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HOTS Outcomes in IPAS Learning Through the Discovery Learning Model for Fifth Graders of SDN Sukamulya

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Abstract: This study addresses the low higher-order thinking skills (HOTS) among elementary students by evaluating the implementation of the discovery learning model. It aims to determine the science and social sciences (IPAS) learning outcomes of fifth-grade students at SDN Sukamulya, analyze their obstacles in solving HOTS questions, and identify factors influencing their HOTS development. Employing a descriptive quantitative approach, this study involved 20 fifth-grade students. Data were collected via HOTS-oriented essays and observations, then analyzed using descriptive statistics and a one-sample t-test against the Minimum Mastery Criterion (KKM = 75). The results showed a mean post-test score of only 46.75, significantly below the KKM, with only 5% of students achieving mastery. Most students fell into the "very low" HOTS category due to three main factors: limited teacher readiness in designing HOTS learning, lack of supporting learning media, and low student prior knowledge. In conclusion, these findings underscore the urgent need for systematic improvements in implementing discovery learning to effectively foster higher-order thinking skills at the elementary school level.

Keywords: High Order Thinking Skills, Discovey Learning, IPAS, Elementary School.

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INTRODUCTION

The 21st-century educational landscape increasingly demands that students develop Higher-Order Thinking Skills (HOTS), specifically the abilities to analyze, evaluate, and create, which align with the C4, C5, and C6 levels of the revised Bloom's Taxonomy. Within the framework of the Kurikulum Merdeka (Independent Curriculum), the Natural and Social Sciences (IPAS) subject integrates these competencies discovery based learning approaches (Rizki Miftahul Ilmi et al., 2023). Higher-order thinking is defined as a combination of two elements: the ability to process information critically and creatively to solve newly emerging problems. In this context, higher-order thinking is also defined not merely as a theoretical skill, but as a manifestation of practical competence. This competence encompasses the ability to assess the validity of information sources, detect hidden assumptions, analyze the depth of linguistic meaning, and formulate solutions to problems (Sabaruddin, 2022).

The implementation of HOTS-based learning trains students to articulate ideas, argue systematically, solve problems independently, contextualize knowledge, formulate hypotheses, and break down complex concepts more easily. To facilitate this, selecting the appropriate learning model—as accommodated within the educational curriculum—becomes key to instructional effectiveness. Through models that align with constructivist principles, students are encouraged to actively construct their own understanding and knowledge (Khairani et al., 2022). Learning models are designed to maximize learning activities. Through the implementation of these models, it is expected that both student quality and the overall quality of education can be enhanced. One of the models that teachers can implement is the discovery learning model (Sunarto & Amalia, 2022).

The discovery learning model is designed to help students develop analytical and critical thinking skills in problem-solving. Through this model, students actively discover and investigate concepts independently, enabling them to retain knowledge in their long-term memory and making the learning experience more meaningful and profound. The advantages of the discovery learning model include its capacity to enhance students' problem-solving skills, foster collaboration and conceptual understanding, and support a student-centered learning environment (Rahayu et al., 2019).

The discovery learning model is strongly emphasized in the *Kurikulum Merdeka* due to its capacity to actively engage students in constructing knowledge through exploration and conceptual insights (Syamsidah et al., 2022). Furthermore, a large body of research indicates that the implementation of this model can significantly foster critical, analytical, and creative thinking dimensions, as well as problem-solving skills, among elementary school students (Imanda et al., 2024; Rian Hariyantini et al., 2025). The discovery learning model has also been proven to improve students' science skills compared to classes utilizing conventional models, which in turn leads to better student learning outcomes (Pranoto, 2023).

However, at SDN Sukamulya Garawangi, Kuningan Regency, the discovery learning model has been implemented in fifth-grade IPAS learning. Despite this, empirical evidence indicates that many fifth-grade students have not yet achieved the Minimum Mastery Criterion (KKM) of 75 on essay-based assessments. These assessments are specifically designed to measure higher-order thinking skills at the cognitive levels of C4 (analyzing), C5 (evaluating), and C6 (creating). This situation clearly contradicts the findings of previous research, which state that the application of the discovery learning model can enhance student learning outcomes and higher-order thinking skills.

Consequently, a discrepancy exists between the ideal conditions and reality. Previous studies have not comprehensively examined the factors influencing how the implementation of the discovery learning model can improve students' HOTS capabilities. In practice, a substantial gap still remains between the expected outcomes of discovery learning and students' actual HOTS achievement in IPAS content, particularly in schools with limited educational resources.

To address this research gap, this study aims to determine the IPAS learning outcomes of fifth-grade students at SDN Sukamulya following the implementation of the discovery learning model, analyze the greatest obstacles faced by students in solving HOTS questions (C4, C5, and C6) within IPAS learning, and identify the factors influencing how the implementation of the discovery learning model can enhance students' higher-order thinking skills. This research is expected to contribute to the development of scientific literature regarding HOTS improvement in Indonesian

elementary schools. Furthermore, these findings are intended to serve as an evidence-based foundation for instructional improvement and to support educators in designing more effective discovery learning experiences that truly foster students' higher-order thinking skills.

METHODS

This study employs a descriptive quantitative research design. A descriptive quantitative approach is utilized to systematically describe the phenomena or characteristics of the research object based on numerical data, without applying any treatment or manipulating the variables under investigation (Waruwu et al., 2025). The data collected in this study are in the form of numerical values such as scores, frequencies, percentages, and means—which are statistically analyzed to provide an objective overview of the students' HOTS profiles and the hindering factors encountered in the field.

Research setting and participants was conducted at SDN Sukamulya. The population, which also served as the sample for this study, consisted of all fifth-grade students who possessed valid post-test score data, totaling 20 students. According to Sugiyono (2019), a population is the entire object or subject that possesses specific qualities and characteristics determined by the researcher to be studied and from which conclusions are subsequently drawn. In detail, the participants involved in this study were aged between 11–12 years, consisting of 12 male students and 8 female students.

Data source utilizes three main data sources categorized into primary and secondary data. Primary data were obtained directly by the researcher through two instruments. First, the students' completion of essay questions structured based on the cognitive level syntax of Bloom's Taxonomy. Second, interviews with the fifth-grade classroom teacher who possesses a deep understanding of the students' characteristics and abilities. Meanwhile, secondary data were obtained through documentary studies and archives of relevant student cognitive assessment scores.

Data collection in this study was carried out through three primary methods:

1. Testing**:** The test instrument consisted of 5 essay items structured based on the cognitive levels of Bloom's Taxonomy to meet higher-order thinking criteria, specifically levels C4 (analysis), C5 (evaluation), and C6 (creation). These questions were developed in alignment with the pre-designed learning objectives for the Natural and Social Sciences (IPAS) subject, while also serving to measure

student ability quantitatively.

2. Semi-structured Interviews: Qualitative data were obtained through semi-structured interviews with the classroom teacher regarding the implementation of the discovery learning model and student profiles. These profiles encompassed the students' emotional, physical, and cognitive conditions, as well as their family backgrounds.
3. Documentation: The documentation method was used to collect historical records of learning outcomes and other relevant documents supporting the instructional process.

Research Instruments that utilizes two types of instruments to collect data in the field:

1. Instrument test (Essay Questions): Consists of five essay items specifically designed to measure Higher-Order Thinking Skills (HOTS) at the cognitive levels of C4 (analyzing), C5 (evaluating), and C6 (creating). Each question answered with perfect correctness is awarded a maximum score weight of 20 points, making the maximum total score for this instrument 100.
2. Semi-structured Interview Instrument: Aimed at the fifth-grade classroom teacher to gather in-depth information regarding the characteristics, individual conditions, and actual abilities of students in the daily learning process.

Data Analysis that use in this research are:

1. Descriptive Statistical Analysis: This technique is used to describe the profile of fifth-grade student learning outcomes in the IPAS subject following the implementation of the discovery learning model. The processing of student essay test data was performed with the assistance of Microsoft Excel to determine the maximum value, minimum value, range, class intervals, and number of classes. The processed data were then presented in the form of frequency distribution tables and analyzed descriptively.
2. HOTS Score Calculation: The total score obtained by students from the accumulation of answers to higher-order thinking questions (cognitive levels C4, C5, and C6) was converted into a percentage value using the following formula:

$$P = \frac{\textit{The sum of actual scores}}{\text{ideal scores of the question}} \text{ x } 100\%$$

Note: P = The percentage of student score achievement

X = The total score obtained by the student

N = The maximum score of the test instrument (100)

3. Quantitative Hypothesis Testing: Further quantitative analysis was conducted using a one-sample t-test at a significance level of $\alpha = 0.05$. This one-tailed hypothesis test was utilized with a null hypothesis (H_0) to examine whether the students' mean post-test score had significantly reached or exceeded the established Minimum Mastery Criterion (KKM) of 75. Additionally, descriptive statistics were calculated to characterize the frequency distribution of student scores across each HOTS capability level category.

Table 1. Percentage Categories by Suharsimi Arikunto (2016)

Presentation	Category
80%- 100%	Very Good
70% - 79%	Good
60% - 69%	Fair
50% - 59%	Low
0 – 49%	Very Low

RESULTS

This study involved 20 fifth-grade students from SDN Sukamulya, comprising 12 male students and 8 female students. The primary objective of this research was to evaluate student learning outcomes in the Natural and Social Sciences (IPAS) subject following the implementation of the discovery learning model. Additionally, this study aimed to analyze the main obstacles faced by students in solving Higher-Order Thinking Skills (HOTS) questions at the C4, C5, and C6 levels, as well as to identify the factors influencing these higher-order thinking abilities. The focus of the analysis was directed toward identifying and categorizing students' critical thinking levels post-implementation of the instructional model. Through this approach, it is expected to provide a comprehensive overview and classification to evaluate and enhance the quality of instruction, thereby improving students' HOTS capabilities to meet modern contemporary challenges.

Student learning outcomes utilizing the discovery learning model post-test data were collected from 20 fifth-grade students at SDN Sukamulya Garawangi with valid records. These scores were statistically analyzed utilizing Excel formulas. The frequency distribution of the data is presented in Table 2 below.

Table 2. Fifth-Grade Student Learning Outcomes in IPAS Learning at SDN Sukamulya

Interval	frequency	Precentage %	Category
20 - 33	4	20%	Not Yet Mastered
34 - 47	6	30%	Not Yet Mastered
48 - 61	4	20%	Not Yet Mastered
62 - 75	5	25%	Not Yet Mastered
76 - 89	0	0	Not Yet Mastered
90 - 103	1	5%	Mastered
Total	20	100%	

Based on the data presented in the table, specifically, 20% of the students within the score interval of 20–33 were declared to have not achieved the criterion. Furthermore, 30% of the students within the 34–47 score interval also failed to meet the Minimum Mastery Criterion (KKM), let alone exceed that minimum threshold. Another 20% of the students within the 48–61 score interval did not pass, and finally, 25% of the students within the 62–75 score interval were declared to have not yet met the predetermined criteria. Consequently, the total percentage of students who failed to achieve the mastery standard reached 95%. The table indicates that only one student, or approximately 5%, achieved mastery learning and obtained a score above the KKM threshold on the HOTS-based essay test in IPAS learning using the discovery learning model. These learning outcomes clearly demonstrate the urgent need to enhance the learning outcomes of fifth-grade students at SDN Sukamulya, particularly in solving questions that require higher-order thinking skills (C4, C5, and C6).

Quantitative analysis was also conducted using a one-sample t-test at a significance level of $\alpha = 0.05$ and a one-tailed hypothesis (H_1) to examine whether the students' mean post-test score significantly exceeded the Minimum Mastery Criterion (KKM) of 75.

Table 3. One-Sample T-Test Results on Post-Test Scores

Parameter	Value
N (data valid)	20
Avarage ($\bar{x}$)	46,75
Standar Devition	18,73
Standar Error	4,19
KKM (μ_0)	75
t-statistic	−6,746
Degrees of freedom(df	19
t table (one-tail, α=0,05)	1,729
p-value (1-tail)	0,0000012
Confidence Interval 95%	[37,99 ; 55,51]
Decision	Fail to reject H_0

The statistical results showed a t-value of -6.746 with $df = 19$. Because the calculated t-statistic (-6.746) is significantly smaller than the critical t-table value (1.729), and directional

evidence indicates that the mean score of 46.75 falls well below the KKM threshold of 75, the null hypothesis (H_0) cannot be rejected. Consequently, the students' mean post-test score does not statistically exceed the KKM of 75—in fact, it is 28.25 points below the required threshold. Only 1 out of 20 students (5%) achieved mastery learning.

Analysis of Higher-Order Thinking Skills Scores

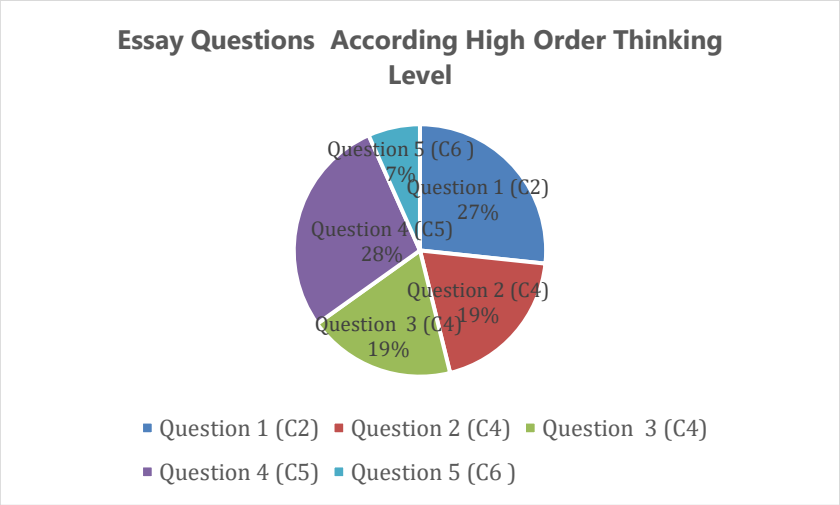

Figure 1. Higher-Order Thinking Skills (HOTS) Score Analysis

Based on the pie chart, it is illustrated that the majority of students face difficulties in answering HOTS-based questions. For question number 1, which represents the C2 level (explaining and providing examples), 27% of the 20 students were able to answer correctly. The highest percentage was found in question number 4 at the C4 level (analyzing), where this question discusses science (IPAS) materials regarding environmental problems in the surrounding community and their impact on living things, with approximately 28% of students successfully answering the question. However, for question number 5 at the C6 thinking level (creating solutions), students were still unable to provide adequate answers.

Data shows that only 7% of students answered in detail and correctly to provide solutions for the problems faced during science learning implemented through the discovery learning model. Based on the categories in the table, this percentage is classified as very low. For question number 2, which represents the C4 thinking level (analyzing environmental problems occurring in mountain communities), only 19% of students were able to answer the question successfully. Similarly, for question number 5, at the C5 thinking level (evaluating), only 19% of students succeeded in providing the correct answer. Therefore, efforts are needed to foster students' higher-order thinking

skills. According to the percentage classification table by Suharsimi Arikunto (2016), this percentage is classified into the "very low" category.

Based on semi-structured interviews conducted with the fifth-grade homeroom teacher regarding student characteristics and abilities, the teacher noted that the fifth-grade students possess diverse characteristics and academic abilities. However, the teacher generally acknowledged that the students' higher-order thinking skills (HOTS) and literacy skills are still classified as low. When given essay questions, most students tend to provide very brief answers and occasionally face difficulties understanding the questions they read. According to the teacher's observations, the students' abilities have not yet reached the stages of analyzing, critical thinking, and evaluating as outlined in Bloom's Taxonomy. Consequently, students find it difficult to answer questions that involve analytical and critical thinking skills; conversely, when given multiple-choice questions, they answer them enthusiastically and easily.

During the interview, the teacher also outlined the students' profiles, which encompass a variety of backgrounds, physical conditions, socio-emotional traits, cognitive abilities, and other factors. Regarding parenting conditions, several students live with their grandparents because both of their parents work out of town, resulting in a lack of parental attention and guidance. In terms of physical conditions, the majority of students do not have physical limitations or disabilities. Meanwhile, for cognitive abilities, the teacher explained that some students experience cognitive delays and have below-average IQ scores. Based on these circumstances, the teacher concluded that these factors, to a certain extent, influence the students' learning outcomes.

DISCUSSION

Student Learning Outcomes Using the Discovery Learning Model. Data presenting a figure of 95% indicates that the learning outcomes of fifth-grade students at SDN Sukamulya in Natural and Social Sciences (IPAS), taught through the discovery learning model, have not been successful. Ninety-five percent of the fifth-grade students were declared not to have passed the minimum mastery criterion (KKM), which is set at 75, even though the discovery learning model had been implemented. A study conducted by (Adi Pristine, 2022) indicates that the effective implementation of the discovery learning model requires time and consistency. This explains that through regular and systematic

application (in cycles), students' higher-order thinking skills (HOTS) can be well-stimulated. This is because the model conditions students to be actively involved in analyzing information, solving problems, and formulating conclusions independently, rather than merely relying on rote memorization.

This is further supported by research findings (Cintia et al., 2018)which state that the implementation of the discovery learning model over two cycles is capable of improving students' critical thinking skills, with a maximum score of 87.5 and a minimum score of 55. However, the failure of the discovery learning model to improve students' abilities is also influenced by the activities provided by the teacher during teaching and learning activities, learning motivation, learning interest, as well as student engagement during lessons (Pratama et al., 2023).

The 95% percentage in the category of student learning outcome non-achievement, after conducting the assessment process in Natural and Social Sciences (IPAS) learning using the discovery learning model, can be influenced by several factors and obstacles, both external and internal. From the results of research conducted by (Ismawati et al., 2024)factors influencing students' higher-order thinking skills include the regular and sustainable use of the discovery learning model, which can effectively enhance higher-order thinking skills, particularly critical thinking, in mathematics learning.

Meanwhile, the primary factors in implementing the discovery learning model that lead to suboptimal student learning outcomes lie in the complexity of structuring the discovery phases, formulating efficient prompting questions, and determining the right balance between teacher guidance and student independence. In terms of evaluation, constraints arise from the dominance of assessments that focus on the final product rather than the students' reasoning during problem-solving (Karina & Apriani, 2024). The external factors influencing learning outcomes are determined by three main elements. First, how learning resources are utilized; second, the condition of the school environment; and third, the culture that exists within that school environment (Yandi et al., 2023).

In terms of external factors for the 5% of students who achieved satisfactory learning outcomes (mastered), this success can be attributed to students' internal factors, including their engagement in learning which has a positive impact on improving their

learning outcomes attention and focus during lessons, self-motivation, and the ability to grasp the material easily. Other internal factors that also exert an influence include physical aspects, as well as cognitive and psychological processes, such as intelligence, motivation, interests, and attitudes toward learning (Nabillah & Abadi, 2019). Therefore, this study highlights the urgency of enhancing teacher competence through training in scaffolding methods, differentiated learning strategies, and process-based evaluation design. The success of providing scaffolding in improving learning outcomes is also supported by the results of a study conducted by (Sarmiento-Campos et al., 2022), this research findings indicate that the implementation of the scaffolding method significantly improves students' English speaking skills. This gradual assistance strategy has proven effective in overcoming students' psychological barriers, such as a lack of self-confidence and anxiety when communicating.

Recent studies provide creative and engaging solutions by blending the implementation of the discovery learning model with student learning outcomes. This approach successfully enhances the academic performance of computer science students, as it is considered non-monotonous. However, in this study's context, the situation is exacerbated by the heterogeneity of students' learning readiness, which triggers participation gaps in the classroom, compounded by a lack of supporting facilities and an overly dense curriculum workload. The discovery learning model can be implemented by integrating it with fun, game-based activities, such as offering rewards, points, and challenges. This strategy is designed to boost student enthusiasm, increase their motivation, and build collaboration alongside positive competition among classmates (Aldalur & Perez, 2023) . to optimize the implementation of the discovery learning model on learning outcomes and to support students in becoming actively engaged, it is essential to provide interactive and context-based learning media, especially when discussing challenging learning materials (Firdaus et al., n.d.).

Statistical analysis of 20 valid sample data revealed that the students' average score only reached 46.75, with a standard deviation of 18.73. This achievement indicates that the students' classical learning outcomes remain significantly below the targeted Minimum Mastery Criterion (*KKM*) of 75. Nevertheless, this outcome is not permanent and holds a high potential for improvement, as the dynamics of learning outcomes are closely interrelated with students' internal factors, environmental conditions, and the

teacher's pedagogical strategies. In line with that study, (Gunawan et al., 2018)state that students' intellectual intelligence (IQ) plays a major role in determining their level of academic success. .In addition to the intelligence factor, variations in student learning achievement are also significantly influenced by individual learning style preferences and the optimization of learning media by the teacher in the classroom (Dewi Astiti et al., 2021).

The analysis of Higher-Order Thinking Skills (HOTS) scores based on the pie chart data—which displays the results of HOTS-based question analysis at the C4, C5, and C6 levels in the fifth-grade *IPAS* curriculum at SDN Sukamulya—reveals that for question number 2 at the C4 cognitive level (analyzing), only 19% of the 20 students were able to answer the essay question correctly. This percentage is identical to that of question number 5, which represents the C5 cognitive level (evaluating). However, the lowest percentage was observed at the higher cognitive level, namely the C6 level (creating), with only 7% of students answering successfully.

These results highlight a tangible issue that requires strategic intervention and improvement to foster the HOTS capacity of fifth-grade students at SDN Sukamulya. A causal relationship underlies the low thinking levels of these fifth-grade students in *IPAS* learning. According to a study by (Mufit & Wrahatnolo, 2020), several factors can contribute to students' lower-order thinking skills (LOTS), including students' readiness to engage in the learning process, low literacy levels, environmental influences, teacher-student interactions during learning activities, and curriculum policies.

The low percentages in the data for questions 2, 3, and 5 at the C4, C5, and C6 levels indicate that students encounter difficulties in solving these problems. Instead of understanding the core concepts, they tend to merely memorize terminology. In their book, (Winarti & Istiyono, 2020) categorize the remembering dimension under the C1 level in Bloom's Taxonomy, which represents the most basic level of cognition. Conversely, Higher-Order Thinking Skills (HOTS) require more advanced cognitive abilities, including analyzing, evaluating, and creating. (Putro & Sumardjoko, 2023)state that the primary factors hindering students from answering higher-order thinking questions are a weak ability to identify problems, a lack of initiative to seek references, and an inability to interpret information and devise solution strategies.

These academic constraints are further compounded by students' low active participation and confidence in class, as evidenced by a passive attitude, hesitation in evaluating the reliability of information sources, and fear of presenting arguments or drawing conclusions. Their limitations in interpreting the intent of the questions are further exacerbated by a lack of critical thinking and scientific literacy skills. These findings are supported by interviews with the classroom teacher, which show that because students are accustomed to multiple-choice formats, they experience confusion and difficulty when required to analyze and express their reasoning in essay questions.

Higher-order thinking involves the process of analyzing complex material into smaller components, discovering interrelationships among information, and creatively integrating new and existing insights within a specific context. This ability also integrates all previous basic thinking levels to evaluate a particular condition. The primary focus of this skill lies within the application domain, which requires students to constructively build their knowledge factually. Through written evaluations, the measured aspects include reasoning, argumentation, analysis, information processing, and evaluation skills. Therefore, proficiency in scientific literacy directly correlates with higher-order thinking skills. Being scientifically literate means that an individual does not merely stop at understanding information, but is also capable of integrating it with other knowledge, formulation strategic plans, and applying it effectively in daily life.

Higher-order thinking skills enable students not only to absorb information but also to evaluate and apply that knowledge to solve problems in their surrounding environment. This notion aligns with the principles of deep learning. (Suyanto, 2025) explains the concept that deep learning manifests in the cultivation of thought, heart, and feeling (*olah pikir, olah hati, olah rasa*), wherein students actively participate in complex reasoning, move away from mere rote memorization, and sharpen essential future skills such as problem-solving, collaboration, and creativity. In line with this, prior research conducted by (Aryanto et al., 2025) demonstrates that the implementation of deep learning is effective in boosting critical thinking skills, conceptual understanding, as well as fostering self-confidence and cooperation among students. Teachers can apply a deep learning approach to support students' cognitive capacity, thereby driving the development and improvement of their higher-order thinking skills.

Based on the interview results, the teacher explained that the students' learning capacities and characteristics are highly diverse and varied. The teacher further elaborated that there are distinct differences in their family backgrounds, learning readiness, surrounding environments, physical conditions, learning styles, and socio-emotional aspects. Consequently, when the teacher explains materials and conducts learning activities in the classroom, the methods have not fully accommodated their diverse learning needs. This is aligned with Vygotsky's theory, which indicates that a child's cognitive development process cannot be separated from stimulation and social interaction within their surrounding environment, including the family environment (Wardani et al., 2023)

The teacher's statement regarding the diversity of students' learning styles is supported by research findings from(Rijal, 2015), which show a positive correlation between learning styles and students' cognitive learning outcomes in science. Furthermore, this perspective is grounded in the theory by Dunn and Dunn, which states that each individual's process of absorbing and processing information is unique due to the influence of five primary stimuli. According to this theory, these determining elements encompass environmental aspects (e.g., noise, lighting, and temperature), as well as the emotional, social, and physiological conditions of the learners(Md Hassan et al., 2021). The classroom teacher also explained that students' learning abilities vary significantly. In addition, according to Vygotsky's theory, teachers need to identify students' prior abilities or the Zone of Proximal Development (ZPD) and provide gradual assistance, or scaffolding, to students who experience difficulties during the learning process (Marlina & Rahayu, 2025).

The factors Influencing the Discovery Learning Model in Enhancing Students' Higher-Order Thinking Skills. Based on the data presentation and discussion, there is a critical point that needs to be highlighted in this study. Only 5% of the students fell into the "passed" category and exceeded the Minimum Mastery Criterion (*KKM*) when solving HOTS-based *IPAS* questions after the implementation of the discovery learning model; the vast majority of the other students demonstrated HOTS percentages in the "Very Low" category. This data is certainly surprising, particularly since the *IPAS* lessons conducted by the teacher were designed using the discovery learning model, which theoretically should encourage students to become actively engaged and construct their own

knowledge. This indicates the presence of factors influencing the implementation of the discovery learning model in enhancing students' HOTS capacity, thereby causing students to encounter difficulties in answering higher-order thinking questions (C4, C5, C6) in *IPAS* learning.

These factors are divided into internal and external categories. The internal factors include differences in each student's physiological conditions, student readiness—where students are less prepared to learn independently—the teacher's readiness in designing the lessons, and the students' low literacy skills. Meanwhile, external factors encompass the utilization of resources, the school environment's condition, the culture within the school environment, the suboptimal use of learning media to support active student engagement, the teacher's lack of knowledge regarding each student's ZPD, the insufficient provision of scaffolding, and the learning activities being designed in a less engaging manner. These factors have influenced the thinking skills of fifth-grade students at SDN Sukamulya.

The results of this study serve as a reflection that needs to be collectively reviewed, ensuring that teachers do not merely focus on achieving high student learning outcomes through the implementation of the discovery learning model. Beyond that, teachers also need to conduct preparation and profiling, such as identifying students' ZPD, providing scaffolding, meeting learning style needs, ensuring the provision of learning resources and media, and finalizing lesson plans to meet expectations. Thorough lesson preparation and supportive school facilities can serve as driving factors to enhance students' higher-order thinking skills.

Nevertheless, this study certainly has several limitations, including a limited sample size of only 20 students, time constraints during the study's execution, incomplete instruments, and a lack of detailed discussion regarding the factors that influence the success of the discovery learning model in enhancing the higher-order thinking skills (HOTS) of fifth-grade students. Recommendations for future studies include utilizing a mixed-methods design to thoroughly dissect the complex interrelationships of factors influencing the success of the discovery learning model in enhancing students' higher-order thinking skills more comprehensively. In general, this study finds that the successful implementation of the discovery learning model in enhancing higher-order thinking skills is influenced by a wide array of factors from both teachers and students. These findings

emphasize the urgency of implementing a deep learning approach alongside a comprehensive, differentiation-based approach to provide learning facilities and meet students' learning needs.

CONCLUSION

Based on the results, the implementation of the discovery learning model in fifth-grade *IPAS* at SDN Sukamulya was unsuccessful in terms of classical mastery. Statistical data showed that 95% of students (19 out of 20) failed to reach the *KKM* of 75, resulting in a low post-test average of 46.75. Only 5% (1 student) achieved mastery. Students' HOTS capacities at the C4, C5, and C6 levels were "very low." Correct response rates were merely 19%–28% for C4 (analyzing), 19% for C5 (evaluating), and 7% for C6 (creating). This subpar achievement stems from students' weak problem identification, low scientific literacy, lack of solution strategies, passivity, and low self-confidence. Conversely, the teacher struggled to structure complex discovery phases and failed to accommodate students' diverse characteristics, learning styles, and cognitive capacities (IQ).

To improve learning outcomes, the discovery learning model should be implemented cyclically and integrated with interactive media or gamification. Teachers are advised to adopt a deep learning approach, assess students' Zone of Proximal Development (ZPD), and provide structural scaffolding to restore motivation and critical thinking. Future studies should employ a mixed-methods design to comprehensively dissect the complex factors influencing the success of the discovery learning model in enhancing higher-order thinking skills.

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