

THE DOMINANCE OF LOTS IN SUMMATIVE ASSESSMENT: THE CHALLENGE OF IMPROVING HOTS IN INDONESIAN LANGUAGE LEARNING

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ABSTRACT

The competence of teachers in making test questions for students is very diverse. There are teachers who are able to make HOTS questions, there are teachers who are still using HOTS questions. HOTS questions are questions that measure students' level of critical thinking, for that we need to know how the teacher's competence in making HOTS questions so that students can measure their level of critical thinking in mastering the material taught. This study aims to describe the level of LOTS and HOTS questions made by teachers on formative and summative questions in Indonesian subjects. The participants in this study are junior high school Indonesian teachers in the Brebes area, Indonesia. This type of research is qualitative descriptive. The data and data source are Indonesian teachers in the Brebes area, Indonesia. The results of the study revealed the dominance of LOTS-based questions (Lower Order Thinking Skills) in summative assessment, which covered 66.9% of the total questions, while HOTS-based questions (Higher Order Thinking Skills) only reached 33.1%. This inequality suggests that assessments still focus on basic abilities such as remembering and comprehension, with minimal attention paid to the development of students' analytical, evaluative, and creative skills. This condition reflects the challenges faced in the preparation of questions, such as the lack of technical training for teachers and the limited guidelines for the preparation of HOTS-based questions. These findings have important implications that ongoing training is needed for teachers to improve their ability to design assessment instruments that encourage students to think more deeply and critically.

Keywords: high level thinking skills, low level thinking skills, summative assessment, assessment development

INTRODUCTION

In the era of globalization, characterized by rapid developments in science and technology, education stands as one of the most significantly affected sectors (Imamov & Semenikhina, 2021; Spring, 2008; Stofkova & Sukalova, 2020). These rapid changes necessitate an enhancement in human resource (HR) quality, where individuals must not only be cognitively intelligent but also possess critical thinking, creativity, and adaptability. The ability to innovate, solve problems, and collaborate in dynamic work environments is essential to meet global demands (Bereczki & Kárpáti, 2021). Educators, therefore, must integrate technological advancements into the learning process, fostering creative and innovative learning atmospheres. Technology has evolved beyond being a mere tool; it has become an integral element of effective education. The demands of Industry 4.0 compel educators to equip students with collaboration and problem-solving skills, which are crucial for navigating the complexities of the modern workforce (Ahmad, 2020; Goulart et al., 2022; Mian et al., 2020; Vieira et al., 2022). Consequently, education must emphasize not just knowledge transfer but also the cultivation of character and essential life skills. One of the critical aspects of contemporary education is the emphasis on high-order thinking skills (HOTS). These skills go beyond rote memorization and basic comprehension, focusing instead on students' abilities to analyze, evaluate, and create (Bloom, 1956). HOTS-based learning encourages students to engage deeply with content, fostering intellectual independence and problem-solving capabilities. The application of

HOTS in education is essential for preparing students to face real-world challenges that require analytical reasoning, decision-making, and creative problem-solving abilities. However, the successful implementation of HOTS-based learning is contingent upon effective assessment strategies. Assessments must be structured in a way that measures students' abilities to think critically and creatively. Despite the acknowledged importance of HOTS, many educators struggle with designing appropriate assessments that align with these principles (Hamzah et al., 2022; Kusumaningtyas et al., 2023; Maryani et al., 2021). The challenges associated with HOTS implementation include inadequate teacher training, a lack of familiarity with assessment frameworks, and rigid curricular structures that prioritize standardized testing over innovative evaluation methods.

One of the primary challenges in implementing Higher-Order Thinking Skills (HOTS)-based learning is the limited competency and readiness of teachers. Many educators are accustomed to traditional teaching methods that prioritize knowledge acquisition over analytical and creative thinking (El-Sabagh, 2021; Firman et al., 2020). The transition to HOTS-based instruction requires teachers to adapt their pedagogical approaches, incorporating inquiry-based learning, problem-solving activities, and open-ended questioning techniques. However, many teachers struggle with designing and administering assessments that accurately measure higher-order cognitive skills. The ability to construct such assessment instruments is crucial yet often underdeveloped among educators, leading to ineffective evaluations of students' analytical and creative abilities (Hamzah et al., 2022). As a result, the overall effectiveness of HOTS-based learning is compromised. Another significant challenge is the diversity of student learning styles and needs. Research indicates that students absorb and process information in different ways, which directly impacts their engagement with HOTS-based learning activities (Rachmad, 2022). While some students excel in problem-solving and analytical thinking, others may struggle due to their preferred learning modalities (Hassan et al., 2021; Wahyudin & Wahyuni, 2022). Teachers must, therefore, employ differentiated instructional strategies to accommodate various learning styles, ensuring that all students can actively participate in HOTS-based learning. Additionally, socio-economic disparities play a role in students' exposure to critical thinking and problem-solving activities outside the classroom. Those from disadvantaged backgrounds may require additional support, necessitating targeted interventions and scaffolding techniques to bridge the gap. The design and evaluation of HOTS-based assessments also present a considerable challenge. Effective assessments should measure students' abilities to analyze, synthesize, evaluate, and create. However, many existing assessments rely heavily on multiple-choice questions, which primarily test recall and comprehension rather than critical thinking skills (Hamzah et al., 2022). Developing assessments that align with Bloom's taxonomy and effectively measure HOTS remains a major hurdle (Maryani et al., 2021). Furthermore, standardized assessments often fail to capture the depth of students' thinking processes. More effective evaluation methods, such as open-ended questions, project-based assessments, and performance-based evaluations, require additional time and effort for implementation and grading. Teachers may also lack sufficient training to consistently and objectively assess subjective responses, making it difficult to ensure fairness and reliability in evaluating students' higher-order thinking skills.

To effectively implement Higher-Order Thinking Skills (HOTS)-based learning, several strategic approaches must be adopted. These strategies focus on improving teacher competency, redesigning the curriculum, and enhancing assessment methods to ensure that students develop critical thinking, problem-solving, and analytical skills. One of the most crucial strategies is professional development and teacher training. Since many educators struggle with integrating HOTS into their teaching practices, continuous professional development programs should be prioritized. Workshops and training sessions focused on HOTS-based pedagogy and assessment design can equip teachers with the necessary skills to foster critical thinking in students. Emphasis should be placed on inquiry-based learning, problem-solving techniques, and the effective use of technology in HOTS-oriented instruction (Fernández-Batanero et al., 2022; Kilag

& Sasan, 2023). Additionally, mentoring and peer collaboration can enhance teachers' competencies by creating opportunities for knowledge-sharing and best practices in HOTS implementation. Schools should encourage professional learning communities where educators can exchange ideas, reflect on their instructional methods, and receive constructive feedback to improve their assessment techniques. Another essential strategy is curriculum redesign and the adoption of flexible learning approaches. The curriculum should incorporate real-world problem-solving activities, case studies, and project-based learning to enhance students' ability to apply knowledge across different contexts. Interdisciplinary learning approaches should also be encouraged, allowing students to connect concepts from various subjects and develop a deeper understanding of complex issues (Guljakhon & Shakhodat, 2020). Furthermore, differentiated instruction strategies can be employed to accommodate diverse learning needs. Teachers should use a variety of instructional methods such as group discussions, role-playing, hands-on experiments, and digital learning tools to ensure that all students can effectively engage with HOTS-based learning.

Innovative assessment strategies are also vital for measuring students' higher-order thinking skills accurately. Traditional standardized tests primarily assess recall and comprehension, making them inadequate for evaluating HOTS. Instead, alternative assessment techniques should be adopted, including project-based assessments, portfolio assessments, performance-based evaluations, and rubric-based grading. Project-based assessments encourage students to engage in real-world problem-solving tasks and research projects, while portfolio assessments allow them to document their learning progress over time. Performance-based evaluations, such as presentations, debates, and simulations, enable teachers to assess students' ability to apply knowledge in practical settings. Meanwhile, rubric-based evaluations ensure consistency and objectivity in grading subjective responses. Moreover, integrating technology into assessment can enhance the effectiveness of HOTS evaluation. Digital platforms that support interactive assessments, gamification, and adaptive testing can provide valuable insights into students' cognitive development and critical thinking skills. By leveraging technology, educators can design more engaging and effective assessments that accurately measure students' ability to analyze, synthesize, evaluate, and create. Finally, inclusivity in educational policies plays a crucial role in ensuring a just and effective education system. Providing equal access to quality HOTS-based learning opportunities, regardless of students' socioeconomic backgrounds or geographical locations, will contribute to a more equitable and effective learning environment. By implementing these strategies, educators can create a robust educational framework that fosters higher-order thinking skills and prepares students for future challenges.

METHOD

This study employs a descriptive qualitative approach to provide a comprehensive and detailed analysis of the implementation of Lower-Order Thinking Skills (LOTS) and Higher-Order Thinking Skills (HOTS)-based assessment instruments by junior high school teachers in Brebes, Indonesia. The qualitative approach was chosen because it allows for an in-depth exploration of the phenomenon under study, particularly concerning assessment practices implemented by teachers. Through this approach, the study aims to capture the authenticity of assessment designs, cognitive level distributions, and the extent to which they align with the principles of LOTS and HOTS.

Participants and Sampling

The participants in this study consist of 20 Indonesian junior high school teachers actively teaching in the Brebes region. The selection of participants was conducted using a purposive sampling technique, focusing on availability, willingness, and teaching experience related to LOTS and HOTS-based assessments. The study also examines three summative assessment instruments, which were purposefully selected from end-of-semester assessment documents from the 2022/2023 academic year. These documents

serve as primary data sources to analyze question structures, cognitive levels, and their alignment with LOTS and HOTS frameworks. By examining real assessment instruments, the study ensures the data collected is contextually relevant and accurately represents the implementation of LOTS and HOTS in actual classroom settings.

Data Collection Techniques

Data collection was carried out using four primary techniques: observation, questionnaires, interviews, and content analysis.

1. Observation

- Observations were conducted in classroom settings to understand how assessment instruments were designed, administered, and used in the learning process.
- This technique provided direct insights into the practical implementation of assessment strategies and the extent to which teachers incorporate HOTS-based approaches in their evaluations.

2. Questionnaires

- A structured questionnaire was distributed to the participating teachers to measure their level of understanding of LOTS and HOTS concepts, including their ability to design assessments at different cognitive levels.
- The questionnaire covered aspects such as teachers' familiarity with HOTS-based assessments, challenges in implementation, and their perceived effectiveness.

3. In-depth Interviews

- Semi-structured interviews were conducted with selected teachers to gather qualitative data on the challenges they face in designing HOTS-based assessments and the strategies they use to overcome these challenges.
- The interview questions focused on teachers' experiences, perceived difficulties in aligning assessments with HOTS principles, and institutional support for implementing HOTS-based learning.

4. Content Analysis

- Content analysis was conducted to examine the structure and cognitive level distribution of questions found in the summative assessment documents.
- The analysis focused on categorizing questions based on Bloom's Taxonomy, specifically identifying whether the items fall under LOTS (remembering, understanding, and applying) or HOTS (analyzing, evaluating, and creating).
- This process also included identifying question types, patterns in assessment design, and their alignment with the expected learning outcomes.

Data Analysis Techniques

The collected data were analyzed using **interactive analysis techniques** (Endarto & Martadi, 2022; Mujab & Gumelar, 2023; Safira et al., 2021; Sakiah & Effendi, 2021; Tressyalina et al., 2023), which include the following stages:

1. Data Reduction

- The data reduction process involved selecting and filtering relevant information, eliminating redundant or irrelevant responses, and categorizing key findings to maintain focus on the research objectives.

2. Data Presentation

- The processed data were presented in the form of thematic groupings, enabling a clear comparison between the implementation of LOTS and HOTS in assessment instruments.

- Data presentation also involved tables, charts, and descriptive narratives to illustrate cognitive level distributions and common assessment practices.
3. Conclusion Drawing and Verification
- The final step involved drawing conclusions based on patterns and relationships observed in the data.
 - Triangulation was employed to ensure the reliability and validity of findings by cross-referencing questionnaire responses, interview data, classroom observations, and content analysis results.

This systematic and interactive approach ensures an in-depth and rigorous analysis of the implementation of LOTS and HOTS-based assessments in junior high schools in Brebes. The findings from this study aim to contribute to enhancing assessment practices and supporting the effective integration of higher-order thinking skills in Indonesia's education system.

RESULTS AND DISCUSSION

This study is designed to identify the distribution patterns and characteristics of LOTS (Lower Order Thinking Skills) and HOTS (Higher Order Thinking Skills) based questions in summative assessments prepared by Indonesian teachers at the junior high school level in the Brebes area. In the context of 21st century education, the shift in learning paradigm demands critical, analytical, and creative thinking skills that are realized through HOTS-based assessments. However, various studies show that many educators are still more comfortable with the LOTS approach, which is oriented towards information reproduction and basic skills. Therefore, this study not only explores the distribution of questions based on the six cognitive levels of Bloom's taxonomy but also evaluates the depth and relevance of questions in supporting more meaningful learning. The data and visualizations presented aim to provide clear insights into the current conditions, as well as a foothold to recommend strategic steps to improve the quality of assessment.

LOTS: Dominance of Basic Abilities in Assessment

The results of the study show that LOTS (Lower Order Thinking Skills) dominated the summative assessment analyzed, with the largest distribution at the level of C1 (remembering) at 26.1%, followed by C2 (understanding) at 26.9%, and C3 (applying) at 13.9%. For example, a question at the C1 level asks students to identify a basic fact, such as *"Name the elements in the text of a fantasy story!"*. At level C2, the questions require more understanding of concepts, such as *"The above text excerpt is part of the structure of the text...."*, while level C3, although it begins to involve the application of concepts, is still limited to simple contexts, such as *"The order of steps of the procedural text in order is...."*.

Overall, LOTS-based questions cover 77 out of 115 questions or about 66.9%. This dominance reflects a more assessment approach oriented to students' basic abilities, without providing analytical or applicative challenges in more complex contexts. The following figure shows the overall distribution of LOTS and HOTS in the form of a pie chart, as well as the detailed distribution of each cognitive level in LOTS through a horizontal bar chart. This visualization helps to understand the concentration of questions at each cognitive level and provides insight into the existing LOTS dominance patterns.

Tabel 1. Data LOTS

Level Cognitive	Sample Questions
C1 (Remember)	<i>"Mention the elements in the text of the fantasy story!"</i>
C2 (Understand)	<i>"The text quote above is part of the text structure...."</i>
C3 (Apply)	<i>"The sequence of steps of the procedural text in order is...."</i>

For this, Figure 1 shows the overall proportion of LOTS problems compared to HOTS, where LOTS dominate significantly. Meanwhile, Figure 2 shows a detailed distribution of questions at each cognitive level of the LOTS, with the largest concentration at levels C1 and C2.

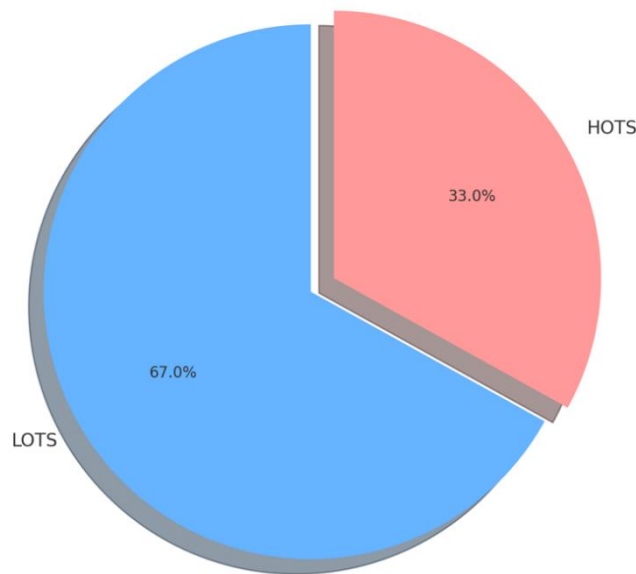


Figure 1. Overall Distribution of LOTS and HOTS

Figure 1 shows the overall proportion between LOTS (Low-Level Thinking Skills) and HOTS (High-Level Thinking Skills). The proportion of LOTS is 67%, while HOTS is only 33%. This indicates that the questions designed predominantly assess lower-order thinking skills, such as recalling and comprehending, rather than higher-order thinking skills, such as analysing or evaluating. Figure 2 shows the detailed distribution of questions belonging to the LOTS category, based on cognitive levels in taxonomy Benjamin S Bloom said that An in-depth analysis was conducted to evaluate the distribution of questions at the levels of C1 (Remembering), C2 (Understanding), and C3 (Applying) (Grebin et al., 2020; Mahmudi et al., 2022; Prasad, 2021; Sobral, 2021; Voss, 2024). For this, Figure 2 is an overview of the distribution of the amount of questions based on the determined cognitive level.

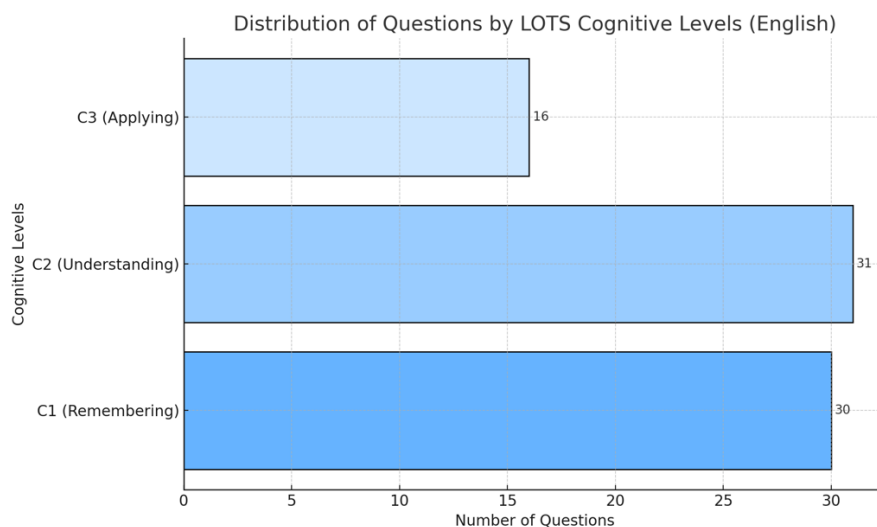


Figure 2. Distribution of the number of questions based on the cognitive level of LOTS

The results of this study reveal several important patterns related to the dominance of LOTS in summative assessments:

- a) Dependence on Levels C1 and C2: The majority of LOTS questions are at levels C1 and C2, which are oriented towards memorizing facts and understanding basic concepts. This shows that the assessment is designed to assess students' reproductive abilities, with the main focus on information transfer that is linear.
- b) Lack of use of Level C3: Although level C3 is beginning to show involvement in applicability, the number of questions at this level is only 13.9%. In addition, questions at this level often do not involve visual stimuli or contextual elements that can trigger further exploration.
- c) Limitations in Integrating Real Context: Lots-based questions are generally textual in nature without supporting students' exploration through real-world scenarios or supporting graphics. For example, a question that asks students to structure procedural steps relies solely on text without integrating visual illustrations or practical situations.
- d) Question Design Transformation Needs: To increase the relevance and significance of LOTS-based assessments, it is necessary to transform the question design. The use of visual stimuli, such as tool drawings or data tables, can enrich students' experience in understanding and applying concepts. For example, the application question (C3) can be modified to: *"Sort the steps in the procedure text to create the following tool based on the given image."*

HOTS: Limitations in Analysis, Evaluation and Creation

The results showed that HOTS (Higher Order Thinking Skills) only covered 33.1% of the total 115 questions analyzed. This category includes the cognitive levels of C4 (analyzing), C5 (evaluating), and C6 (creating). The largest distribution is in level C4 sebesar 20%, sedangkan C5 dan C6 masing-masing hanya mencakup 5,2% dan 7,8%. For example, questions at the C4 level generally ask students to analyze elements in the text, such as *"The character depicted in the story above is..."* C5 questions often ask students to evaluate arguments or improve sentence structure, for example *"Fix the following ineffective sentences into effective sentences!"* As for C6 questions, they usually require students to come up with new ideas or creative solutions, such as *"Make a connotative sentence from the following word: 'red jago'."* Details are displayed pada Tabel 2.

Table 2 Examples of HOTS Data

Level Cognitive	Sample Questions
C4 (Analyze)	<i>"Fix the following ineffective sentences into effective sentences...."</i>
C5 (Evaluate)	<i>"Fix the following ineffective sentences into effective sentences!"</i>
C6 (Create)	<i>"Make a connotative sentence from the following word: 'red jago'."</i>

Table 2 presents examples of questions that fall into the HOTS (Higher Order Thinking Skills) category based on cognitive level in the Bloom Taxonomy: C4 (Analysis): An example question encourages students to analyse characters within a narrative; C5 (Evaluating): An example question requires students to assess and rectify ineffective sentence structures; C6 (Creation): An example question inviting students to develop innovative sentences using specific terms. These examples illustrate how HOTS questions can be designed to enhance students' higher-order thinking skills, such as analysis, evaluation, and creation.

Table 3 shows the distribution of the number of HOTS questions according to their cognitive level. This data includes the number of questions at each level (C4, C5, and C6) as well as their percentage to the total HOTS questions. After that, Table 3 is a more in-depth analysis of this.

Table 3. Distribution of HOTS Questions Based on Cognitive Level

Level Cognitive	Number of Questions	Percentage (%)
C4 (Analyze)	23	20%
C5 (Evaluate)	6	5,2%
C6 (Create)	9	7,8%

The results show that HOTS-based questions are still focused on the C4 (analyzing) level with a percentage of 20%, much higher than the C5 (evaluating) and C6 (creating) levels which only cover 5.2% and 7.8% respectively. The dominance at the C4 level indicates that most HOTS-based questions are designed to challenge students in analyzing elements of information, such as understanding the relationships between passages in the text or identifying certain characteristics. For example, a question like *"The character depicted in the story above is..."* Ask students to perform a simple analysis without involving a more complex context. Although the questions at this level are a step forward from the LOTS, the approach tends to be limited to basic exploration that does not take advantage of the full potential of the student's analytical skills. Meanwhile, the number of questions at the evaluation (C5) and creation (C6) levels is very limited. Evaluation questions usually require students to assess the quality or effectiveness of certain information, such as *"Fix the following ineffective sentences into effective sentences!"*, but rarely accompanied by relevant contexts or challenges that require deep critical thinking. The same is true for the problem of creation, which generally requires students to come up with something new, such as *"Make a connotative sentence of the following word: 'red jago'."* Although this problem involves an element of creativity, the design is less challenging because it does not involve more realistic situations or practical applications.

This study reveals a significant disparity between LOTS (Lower Order Thinking Skills) and HOTS (Higher Order Thinking Skills)-based questions in summative assessment. The dominance of LOTS shows that assessment approaches still tend to focus on basic abilities, such as remembering and comprehending information, while the development of analytical and creative skills that are at the core of modern learning has not received enough attention. This is a reflection of the question design pattern that has not fully supported the demands of 21st century education, where students are expected to be able to think critically, evaluate, and creatively create to face more complex challenges. This inequality not only reflects the pattern of assessment but also indicates the challenges faced by teachers. Time constraints, lack of technical training, and lack of HOTS-based question design guidelines are the main obstacles in integrating high-level thinking skills into assessment. Without relevant stimulus or supporting contextual elements, HOTS-based questions often lose their potential to truly challenge students. This condition indicates the need for a fundamental change in the approach to question design that not only measures basic abilities but also encourages more in-depth and relevant exploration of concepts. For this reason, an assessment transformation strategy is needed that focuses on increasing teachers' capacity in compiling innovative, contextual, and relevant HOTS-based questions. The provision of intensive training and the development of HOTS-based question banks can be a strategic step to help teachers improve their assessment designs. With a more balanced approach, assessment is not only a measure of students' abilities but also a means to support meaningful learning, producing graduates who are not only academically superior but also able to think critically and creatively in the face of global challenges.

CONCLUSION

The study highlights a significant imbalance in the distribution of LOTS (Lower Order Thinking Skills) and HOTS (Higher Order Thinking Skills) in summative assessments conducted by Indonesian junior high school teachers in Brebes. The findings indicate that LOTS-based questions dominate, with the majority focusing on C1 (remembering) and C2 (understanding), while HOTS-based questions, particularly at the C5 (evaluating) and C6 (creating) levels, remain underrepresented. This dominance of LOTS reflects an assessment approach that prioritizes basic knowledge retention over analytical and creative thinking, which are essential for 21st-century education. Several challenges contribute to this disparity, including teachers' familiarity with traditional assessment methods, limited training in designing HOTS-based questions, and a lack of contextual stimuli to encourage deeper cognitive engagement. To bridge this gap, a strategic transformation in assessment practices is necessary, emphasizing capacity-building for educators through targeted training and the development of HOTS-based question banks. A balanced integration of LOTS and HOTS will not only enhance the quality of assessments but also foster students' critical thinking and problem-solving skills, preparing them to meet global challenges effectively.

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