correlation exists between these two variables in the designated population.

2.2. Population and Sample

The study population consisted of fifth-grade elementary school students from several schools in Bangkalan Regency, East Java. The sample was selected through purposive sampling, which focuses on choosing schools that meet specific criteria. The criteria for school selection are schools willing to participate in the research, schools with a curriculum that aligns with the implementation of global metacognition-based learning, those aged 10–12 years, male/female students, and Grade 5 elementary schools. A sample of 140 students was obtained on the basis of the specified criteria.

2.3. Research instruments

For the critical thinking ability test, this instrument is used to assess students' critical thinking skills. It comprises several questions designed to evaluate students' abilities in analysis, evaluation, inference, and reflection across different contexts. The questions are structured to test critical thinking in both local and global settings. With a global-based metacognition questionnaire, this questionnaire gauges students' awareness of and control over their thinking processes in both global and local contexts. It includes questions about self-awareness in thinking, the ability to adapt thinking strategies in a cross-cultural context, and reflection on local and global cultural values. The instruments have undergone validation by subject matter experts and have been tested for reliability. On the basis of the trial runs, the instruments were found to be both valid and reliable.

2.4. Data Analysis Techniques

The collected data were analyzed via SPSS software. The steps of analysis include descriptive statistical analysis (summarizing the data characteristics, including the mean, standard deviation, minimum, and maximum values), a normality test (the normality of the data will be examined via the Kolmogorov–Smirnov test), and a Pearson correlation test (used to assess the existence of a significant correlation between global-based metacognition and critical thinking skills).

Research Hypotheses

- H0: There is no significant relationship between global-based metacognition and critical thinking skills among elementary school students in Bangkalan.
- H1: There is a significant relationship between global-based metacognition and critical thinking skills among elementary school students in Bangkalan.

3. Results

The results of this research are reported via outputs from SPSS, including descriptive statistics, tests for normality, and the Pearson correlation test. Descriptive statistics provide an overview of the data, such as the mean, standard deviation, minimum, and maximum values, providing a clear picture of the distribution of students' critical thinking abilities and metacognitive awareness. To check if the data follow a normal distribution, a key requirement for running parametric tests, the Kolmogorov–Smirnov test, will be used. After that, the Pearson correlation test helps examine how strongly and in what direction global-based metacognition relates to students' critical thinking abilities. This method offers a way to uncover meaningful connections, providing a clearer picture of how metacognitive awareness might shape the development of critical thinking in elementary school learners.

3.1. Descriptive statistics

Descriptive statistics help provide an overview of the main features in the data, including the average (mean), how much the values vary (standard deviation), and the highest and lowest scores for the two variables being studied: global-based metacognition and critical thinking skills.

The data presented in Table 1 indicate that the average score for global-based metacognition is 68.12, with a standard deviation of 12.34. For critical thinking ability, the average score is 72.45, with a standard deviation of 10.87. The minimum and maximum values reflect a broad variation in both variables.

Table 1 Descriptive statistics.

Variable	N	Mean± Std. Deviation	Minimum	Maximum
Glocal-Based Metacognition	140	68.12±12.34	40	95
Critical Thinking	140	72.45±10.87	50	95

3.2. Tests for normality

Table 2, which uses the Kolmogorov–Smirnov test, reveals that the significance values for both variables exceed 0.05. These findings suggest that the data for global-based metacognition and critical thinking skills follow a normal distribution. Therefore, since the normality assumption has been satisfied, parametric statistical tests, such as Pearson's correlation, can be applied to assess the relationship between two variables. This is an important step, as it guarantees the accuracy and dependability of the subsequent analysis and conclusions.

Table 2 Normality test.

Variable	Sig	Information
Glocal-Based Metacognition	0.120	Normal
Critical Thinking	0.145	Normal

3.3. Pearson's correlation test

Table 3 reveals that the correlation coefficient of $r = 0.78$ signifies a very strong positive relationship between glocal-based metacognition and students' critical thinking skills. This suggests that as students' awareness of and control over their thinking processes in both global and local contexts increase, so do their critical thinking abilities. Moreover, the p value of 0.000 indicates that this correlation is highly significant, being much smaller than the alpha level of 0.05, confirming that the observed relationship between the two variables is not due to chance.

Table 3 Pearson correlation test.

	r result	Sig result
Glocal-Based Metacognition- Critical Thinking	0.120	0.000

4. Discussion

The results of this study reveal a positive link between glocal-based metacognition and the critical thinking skills of elementary school students. This aligns with earlier research, which also revealed that metacognitive learning strategies play a significant role in shaping students' critical thinking. In other words, when students have strong metacognitive skills, their ability to think critically tends to increase (Zaswita et al., 2023). The findings from this study suggest that when students become more aware of and take greater control over how they think—especially when considering both global and local perspectives—their critical thinking skills also improve. Glocal-based metacognition involves students recognizing their own thought patterns and being able to reflect on and adjust their thinking in light of different cultural viewpoints. Strengthening this kind of metacognitive awareness helps students better evaluate information, form reasoned judgments, solve problems thoughtfully, and think through complex issues—core elements of critical thinking. These results point to the value of developing metacognitive abilities that blend an understanding of local values with an openness to global ideas, especially in today's interconnected world, where students face a mix of cultural and intellectual challenges. As they sharpen their awareness of how they think and learn, students become more capable of analyzing, reflecting, and making informed decisions. These skills help them recognize what strategies work, spot mistakes in their thinking, and make improvements. In short, metacognition lays the groundwork for critical thinking by encouraging students to actively engage with information, leading to deeper analysis and stronger reasoning.

Flavell was one of the first to define metacognition, describing it as both the awareness of one's own thinking processes and the ability to regulate those processes (Fadilla & Purwaningrum, 2021; Kusuma & Busyairi, 2023; Zaswita et al., 2023). Metacognition plays a key role in successful learning, as it helps individuals manage their thinking more effectively and identify areas of weakness that can be improved by developing new strategies (Maharani et al., 2021; Puspita & Wrahatnolo, 2021; Siswati et al., 2021). Metacognition refers to a person's awareness of their own thinking and their ability to regulate and guide those thought processes effectively (Fadilla & Purwaningrum, 2021; Prayitno & Sugiharto, 2017; Zaswita et al., 2023).

Metacognitive skills have a positive connection with critical thinking. This is based on the results of his research, which revealed that the effective contribution of metacognitive skills to learning outcomes is 28.86% and that the effective contribution of critical thinking skills is 46.16%, so the total effective contribution is 75.02%. The results of this research prove that metacognitive skills and critical thinking abilities together make a very large effective contribution to student learning outcomes. Efforts to involve metacognition in various learning activities can benefit the process of improving quality and learning outcomes, especially students' critical thinking abilities (Andayani et al., 2020; Avandra & Desyandri, 2023; Putri et al., 2023). This is supported by the opinion of (Allanta & Puspita, 2021; Al-Qonita et al., 2023; Batuthoh et al., 2020), which states that students' critical thinking skills can be developed and facilitated through metacognition because, in metacognition, there is the ability to control knowledge and a person's thinking (metacognitive control), and this process directs a person to think critically.

Critical thinking ability is the ability possessed by every individual to solve a problem by focusing on the process and steps taken carefully for which they can be held accountable. Critical thinking refers to the activity of analyzing an idea systematically and specifically, distinguishing things carefully and thoroughly, identifying, studying, and developing the thinking process using logic and evidence in a more perfect direction. This is in line with what was stated by (Faiziyah & Priyambodho, 2022; Nur Sopa et al., 2023), who stated that critical thinking is related to the ability to identify, analyze and solve problems creatively and think logically to produce the right considerations and decisions. (Kusuma & Busyairi, 2023; Rachmawati & Rosy, 2021) stated that critical thinking is an ability that is needed in all current learning systems. The aim of instilling critical thinking skills in mathematics learning in the classroom is to position students not only as recipients of information but also as recipients of the information they receive. Critical thinking emphasizes rational and reflective thinking so that the decision-making process can be achieved. This means that when solving a problem, there needs to be reasonable and reflective consideration so that one can make a decision about what is the right and correct solution that can be used to solve the problem (Nursabrina & Laksanawati, 2023; Rohmah et al., 2022). Another opinion expressed by (Ananda et al., 2021;

Yustiasyah et al., 2023) is that critical thinking involves the ability to make rational decisions about what actions to take or what beliefs to hold.

As a result, the findings of this study provide useful insights for educators in designing lessons that do more than just present content. They emphasize the need to foster students' awareness of their own thinking, helping learners become more independent and thoughtful as they navigate the cognitive challenges of a rapidly evolving world.

5. Conclusions

The data analysis revealed a strong positive relationship between glocal-based metacognition and critical thinking skills among elementary school students. This suggests that students who are better at managing their thought processes while balancing global perspectives with local cultural values tend to have stronger critical thinking abilities. These findings emphasize the importance of developing metacognitive skills that are both culturally responsive and context aware, which serve as a foundation for fostering reflective, analytical, and inclusive thinking skills that are crucial in today's world. It is recommended that elementary education begin nurturing critical thinking from an early stage through learning models that engage students in analyzing, evaluating, and addressing real-world challenges while also respecting local traditions and connecting with global themes. Future research is encouraged to broaden the geographical context or explore deeper elements of glocal metacognition, such as how local wisdom influences critical decision-making or how students' reflective thinking is shaped by their cultural and social environments.

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Ethical considerations

Ethical considerations for this study involved obtaining informed consent from all participants, consisting of 140 fifth-grade elementary school students.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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