

STUDENTS' CRITICAL THINKING ABILITIES IN SOLVING FINAL YEAR SUMMATIVE ASSESSMENT (ASAT) QUESTIONS FOR SCIENCE SUBJECTS IN GRADE IV PRIVATE ELEMENTARY SCHOOLS IN KUTOARJO

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Abstract

Critical thinking skills are one of the important skills that need to be developed in 21st century learning. In the Natural and Social Sciences (IPAS) subject, critical thinking skills are needed to solve problems that require Higher Order Thinking Skills (HOTS). However, assessments in elementary schools are still dominated by questions oriented to Lower Order Thinking Skills (LOTS), so students' critical thinking skills have not been optimally measured. This study aims to analyze students' critical thinking skills in solving the Year-End Summative Assessment (ASAT) questions for science subjects grade IV Private Elementary School in Kutoarjo. This study used a qualitative descriptive approach involving 24 students in grade IV, while five students were selected purposively as the main subjects of the study. Data was collected through documentation, observation, and interviews, then analyzed using the Miles and Huberman models. The results showed that of the 30 ASAT questions analyzed, as many as 18 questions (60%) were included in the LOTS category and 12 questions (40%) were included in the HOTS category. Students' critical thinking skills are divided into the categories of Developing Very Good (20%), Developing as Expected (40%), and Starting to Develop (40%) based on the achievement of Ennis' critical thinking indicators, namely focus, reason, inference, situation, clarity, and overview. Students in the Very Well Developed category were able to meet most of the critical thinking indicators and showed better ability to solve HOTS questions, while students in the Developing Beginning category still had difficulty in giving reasons, drawing conclusions, and evaluating answers. The findings of the study show that the better the students' critical thinking skills, the better their ability to solve HOTS problems in science subjects.

Keywords: Critical Thinking Ability; HOTS; LOTS; IPAS

Abstract

Kemampuan berpikir kritis merupakan salah satu keterampilan penting yang perlu dikembangkan dalam pembelajaran abad ke-21. Pada mata pelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS), kemampuan berpikir kritis diperlukan untuk menyelesaikan soal-soal yang menuntut Higher Order Thinking Skills (HOTS). Namun, asesmen di sekolah dasar masih didominasi oleh soal yang berorientasi pada Lower Order Thinking Skills (LOTS), sehingga kemampuan berpikir kritis siswa belum terukur secara optimal. Penelitian ini bertujuan untuk menganalisis kemampuan berpikir kritis siswa dalam menyelesaikan soal Asesmen Sumatif Akhir Tahun (ASAT) mata pelajaran IPAS kelas IV SD Swasta di Kutoarjo. Penelitian ini menggunakan pendekatan deskriptif kualitatif dengan melibatkan 24 siswa kelas IV, sedangkan lima siswa dipilih secara purposive sebagai subjek utama penelitian. Data dikumpulkan melalui dokumentasi, observasi, dan wawancara, kemudian dianalisis menggunakan model Miles dan Huberman. Hasil penelitian menunjukkan bahwa dari 30 butir soal ASAT yang dianalisis, sebanyak 18 soal (60%) termasuk kategori LOTS dan 12 soal (40%) termasuk kategori HOTS. Kemampuan berpikir kritis siswa terbagi ke dalam kategori Berkembang Sangat Baik (20%), Berkembang Sesuai Harapan (40%), dan Mulai Berkembang (40%) berdasarkan ketercapaian indikator berpikir kritis Ennis, yaitu focus, reason, inference, situation, clarity, dan overview. Siswa pada kategori Berkembang Sangat Baik mampu memenuhi sebagian besar indikator berpikir kritis dan menunjukkan kemampuan yang lebih baik dalam menyelesaikan soal HOTS, sedangkan siswa pada kategori Mulai Berkembang masih mengalami kesulitan dalam memberikan alasan, menarik kesimpulan, dan mengevaluasi jawaban. Temuan penelitian menunjukkan bahwa semakin baik kemampuan berpikir kritis siswa, semakin baik pula kemampuan mereka dalam menyelesaikan soal HOTS pada mata pelajaran IPAS.

Keywords: Kemampuan Berpikir Kritis; HOTS; LOTS; IPAS

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Introduction

Education for the 21st century emphasizes on improving critical thinking skills that enable students to adapt to changes in increasingly complex society, technology, and science. The focus of education is not only on mastery of information, but also on the development of thinking skills that help in solving problems and making decisions in a logical way (Ngatminiati, 2024). In Indonesia, this orientation is in line with the goals of national education which emphasizes the development of students to become individuals of faith, character, creativity, independence, and responsibility (Amalia et al., 2021).

One of the crucial competencies in 21st century education is critical thinking skills. Facione (1990) Define critical thinking as a deliberate and directed evaluation process, including interpretation, analysis, assessment, inferences, explanations, and self-management. In line with this, Ennis (2011) Outline that critical thinking skills can be seen through focus markers, reasons, conclusions, situations, clarity, and overview. In addition, Andreucci-Annunziata et al. (2023) explained that critical thinking is a high-level cognitive process that involves skills as well as thinking disposition, so that students are not only able to analyze and evaluate information, but also have a tendency to use these abilities in dealing with various problems. These skills empower students to dissect information, weigh evidence, formulate plausible arguments, separate fact from opinion, and reach accurate conclusions based on existing evidence. Therefore, the ability to think critically is one of the vital achievements that need to be grown from the basic education level because it supports students' academic success in various subjects (Ngatminiati, 2024; Wandira & Surmilasari, 2022).

The development of critical thinking skills is closely related to the application of Higher Order Thinking Skills (HOTS). Based on the revised Bloom Taxonomy, HOTS includes the ability to analyze (C4), evaluate (C5), and create (C6), while Lower Order Thinking Skills (LOTS) include the ability to remember, understand, and apply (Ngazizah, 2022). Through HOTS-oriented learning, students are encouraged to reason, solve problems, and make decisions based on available information. One of the subjects that provides a great opportunity to develop these abilities is Natural and Social Sciences (IPAS). Social Science learning emphasizes observation, investigation, analysis, and interpretation of various natural and social phenomena so that it can help students develop critical thinking skills more optimally (S. Eko Putro Widoyoko, 2025; Zulia Rahma Rahayu & Laili, 2025). In line with this, Suresman et al. (2023) stated that science learning should be able to be a means to develop students' critical thinking skills because the science learning process requires students to understand concepts, analyze information, and solve various problems found in daily life. In addition, Urip Umi S., Widoyoko, and Ngazizah (2022) Explaining that the use of teaching materials based on critical thinking skills can help students develop analysis, reasoning, and problem-solving skills in learning. The findings indicate that the ability to give logical reasons and evaluate information is an important factor that affects students' success in solving problems that require high-level thinking skills (Susanti et al., 2025).

Students' critical thinking skills need to be measured through appropriate assessments. In the Independent Curriculum, the Year-End Summative Assessment (ASAT) is used to

measure the achievement of student learning outcomes after participating in the learning process in a certain period (Adzkia et al., 2024; S. Eko Putro Widoyoko, 2025). However, research Nurjanah (2022) shows that assessment questions in elementary schools are still dominated by LOTS-oriented questions, while HOTS questions are still relatively limited. This condition causes students' critical thinking skills to not be optimally measured. The results of previous research also show that students tend to experience difficulties when facing problems that require high-level thinking skills due to limited experience in working on problems that require analysis, evaluation, and conclusion drawn. This condition shows the importance of developing assessment instruments that not only measure mastery of concepts, but also students' critical thinking skills comprehensively (Hartina et al., 2024).

Initial observations of private elementary schools in Kutoarjo show similar conditions. Analysis of ASAT IPAS class IV questions shows that most of the questions still focus on the ability to remember and understand concepts, while questions that require analytical and evaluation skills are still limited. The difference in answers given by students also shows that there is a variation in critical thinking skills that need to be analyzed more deeply.

Previous research has examined the critical thinking skills of elementary school students. Khasanah and Ngazizah (2024) analyze students' critical thinking skills in solving science questions in the Year-End Assessment, while Rahayu and Laili (2025) Although they made important contributions, the two studies have not specifically examined students' critical thinking skills in solving ASAT IPAS class IV questions and related them to the characteristics of questions based on the LOTS and HOTS categories. The novelty of this study lies in the integrated analysis between students' critical thinking skills and the cognitive characteristics of ASAT IPAS questions based on the LOTS and HOTS categories in grade IV students of Kutoarjo Private Elementary School.

Based on this description, this study aims to analyze the critical thinking ability of grade IV students in solving the Year-End Summative Assessment (ASAT) questions for the science subject of Private Elementary School in Kutoarjo. The results of this study are expected to provide an overview of the profile of students' critical thinking abilities and become evaluation material in the development of assessments and learning that support high-level thinking skills.

Research Methods

This research was carried out at Kutoarjo Private Elementary School using a qualitative descriptive approach. This study aims to analyze students' critical thinking skills in solving the Year-End Summative Assessment (ASAT) questions in fourth-grade science subjects. The research subjects consisted of all 24 students in grade IV. Five students were selected as the main subjects through purposive sampling because they represented three categories of ASAT results, namely Very Good Development (1 student), Developing According to Expectations (2 students), and Starting to Develop (2 students), so that it could describe the variation in critical thinking skills in more depth. The data source consists of primary and secondary data. Primary data were obtained from students' answers to ASAT questions, interviews with selected students, and interviews with fourth-grade teachers. Secondary data was obtained from ASAT question documents and student assessment records.

Data collection was carried out through documentation, interviews, and observations. Documentation is done by collecting ASAT question sheets and student answer sheets. Semi-structured interviews are conducted to explore students' ability to identify problems, provide reasons, analyze information, and draw conclusions when solving ASAT questions.

Observations were conducted using observation guidelines that focused on student participation, reasoning processes, and responses during learning activities.

The assessment of students' critical thinking skills in this study refers to the critical thinking indicators proposed by Ennis (2011), namely focus (focusing on the issue), reason (providing a logical argument), inference (inference), situation (considering the context), clarity (conveying clearly), and review (reviewing and assessing the decisions made). The six indicators are used as a basis for designing interview guidelines and analyzing student responses to reflect students' critical thinking skills in solving ASAT IPAS questions.

The validity of the data is ensured through methodological triangulation by comparing findings obtained from documentation, interviews, and observations. Member checks are also carried out by confirming the results of interviews with participants. In addition, the audit trail is maintained by documenting all stages of data collection, coding, categorization, and interpretation to ensure the transparency of the research.

Data analysis follows an interactive model Miles and Huberman (2014), which consists of data reduction, data display, and conclusion drawn. Data reduction is carried out by selecting and simplifying relevant information obtained from documents, interviews, and observations. The data is then presented in a descriptive narrative and table to facilitate interpretation. Finally, conclusions are drawn based on patterns and findings that emerge from the analyzed data.

Results and Discussion

Characteristics of ASAT IPAS Questions Based on LOTS and HOTS Categories

Based on the analysis of 30 questions for the Year-End Summative Assessment (ASAT) for Natural and Social Sciences (IPAS) grade IV Private Elementary School in Kutoarjo, the topics used are divided into two categories: Low-Level Thinking Skills (LOTS) and High-Level Thinking Skills (HOTS). The results of the analysis are shown in Table 1.

Table 1. Distribution of ASAT IPAS Questions Based on LOTS and HOTS Categories

Categories	Cognitive Level	Number of Questions	Percentage
MANY	C1 (Remembering), C2 (Understand)	18	60%
HOT	C4 (analyze), C5 (Evaluate)	12	40%
Quantity	-	30	100%

Based on Table 1, out of a total of 30 questions for the Year-End Summative Assessment (ASAT) for Natural and Social Sciences (IPAS) grade IV Private Elementary School in Kutoarjo, as many as 18 questions (60%) were in the Lower Order Thinking Skills (LOTS) category, while 12 questions (40%) were in the Higher Order Thinking Skills (HOTS) category. These results show that the assessment instruments used still measure more basic students' skills, such as remembering and understanding the material that has been studied. The LOTS category questions focus on mastering concepts and factual knowledge, while the HOTS questions require students to analyze, reason, and evaluate the information provided before determining the right answer.

The high percentage of LOTS questions indicates that the assessment has not fully accommodated the measurement of high-level thinking ability. This condition can occur because assessments are still more focused on mastering basic concepts than analysis and evaluation skills. As a result, students' critical thinking skills have not been optimally identified through the assessments used. Even though according to Facione (1990), critical thinking skills include the skills of analyzing, evaluating, and drawing conclusions based on relevant evidence.

Therefore, a greater proportion of HOTS questions is needed so that the assessment is able to provide a more comprehensive picture of students' critical thinking skills.

This is in line with research Nurjanah (2022), which shows that LOTS questions still dominate the elementary school level. This situation shows that the implementation of HOTS-oriented assessments needs to be strengthened in order to provide a more comprehensive illustration of students' critical thinking skills.

Research Subject Profile

Based on the results of ASAT IPAS grade IV Private Elementary School in Kutoarjo, students are grouped into three categories of development, namely Developing Very Good (BSB), Developing According to Expectations (BSH), and Starting to Develop (MB). Of the 24 students who took ASAT, five research subjects were selected using purposive sampling techniques to represent the variation in students' abilities in each category.

Table 2. Summary of Research Subjects

Subject Code	Value	Categories
S1	86,67	Very Well Developed
S2	80,00	Growing Up With Expectations
S3	68,89	Growing Up With Expectations
S4	66.67	Start Growing
S5	48,89	Start Growing

Based on the results of ASAT IPAS grade IV Private Elementary School in Kutoarjo, students are categorized into three levels of development, namely Developing Very Well (BSB), Developing According to Expectations (BSH), and Starting to Develop (MB). From 24 students, five research subjects were selected using purposive sampling techniques representing each ability category. There is one student in the Very Good Performing category, two students in the Performing Well category, and two students in the Starting Up category. The selection of this topic aims to gain a more comprehensive understanding of students' critical thinking skills in working on ASAT IPAS questions.

Students' Critical Thinking Skills Based on Ennis Indicators

Students' critical thinking skills are analyzed based on the indicators presented by Ennis (2011), i.e. focus, reason, inference, situation, clarity, and overview. The results of the analysis of answer sheets and interviews showed that there were differences in critical thinking skills in each category of students.

Table 3. Students' Critical Thinking Skills Based on Ennis Indicators

Indicator	BSB	BSH	MB
Focus	Good	Good	Enough
Reason	Good	Enough	Less
Conclusion	Good	Enough	Less
Situation	Good	Good	Enough
Clarity	Good	Enough	Less
Overview	Good	Enough	Less

The results of the study indicate that students in the Very Good Developed category are able to meet almost all critical thinking indicators. Students are able to find key information in questions, provide rational arguments, and draw conclusions based on existing evidence. In contrast, students in the Starting Up category still face challenges in presenting relevant arguments and drawing conclusions accurately. In general, the results of the study show that there is a consistent pattern between the category of student ability and the achievement of critical thinking indicators. Students in the Very Developed category showed better ability to give reasons, draw conclusions, and evaluate answers than students in the Very Developing

category. These findings show that differences in critical thinking skills between students are mainly seen in the ability to reason, draw conclusions, and evaluate the information obtained. These findings indicate that the ability to give logical reasons and evaluate information is an important factor that affects students' success in solving problems that require high-level thinking skills.

The Relationship between Critical Thinking Skills and HOTS Problem Solving

The findings of the study show that students who have good critical thinking skills tend to be more able to work on HOTS questions than students with low critical thinking skills. Students in the Very Well Developed category are able to answer questions that require analysis and evaluation more accurately because they can relate existing information to the concepts they have learned. These results show that students who have better critical thinking skills tend to be more successful in solving HOTS questions. Students who are able to meet the reason, inference, and overview indicators tend to find it easier to analyze information, evaluate alternative answers, and draw logical conclusions. On the other hand, students who have not been able to meet these indicators have difficulty when they have to give strong reasons and connect various information to get the right answer. These findings show that students with low critical thinking skills tend to have difficulties in solving HOTS questions.

On the other hand, students in the Starting Up category usually have difficulties when facing HOTS questions. Most students in this category can only provide answers to questions that require the ability to remember and understand ideas. These findings show that students with better critical thinking skills tend to be better able to solve HOTS problems than students whose critical thinking skills are still low.

These findings reinforce Facione's theory (1990) which states that critical thinking skills include interpretation, analysis, evaluation, and inference in the decision-making process. The higher the student's critical thinking ability, the better their ability to solve problems that require high-level thinking. The findings of this study are in line with Hapsari, Wicaksono, and Hanafi (2024) which shows that critical thinking skills have a relationship with students' success in solving HOTS problems in science learning. Students who have better critical thinking skills tend to be better able to analyze information, evaluate alternative answers, and draw appropriate conclusions.

Implications of Findings on Social Science Learning and Assessment

The findings of the study show that critical thinking skills need to be one of the main focuses in learning science in elementary schools. The results of the study show that students who are able to meet the critical thinking indicators, especially in the aspects of reason, inference, and overview, tend to be more successful in solving HOTS problems than students who have not met these indicators. These findings indicate that critical thinking skills have an important role in supporting students' success in facing assessments that require high-level thinking skills. These findings are also supported by the research of Kisworo, Wibawa, and Fauziah (2023) which shows that learning social studies can be a means to develop students' critical thinking skills through investigation activities, information analysis, and conclusion drawing based on evidence. Therefore, teachers need to design social studies learning that provides opportunities for students to conduct observation, investigation, discussion, information analysis, and problem-solving. In addition, the preparation of assessment instruments also needs to contain more HOTS questions so that students' critical thinking skills can be measured and developed optimally.

In addition, the findings of the study also show that the dominance of LOTS questions in ASAT reflects that the assessment has not fully met the needs of measuring students' high-

level thinking skills. Therefore, it is important for teachers to increase the number of HOTS questions in assessments so that students' critical thinking skills can be measured more effectively. Social studies teaching must be planned through observation, investigation, discussion, and problem-solving activities that motivate students to think analytically and reflectively. These results are in line with Widoyoko and Ngazizah's research (2022) which shows that HOTS-based learning can help students develop critical thinking skills through activities that demand analysis and problem-solving.

The results of this study support Facione's theory (1990) which suggests that critical thinking includes the skills of interpretation, analysis, evaluation, and inference in the decision-making process. In addition, the research findings also strengthen Ennis' theory (2011), that critical thinking skills can be observed through the indicators of focus, reason, inference, situation, clarity, and overview. In this study, the indicators of reason, inference, and overview are the aspects that most distinguish students' ability to solve HOTS problems. This shows that the success of solving HOTS questions is not only determined by mastery of the material, but also by the ability of students to give logical reasons, draw the right conclusions, and critically evaluate various possible answers.

Conclusion

Based on the results of the study, it can be concluded that ASAT IPAS class IV private elementary school questions in Kutoarjo are still dominated by questions in the LOTS category (60%), while HOTS questions only reach 40%. Students' critical thinking skills show differences in each category of development. Students in the Very Good Developing category are able to meet most of Ennis' critical thinking indicators, especially in the aspects of reason, inference, and overview, while students in the Begin to Develop category still have difficulty in giving logical reasons, drawing conclusions, and evaluating answers.

The findings of the study show that students who have better critical thinking skills tend to be better able to solve HOTS problems than students who have low critical thinking skills. Therefore, IPAS learning and assessment need to be designed by giving a larger portion to activities and questions that encourage students' ability to analyze, evaluate, and critically reason.

References

- Adzkia, U., Jl, A., Paneh, T., Korong, N., Kuranji, K., & Padang, K. (2024). *Asesmen dalam Pendidikan: Memahami Konsep, Fungsi dan Penerapannya* Natasya Lady Munaroh mengumpulkan informasi guna membuat keputusan yang tepat terkait siswa, kurikulum, 3(3), 281–297.
- Amalia, A., Puspita Rini, C., & Amaliyah, A. (2021). Analisis Kemampuan Berpikir Kritis Siswa Kelas V Dalam Pembelajaran Ipa Di Sdn Karang Tengah 11 Kota Tangerang. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, Dan Pendidikan*, 1(1), 33–44. <https://doi.org/10.54443/sibatik.v1i1.4>
- Andreucci-annunziata, P., Riedemann, A., Cortés, S., Mellado, A., Teresa, M., & Vega-muñoz, A. (2023). *Conceptualizations and instructional strategies on critical thinking in higher education: A systematic review of systematic reviews*. March. <https://doi.org/10.3389/feduc.2023.1141686>
- B. Miles, A. Michael Huberman, dan J. S. (2014). *Qualitative Data Analysis*.
- Ennis, R. H. (2011). *The Nature of Critical Thinking: An Outline of Critical Thinking Dispositions*. 1–

8.

- Facione, P. A. (1990). *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction*.
- Hapsari, S. P., Wicaksono, A. G., Hanafi, M. F., Guru, P., Dasar, S., Slamet, U., & Surakarta, R. (2024). *Analisis Kemampuan Berpikir Kritis Siswa dalam Menyelesaikan Soal HOTS Pembelajaran IPAS Kelas V SDN Plumbon 01*. 8, 36132–36137.
- Hartina, T., Ningsih, I., Dewi, Y. K., Sari, D. P., & Sari, I. (2024). *Sekolah Pascasarjana, Universitas Negeri Malang, Malang 1 2*. 09.
- Khasanah, F., & Ngazizah, N. (2024). *Analisis Kemampuan Berpikir Kritis Siswa dalam Menyelesaikan Soal IPA Kelas 3 Pada Penilaian Akhir Tahun (PAT) 2023/2024*. 7(3), 721–728. <https://jurnal.uns.ac.id/shes>
- Kisworo, T. W., Wibawa, L., Fauziah, P. Y., Dasar, P. P., & Sekolah, P. L. (2023). *Analisis Penerapan Model Pembelajaran Discovery Inkuiri Terhadap Peningkatan Kemampuan Berpikir Kritis Pada Mata Pelajaran IPAS di SD*. 5(2), 186–196. <https://doi.org/10.37216/badaa.v5i1.1236>
- Ngatminiati, Y. (2024). *Keterampilan Berpikir Kritis Untuk Siswa Sekolah Dasar*. 7, 8210–8216.
- Ngazizah, N. (2022). *Efektivitas Penggunaan Media Edutoys Berbasis HOTS Terintegrasi Karakter Tema 6 Panas Dan Perpindahannya*. 6(4), 1418–1428. <https://doi.org/10.35931/am.v6i4.1218>
- Nurjanah, E. (2022). *Analisis soal tipe high order thinking skill (hots) pada soal penilaian akhir semester (pas) tematik ganjil kelas v sdn selakaso tahun ajaran 2020/2021*. 05(02), 308–315.
- S. Eko Putro Widoyoko, N. N. (2025). *Asesmen Pembelajaran Sekolah Dasar*.
- Suresman, E., Febrianti, F. A., & Dallyono, R. (2023). *Cakrawala Pendidikan Implementation of i-Spring Suite to improve students' learning for critical thinking skills in natural science*. 42(2), 433–446.
- Susanti, N. I., Rozy, F. S., Munawaroh, L., & Alfiah, A. S. (2025). *Analisis Tingkat Keterampilan Berpikir Kritis Siswa Kelas VI Sekolah Dasar pada Mata Pelajaran IPAS*. 31(2), 325–336. <https://doi.org/10.30587/didaktika.v31i2.9847>
- Urip Umi S., S. Eko Putro Widoyoko, N. N. (2022). *Pengembangan Lembar Kerja Siswa Digital Berbasis Critical Thinking Skill Pada Tema Ekosistem Kelas V Sekolah Dasar*. 8(2), 687–695. <https://doi.org/10.31949/educatio.v8i2.2152>
- Wandira, S. A., & Surmilasari, N. (2022). *Analisis Kemampuan Berpikir Kritis Siswa Kelas V pada Pembelajaran Matematika di SD Negeri 216 Palembang*. 4, 180–189.
- Zulia Rahma Rahayu, A., & Laili, M. (2025). *Analysis Of Critical Thinking Ability Of Fifth Grade Students In The Subject Of Ipas Sdn 1 Bandung Tulungagung District*. 1(1), 1–6.