Analysis of Class VIII Students' Critical Thinking Ability in Solving Numeration-Based Questions at SMPN 2 Kunto Darussalam

Analisis Kemampuan Berpikir Kritis Siswa Kelas VIII dalam Menyelesaikan Soal Berbasis Numerasi di SMPN 2 Kunto Darussalam

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Abstract

This study aimed to describe the critical thinking skills of grade VIII students in solving numeracy-based problems at SMP Negeri 2 Kunto Darussalam. This research used a qualitative approach with a descriptive type. The subjects in this study were class VIII students of SMP Negeri 2 Kunto Darussalam, comprising 25 students. Then, six students, consisting of two students with high scores, two students with medium scores, and two students with low scores, were selected as interview subjects. Data validity was measured using triangulation techniques. The data analysis technique used the Miles and Hubberman (1984) model, which consisted of data reduction, data presentation, and concluding. The results showed that the critical thinking ability of grade VIII students in solving numeracy-based problems at SMP Negeri 2 Kunto Darussalam was moderate, with an average score of 57.8. When viewed from the FRISCO stages, focus was classified as a high category with a value of 2.76, reason was classified as a high category with a value of 2.72, inference was classified as a medium category with a value of 1.2, situation was classified as a medium category with a value of 1.16, clarity was classified as a medium category with a value of 1.52, and overview was classified as a medium category with a value of 1.6.

Abstrak

Penelitian ini bertujuan untuk mendeskripsikan kemampuan berpikir kritis siswa kelas VIII dalam menyelesaikan soal berbasis numerasi di SMP Negeri 2 Kunto Darussalam. Penelitian ini menggunakan pendekatan kualitatif dengan jenis deskriptif. Subjek dalam penelitian ini adalah peserta didik kelas VIII SMP Negeri 2 Kunto Darussalam yang berjumlah 25 siswa. Kemudian dipilih 6 siswa yang terdiri dari 2 siswa dengan nilai tinggi, 2 siswa dengan nilai sedang dan 2 siswa dengan nilai rendah sebagai subjek wawancara. Keabsahan data diukur menggunakan triangulasi teknik. Teknik analisis data menggunakan model Miles dan Hubberman (1984) yang terdiri dari reduksi data, penyajian data, dan menarik kesimpulan.

Hasil penelitian menunjukkan bahwa kemampuan berpikir kritis siswa kelas VIII dalam menyelesaikan soal berbasis numerasi di SMP Negeri 2 Kunto Darussalam, yaitu sedang dengan nilai rata-rata 57,8. Jika ditinjau dari tahapan *FRISCO, focus* tergolong kategori tinggi dengan nilai 2,76, *reason* tergolong kategori tinggi dengan nilai 2,72, *inference* tergolong kategori sedang dengan nilai 1,2, *situation* tergolong kategori sedang dengan nilai 1,16, *clarity* tergolong kategori sedang dengan nilai 1,52, *overview* tergolong kategori sedang dengan nilai 1,6.

Kata Kunci: Kemampuan Berpikir Kritis, FRISCO, Soal Berbasis Numerasi

1.   INTRODUCTION

The development of 21st-century Education demands that students acquire critical thinking skills as part of essential competencies. Critical thinking enables students to analyze information, evaluate problems, and make reasoned decisions, especially in mathematics learning (Puspita & Rahaju, 2022; Ennis, 1991; Saudi et al., 2018). This ability plays a vital role in solving mathematical problems, which require complex and reflective cognitive processes.

In this context, numeracy literacy is a crucial aspect that reflects students' critical thinking ability in understanding and solving contextual mathematical problems. However, the 2022 PISA results show that Indonesian students' numeracy literacy remains below the international average, with a mathematics score of 366 compared to the OECD average of 472 (OECD, 2023). This indicates the low level of critical thinking skills among Indonesian students in numeracy contexts.

As part of education assessment reform, the Indonesian Ministry of Education introduced the National Assessment through the Minimum Competency Assessment (Asesmen Kompetensi Minimum/AKM), focusing on literacy and numeracy skills. Numeracy items in AKM require students to demonstrate critical thinking in solving contextual problems logically and accurately (Pusmenjar, 2020).

However, the education report of SMP Negeri 2 Kunto Darussalam in 2023 shows a 38.7% decline in students' numeracy skills compared to the previous year. Preliminary studies also reveal that the critical thinking ability of Grade VIII students is relatively low, with an average score of only 26.4 out of 100. This condition highlights the need to investigate students' critical thinking abilities in solving numeracy-based problems. This study aims to investigate the critical thinking ability of eighth-grade students at SMP Negeri 2 Kunto Darussalam in solving numeracy-based problems.

2.   METHODS

The This study employed a descriptive qualitative approach aimed at describing students' critical thinking skills in solving numeracy-based problems. The research was conducted at SMP Negeri 2 Kunto Darussalam in 2024, with class VIII students who had previously taken the Minimum Competency Assessment (AKM) as participants.

A total of 25 students participated in the written test, and six students were selected purposively for interviews based on their test performance (two high, two medium, and two low scorers). Data were collected through a numeracy-based written test, semi-structured interviews, and supporting documentation. The test items focused on numeracy content in the number domain and were constructed based on FRISCO indicators: Focus, Reason, Inference, Situation, Clarity, and Overview.

Data analysis was conducted using the Miles and Huberman model, involving

data reduction, data display, and conclusion drawing. Data validity was ensured through triangulation of techniques.

3.   RESULT AND DISCUSSION

The results of this study describe a descriptive analysis of data based on the results obtained from a critical thinking ability essay test based on numeracy and interviews with students. The analysis of the results obtained is as follows:

Critical Thinking Skills Data Based on Numeracy Questions

Data in this study were obtained from the results of a critical thinking skills test based on numeracy using the FRISCO framework, administered to 25 eighth-grade students at SMP Negeri 2 Kunto Darussalam. The test instrument consisted of 5 essay questions within the number domain. The first step in data collection involved the development of test instruments and interview guidelines. The test items were then validated by two academic supervisors and subsequently underwent a trial to ensure the instrument's feasibility for data collection and alignment with the research objectives.

Based on the written test results from 25 students, their critical thinking abilities in solving numeracy-based problems were categorized into three levels: high, moderate, and low. The categorization is presented in Table 1

Table 1. Categorization of Critical Thinking Skills

Score Range	Category
80-100	High
50-79	Moderate
0-49	Low

According to Table 1, the average score of students in solving numeracy-based problems was 57.8, which falls into the moderate category. The overall distribution of students by category is shown in Table 2.

Table 2. Description of Students' Critical Thinking Skills

No	Category	Number of Students	Average	%
1	High	8	90,9	32
2	Moderate	12	56	48
3	Low	5	27,8	20

As shown in Table 2, students' critical thinking abilities varied across categories. There were eight students with high-level thinking skills, 12 students in the moderate category, and five students categorized as low in critical thinking. This distribution suggests that most students performed at a moderate level in applying critical thinking skills to numeracy-based problems using the FRISCO stages.

Critical Thinking Skills Criteria

The overall test results reviewed from each of the FRISCO students' critical thinking ability criteria can be seen in the following Table 3.

Based on Table 3, there is a noticeable variation in students' critical thinking abilities across the FRISCO criteria. The Focus and Reason indicators reached the "High" category. The highest achievement was in the Focus criterion, where students demonstrated the ability to understand the problems presented, identify relevant information, and comprehend the questions, with an average score of 2.76. The second-highest achievement was in the Reason criterion, where students were able to provide sound

reasoning based on facts or evidence relevant to each decision-making step, with an average score of 2.72. These results indicate that students generally understood the problems and were able to justify their answers with appropriate reasoning

Tabel 3. Critical Thinking Ability Test Results by Criteria

FRISCO Criteria	Average Score	Ideal Score	Category
Focus (Understanding the problem in the given question by knowing the information and understanding the questions in the question)	2.76	3	High
Reason (Provide good reasons based on facts/evidence related to each stage of decision making)	2.72	3	High
Inference (Formulating conclusions or steps well, providing very precise reasons that support the findings or steps taken.)	1.2	3	Moderate
Situation (Using information that is appropriate to the problem at hand)	1.16	3	Moderate
Clarity (Provides a clear explanation of the conclusions drawn.	1.52	3	Moderate
Overview (Rechecking the results of the completion from start to finish very carefully)	1.6	3	Moderate

However, several criteria require further attention and improvement. The Overview criterion, which involves thoroughly reviewing the solution process from start to finish, had an average score of 1.60. The Clarity criterion, which assesses the ability to express conclusions and provide further explanation clearly, had an average score of 1.52. The inference criterion, which measures the ability to formulate the findings and support them with accurate reasoning, had an average score of 1.20. Meanwhile, the situation criterion, which involves using appropriate information to address the given problem, received the lowest average score of 1.16. These results suggest that students still struggle with drawing sound conclusions, using relevant information effectively, and reviewing their solutions thoroughly.

Students' Critical Thinking Skills in Solving Numeracy-Based Problems

This study aims to identify students' critical thinking skills using the FRISCO framework in solving numeracy-based problems within the number domain. Data were collected from students' test results, which were analyzed based on the FRISCO indicators of critical thinking. The analysis revealed the following:

Students in the high category scored an average of 3 out of 3. They were able to answer all numeracy questions covering all six FRISCO criteria: Focus, Reason, Inference, Situation, Clarity, and Overview. Students in the medium category scored an average of 2. Among the 12 students in this category, their ability to answer varied, with some meeting two to five of the FRISCO criteria. Students in the low category scored an average of 0. Of the five students, some were only able to respond to questions meeting one or two criteria, and one student was unable to answer any of the FRISCO-based questions.

Based on this classification, six students two from each performance category (high, medium, and low) were selected for interviews using purposive

sampling. The selected students are listed in Table 4.

Table 4. Subject Code of Students' Critical Thinking Skills with FRISCO Stages

No	Critical Thinking Skill Level	Initial
1	High	IA
2		AB
3	Moderate	MR
4		AA
5	Low	S
6		EAT

The selection of subjects was based on two main considerations: first, the students had already received instruction on Social Arithmetic in Grade VIII Mathematics; second, they were chosen based on their critical thinking categories in solving numeracy-based problems using the FRISCO framework. Subjects IA and AB were selected for having the highest scores in the high category. Subjects MR and AA were chosen for achieving the top scores within the medium category. Meanwhile, subjects S and EAT were selected from the low category as they had the highest scores among the students with low numeracy performance.

Analysis and Discussion of Students' Critical Thinking Skills in Solving Numeracy-Based Problems Using the FRISCO Framework

This section presents the analysis of students' critical thinking skills based on the FRISCO framework: Focus, Reason, Inference, Situation, Clarity, and Overview. This model, developed by Ennis (1996), evaluates students' reflective and rational thinking when making decisions and solving contextualized problems.

Focus (Understanding the Problem)

Most students were able to understand the essential information in the numeracy problems and identify what was asked. The average score for focus was 2.76, categorized as high. High-achieving students could concentrate on the core problem. Yuliani & Hartanto (2018) emphasized that understanding the problem is a fundamental aspect of critical thinking.

Reason (Providing Justifications)

This indicator showed an average score of 2.68 (high). Students provided logical and relevant justifications. Some even related their reasoning to mathematical concepts. Nurhasanah & Sobandi (2016) stated that critical thinking involves reasoning based on facts and logic.

Inference (Drawing Conclusions)

The average score for this indicator was 1.20 (moderate). Many students failed to reach correct conclusions due to miscalculations or incomplete steps. Ennis (2003) noted that concluding is essential in critical thinking, directly influencing decision-making.

Situation (Using Contextual information)

Students scored an average of 1.16, indicating difficulties in connecting mathematical tasks with real-life contexts. Saputri (2021) asserted that contextualized problem-solving tasks are effective in developing students' critical thinking.

Clarity (Clarity of Responses)

With an average score of 1.52, many students did not clearly explain the steps or reasoning. Yuliani & Hartanto (2018) argued that clarity in communication is crucial for understanding one's thinking process.

f. Overview (Reviewing the Process and Answer)

Students averaged 1.60, showing a lack of self-evaluation. Most did not review their answers. Ennis (2003) highlighted the importance of evaluating and reflecting on problem-solving outcomes (Table 5).

Table 5. Average Scores of Critical Thinking Indicators

FRISCO Indicator	Average Score	Category
Focus	2.76	High
Reason	2.68	High
Inference	1.20	Moderate
Situation	1.16	Moderate
Clarity	1.52	Moderate
Overview	1.60	Moderate

In general, students' critical thinking skills in solving numeracy-based problems are in the moderate category. The strongest aspects were Focus and Reason, while Inference, Situation, Clarity, and Overview still need improvement. It is recommended that numeracy learning should integrate problem-based and contextual approaches (Saputri, 2021) to help students develop more holistic and reflective critical thinking skills.

4. CONCLUSIONS

Based on the analysis of students' critical thinking skills in solving numeracy-based problems using the FRISCO stages, it can be concluded that students' critical thinking skills in solving numeracy-based problems in grade VIII of SMP Negeri 2 Kunto Darussalam are in the moderate category, with an average score of 57.8. The FRISCO stages for solving numeracy-based problems yield the following results:

The Focus (F) criterion is classified as high. Students can critique and focus information on the problem, achieving a success score of 2.76. The Reason (R) criterion is classified as high. Students can provide reasons and provide steps for solving the problem, although many are unable to prove it mathematically to find the correct answer, achieving a success score of 2.72. The Inference (I) criterion is classified as medium. Students are able to draw conclusions from the answer, although they do not provide logical and precise steps to obtain the desired answer, achieving a success score of 1.2. The Situation (S) criterion is classified as medium. Students are able to understand the problem but are unable to guide their opinions toward the correct answer, achieving a success score of 1.16. The Clarity (C) criterion is classified as a moderate level, where students can solve complex problems so they can provide clarity to their work results and achieve a success score of 1.52. The Overview (O) criterion is classified as a moderate level, where students answer questions that measure this criterion. The thought process for reviewing information and work steps in solving the problem meets the assessed aspects and achieves a success score of 1.6

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