Analysis of critical thinking skills of primary students in IPAS learning

Dian Fitriyanti*, Alif Mudiono, Oktaviani Adhi Suciptaningsih

Universitas Negeri Malang, Indonesia

Abstract: 21st century abilities are required to face the challenges, problems, living, and careers of the modern age. These abilities include critical thinking, creativity, communication, and collaboration (4C). In the context of problem-based learning in IPAS (Natural and Social Sciences) education, critical thinking is quite relevant. The goal of this study is to examine the critical thinking abilities of fifth-grade students in IPAS learning. This study applies a quantitative approach to investigate data in real world settings. The study includes 27 fifth-grade students from a public primary school in Blitar Regency, East Java. The instrument utilized is a descriptive test sheet that measures five components of critical thinking as defined by Ennis: offering simple explanations, developing basic abilities, drawing conclusions, providing additional explanations, and developing strategies and tactics. These five components are further expanded into ten indications of critical thinking ability. The analysis's findings indicate that students' typical critical thinking abilities are divided into three categories: medium category 10%, low category 60%, and extremely low 30%. These insights can be used to build more effective learning innovations that improve students' critical thinking skills.

Keywords: Critical thinking skills, primary school students, IPAS learning

Abstrak: Keterampilan abad ke 21 diperlukan untuk menghadapi tantangan, permasalahan, kehidupan, dan karier di era modern. Keterampilan ini mencakup berpikir kritis, kreativitas, komunikasi, dan kolaborasi (4C). Dalam pembelajaran IPAS (Ilmu Pengetahuan Alam dan Sosial), keterampilan berpikir kritis sangat penting. Tujuan dari penelitian ini adalah untuk mengevaluasi keterampilan berpikir kritis siswa di kelas V dalam pembelajaran IPAS. Penelitian ini menggunakan pendekatan kuantitatif untuk menyelidiki data dalam konteks dunia nyata. Penelitian ini melibatkan 27 siswa kelas V dari sebuah sekolah dasar negeri di Kabupaten Blitar, Jawa Timur. Instrumen yang digunakan berupa lembar tes deskriptif yang mengukur lima komponen berpikir kritis menurut Ennis: memberi penjelasan yang masih sederhana, mengembangkan keterampilan dasar, menarik kesimpulan, memberi penjelasan tambahan, serta membuat strategi dan taktik. Kelima komponen ini diperluas menjadi sepuluh indikator keterampilan berpikir kritis. Hasil analisis keterampilan berpikir kritis menunjukkan bahwa skor rata-rata siswa terbagi dalam tiga kategori: kategori sedang 10%, kategori rendah 60%, dan kategori sangat rendah 30%. Temuan ini dapat digunakan untuk mengembangkan inovasi pembelajaran yang lebih efektif dalam meningkatkan keterampilan berpikir kritis siswa

Kata kunci: Berpikir kritis, siswa sekolah dasar, pembelajaran IPAS

*Corresponding author: dianfitriyanti.2321038@students.um.ac.id

INTRODUCTION

The rapid growth of technology has altered many aspects of existence. The current period of civilization 5.0 necessitates the ability to integrate advanced technology into human existence in order to address numerous issues and social concerns (Saragih, 2021; Mustofa et al., 2024). To do this, several innovations from the era of 4.0 industrial revolution—such as the Internet of Things, artificial intelligence, big data, and robots—are used to enhance people's quality of life. The purpose of Society 5.0 is to build a society that embraces Pancasila principles, makes good use of social media, and can generate answers to current problems (Yusuf & Ar Rosyid, 2023).

In order to tackle an issue in the Society 5.0 age, a suitable talent is required: 21st century skills (Arsanti et al., 2021).The four C's of the twenty-first century are creative thinking, critical thinking and problem solving, communication, and collaboration. According to Indarta et al. (2022) identify three key talents for the twenty-first century: thinking, acting, and living in the world. Thinking competencies include critical thinking, creative thinking, and problem solving. Acting competencies include communication, collaboration, digital literacy, and technological literacy. While living in the world requires initiative, self-direction, global awareness, and social responsibility.

The rapid development of the twenty-first century has brought about significant changes in a variety of disciplines, particularly in education. Education is essential to produce students with 21st century abilities (Etistika et al., 2016). According to Mudiono (2018), 21st century teaching can make use of computer-based technology to help students learn and improve critical, creative, and innovative thinking skills. Students are encouraged to learn critical thinking skills from a young age. Students must not only be able to read, write, and count, often known as the "Three R" (reading, writing, and arithmetic), but also have the ability to think critically, communicate, collaborate, and be creative (Suciptaningsih et al., 2023). Facing the twenty-first century necessitates basic abilities that serve as the foundation for survival and thriving in a rapidly changing world. There are seven abilities required in the twenty-first century: (1) critical thinking and problem solving, (2) teamwork and leadership abilities, (3) flexibility and adaptability, (4) entrepreneurial spirit and initiative, (5) capacity to communicate effectively both orally and in writing, (6) ability to obtain and evaluate information, and (7) curiosity and creativity (Zakiah & Lestari, 2019).

Critical thinking abilities are being able to analyze, evaluate, and make decisions based on facts in order to make the best decision possible. Ennis (2018) defines critical thinking as thinking clearly and wisely with the goal of making decisions regarding actions or beliefs. This definition demonstrates how a person makes judgments by considering a variety of factors first. To increase students' critical thinking skills, employ an appropriate technique, paradigm, or learning style. The appropriate learning model will pique students' interest and motivation to learn (Aprina et al., 2024; Nasir et al., 2023). Critical thinking abilities are especially important in problem-based learning, which pushes students to analyze situations, identify issues, and seek innovative solutions (Ennis, 2018). Critical thinking allows students to assess alternative points of view, ask in-depth questions, and create a more nuanced comprehension of the learning content.

Critical thinking abilities are essential for primary school learning, particularly in Natural and Social Sciences (IPAS) disciplines. This ability enables students to analyze, evaluate, solve problems, and draw conclusions (Cacik & Widiyanti, 2024). This is also supported by Ennis' theory, which contains five indicators: offering simple explanations, determining the basis for decision making, drawing conclusions, providing advanced explanations, and estimating and assuming (Ennis, 1987). Sarwanto et al. (2021) found that the value of critical thinking skills was influenced by an average of 70, average analysis 63, average interpretation 56, and average explanation 50. This study indicated that primary school kids' critical thinking skills were caused by student factors such as (1) non-systematic answers, (2) misidentification of questions, (3) misunderstandings, and (4) reliance on memory rather than understanding. In one class, just 10% of the students had

above-average critical thinking abilities. As a result, it is vital to practice questions that require critical thinking.

Essentially, students' with critical thinking abilities may master the indications of critical thinking skills learnt in class and apply these concepts in the actual world to solve an issue (Delina, 2021; Novitasari et al., 2024). These skills can be improved by following a logical and controlled learning procedure. Researchers conducted exploratory research to assess students' baseline critical thinking abilities. The first analysis was performed on fifth-grade students at one of the Blitar Regency public primary schools in IPAS learning. This initial investigation intends to determine students' critical thinking skills, which will be utilized as a foundation for future learning innovations. This study was conducted prior to students receiving treatment designed to increase critical thinking skills. Furthermore, the study's findings can be utilized as a sample to explain students' critical thinking capabilities, thereby improving students' critical thinking abilities.

According to the description provided above, critical thinking abilities are one of the most crucial qualities that students must learn in order to tackle future obstacles. This study aims to provide an in-depth picture of how these skills develop in the context of IPAS learning at the primary level, as well as the factors that influence them. The goal of this study is to examine the critical thinking abilities of grade V students in IPAS learning.

METHOD

This study employs quantitative research methodologies with the goal of investigating data under starting settings relevant to critical thinking skills. According to (Sugiyono, 2016), quantitative research is a research method based on the positivist philosophy that examines specific populations or samples, collects data using research instruments, and analyzes data quantitatively or statistically with the goal of testing hypotheses. Meanwhile, Syahroni (2022) defines quantitative research as the utilization of numerical data from data collection to data analysis to research findings presentation.

This study included 27 fifth-grade children from one of the public primary schools in Blitar Regency, East Java, during the 2024/2025 school year. According to Ennis (1987), data were collected using a description test that measured five areas of critical thinking: giving simple explanations, developing basic abilities, inferring, explaining further, and devising strategies and tactics.

The data collection method that is used is tes. Tes is carried out by providing ten uraian samples that are validated to two validators. Validity is closely related to the "accuracy of the measuring instrument". The level of validity of a test determines how far a test can accurately reveal the true characteristics or conditions of the measuring object (Fauziyah et al., 2023). If a measuring instrument can measure accurately, the instrument can be considered valid. The total score from the 2 validator tests is 44.5 with an ideal maximum score of 50. This shows that the percentage score from the two validators is 89%, so the critical thinking skills questions are declared very valid and suitable for use. Next, the test is used to determine students' initial abilities in critical thinking.

This test is designed to evaluate aspects of critical thinking indicators based on Ennis' theory, which consists of 10 indicators. The indicators of students' critical thinking skills used in this research refer to Ennis (1984) as stated in Table 1.

Table 1. Indicators of critical thinking skills

Aspect	An Indicator of critical thinking	Sub Indicator
Elementary Clarification	1. Focusing the question 2. Analyse the argument	a. Identify or formulate questions b. Identifying and dealing with
Basic For Decession	1. Considering source credibility 2. Observing and considering the results of observations	a. Able to give reasons b. Presenting the results of the observation with correct evidence
Inference	1. Making deductions 2. Making induction	a. Determine the conclusion b. Presenting conclusions and hypotheses
Advances Clarification	1. Define terms 2. Identifying assumptions	a. Provide definitions with further explanation b. Explaining assumptions
Strategis and Tactics	1. Deciding on an action 2. Interacting with others	a. Considering the right solution b. Interact using arguments

The data gathered from student responses were then analyzed to determine each student's initial critical thinking skills score on each indicator. In addition, the average score was derived to characterize students' overall critical thinking ability. The algorithm below can be used to determine the value of students' critical thinking skills:

Score obtained = Number of correct answers x 10   (1)

While the average value of students' critical thinking skills is calculated using the following formula:

$$\text{Average score } = \frac{\text{Total score obtained}}{\text{Total students}} \qquad (2)$$

Researchers can categorize students' critical thinking skills into the categories given in Table 2 based on their individual scores and average scores.

Table 2. Average criteria for students' critical thinking skills

Score	Criteria
86-100	Very High
71-85	High
56-70	Medium
41-55	Low
<40	Very Low

Source: (Wayudi et al., 2020)

Furthermore, researchers calculated the percentage of students who obtained high, medium, and low scores using the following formula:

$$\text{Percentage of each category} \quad = \frac{\textit{Number of student in each category}}{\textit{Number of student}} \text{X } 100\% \qquad (3)$$

RESULTS AND DISCUSSION

In collecting data, students were given tests that referred to Ennis's validated indicators of critical thinking skills. Student scores are calculated using formula 1 and the average score of students' critical thinking skills is calculated using formula 2. As shown in Table 3.

Table 3. Average score of critical thinking skills for each indicator and its category

Aspect	Question number	Critical Thinking Indicator	Average score	Category
Elementary Clarification	1	Focusing the question	46.2	Low
	2	Analyse the argument	55.6	Low
Basic For Decession	3	Consider the credibility of the source	27.8	Very low
	4	Observe and consider the results of observations	48.1	Low
Inference	5	Creating an induction	16.7	Very low
	6	Make valuable decisions	51.9	Low
Advances Clarification	7	Define the term	70.4	Medium
	8	Identifying assumptions	50.0	Low
Strategis and Tactics	9	Deciding on an action	46.3	Low
	10	Interact with others	38.9	Very low

The research results on the indicator of concentrating questions show an average score of 46.2 in the poor group. This indicator assesses students' ability to identify relevant key questions in order to gather the required information. The low score shows that students have trouble understanding the main problem or deciding the course of action to solve a problem. The weakness in this indicator is due to a lack of structured critical thinking practice or experience dealing with situations that need logic-based questioning. According to Ennis (2018), learning tactics such as guided conversations and problem-based learning methods can aid in the development of critical thinking abilities.

The indicator of analyzing arguments obtained an average score of 55.6 in the low category. This demonstrates that students' capacity to express their thoughts, identify and evaluate the strength of an argument has to be improved. The low score suggests that students struggle to understand the argument's logical framework. This poor score could be attributed to students limited comprehension of basic logic or a lack of ability to generate ideas in arguments. Appropriate learning utilizing real-world examples, such as analyzing news or speeches, can help students develop their ability to critique arguments. This is consistent with Maslakhatunni'mah et al. (2019) findings, which show that students' critical thinking skills remain inadequate, particularly in the explanation indicator. Students' critical thinking abilities must be improved and trained again. Creative and innovative

learning approaches will have an impact on students' enthusiasm for learning and critical thinking skills, particularly in expressing viewpoints.

The indicator for assessing the credibility of the source had an average score of 27,8 in the extremely poor category. This indicator focuses on students' ability to determine the reliability of an information source. The very low score implies that students were unable to discern between credible and non-credible sources. This score shows the need to teach information literacy more rigorously, such as analyzing the accuracy and bias of sources. Students can gain real-world experience through project-based learning, which includes analyzing information sources.

The indicator of observing and considering the outcomes of observations obtained an average score of 48.1 in the low category. This ability is defined as the systematic observation of data or phenomena and the use of that information to make decisions. The low score implies that students may not yet be capable of making correct observations or considering the data logically. The low score could be attributed to a lack of learning from direct observation. Providing students with opportunity to participate in observation projects can help them enhance their skills. The findings of this study are consistent with research conducted by Indarti and Purwantoyo (2017), who found that employing an observation technique that takes use of the school environment, observation project-based learning can increase student interest and activity. The findings of this study show that PjBL improves student learning activities and outcomes.

The indication of making induction has an average score of 16.7 with a very poor category. Induction is the process of making generalizations based on specific data or examples. The very low score shows that students struggle to identify patterns or make logical conclusions from the material. This could be attributed to students' lack of comprehension of inductive reasoning patterns. Structured workouts using real data or logic-based games can assist enhance this capacity. According to Fernanda et al. (2019), low-group students continue to struggle with source credibility, observation, induction, decision-making, and identifying preconceptions. The indications of asking and answering have the highest success rate, whereas the indicators of making inductions have the lowest success rate.

An indicator of making valuable judgments earned an average score of 51.9 in a low category. This metric assesses students ability to make decisions based on critical consideration of multiple options. The low score implies that students were unable to properly assess the repercussions of their choices. Limitations in this competence could be attributed to a lack of expertise in decision-making. Students can learn how to make valuable decisions through simulations of real-life scenarios or case studies. To strengthen students' critical thinking skills, problem-based learning exposes them to real-world situations that must be solved and analyzed. This approach also enables students to think critically and understand more about the subject (Anggraeni et al., 2023).

The indicator of defining phrases obtained an average score of 70.4 and was classified as medium. This indicator measures students ability to explain or define a phrase. The medium score suggests that students have a good comprehension, but there is still potential for improvement. Students appear to be able to understand and define basic concepts, but they require assistance in developing and deepening their knowledge. Mind-mapping approaches and visual glossaries can help them understand things better.

The indicator for recognizing assumptions obtained an average score of 50,0, placing it in the low category. This indicator evaluates students ability to understand the assumptions that underpin an argument or assertion. The low score implies that students may struggle to distinguish between facts and assumptions. This challenge can be overcome by assigning students to analyze events and determine what is assumed or overlooked. Analytical discussion-based learning can improve this skill.

The indication of deciding on an action obtained an average score of 46.3 in a low category. This indicator assesses students ability to select the optimal course of action from among multiple alternatives. The low score implies that students may lack the confidence or expertise necessary to choose a successful plan of action. This deficit can be overcome by role-playing or simulations that compel students to make quick decisions and accept responsibility for the outcomes, thereby training them to make the appropriate decisions.

The indicator of engaging with others obtained an average score of 38.9, indicating a very poor category. This indicator measures students capacity to interact and cooperate with others. The extremely low score suggests that children may feel uneasy or lack adequate social skills. Because of the low level of this ability, it is suggested that children improve their social skills by participating in more group activities and interactive games. Encourage teamwork and collaborative initiatives to assist strengthen these skills.

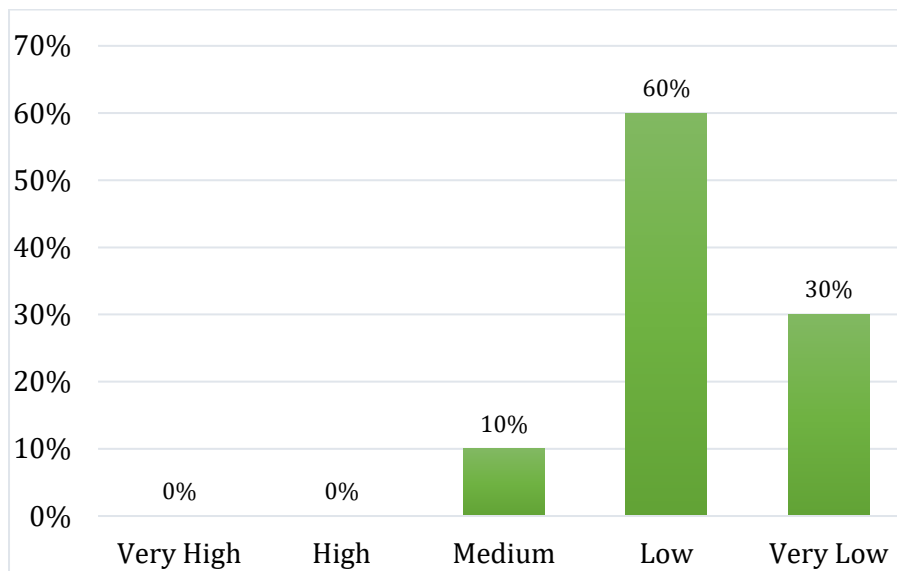Figure 1 depicts a percentage graph of the critical thinking skill indicator categories from Table 2.

Fig. 1. Percentage of each category of critical thinking ability test result

Figure 1 demonstrates that the results of the tests conducted indicate that students' critical thinking skills are generally low. No students scored very high or high on this test, indicating that no students demonstrated exceptional critical thinking skills. A total of 10% of students fell into the medium category, indicating that they have basic critical thinking skills but still need to improve. A total of 30% of students were in the very poor category, indicating a lack of critical thinking skills. The low group is the most populated by students, at 60%, indicating that the majority of students in the class have not developed critical thinking abilities well.

This finding is consistent with research performed by means of Sarip et al. (2022), which found that the intermediate organization ruled students' overall important thinking competencies with a percentage of 40,94%. The results revealed that the analysis indicator had the highest average score percent 30,91% of college students inside the low group, while the inference indicator had the bottom average score percentage 23,98% of college students within the low category. college students lack essential questioning competencies due to the fact they are unexpected with employing questions with signs of vital thinking talents. In keeping with Agnafia (2019), college students' insufficient critical thinking competencies are resulting from a lack of experience running on troubles with signs of critical wondering competencies, as well as a lack of mastering that applies vital wondering abilities.

CONCLUSION

The study concludes that the critical thinking skills of fifth-grade students at one of the Blitar Regency state primary schools remain low and need to be improved. The findings of the analysis revealed that 10% of students were in the moderate group, 30% were in the very low category, and the majority, 60%, were in the low category. Overall, these findings show a need for growth in several facets of critical thinking, with a particular emphasis on the ability to form inductions, assess the reliability of sources, and connect with others. To strengthen these skills, use interactive and immersive teaching tactics such as group discussions, observation projects, and real-life simulations. Thus, further research is needed to identify the best media, methods, strategies, and learning innovations for improving students' critical thinking skills.

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