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Implementation of Guided Inquiry in Science Education to Improve Higher Order Thinking Skills of Fourth Grade Students at Masadian Public Elementary School

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ABSTRACT

This study was motivated by the low level of Higher Order Thinking Skills (HOTS) among Grade IV students in IPAS (Integrated Science and Social Studies) learning, particularly in the theme "Caring for the Environment" at SD Negeri Masadian. Conventional teaching methods still dominate, limiting students' opportunities to think critically and solve problems independently. The purpose of this research was to describe the implementation of an inquiry-based learning model and examine its impact on students' HOTS. A qualitative descriptive approach was employed, involving 30 students of Grade IV, along with the school principal, classroom teacher, and IPAS subject teacher. Data were collected through observation, interviews, documentation, questionnaires, and HOTS-based tests. The findings showed significant improvements in three core competencies: (1) analytical skills, seen in students' ability to break down environmental issues and present logical arguments; (2) synthesis skills, reflected in integrating diverse information into data-driven solutions; and (3) evaluative skills, demonstrated by assessing information sources, comparing alternatives, and making evidence-based decisions. In conclusion, the inquiry-based approach effectively enhanced students' critical, reflective, and integrative thinking, enabling them to connect IPAS concepts with real-life environmental challenges.

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1. INTRODUCTION

Education is a dynamic process aimed at developing learners intellectually, emotionally, and socially (Brutu et al., 2023). In the 21st century, education is not merely the transfer of knowledge but

also the cultivation of critical, creative, and problem-solving capacities to face real-world challenges (Utami et al., 2025). These demands are reflected in the framework of 21st-century skills, commonly known as the 4Cs: Critical Thinking, Creativity, Communication, and Collaboration (Zubaidah, 2018). Within Indonesia's Merdeka Curriculum, one of the emphasized competencies is Higher Order Thinking Skills (HOTS), which requires differentiated and contextual learning experiences closely tied to students' daily lives (Alu, L., & Saadillah, 2024)

IPAS (Integrated Science and Social Studies) provides a rich platform for developing HOTS, particularly in themes such as "Caring for the Environment" (Hayunanda et al., 2025). Beyond delivering theoretical knowledge, IPAS encourages learners to analyze, reflect, and propose solutions to environmental issues in their local context (Nugraha, 2024). However, classroom observations conducted on July 8, 2024, at Grade IV SD Negeri Masadian revealed that many students still rely heavily on rote memorization. They struggled with tasks demanding analysis, evaluation, and synthesis, while learning activities remained dominated by lecture-based instruction, positioning students as passive recipients.

To bridge this gap, innovative instructional models are needed. Guided inquiry has been widely acknowledged as effective in supporting critical and analytical thinking (Elvada et al., 2025). Its structured stages from formulating problems to drawing conclusions provide both scaffolding and autonomy for learners (Hapsari et al., 2019). Prior studies in Indonesia Rahaju, (2024) confirm the benefits of inquiry-based instruction in promoting reflective and logical thinking. Meanwhile, many studies have strengthened these findings, showing that guided inquiry learning can enhance HOTS in STEM learning contexts (Wahyu & Parmin, 2025), develop problem-solving skills (Putra & Walid, 2024), and strengthen environmental literacy (Purnawati & Yakin, 2025).

What distinguishes this research from previous studies is its contextual and adaptive approach to the school's local environment. Masadian Public Elementary School is located in the coastal area of Morowali Regency, where environmental issues such as waste management and coastal ecosystem degradation are real challenges in the community. In this context, the implementation of the guided inquiry learning model is used not only as a pedagogical strategy but also as a means of empowering students to observe, research, and contribute to environmental solutions in their own community. Through investigative activities such as field observations, simple experiments, and environmental action projects, students not only develop HOTS cognitively but also foster social empathy and ecological awareness based on local culture.

This study aims to describe in depth the application of the guided inquiry learning model in improving fourth-grade students' higher-order thinking skills (HOTS) in science lessons at Masadian Public Elementary School, specifically on the theme "Caring for the Environment." This research is expected to provide theoretical and practical contributions to the development of inquiry-based learning models in elementary schools, while enriching discussions about the integration of environmental education into the Merdeka curriculum. Furthermore, the results of this study are expected to be a reference for educators, curriculum developers, and policy makers in designing learning practices that are more contextual, reflective, and oriented towards developing higher-order thinking skills in the 21st century education era.

2. METHODS

This study employed a qualitative descriptive design to explore the process and impact of implementing the guided inquiry learning model on Grade IV students' Higher Order Thinking Skills (HOTS) in IPAS learning under the theme Caring for the Environment at SD Negeri Masadian, Sombori Kepulauan Subdistrict, Morowali Regency. The qualitative approach was chosen to capture meaning, learning processes, and students' experiences in a natural classroom context (Wijaya, 2020). A

descriptive strategy was applied to provide a comprehensive account of the instructional practices and students' responses (Ibrahim et al., 2023). The research subjects included the school principal, the Grade IV classroom teacher, the IPAS subject teacher, and 30 Grade IV students. For the purpose of in-depth interviews, 7 students were selected through purposive sampling. This decision was based on their ability to represent diverse academic abilities and provide rich insights, rather than aiming for statistical generalization. The school principal and two teachers were also included as key informants to triangulate the data.

Triangulation was applied through multiple techniques: (1) non-participatory observation to document classroom practices; (2) unstructured interviews with students, teachers, and the principal to capture in-depth perspectives; (3) documentation of instructional materials and school archives; (4) questionnaires measuring students' environmental attitudes using IPAS indicators such as waste management and the 3Rs (Reduce, Reuse, Recycle); and (5) HOTS assessments consisting of multiple-choice and open-ended questions (Mukhlish, 2020). The HOTS test was developed based on Bloom's taxonomy (analysis, evaluation, and creation) and was scored using an analytic rubric (Ismawati, 2025).

To ensure validity, the questionnaire and HOTS test were developed from standardized blueprints reviewed by two subject-matter experts. Content validity was verified through expert judgment, while reliability was tested using pilot trials on a comparable student group prior to implementation. Internal consistency was checked using Cronbach's Alpha, and inter-rater reliability was applied for scoring open-ended HOTS tasks. Detailed samples of the questionnaire items, test questions, and scoring rubrics are provided in the appendix to facilitate replication by other researchers. The interactive model of Miles and Huberman Qomaruddin & Sa'diyah, (2024) was applied, involving three stages: data reduction, data display, and conclusion drawing. Observational and interview data were coded thematically, while questionnaire and test results were analyzed descriptively with frequency distributions and Likert-scale scoring. The HOTS assessment results were categorized into three domains: analyzing, evaluating, and creating. Triangulation across different data sources was conducted to strengthen the credibility of findings (Purnasari et al., 2021).

3. FINDINGS AND DISCUSSION

3.1 Implementation of the Guided Inquiry Learning Model

This study aims to describe the implementation of the Guided Inquiry Learning Model in enhancing Higher Order Thinking Skills (HOTS) among Grade IV students at SD Negeri Masadian in the *IPAS* subject under the theme *Caring for the Environment*. The guided inquiry model was chosen because it allows students to actively engage in the process of searching, discovering, and solving problems scientifically, while still receiving guidance from the teacher. Through stages such as problem formulation, hypothesis development, experimentation, data collection and analysis, and drawing conclusions, students are trained to think critically, analytically, creatively, and reflectively core components of HOTS.

The implementation of the guided inquiry model positions students as active participants in the learning process, while the teacher assumes the role of facilitator and mentor (Suparmi, 2020). This is consistent with Anadiroh, (2019) view that learning should not merely focus on the mastery of concepts, but should also encourage students to identify problems, analyze them, evaluate potential solutions, and generate new ideas through structured scientific stages. In the teaching practices observed during this study, the teacher developed a Student Worksheet (Lembar Kerja Peserta Didik or LKPD) centered on the theme *Caring for the Environment* as the primary tool to foster student engagement. The LKPD included content and tasks designed to prompt students to analyze local environmental conditions,

synthesize information from multiple sources, and evaluate actionable steps for environmental preservation (Rahmawati & Fadlillah, 2024).

Through the use of the Student Worksheet (LKPD), students also developed critical awareness and a sense of responsibility toward the environment. In addition to the LKPD, the teacher employed an assessment framework encompassing the domains of knowledge, skills, and attitudes to evaluate the comprehensive attainment of students' HOTS. According to Musfiqon, (2019), assessment in this context is carried out through various forms such as projects, presentations, discussions, behavioral observations, and individual assignments. These are assessed using rubrics focused on conceptual understanding, argumentation, creativity, and environmentally conscious reflection. The initial steps undertaken by the teacher were as follows:

1. Distribution of LKPD

The distribution of the Caring for the Environment LKPD in Grade IV was a key instructional activity in which the teacher provided students with worksheets containing tasks or activities aimed at fostering environmental awareness and care.

a) The content of the LKPD typically included materials and activities related to:

- Maintaining cleanliness at school and home by disposing of waste properly.
- Applying the 3Rs: reducing waste, reusing items, and processing waste into usable products.
- Promoting environmental conservation through local tree planting initiatives.

b) The objectives were to:

- Help students understand the importance of environmental stewardship.
- Develop a caring and responsible attitude.
- Strengthen critical and collaborative thinking skills through active, contextual learning activities.

The use of the *Caring for the Environment* LKPD in Grade IV aimed to enhance students' awareness and understanding of environmental preservation, encourage them to think critically about current environmental conditions, and provide experiential learning in how to take environmentally responsible actions (Wahab et al., 2025). The LKPD served as an instructional medium that encouraged students to be more active and engaged in learning about environmental issues (Rahma & Nurani, 2025).


LKPD (Lembar Kerja Peserta Didik)
Tumbuhan Sebagai Sumber Kehidupan Di Bumi

Nama kelompok
1. Nesa Adiba Putri
2. Mona
3. Wilda
4. Rafis Firdaus
5. Arisa

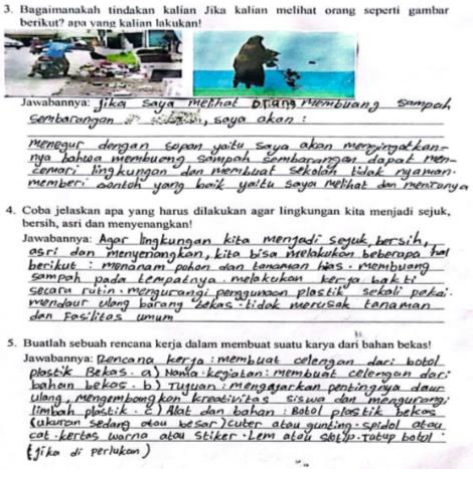
Jawablah pertanyaan di bawah ini dengan benar!

1. Coba kalian jelaskan apa perbedaan dari gambar berikut ini!

Jawaban: Gambar yang pertama adalah lingkungan yang bersih, bebas dari sampah, sangat terawat membuat kita nyaman dan sehat karena udaranya segar dan sejuk. Sedangkan gambar yang kedua adalah lingkungan yang kotor dan banyak sampah, lingkungan seperti ini dapat menyebabkan berbagai penyakit karena kotor dan tak baik, udaranya tidak bersih.

2. Jelaskan apa yang dilakukan pada gambar berikut ini!

Jawaban: Orang yang sedang bekerja bakti membersihkan lingkungan yang penuh dengan sampah. Kita sebagai siswa yang baik harus ikut bekerja bakti agar lingkungan kita selalu bersih, bebas dari penyakit, perbaikan pada gambar diatas adalah perubahan yang terjadi dan tempat di lakukan oleh semua orang jangan membuang sampah sembarangan.


3. Bagaimanakah tindakan kalian Jika kalian melihat orang seperti gambar berikut? apa yang kalian lakukan!

Jawabannya: Jika saya melihat orang membuang sampah sembarangan, saya akan :

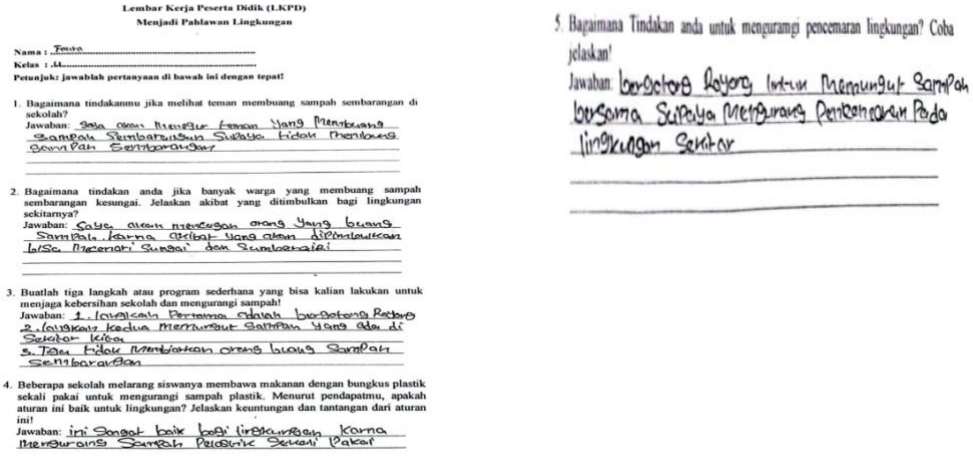
menegur dengan sopan yaitu saya akan mengingatkannya bahwa membuang sampah sembarangan dapat mencemari lingkungan dan membuat sekolah tidak nyaman. memberi contoh yang baik yaitu saya melihat dan mentanya

4. Coba jelaskan apa yang harus dilakukan agar lingkungan kita menjadi sejuk, bersih, asri dan menyenangkan!

Jawabannya: Agar lingkungan kita menjadi sejuk, bersih, asri dan menyenangkan, kita bisa melakukan beberapa hal berikut : menanam pohon dan tanaman hias. membuang sampah pada tempatnya melakukan kerja bakti secara rutin. mengurangi penggunaan plastik sekali pakai. mendaur ulang barang bekas. tidak merusak tanaman dan fasilitas umum

5. Buatlah sebuah rencana kerja dalam membuat suatu karya dari bahan bekas!

Jawabannya: Rencana kerja : membuat celengan dari botol plastik Bekas. a) Nama kegiatan : membuat celengan dari bahan bekas. b) Tujuan : mengajarkan pentingnya daur ulang, mengembangkan kreativitas siswa dan mengurangi limbah plastik. c) Alat dan bahan : Botol plastik bekas (ukuran sedang atau besar) cuter atau gunting. spidol atau cat. kertas warna atau stiker. Lem atau skotip. Tutup botol. (jika di perlukan)



Lembar Kerja Peserta Didik (LKPD)
Menjadi Pahlawan Lingkungan

Nama : Tesya
Kelas : 4
Petunjuk: jawablah pertanyaan di bawah ini dengan tepat!

1. Bagaimana tindakanmu jika melihat teman membuang sampah sembarangan di sekolah?
Jawaban: Saya akan memberitahu teman yang membuang sampah sembarangan supaya tidak membuang sampah sembarangan

2. Bagaimana tindakan anda jika banyak warga yang membuang sampah sembarangan kesungai. Jelaskan akibat yang ditimbulkan bagi lingkungan sekitarnya?
Jawaban: Saya akan menegur orang yang buang sampah karna akibat yang akan ditimbulkan bisa mencemari sungai dan sungainya

3. Buatlah tiga langkah atau program sederhana yang bisa kalian lakukan untuk menjaga kebersihan sekolah dan mengurangi sampah!
Jawaban: 1. Langkah pertama adalah berdoang Pada
2. Langkah kedua membuang sampah yang ada di Sekitar kita
3. Tidak membiarkan orang buang sampah sembarangan

4. Beberapa sekolah melarang siswanya membawa makanan dengan bungkus plastik sekali pakai untuk mengurangi sampah plastik. Menurut pendapatmu, apakah aturan ini baik untuk lingkungan? Jelaskan keuntungan dan tantangan dari aturan ini!
Jawaban: ini sangat baik bagi lingkungan karna mengurangi sampah plastik sekali pakai

5. Bagaimana Tindakan anda untuk mengurangi pencemaran lingkungan? Coba jelaskan!
Jawaban: bergotong royong untuk membuang sampah bersama supaya mengurangi pencemaran pada lingkungan sekitar

Gambar 19. LKPD Hasil Pekerjaan Siswa

2. Assessment Instruments

The assessment instruments used in Grade IV at SDN Masadian refer to tools designed by the teacher to collect information regarding students' achievement of learning competencies throughout the instructional process. These instruments serve to objectively measure student performance across three core domains: knowledge, skills, and attitudes. The instruments function as tools for evaluating learning outcomes or gathering data related to specific variables. Teachers utilize these tools to collect, analyze, interpret, and apply the information obtained in order to determine the extent to which learning objectives have been achieved, particularly in relation to the development of students' competencies in knowledge, skills, and character.

The learning objectives measured through these instruments include students' ability to identify environmental issues in their surroundings, explain the importance of environmental conservation, and demonstrate environmental responsibility through real-life actions (Hasibuan & Sapri, 2023). Furthermore, students are expected to contribute to climate change mitigation efforts and the preservation of local culture or wisdom through simple, everyday activities. They are also encouraged to carry out small-scale projects aimed at maintaining environmental cleanliness and sustainability. Cognitive assessments focus on elements such as creativity, engagement, impact, and presentation, while affective and psychomotor assessments evaluate behaviors such as proper waste disposal, reusing recyclable items, conserving water and electricity at school, and encouraging peers to be environmentally conscious (Assalimah et al., 2024). Rubrics for open-ended assessments include indicators such as conceptual understanding, quality of argumentation, and creative thinking.

Table 4.1 presents the development of Grade IV students' scores at SDN Masadian in the IPAS subject under the theme Caring for the Environment, as a result of the implementation of the guided inquiry learning model. Scores were collected at four points: an initial baseline before intervention, followed by three evaluations conducted after the guided inquiry model was applied

Table 4.1 list of grade IV students' grades at Masadian Elementary School

No	Nama	Initial Value	Guided Inquiry Learning Value 1	Guided Inquiry Learning Value 2	Guided Inquiry Learning Value 3
1.	Mega Pertiwi	51	75	80	100
2.	Nesa Aqila Putri	52	73	85	100
3.	Wihra	50	74	89	100
4.	Hafis Firdaus	53	76	88	100
5.	Ikbal	52	77	89	100
6.	Ariya	53	75	85	98
7.	Sukma	52	76	88	98
8.	Fauzya	51	75	87	100
9.	Muh.Fajar Maulana	50	74	88	100
10.	Nurfadila	52	74	85	98
11.	Siti Mahadewi Haris	52	75	89	100
12.	Sutra	51	73	90	100
13.	Fiki Afriansyah	52	72	91	100
14.	Huswatun Nisa	51	73	90	100
15.	Muh.Alfarezi	52	76	87	99
16.	Fahra	52	77	89	100
17.	Chika	50	74	80	98
18.	Alfita bina	53	73	87	100
19.	Fikri	50	74	90	100
20.	Ikmal	50	75	86	100

Based on the data presented in Table 4.1, there is a notable improvement in students' Higher Order Thinking Skills (HOTS) following the implementation of the guided inquiry learning model. Most students demonstrated a consistent increase in their scores at each evaluation stage, with the third evaluation showing the most optimal results. This trend reflects the effectiveness of the instructional strategy in fostering students' critical and analytical thinking skills, particularly in relation to environmental issues (Andrianto, 2025).

3.2 Analysis of Students' HOTS Thinking Skills Through the Implementation of the Guided Inquiry Model

The IPAS learning process on the theme *Caring for the Environment* in Grade IV at SD Negeri Masadian was designed not only to provide factual knowledge but also to foster students' Higher Order Thinking Skills (HOTS). Through the implementation of the guided inquiry model, students engage in an active, contextual, and reflective learning experience encompassing activities such as observation, discussion, experimentation, and the development of environmentally-based projects.

Teachers use student worksheets (LKPD) as the primary tool to train students' thinking skills. Through these worksheets, students are encouraged to observe their environment, identify problems, seek solutions, and create outputs such as posters or group reports. In this process, the teacher serves solely as a facilitator and guide, while students remain at the center of the learning process (Panjaitan

& Hafizzah, 2025). To assess the effectiveness of this instructional model, the study focuses on three key indicators of HOTS: analysis, evaluation, and creation.

1. Analytical Skills

The analytical skills of Grade IV students form a crucial part of HOTS, encompassing problem-solving, critical thinking, and creativity. With these skills, students are able to deconstruct information, select relevant data, and draw accurate conclusions. According to the IPAS teacher, Mr. Tasino, S.Pd, students' analytical abilities are observed through their verbal explanations, written responses, and follow-up questions that reflect their understanding. In terms of synthesis, he evaluates how students articulate their answers during discussions whether they are simply recalling information or are able to link concepts meaningfully. For the evaluation aspect, he assesses whether students can interpret questions in their own words, restate explanations, and integrate information from various sources.

The school principal, Ms. Sri Yuliani Daosi, S.Pd.SD, emphasized that HOTS encompasses the abilities to analyze, evaluate, and create. Teachers at her school promote the development of HOTS through discussions, question-and-answer sessions, and assignments that require students to express their thinking both verbally and in writing. Analytical skills are observed through how students solve problems and the feedback they receive (Purwadi, 2020). Synthesis is identified through students' responses to case studies and their ability to integrate information. Evaluation is assessed through discussions, projects, reflections, and students' capacity to critically assess solutions. Grade IV students themselves also demonstrated awareness of HOTS. Albi interpreted analysis as the effort to understand something in detail. Ikmal approached problem-solving by engaging in discussions, re-reading texts, and taking notes. Asma recognized the importance of using simple language when analyzing. Fauzya evaluated information based on its relevance to the topic under discussion.

2. Synthesis Skills

The synthesis skills of Grade IV students represent a crucial component of Higher Order Thinking Skills (HOTS), which emphasize the integration of information, ideas, and concepts to generate new solutions or insights. HOTS encourages students to think critically and creatively, rather than merely memorize facts. According to Mr. Tasino, S.Pd, the IPAS teacher, identifying the essential elements of the subject matter begins with referencing the basic competencies and curriculum indicators. He breaks down the material into smaller parts, highlighting fundamental concepts and elements closely related to students' daily lives. For more complex concepts, he simplifies them into manageable steps, provides concrete examples, and encourages students to create mind maps to visualize the relationships between components (Pramesti & Dewi, 2024).

To support synthesis skills, he applies guided and collaborative inquiry-based learning. Students are encouraged to collect information from various sources, engage in discussions, and develop concept maps to produce new ideas. This process cultivates both creative and critical thinking abilities. The principal, Ms. Sri Yuliani Daosi, S.Pd.SD, affirms that inquiry-based learning is effective in fostering HOTS. Through exploration, experimentation, and discussion, students are actively engaged in their learning. When identifying key learning materials, teachers emphasize core concepts, contextual experiences, and common learning challenges. HOTS development at the school is supported through teacher training, subject-based teacher working groups (KKG), and independent reading of relevant literature (Zulrafli et al., 2023).

Grade IV students also demonstrate an understanding of synthesis. Alfarezi explained that synthesis involves combining information from multiple sources to build a new understanding, such as when preparing a report on plants. Nesa shared her experience of working on a pet project, in which she integrated information from books, friends, and her parents. Nur Fadilah and Ikbal also described how they used knowledge from various subjects to solve problems and construct new conclusions from multiple pieces of information

3. Evaluation Skills

Evaluation is a key component of Higher Order Thinking Skills (HOTS), requiring students to assess information based on specific criteria (Maslihah, A., Aziroh, K. M. U., & Bashith, 2025). This includes the ability to critique, compare, and make decisions grounded in evidence rather than mere recall. According to Mr. Tasino, S.Pd, the IPAS teacher, evaluation skills are developed through integrated thematic learning and interdisciplinary projects. Students are trained to connect concepts across various subjects for example, by creating environmental campaign posters using information from books, the internet, and interviews (Kurniawan et al. , 2024). Through this process, students learn to filter, compare, and synthesize information into meaningful outputs.

The assessment of synthesis and evaluation skills is based on indicators such as the ability to combine information, express ideas in their own words, connect prior knowledge with new insights, create concept maps, and draw conclusions from texts. Teachers also pay attention to students' active participation, confidence in asking questions, and their ability to respond using integrated knowledge (Nurdiniah, 2024). The development of evaluation skills is supported by encouraging students to inquire, seek addional sources, and compare perspectives establishing a habit of critical thinking from an early age (Monalistyani et al., 2024).

The school principal, Ms. Sri Yuliani Daosi, S.Pd.SD, explained that HOTS can be identified through students' responses to open-ended questions, their arguments, and project outcomes. At her school, HOTS are fostered through:

- HOTS-based lesson planning,
- Active methods such as guided inquiry,
- Open-ended questioning,
- Encouragement of questioning and argumentation,
- Use of the surrounding environment as a learning resource, and
- Ongoing evaluation and reflection.

The guided inquiry model is regarded as highly effective, as it encourages students to observe, analyze, and draw conclusions aligning with the *Merdeka Belajar* curriculum (Aditiyas & Kuswanto, 2024). Students also demonstrate a deeper understanding. Fardhani, (2025) connects memory and synthesis as a continuous process leading to the creation of new ideas. This aligns with findings from the current study, where students were more critical and engaged in learning, fostering two-way communication between teachers and students in the classroom.

These findings also suggest the need for systematic teacher professional development. Training programs focusing on guided inquiry methods would equip teachers with the pedagogical skills and confidence to design inquiry-based lessons. By strengthening teacher competencies, the long-term sustainability of HOTS-oriented learning in primary schools can be ensured.

3.3 The Impact of Guided Inquiry Learning Model Implementation on HOTS Development in Grade IV Students in the IPAS "Caring for the Environment" Topic

Based on interview results regarding the impact of the guided inquiry learning model on the development of Higher Order Thinking Skills (HOTS) in Grade IV students, it can be concluded that this model involves a structured sequence of learning activities that actively engage students' full cognitive abilities in a systematic, critical, logical, and analytical manner. As a result, students are empowered to formulate their own discoveries with confidence. Inquiry, in its essence, is a universal human process of seeking and understanding information. Generally, the inquiry process requires both cognitive activity and scientific skills to construct and advance knowledge.

This aligns with the view of Ernawati, (2019), who argued that the inquiry model is highly suitable for classroom implementation, as it trains students to become discoverers rather than passive receivers of unverified information. Investigative activities are always present in the inquiry process. Through these investigations, students are encouraged to work systematically and follow scientific methods in verifying facts (Sufraini & Arwinda, 2025).

The guided inquiry model has proven to be a powerful approach for delivering subject matter content to Grade IV students. It encourages students to pose questions and use evidence to find answers. Students are trained to conduct investigations, gather evidence from multiple sources, describe and communicate data, and defend their conclusions. This model offers authentic, hands-on learning experiences that emphasize active student involvement. The main objectives of guided inquiry learning activities are: (1) to maximize student engagement in the learning process, (2) to direct learning logically and systematically toward instructional goals, and (3) to foster students' self-confidence in the knowledge they construct through inquiry. In this model, students are no longer passive recipients of information but are active participants in the construction of their own knowledge (Herung et al., 2025)

Critical thinking skills are effectively supported by guided inquiry activities implemented in Grade IV at SDN Masadian. These activities include asking questions related to natural phenomena or lesson content, formulating problems and hypotheses, conducting simple experiments to test hypotheses, analyzing data, and drawing conclusions. The inquiry model is expected to foster independence in thinking, encourage students to design investigations, and enable them to gain new experiences. Inquiry-based learning emphasizes students' ability to analyze and independently find answers to questions posed during learning. It encourages a more proactive stance, especially in relation to policy oriented problem-solving answering the question: "What should be done?" This action-oriented thinking leads to students becoming skillful learners who are capable of regulating their own cognitive processes. The ultimate aim of the inquiry model is to provide students with the means to develop intellectual competence, particularly in relation to meaningful thinking processes (Rusmiyati et al., 2024).

HOTS-based learning involves cognitive processes at a higher level compared to conventional approaches such as basic problem-solving methods, taxonomies, assessments, and traditional instruction. It cultivates students' abilities to think critically and creatively, solve problems, construct arguments, and make evidence-based decisions (Papunggo et al., 2024). Therefore, HOTS-oriented instruction has the potential to significantly enhance the overall quality of learning in schools. In Indonesia, HOTS-based learning has been consistently promoted; however, its effectiveness remains limited due to the frequent use of teaching models that do not align with students' needs (Meriska & Sudibyo, 2025). Many educators still rely heavily on lecturing methods, neglecting to administer pretests or incorporate experiential, application-based learning strategies. As a result, students often

lack essential life skills necessary for solving real-world problems. Moreover, the instructional materials used are often suboptimal, which further hampers students' ability to grasp the subject matter thoroughly. In contrast, HOTS-oriented learning can be implemented more effectively through the guided inquiry model, particularly in Grade IV classrooms. Numerous studies have explored the use of guided inquiry to enhance students' HOTS in IPAS (Integrated Natural and Social Sciences) lessons, demonstrating its effectiveness in promoting deeper thinking and active learning engagement.

In addition to classroom-level implications, the results of this study contribute to the broader development of Indonesia's national curriculum. By showing how guided inquiry can be contextualized in IPAS learning, the findings reinforce the goals of the Merdeka Curriculum to cultivate critical, creative, and reflective learners in line with the Pancasila Student Profile. Integrating inquiry-based approaches into curriculum design and teacher training modules could strengthen the national movement toward HOTS-based learning across different subjects and grade levels.

The findings highlight the importance of sustained teacher professional development. While guided inquiry has been shown to enhance students' analytical, synthesis, and evaluative skills, its success depends greatly on teachers' ability to design, facilitate, and assess inquiry-based lessons. As Santoso, (2024) emphasized, inquiry learning is most effective when teachers are equipped with appropriate scaffolding strategies and ongoing pedagogical support. Therefore, structured training programs, workshops, and professional learning communities are strongly recommended to strengthen teachers' capacities in implementing guided inquiry consistently in primary schools.

At the policy level, this study provides empirical support for the integration of inquiry-based models into the national curriculum framework. The Merdeka Curriculum emphasizes critical and creative thinking as part of the Pancasila Student Profile, yet many teachers still rely on conventional instruction. By contextualizing guided inquiry in IPAS lessons with environmental themes, this research demonstrates a practical pathway to achieving the curriculum's intended competencies. Similar to international findings on inquiry-based STEM education (Azzahra, 2024), embedding inquiry models within Indonesian curriculum design could bridge the gap between global best practices and local classroom realities.

Finally, this study contributes to the global discourse on inquiry-based learning by offering a case from a unique educational setting in Indonesia. While prior research has explored inquiry learning predominantly in STEM and secondary school contexts (Gustarina, 2020), this research shows its adaptability and effectiveness in primary-level integrated science and social studies. Thus, future studies should expand the scope to different grade levels and subjects, while also examining the long-term impact of inquiry models on learners' critical thinking, creativity, and environmental literacy. This would enrich both national curriculum development and international comparative education research.

4. CONCLUSION

Based on the findings presented above, it can be concluded that the guided inquiry learning model effectively promotes the development of students' Higher Order Thinking Skills (HOTS), which include the abilities to analyze, synthesize, and evaluate. Through a structured learning approach that still allows room for exploration, students are not only able to critically identify environmental issues, but also to integrate diverse information into new ideas and evaluate that information using rational criteria. Both teachers and school leaders affirm that this approach encourages students to become more active, reflective, and creative thinkers. Furthermore, students' involvement in discussions,

interdisciplinary projects, and the use of varied learning resources significantly enhances the achievement of HOTS within the contextual framework of IPAS (Integrated Natural and Social Sciences) learning.

This study underscores that the implementation of the guided inquiry model aligns with the objectives of the Merdeka Curriculum, particularly in cultivating the Pancasila Student Profile and fostering critical thinking. However, the scope of the research remains limited to a single school and grade level. Therefore, it is recommended that similar studies be conducted at different educational levels and across various subjects to broaden the understanding of the model's effectiveness in a wider context. In addition, future research could explore the long-term impact of guided inquiry implementation on the comprehensive development of students' 21st-century competencies.

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