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Cognitive Analysis and Student Response to Contextual-Based HOTS Questions on Plant Morphology Materials

Annas Solihin*
Department of Master's Basic Education, State University of Surabaya, Surabaya, Indonesia

Dinda Arofahtul Munawwaroh
Department of Master's Basic Education, State University of Surabaya, Surabaya, Indonesia

Meyta Vivin
Department of Master's Basic Education, State University of Surabaya, Surabaya, Indonesia

Krisny Eka Putri Ramadhanny
Department of Master's Basic Education, State University of Surabaya, Surabaya, Indonesia

Julianto
Department of Basic Education, State University of Surabaya, Surabaya, Indonesia

Endang Susantini
Department of Biology Education, State University of Surabaya, Surabaya, Indonesia

***Corresponding Author:** 24010855015@mhs.unesa.ac.id

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Abstract
This study aims to analyze the cognitive abilities and responses of elementary school students to contextually-based higher order thinking skills (HOTS) on plant morphology materials. The research approach used was a mixed exploratory method, with one student in grade IV elementary school in Surabaya for qualitative data (think aloud) and 25 students in Lamongan for quantitative data (written test). The instruments used were contextual-based HOTS questions developed through expert validation and limited trials. Data collection techniques include observation, interviews, documentation, and tests. Qualitative data were analyzed thematically, while quantitative data were analyzed using descriptive statistics and reliability (α = 0.76). The results showed that students experienced increased cognitive engagement when faced with problems associated with the context of daily life, such as familiar plants. The students' responses showed that analytical thinking skills began to develop, although evaluative abilities were still limited. Students' thinking processes are more structured when they receive visual stimulus and verbal guidance through think aloud techniques. However, some students have difficulty understanding scientific terms, which shows the need for language adjustments in the preparation of questions. Research has also found that students with previous observational and discussion experiences tend to give more complex and reflective answers. These findings underscore the importance of developing HOTS questions that take into account local contexts, cognitive developmental stages, and student learning experiences. The research recommends the integration of contextual-based learning and HOTS assessment in the elementary school science curriculum. HOTS questions not only serve as an evaluation tool, but also as a means to train critical and reflective mindsets from an early age. Thus, this approach supports the strengthening of 21st century competencies at the basic education level.

INTRODUCTION

21st century education emphasizes the importance of higher order thinking skills (HOTS) as a provision for students to face the challenges of the times. In the context of science learning in elementary school, HOTS includes the ability to analyze, evaluate, and create solutions to real problems in daily life (Putri et al., 2021b). Plant morphology as part of the science material for grade IV elementary school has great potential to be developed in the context of HOTS because it is directly related to the environment around students. However, the reality on the ground shows that most of

the questions given to students are still oriented towards memorization and low-level comprehension. As a result, students struggle to develop scientific reasoning and problem-solving based on real observations. Students' ability to represent plant morphological phenomena through analysis and interpretation is still relatively low (Susanti et al., 2025). These limitations have an impact on students' readiness to face competency-based learning challenges. Thus, the specific problem addressed in this study is the lack of appropriate and effective HOTS assessment tools that are contextual and developmentally suitable for elementary students, particularly in the topic of plant morphology. This study is guided by two main theoretical frameworks: (1) Piaget's theory of cognitive development, which places grade IV students at the concrete operational stage—requiring real, tangible stimuli for effective learning; and (2) the HOTS framework as defined by Anderson and Krathwohl's revision of Bloom's taxonomy, focusing on analyzing, evaluating, and creating as cognitive processes. Therefore, it is necessary to innovate in the development of question instruments that encourage students to think critically and contextually.

Contextual-based HOTS questions are present as one of the innovative approaches to bridge the needs of the curriculum with the characteristics of elementary school students. The contextual approach relates learning materials to real-life situations so that students can more easily understand and apply their knowledge (Khoimatun & Wilsa, 2021). In the context of plant morphology, the use of images, local phenomena, and environmental problems can be used as a stimulus in HOTS questions. This is in line with the principle of meaningful learning that places students as active subjects in the learning process. Thus, learning emphasizes not only on knowledge transfer, but also on the development of high-level thinking skills. The study of Sadiyah & Ginanjar (2020) shows that contextual-based questions can increase student engagement and strengthen their conceptual understanding. However, few studies have examined in depth how elementary school students cognitively respond to HOTS questions in the theme of plant morphology, particularly within the context of daily life phenomena. Therefore, this research is important to fill the gap in the literature in this field.

In the development of HOTS questions, the cognitive aspect of students is the main concern because it is directly related to the thinking process that occurs when students answer questions. Cognitive analysis not only focuses on correct or incorrect answers, but also tracks the flow of thinking, strategies, and difficulties experienced by students (Adatul'aisy et al., 2023). This approach allows educators to understand how a question stimulus can trigger or inhibit a higher-level thinking process. In addition, a deep understanding of students' responses will help teachers formulate questions that are more effective and appropriate to their level of cognitive development. Rahman (2019) states that elementary school students are at a concrete operational stage, which demands a learning stimulus based on real objects and contextual. Therefore, examining students' cognitive responses to contextual HOTS questions can provide an accurate picture of the effectiveness of the question design. This research can also contribute to the development of HOTS-based diagnostic assessments at the elementary level. Thus, teachers not only know the students' learning outcomes, but also the underlying thought processes.

Despite the extensive use of HOTS at the secondary level, international comparative studies such as those in Singapore, Finland, and South Korea highlight how early exposure to critical thinking in primary science education improves long-term academic outcomes. Most previous research on HOTS has still focused on the middle and high school levels, with little attention to the context of basic education. In fact, the development of critical and analytical thinking skills needs to be started early in order to become a strong foundation for the next level (Watik et al., 2023). Primary school-aged children have great potential to be trained in high-level thinking, provided that the approach used is in accordance with their developmental characteristics. Unfortunately, many teachers still find it difficult to design and implement HOTS questions due to limited training and resources. In addition, a dense curriculum and pressure on the achievement of grades are also obstacles in itself. Therefore, systematic efforts are needed to develop and test relevant and contextual HOTS question instruments

for elementary school students. This research specifically seeks to answer the following questions: (1) How do grade IV elementary students cognitively respond to contextual-based HOTS questions in plant morphology? (2) What thinking strategies and difficulties are observed during the think aloud process? (3) How effective and readable are the developed HOTS items in a limited field trial?.

This study uses a mixed approach, which is a combination of qualitative and quantitative analysis. The qualitative approach is carried out through the think aloud technique on one student to reveal the flow of thinking and cognitive strategies in answering questions. Meanwhile, a quantitative approach was used to analyze the response results of 25 students as a form of limited trial. The combination of these two approaches provides a comprehensive understanding of the effectiveness and readability of the HOTS questions developed. According to Creswell & Plano Clark (2023), the mixed methods approach is particularly suitable for instrument development studies because it can bridge statistical data with the context of participants' experiences. This technique can also uncover gaps between expected outcomes and realities on the ground. In addition, qualitative analysis allows researchers to delve into the dynamics of individual students' thinking. Thus, this study has reliable methodological strength to compile evidence-based recommendations.

Plant morphology material was chosen because it is an important part of science learning that is very close to students' daily lives. An understanding of roots, stems, leaves, flowers, and fruits is highly relevant to student activities in home and school environments. However, the results of initial observations show that many students still have difficulty in correctly identifying plant parts, let alone analyzing their functions contextually (Syakur et al., 2023). This shows that there is a gap between the material taught and the actual understanding of students in the field. The use of contextual-based HOTS questions is expected to bridge this gap by presenting a situation that is closer to the real experience of students. In addition, observation and classification skills in this topic can also be used to measure analytical thinking abilities. As stated by (Azzahra et al., 2024), science learning must be able to integrate content with scientific thinking processes to be meaningful. Therefore, this research focuses on strategic and applicative themes in the context of elementary science learning.

In this study, the local context is also one of the main considerations in the preparation of the questions. Using plants that are often found by students in the surrounding environment such as bananas, spinach, or cassava, it is hoped that it can increase the attractiveness and involvement of students in answering questions. This is in line with the principles of contextual learning that suggest the use of the environment as the main source of learning (Geni et al., 2020). The HOTS questions developed also consider the visual literacy aspect by including relevant and informative supporting images. It is hoped that this can help students in understanding the content of the questions more comprehensively. In addition, local contexts also strengthen the linkages between science and culture, which are important in 21st-century learning (Solihin et al., 2025). Therefore, in addition to measuring student cognition, the questions developed also encourage students to think reflective of the surrounding environment. This effort also supports the implementation of the Independent Curriculum which emphasizes student-centered learning.

In summary, this study aims to analyze students' cognitive responses to contextual-based HOTS questions on plant morphology material. It seeks to provide a theoretical contribution through the application of Piagetian cognitive development theory and HOTS taxonomy to instrument design. Practically, the results of this research can be a reference for teachers in compiling questions that are in accordance with the characteristics and needs of students. This research also opens up a new discussion space regarding the role of assessment as a tool to encourage critical thinking from an early age. Thus, assessment is not only a tool to measure learning outcomes, but also a learning medium that stimulates the thinking process. Furthermore, the results of this research can be the basis for the development of assessment policies that are more in favor of developing students' potential as a whole. Given the importance of this topic, this research is relevant to be studied further in the global context of science education at the elementary school level (Darmayanti et al., 2022).

Therefore, the results of this research are expected to be published in reputable scientific journals to reach a wider audience.

METHODS

This study uses a mixed methods approach with an exploratory sequential design. This design began with the collection of qualitative data through *the think aloud technique*, then continued with the collection of quantitative data to strengthen the initial findings and test the effectiveness of contextual-based HOTS questions. This approach was chosen because it allows researchers to gain a deep understanding of students' cognitive processes and evaluate the readability and differentiating power of questions more broadly (Creswell & Plano Clark, 2023). Sequential exploratory design provides flexibility in developing and testing instruments on an ongoing basis. This research is also included in the type of limited development research, especially at the stage of testing instruments on a small scale. This approach is suitable for the initial study of the development of HOTS questions at the basic education level. Through the combined analysis, it is hoped that a comprehensive picture of how students respond and process the developed questions will be obtained. The research subjects consisted of two groups. First, one grade IV elementary school student in the city of Surabaya was purposively selected to take part in *a think tank* and in-depth interview. This selection considers the students' communication skills and their availability following the individual observation process. Second, as many as 25 grade IV elementary school students in Lamongan Regency were involved in the HOTS test in writing. This sample was taken by purposive sampling to represent the background of students from schools with medium academic standards. All participants are active students who have studied plant morphology material according to the grade IV curriculum. The researcher first obtained permission from the school and the student's parents as part of the research ethics procedure. In addition, students are given an understanding of the research objectives and the confidentiality of their data is guaranteed.

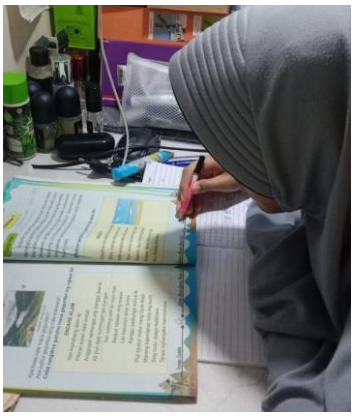

Figure 1. Documentation of the think tank process carried out on one grade IV student in Surabaya. Students seem to be explaining the reasons for answering contextual-based questions.

The main instrument in this study is a contextual-based HOTS question package of 10 short description questions that have been developed by researchers based on the revised indicators of the Bloom Taxonomy (Kusuma et al., 2023). The questions contain stimuli in the form of pictures, local situations, and real cases that are relevant to students' lives. The questions were developed to measure students' ability to analyze, evaluate, and create in the context of plant morphology. In addition, think aloud guidelines and observation sheets are used to examine students' cognitive processes while answering questions. For the purpose of content validation, the questions have been reviewed by two elementary science expert lecturers and one senior teacher. Meanwhile, student answer sheets are used as a source of quantitative data for basic statistical analysis. The researcher

also used semistructured interview guidelines to dig deeper into students' perceptions and thinking strategies.

Figure 2. The situation of the trial of HOTS questions for 25 students in Lamongan was written in the classroom.

Qualitative data was collected through direct observation and think aloud techniques when one student answered a question under the supervision of a researcher. Students are asked to verbally express what they think when answering each question. This process is recorded using audio and recorded using a thinking process observation sheet. After *the think aloud* session, a clarification interview was conducted to explore the reasons students had for choosing certain answers or strategies. Meanwhile, quantitative data was obtained from the written answers of 25 students who worked on questions individually in class. Each answer was analyzed using a pre-compiled high-level thinking assessment rubric. The data collection process was carried out in two weeks, paying attention to the comfort and readiness aspects of students.

Qualitative data were analyzed using data reduction, data presentation, and conclusion drawing techniques (Miles & Huberman, 2013). The researcher identified students' cognitive patterns, strategies, and difficulties in answering questions through transcripts and observation notes. The initial codes were developed based on the HOTS indicators, then categorized into themes of students' thinking. Quantitative data were analyzed descriptively to determine the distribution of scores, the level of difficulty of the questions, and the general tendency to answer each question. Basic statistical calculations were carried out using Microsoft Excel, and the reliability of the questions was analyzed using the Alpha Cronbach formula. Triangulation analysis was carried out by comparing observation results, think aloud transcripts, and student test results to strengthen the validity of the findings. The results of this analysis are used to compile recommendations for the development of more effective contextual-based HOTS instruments.

This research has paid attention to the ethical principles of educational research. The researcher obtained official permission from the school as well as written consent from the parents of the students involved. All data collected is guaranteed confidentiality and is only used for research purposes. The names of students and schools are disguised in the reporting of results to maintain privacy. The data collection process is voluntary and students can resign at any time without any consequences. The researcher also maintains the comfort of the students during the observation and interview sessions. The implementation of research refers to the principles *of respect, beneficence*, and *justice* as recommended in the code of ethics for educational research.

RESULTS AND DISCUSSION

Research Results

1. Results of Students' Cognitive Analysis through Think Aloud

The think aloud process was conducted with a Grade IV elementary student in Surabaya who had previously studied plant morphology. The results revealed that although the student was able to recognize plant parts such as roots, stems, and leaves, difficulties arose when required to analyze their functions in real-life contexts. For instance, when presented with a question involving a picture

of a banana plant growing in wet soil, the student was able to identify the root part correctly but hesitated when explaining the role of fibrous roots in optimizing water absorption. The student's thinking process was found to be mostly linear and relied heavily on factual recall rather than analytical reasoning. When encountering evaluative questions such as *"Why is Plant A more suitable for shaded areas than Plant B?"*, the student tended to rely on intuitive or everyday logic rather than grounding answers in morphological characteristics. This finding suggests that while foundational knowledge exists, students are not yet accustomed to integrating conceptual understanding with reasoning skills.

Figure 3. The spontaneous response of students when asked to explain evaluative questions using the think aloud technique.

There are also indications of cognitive confusion when students are faced with open-ended questions such as "How do you choose plants that are suitable for your yard exposed to direct sunlight?" Students take a long time to respond, and the answers tend to be unsystematic. These results indicate that contextual-based HOTS questions challenge students' thinking capacity at the level of analysis and evaluation. However, when given visual aids such as pictures, students were more confident in composing answers, suggesting that visual literacy helps cognitive activation. In general, the think aloud response reveals that students show high-level thinking potential, but require habituation and stimulus that correspond to concrete operational cognitive stages (Piaget, 1972). Teacher support in guiding the exploration of answers is very important so that students are not only fixated on memorization, but are able to reason and evaluate independently.

2. Results of Students' Quantitative Responses to HOTS Questions

A total of 25 grade IV elementary school students in Lamongan Regency have worked on 10 contextual-based HOTS questions. The results of the analysis show the distribution of the score in Table 1.

Table 1. Results of Student Score Analysis on HOTS Questions

Score Range	Number of Students	Percentage
>80–100 (Very Good)	2 students	8%
>60–80 (Good)	6 students	24%
>40–60 (Fair)	10 students	40%
>20–40 (Poor)	5 students	20%
0–20 (Very Poor)	2 students	8%

Most students (40%) are in the sufficient category, meaning they are able to answer context-based questions, but are not optimal in explaining reasons or formulating logical solutions. Only 8% of

students achieve the excellent category, indicating that a small percentage of students have complete high-level thinking skills. Questions with stimulus images of local plants such as spinach and cassava are easier to answer than questions that contain a comparison of two foreign plant species. This supports the assumption that local context helps the connection between students' personal experiences and science material. The question that required evaluation (C5) had the highest level of difficulty, only answered correctly by 3 out of 25 students (12%). In contrast, the analysis question (C4) with the help of images had the highest success rate (68%).

The reliability analysis of the questions using Alpha Cronbach was obtained with a value of 0.76, which shows that the questions developed have high internal consistency and are test-worthy. The difficulty level of the questions varies: 3 questions are relatively easy, 5 are moderate, and 2 questions are classified as difficult. This shows that the question package has good differentiating power, able to map students' thinking skills in different spectrums.

3. Qualitative-Quantitative Findings (Data Integration)

Integration of both data sets revealed several overlapping themes and challenges. The most prominent obstacles were students' limited mastery of scientific vocabulary, lack of experience with problem-based learning, and unfamiliarity with descriptive or analytical item formats. Students who performed better generally had more exposure to hands-on plant observation at home or school. Items framed around real-life problems such as *"The plants in front of your house wither even though they are watered every day. What do you think is the cause?"* were the most engaging and elicited thoughtful responses. This supports the claim that contextualized questions not only enhance comprehension but also stimulate curiosity and student engagement, aligning with the principles of constructivist learning. Conversely, items that were abstract or contained complex terminology for example, *"root modification into tubers"* tended to be answered by guesswork, highlighting the importance of balancing cognitive challenge with language readability. Therefore, the development of contextual-based HOTS items at the elementary level must carefully consider the alignment of cognitive demand, linguistic accessibility, and local relevance.

Discussion

The results of the study show that the high-level thinking ability of elementary school students on plant morphology material is still at a developing level. Students are able to answer analytical questions when accompanied by visual stimulus, but have difficulties in evaluation questions. This is in line with the findings of Yohannes & Tamur (2021), that high-level thinking requires the ability to connect concepts with complex contexts. Grade IV students are at a concrete operational stage according to Piaget, so tasks that are too abstract are not yet fully completed. Therefore, contextual stimuli such as images or real-life situations are very helpful in their thinking process. Problems associated with daily life, such as plants in the surrounding environment, are able to encourage students to think more deeply (Ali et al., 2022). Nevertheless, students' ability to provide logical reasons is still limited, which shows the need for reasoning-based learning. This shows that HOTS skills are not just a matter of practice, but need to be systematically honed through meaningful learning.

The think aloud technique used in this study is able to directly reveal the students' thinking process when answering questions. Students exhibit a non-linear thought process, sometimes jumping from one idea to another without completing the previous thought. This reflects that even though students have ideas, they have difficulty structuring them systematically. This process shows the importance of scaffolding in HOTS learning, which is a gradual guidance to formulate reasons and solutions (Gunawan et al., 2021). Think aloud also revealed that students tend to rely on personal experience rather than scientific principles in answering questions. As stated by Ningsih et al. (2025), cognitive development occurs optimally when students are assisted in their proximal development zone. With this technique, teachers can understand how students reason and which parts are obstacles. Therefore, think aloud is useful not only in research, but also in everyday learning.

Quantitative data from 25 students in Lamongan showed that contextual HOTS questions were able to distinguish students' ability levels. Most students are in the medium and adequate category, which means they are able to understand the context, but are not yet fully able to answer with a high level of reasoning. This supports research by Putri et al. (2025), who state that HOTS skills require continuous practice as well as the support of a stimulating learning environment. Evaluation questions have the highest level of difficulty, because they require students to consider several factors and draw conclusions. On the other hand, problems that only require an introduction or description of plant parts are easier to solve. Thus, it is important for teachers to balance the demands of the questions and the cognitive capacity of the students. This study shows that HOTS learning can be started early, but needs to be adjusted to the characteristics of child development. Exploratory and reflective learning strategies are needed that can train students to think deeply.

The concept of contextual-based questions has been proven to increase students' cognitive engagement. When students feel close to a topic, such as plants growing around their homes, they find it easier to express understanding and opinions. According to Solihin et al. (2024), authentic context allows students to build meaning and relate new knowledge to their experiences. In this study, questions with local contexts such as banana trees and cassava received better responses than questions using foreign plants. This reinforces the importance of a contextual approach in primary education. Context also serves as a link between declarative and procedural knowledge. When the context is recognized by students, the thinking process becomes more active (Hasanah, 2023). Therefore, the development of HOTS questions must consider the cultural background and environment of the students.

Although context aids comprehension, the use of scientific terms such as "modification of roots into tubers" becomes a barrier for most students. This shows that there is a gap between the scientific language in the curriculum and the language that students understand on a daily basis. According to (Wicaksono & Sugiharto, 2021), teaching must start from representations that students can access, and then progress to a symbolic level. Therefore, in developing HOTS questions, it is important to maintain a balance between cognitive demands and the readability of the questions. Teachers need to facilitate mastery of scientific terms through media, images, and concrete activities before evaluating students' understanding in the abstract. This means that HOTS questions that are too heavy in terms of language can fail to assess the actual thinking ability. Thus, the use of simple but precise language is crucial in the development of HOTS instruments in elementary school. This approach supports child-centered pedagogical principles.

The results of the study also showed that students who were used to discussing and had experience in environmental exploration were superior in answering HOTS questions. These students are able to give more complex reasons and use observations as the basis for answers. This supports the findings of Putri et al. (2021), that high thinking skills develop through discussion, experimentation, and exploration activities. Therefore, elementary science learning should not only be theoretical, but also involve direct observation activities. Activities such as observing plants around school or keeping a plant growth journal can stimulate thinking skills. Students who experience the phenomenon firsthand will find it easier to generalize and draw conclusions. Thus, concrete experience becomes an important foundation in developing HOTS capabilities. Contextual and experiential approaches should be part of science learning.

The high reliability of the questions ($\alpha = 0.76$) showed that the developed instrument was quite consistent in measuring students' high-level thinking skills. This indicates that with the right design, HOTS questions can be used systematically to evaluate learning outcomes. In the context of formative assessment, teachers can use this kind of question to identify aspects of thinking that are still weak. This is in line with the opinion of Agustianti et al. (2022), that good assessment must be informative and encourage further learning. The questions developed in this study not only function as a measuring tool, but also as a reflection tool. Students learn to think when working on problems, especially when asked to explain why. Therefore, the integration of HOTS questions in daily learning is

important to be carried out gradually. This helps to form a culture of critical thinking from the elementary level.

HOTS learning in elementary school is not impossible, but it requires a structured and planned pedagogical strategy. The teacher should be a facilitator who guides students to formulate arguments, evaluate information, and look for alternative solutions. As stated by Elisabet & Herlina (2024), the development of thinking skills involves repetitive processes, exercises, and appropriate feedback. In the context of elementary science, teachers need to relate concepts to students' real experiences. When students see the relevance between their lessons and their lives, motivation and understanding increase. Teachers also need to provide a model of critical thinking through open-ended questions in class discussions. Learning that stimulates curiosity and investigation will encourage students to think more deeply Solihin et al. (2024). Therefore, HOTS questions should be juxtaposed with active learning methods.

The findings of this study provide important implications for curriculum development and assessment in primary schools. The curriculum should provide more space for activities that foster critical, creative, and reflective thinking skills. According to Thana & Hanipah (2023), 21st century skills are indispensable even from the primary education level. The HOTS questions developed in this study are concrete examples of the implementation of authentic assessments that are in accordance with the demands of the times. In addition, teachers need training in compiling this kind of question so that it does not only emphasize the low cognitive aspect. Textbooks and learning resources also need to be designed with the local context and student interests in mind. This research also emphasizes the importance of student involvement in the thinking process, not just providing information. Thus, learning evaluation needs to be redesigned so that it does not only assess memorization.

Overall, this study proves that contextual-based HOTS questions can be used to measure and at the same time train the thinking skills of elementary school students. Despite the challenges, such as vocabulary limitations and abstraction experience, this approach has the potential to be applied widely. The results of the think aloud and the trial showed that students were able to respond positively to the questions designed by paying attention to their context and abilities. This research supports the view that HOTS learning must start early and be integrated into everyday classrooms. Teachers, curriculum, and assessments must work together to create a culture of critical thinking in elementary schools. This research also opens up further opportunities, for example by developing a thematic HOTS question bank or associating it with the Pancasila Student profile. Thus, basic education can play an active role in preparing a reflective, analytical, and solution-oriented generation. This is in line with the goal of national education to educate the life of the nation as a whole.

CONCLUSION

This study concludes that contextually-based HOTS questions on plant morphology materials can reveal students' thinking processes in a more in-depth and realistic manner. The results of the experiment showed that students were able to understand the problem better when it was associated with the context of daily life, such as plants in the surrounding environment. Students' analytical and evaluative thinking skills are still limited, but they begin to develop when given appropriate stimuli and verbal guidance such as think aloud techniques. Questions with high demands such as evaluation require systematic and continuous learning support. The use of language that is too scientific without assistance can be an obstacle for students in understanding the meaning of the question. The findings also show that concrete experiences, discussions, and environmental observations have a significant effect on the quality of student responses. Thus, the development of HOTS questions must consider aspects of cognitive, linguistic, and student learning experiences. The contextual approach has been shown to be effective in stimulating the high-level thinking skills of elementary school students.

Based on the results of the research, it is suggested that elementary school teachers begin to integrate contextual-based HOTS questions in science learning activities gradually and continuously.

Teachers need to be trained in compiling and evaluating HOTS questions that are relevant to students' experiences and according to their cognitive development stages. The use of active learning methods such as discussions, field observations, and think aloud techniques is also recommended to train students' critical thinking skills from an early age. In addition, curriculum developers and textbook writers need to consider the integration of contextual approaches in the preparation of materials and learning evaluations. Further research is also recommended to develop thematic HOTS question banks that are adaptive to local contexts and student characteristics. With the right policy support, this approach can help create a generation that is able to think reflectively, creatively, and solutively in the face of future challenges.

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