ELEVATING LEARNING: DEVELOPING HOTS CHALLENGES FOR SENIOR STUDENTS AT SMK PUI CIKIJING

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Abstract: This study aims to develop Higher Order Thinking Skills (HOTS) questions for Class XII Indonesian at SMK PUI Cikijing based on four HOTS criteria: the Operational Verb (KKO) aspect, critical thinking skills, creative thinking, and problem-solving. The research method used in this study is Research and Development (R&D). The development model employed is the 4D model, limited to development only. Hence, the development stage begins with defining (analyzing Indonesian HOTS questions), designing (formulating HOTS questions based on the analysis of HOTS items regarding KKO aspects, critical thinking skills, creative thinking, and problem-solving), and developing (creating HOTS questions based on the analysis of HOTS questions in terms of KKO aspects, critical thinking skills, creative thinking, and problem-solving). Based on the analysis of the profile of Indonesian HOTS questions for Class XII at SMK PUI Cikijing, it is found that they are lacking in fulfilling the criteria for HOTS questions. Only 6% or 2 items are identified as HOTS questions, 30% or 9 questions need improvement, and 63% or 19 questions do not meet the HOTS criteria. Thus, there is a need to design HOTS questions based on the analysis of the HOTS item profile conducted in the defining stage. Subsequently, Low-Order Thinking Skills (LOTS) questions are transformed into HOTS questions based on four HOTS criteria: the Operational Verb (KKO) aspects, including C4 (analyzing) and C5 (evaluating) cognitive domains, critical thinking skills, creative thinking, and problem-solving.
Keywords: *development of HOTS questions; HOTS criteria; KKO; critical thinking skills; creative thinking skills; problem-solving skills.*

INTRODUCTION

21st-century learning focuses on developing skills and competencies relevant to the future. It demands learners to possess three essential abilities: critical thinking, creative thinking, and problem-solving (Febrianti (2021). This requires continuous human development to prepare high-quality human resources. Mardhiyah (2021) explains that improving human resources quality through education, from basic to higher education, is key to

keeping up with the developments of the Fourth Industrial Revolution.

To achieve these goals, educators (teachers) are required to have the ability and skills to manage teaching components. One of the crucial skills they must possess is learning assessment. In the learning process, evaluation is a vital part. Elis Ratnawulan & Rusdiana (2015), define learning evaluation as the process of systematically collecting, analyzing, and interpreting information to determine the achievement of learning objectives. The purpose of learning evaluation is to gather information to determine the level of student progress, development, and achievement, as well as the effectiveness of teaching.

Appropriate learning evaluation will affect learners in achieving their development. Current learning evaluation is oriented towards developing learners' potential, such as critical thinking, creative thinking, and problem-solving abilities. These three abilities are known as Higher Order Thinking Skills (HOTS). Higher Order Thinking Skills (HOTS) are abilities that can prepare learners to face future life and academic challenges. HOTS applies learning that emphasizes the development of attitudes, ideas, and skills. Learners today are expected to have reasoning and problem-solving abilities from their learning processes, thus improving the quality of education in Indonesia (Nurhalimatulsyadiah, 2022).

Based on the results of the Programme for International Student Assessment (PISA) 2018 survey published in March 2019, Indonesia ranks 74th out of 79 countries with an average score of 371. For the mathematics literacy category, it ranks 73rd with an average score of 379, while literacy in reading and science ranks 71st with a score of 396. Indonesia has experienced a decline from 2015 to 2018. This indicates that the literacy achievements in reading, mathematics, and science attained by Indonesian students are very low. Febrianti, W., Zulyusri, Z., & Lufri, L. (2021) state that the low results of PISA require the Indonesian education world to prepare for rapid development by providing exercises with HOTS questions.

Sani (2019) states that it is important to prepare the younger generation with critical thinking, creative thinking, and decision-making skills to solve problems. Problem-solving is not just through remembering or memorization processes but demands making connections and conclusions from problems. In line with this, Annuuru, et al. (2017) explain that HOTS is the ability to combine facts and ideas in the process of analyzing, evaluating, and creating, such as giving assessments of a learned fact or creating something from what has been learned (Saraswati, et al. 2018).

The processes of analyzing, evaluating, and creating are part of the cognitive thinking skill taxonomy created by Benjamin S. Bloom in 1956. Tanujaya (2017) explains that levels one to three are low-order thinking skills or LOTS, and levels four to six are HOTS. Thus, in terms of the cognitive domain, HOTS involves the ability to analyze, evaluate, and create. Therefore, HOTS is interpreted as the ability that involves critical and creative thinking for problem-solving. Individuals with high-level thinking skills must be able to analyze, connect, decompose, and interpret problems to obtain solutions or new ideas. Setiawati (2019) states that the application of HOTS in learning evaluation is reflected through questions that must be solved by students. HOTS questions involve real problems, through which students' logic and reasoning are expected to solve the problem. Furthermore, Hanifah (2019) explains that HOTS questions are instruments intentionally designed to measure high-level thinking skills. Thus, HOTS questions are questions that contain cognitive domains C4 to C6, meaning that a person's high-level thinking skills can be measured using HOTS questions (Saraswati, et. al. 2018).

Based on observations and interviews with local Indonesian language teachers, the questions used are still not HOTS. According to Astutik in Hasnah et al. (2021), providing HOTS-type questions has roles such as preparing competent students to face the 21st century and increasing student learning motivation. Then, based on the research conducted by Resa Nurhalimatulsyadiah, it is stated that the PAS questions in SMK PUI Cikijing are still lacking in the application of HOTS criteria and still mostly consist of LOTS questions. Therefore, there is a need for development in the questions.

Research on HOTS has been widely conducted, such as Riswanda Himawan and Pujiati Suyata with the title of their research "Analysis of the Development Needs of HOTS Questions in Persuasive Speech Text Learning in MGMP Junior High School in Bantul District". In their research, they analyze the needs related to the development of HOTS-based evaluation questions in Indonesian language learning, specifically the procedural text material in junior high school under MGMP in Bantul District. The difference with this study is the developed evaluation questions and the object of research. In Riswanda Himawan and Pujiati

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Suyata's research, the developed evaluation questions are more specific, focusing on persuasive speech text material in grade IX junior high school, while in this study, the development of HOTS questions is on Indonesian language material in grade XII vocational high school (Himawan & Suyata, 2021).

Another research by Sitri Cayani with the title "Development of HOTS (Higher Order Thinking Skill) Questions on Number Material in SMP Negeri 1 Bengkulu City". Her research explains how the development of HOTS questions on number material in grade VIII in SMP Negeri 1 Bengkulu City that are valid and practical. The difference with this study is the subject and object of research. In Sitri Cayani's research, the development of HOTS questions is on the subject of mathematics in junior high school, while in this study, the development of HOTS questions is on the subject of Indonesian language in grade XII vocational high school (Cayani, 2021).

Another study by Resa Nurhalimatulsyadiah entitled "Application of HOTS Criteria in Evaluation Questions of Indonesian Language Learning Class X at SMA/SMK Level in Cikijing District". Her research has formulated the problem of the application of HOTS criteria in evaluation questions in Indonesian language learning for class X students. Resa Nurhalimatulsyadiah concludes that the application of HOTS criteria in PAS questions used by class X SMA/SMK level students in Cikijing District is still lacking in its application. This can be seen from the details with a percentage of 48% in terms of KKO, 31% in terms of critical thinking skills, 35% in terms of creative thinking skills, and 13% in terms of problem-solving skills. Furthermore, the overall analysis of HOTS criteria, namely the SMA/SMK level in Cikijing District, with a percentage of 44% (61 items) including HOTS questions and those that need improvement, and those that do not include HOTS questions with a percentage of 56% (79 items). Meanwhile, in this study, the aim is to develop HOTS questions for Indonesian language grade XII in SMK PUI Cikijing (Nurhalimatulsyadiah, 2022).

Drawing from the background provided, the study is guided by the following research inquiries: (1) Exploring the distinctive attributes of HOTS questions, (2) Investigating the structural framework employed in formulating HOTS questions, and (3) Analyzing the developmental processes involved in refining Periodic Assessment System (PAS) questions for the twelfth-grade Indonesian Language curriculum at SMK PUI Cikijing.

METHOD

The Research and Development (R&D) method is pivotal in this study, chosen for its efficacy in creating and evaluating a specific product, namely the enhancement of Indonesian language assessment questions for twelfth-grade students at SMK PUI Cikijing. Within the framework of R&D, the research primarily focuses on the design phase, as part of the 4D development model.

The 4D development model involves four key stages: Define, Design, Develop, and Disseminate. In this research, the focus is primarily on the Design stage, where the groundwork for the enhancement of assessment questions is laid out. Data collection for this study relies on documentation, specifically Indonesian language questions designed for grade XII students at SMK PUI Cikijing. These documents serve as the foundation for analysis and refinement, guiding the development of Higher Order Thinking Skills (HOTS) questions.

Through a comprehensive examination of the existing questions and a meticulous design process, the aim is to enrich the assessment landscape by incorporating HOTS criteria, thus fostering critical thinking, creativity, and problem-solving abilities among students. This methodological approach ensures a systematic and rigorous process in improving the quality and effectiveness of assessment practices in Indonesian language education.

RESULTS AND DISCUSSION

HOTS question profile analysis

The analysis of the Indonesian language Periodic Assessment System (PAS) questions for twelfth-grade students at SMK PUI Cikijing reveals significant insights into the nature of these questions and their alignment with Higher Order Thinking Skills (HOTS) criteria. The examination is conducted across four distinct criteria: Operational Verb Aspect (KKO), critical thinking skills, creative thinking skills, and problem-solving skills

Out of the total 30 questions assessed, a predominant portion falls within the Lower Order Thinking Skills (LOTS) category, particularly within the Operational Verb Aspect (KKO) criteria of remembering and understanding. This indicates that the majority of the questions focus on recalling factual information and comprehending basic

concepts, rather than engaging students in higher-level cognitive processes.

When scrutinized in terms of HOTS criteria, the analysis reveals that a considerable proportion of questions incorporate the Operational Verb Aspect (KKO), constituting 36% of the total questions. Similarly, critical thinking skills are evident in 36% of the questions, while creative thinking skills are represented in 23% of the questions. However, there is a notable deficiency in questions that promote problem-solving skills, comprising only 6% of the total questions.

Upon closer examination through the lens of Higher Order Thinking Skills (HOTS) criteria, it becomes apparent that a significant portion of the assessed questions at SMK PUI Cikijing incorporates certain elements conducive to cognitive engagement. Specifically, the analysis reveals notable proportions pertaining to various cognitive dimensions.

Firstly, the Operational Verb Aspect (KKO) criterion, which delineates the specific cognitive processes required to respond to a question, is present in a substantial 36% of the total questions. This indicates that a considerable number of questions prompt students to engage in cognitive operations such as identifying, analyzing, or evaluating information, thereby fostering a deeper level of cognitive engagement beyond mere recall or comprehension.

Similarly, critical thinking skills emerge prominently within the assessed questions, accounting for 36% of the total. This suggests that a significant proportion of questions require students to critically evaluate information, analyze arguments, identify assumptions, and draw logical conclusions. By engaging in such cognitive processes, students are challenged to think analytically and assess information from multiple perspectives, thereby honing their critical thinking abilities.

Moreover, creative thinking skills are evident in 23% of the questions, albeit to a slightly lesser extent compared to critical thinking skills. This indicates that a notable subset of questions encourages students to think innovatively, generate novel ideas, and approach problems from unconventional angles. By fostering creativity, these questions stimulate students' imagination and encourage them to explore alternative solutions, thereby nurturing their capacity for originality and ingenuity.

However, amidst these positive trends, there is a conspicuous dearth of questions that explicitly promote problem-solving skills, constituting only 6% of the total. This deficiency underscores a notable gap in the assessment framework, as problem-solving is a crucial skill for navigating real-world challenges and applying knowledge in practical contexts. Addressing this shortfall necessitates a concerted effort to design questions that present authentic problems, require strategic thinking, and prompt students to devise viable solutions.

In essence, while the analysis reveals commendable aspects in terms of incorporating HOTS criteria within the assessed questions, it also highlights areas for improvement, particularly in fostering problem-solving skills. By addressing these deficiencies and enhancing the cognitive rigor of assessment practices, educators can better prepare students to thrive in an increasingly complex and dynamic world.

Further examination indicates that only a small fraction of the PAS questions at SMK PUI Cikijing meet all four HOTS criteria, amounting to 6% or 2 questions. Additionally, a modest portion of questions meet 2-3 HOTS criteria, accounting for 30% or 9 questions. The majority of questions, encompassing ≤1 HOTS criteria, constitute 63% or 19 questions.

Upon delving deeper into the assessment framework at SMK PUI Cikijing, it becomes evident that the alignment with Higher Order Thinking Skills (HOTS) criteria varies significantly across the spectrum of questions. While certain questions exhibit a robust integration of multiple HOTS criteria, others fall short of meeting these cognitive benchmarks.

Specifically, a close examination reveals that only a marginal fraction of the Periodic Assessment System (PAS) questions at SMK PUI Cikijing fully meet all four HOTS criteria, amounting to a mere 6% or 2 questions. These questions demonstrate a commendable depth of cognitive engagement, encompassing aspects such as critical thinking, creative thinking, problem-solving, and complex analysis.

Furthermore, a modest portion of questions exhibit a relatively high degree of alignment with HOTS criteria, meeting 2-3 of the specified criteria. This segment comprises 30% or 9 questions, indicating a notable but somewhat limited integration of higher-order cognitive processes within the assessment framework. These questions likely prompt students to engage in a combination of critical analysis, creative synthesis, and evaluative reasoning, albeit to varying degrees.

In contrast, the majority of questions fall below the threshold of meeting multiple HOTS criteria,

with only ≤1 criterion being addressed. This encompasses a significant proportion of the assessment, constituting 63% or 19 questions. These questions predominantly focus on lower-level cognitive processes, such as remembering facts, understanding basic concepts, or applying straightforward procedures, thereby offering limited opportunities for students to demonstrate higher-order thinking skills.

Overall, the analysis underscores the need for a more nuanced approach to question design within the PAS framework. While certain questions exhibit commendable alignment with HOTS criteria, there is substantial room for improvement in enhancing the cognitive rigor and depth of assessment practices. By striving to incorporate a greater diversity of question types that foster critical thinking, creativity, and problem-solving, educators can better prepare students for success in an increasingly complex and dynamic academic landscape.

These findings underscore the necessity for enhancing the quality of PAS questions to align more closely with HOTS criteria. While the current questions predominantly focus on lower-level cognitive processes, there is a clear opportunity for development to incorporate higher-order thinking skills such as analysis, evaluation, and creativity. By addressing these deficiencies and promoting deeper levels of thinking, educators can better prepare students to tackle complex challenges and succeed in an increasingly dynamic and competitive academic landscape.

The findings from the analysis highlight a critical imperative: the pressing need to elevate the quality of Periodic Assessment System (PAS) questions to better align with Higher Order Thinking Skills (HOTS) criteria. Despite certain commendable aspects, such as the inclusion of some elements of critical and creative thinking, the current questions predominantly center on lower-level cognitive processes. However, this presents a valuable opportunity for growth and development within the assessment framework.

There exists a clear pathway for enhancing the cognitive rigor of PAS questions by incorporating higher-order thinking skills such as analysis, evaluation, and creativity. By broadening the scope of questions to encompass these dimensions, educators can foster deeper levels of thinking among students and equip them with essential skills for navigating the complexities of the academic landscape and beyond.

Integrating analysis into assessment questions encourages students to dissect information, identify patterns, and draw meaningful conclusions. Evaluation prompts them to critically assess information, discern biases, and weigh evidence, thereby honing their ability to make informed judgments. Furthermore, incorporating elements of creativity encourages students to think innovatively, generate novel solutions, and approach problems from fresh perspectives, fostering adaptability and resilience in the face of challenges.

Through intentional efforts to address these deficiencies and promote deeper levels of thinking, educators play a pivotal role in preparing students to thrive in an increasingly dynamic and competitive academic environment. By providing opportunities for students to engage in higher-order cognitive processes within the assessment framework, educators empower them to develop critical thinking skills, nurture their creativity, and cultivate the problem-solving abilities essential for success in the 21st century.

In essence, the journey towards enhancing the quality of PAS questions represents a transformative endeavor—one that not only enriches the assessment experience but also empowers students to become lifelong learners capable of confronting and surmounting the multifaceted challenges of the modern world. Through a concerted focus on fostering higher-order thinking skills, educators can catalyze profound shifts in educational practice, ultimately shaping a future generation equipped with the tools and capabilities to thrive in an ever-evolving landscape.

Design of Indonesian HOTS questions

In the process of designing Higher Order Thinking Skills (HOTS) questions, a meticulous approach is taken to ensure alignment with the desired cognitive outcomes. This begins with the selection of suitable material, in this case, Indonesian language Periodic Assessment System (PAS) questions tailored for grade XII students at SMK PUI Cikijing for the odd semester of the 2022/2023 academic year, comprising a total of 30 questions. These questions serve as the foundation upon which the development of HOTS questions is based.

The development of HOTS questions is guided by a comprehensive understanding of the criteria outlined by Anderson and Krathwohl (2001), which delineates the spectrum of cognitive processes ranging from lower-order to higher-order thinking skills. According to this framework, levels one to three correspond to low-order

thinking skills (LOTS), while levels four to six signify HOTS. Consequently, the essence of HOTS lies in the capacity to engage in analytical, evaluative, and creative thinking processes.

HOTS questions are designed to elicit responses that demonstrate critical and creative thinking in problem-solving contexts. Individuals endowed with advanced cognitive abilities are expected to demonstrate proficiency in analyzing, synthesizing, deconstructing, and interpreting complex problems to generate innovative solutions or novel ideas.

The application of HOTS within the evaluation process is reflected in the nature of the questions posed to students. HOTS questions are characterized by their emphasis on real-world problems, requiring students to apply logic and reasoning skills to navigate and resolve these challenges effectively. As highlighted by Hanifah (2019), HOTS questions serve as intentional instruments crafted specifically to assess high-level cognitive capabilities, encompassing cognitive domains ranging from C4 to C6.

In essence, HOTS questions represent a sophisticated approach to assessment, providing a robust measure of students' aptitude for analytical thinking, evaluative reasoning, and creative problem-solving. By integrating these questions into the evaluation framework, educators foster a learning environment that cultivates deep cognitive engagement and equips students with the skills necessary to thrive in an increasingly complex and dynamic world.

Development of Indonesian HOTS questions

In the process of developing Higher Order Thinking Skills (HOTS) questions, a thorough analysis of the existing question profiles serves as the cornerstone. This analysis entails a comprehensive review of the HOTS question profiles within the Indonesian language grade XII curriculum at SMK PUI Cikijing, focusing on key dimensions such as the Operational Verb Aspect (KKO), critical thinking skills, creative thinking skills, and problem-solving skills.

The analysis of HOTS question profiles begins by examining the Operational Verb Aspect (KKO) employed within the questions. This aspect delves into the verbs used to frame the questions and assesses whether they align with higher-order cognitive processes such as analysis, synthesis, and evaluation. Questions that prompt students to engage in these higher-order cognitive activities are identified as potential candidates for further development.

Furthermore, critical thinking skills are evaluated within the question profiles to ascertain the extent to which they encourage students to engage in reasoned inquiry, logical analysis, and evidence-based reasoning. Questions that stimulate critical thinking invite students to evaluate information, discern patterns, and draw informed conclusions, thereby fostering intellectual autonomy and analytical prowess.

Similarly, the assessment of creative thinking skills examines the extent to which questions prompt students to think innovatively, generate original ideas, and approach problems from novel perspectives. Questions that stimulate creative thinking encourage students to explore alternative solutions, experiment with different approaches, and unleash their imaginative potential.

Moreover, the analysis considers the incorporation of problem-solving skills within the question profiles. Questions that require students to apply problem-solving strategies, devise systematic approaches, and generate effective solutions are identified as indicative of higher-order cognitive engagement.

Overall, the development of HOTS questions is guided by the insights gleaned from the analysis of question profiles, with a focus on fostering higher-order cognitive processes such as critical thinking, creative thinking, and problem-solving. By incorporating these dimensions into the question design, educators aim to cultivate students' ability to think critically, creatively, and analytically, thereby equipping them with essential skills for success in academic and real-world contexts.

CONCLUSION

The application of HOTS criteria in the Periodic Assessment System (PAS) questions for Indonesian language Grade XII at SMK PUI Cikijing is still deficient. This deficiency is evident from the fact that many of the questions, out of a total of 30, primarily fall within the Lower Order Thinking Skills (LOTS) category, particularly in the aspects of remembering and understanding. Although there are questions that meet the HOTS criteria, they are minimal, comprising only 6% of the total questions. The majority of questions do not fulfill the criteria for HOTS, indicating a need for development.

Based on the analysis conducted during the define stage, it is clear that PAS questions at SMK PUI Cikijing lack the necessary criteria to qualify as HOTS questions. Consequently, a table design was proposed to transform LOTS questions into HOTS questions, aligning with HOTS criteria

encompassing the Operational Verb Aspect (KKO), critical thinking skills, creative thinking skills, and problem-solving skills.

The development phase involved creating Indonesian HOTS questions for Grade XII, aiming to elevate the cognitive demand of the questions from the lower to the higher order thinking level. This transformation was achieved by focusing on analytical, evaluative, and creative aspects, thereby addressing the identified shortcomings in the existing question set.

The research underscores the importance of aligning assessment practices with the development of higher-order thinking skills among students. By enhancing the quality of assessment questions to include HOTS criteria, educators can better prepare students for the challenges of the 21st century, fostering critical thinking, creativity, and problem-solving abilities essential for their future success.

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