

DEVELOPMENT OF HIGHER ORDER THINKING SKILLS (HOTS) QUESTIONS IN AKIDAH AKHLAK TO MEASURE CRITICAL THINKING SKILLS OF MADRASAH IBTIDAIYAH STUDENTS

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Abstract *This study addresses the lack of higher-order thinking Skills (HOTS)-based evaluation instruments in Akidah Akhlak learning that can measure the critical thinking abilities of Madrasah Ibtidaiyah (MI) students. The study aims to develop valid and reliable HOTS questions. The research employed the Tessmer development model, consisting of self-evaluation, expert validation, small group trials, and field testing. The subjects were fifth-grade students of MI Tarbiyah Islamiyah Mandah. Validation results from three experts showed an average validity score of 4.3, categorized as highly valid based on content, construct, and language aspects. Field testing revealed that most students fell into the “good” category for critical thinking skills, with an average score of 63.2%. This research produced ten sets of HOTS questions that meet validity and reliability criteria as evaluation instruments for Akidah Akhlak learning at the MI level. The findings contribute to developing HOTS-based learning instruments and recommend further research to create similar instruments for other subjects, expanding the population and integrating technology.*

Keywords: *Higher Order Thinking Skills (HOTS), Akidah Akhlak, Critical Thinking Skills, Question Development, Madrasah Ibtidaiyah.*

Introduction

Education in the 21st Century requires students to master higher-order thinking Skills (HOTS), encompassing analysis, evaluation, and creation skills. These competencies are essential in preparing students to face the challenges of the modern world (Beribe, 2023). In Akidah Akhlak learning at Madrasah Ibtidaiyah, HOTS is crucial in equipping students with an understanding of religious values and the ability to apply them in daily life (Musdalifah, 2019). However, numerous studies indicate that the evaluation of Akidah Akhlak learning in Madrasah Ibtidaiyah still emphasizes Lower Order Thinking Skills (LOTS), such as rote memorization and basic comprehension (Arinil, 2023). This focus results in students being less trained in critical thinking to address complex moral and religious issues (Muhdar, 2022).

Meanwhile, efforts to develop HOTS-based questions for the subject of *Akidah Akhlak* remain rare, especially those designed explicitly for Madrasah Ibtidaiyah students. Previous studies have predominantly focused on developing HOTS in

science and mathematics subjects (Sutarni, 2024). Existing research has also yet to specifically highlight the integration of Islamic values with HOTS indicators in religious education (Taufik & Rindanigsih, 2024).

MI Tarbiyah Islamiyah Mandah is an educational institution with significant potential to develop its students' critical thinking skills. However, the lack of HOTS-based evaluation instruments specifically designed to align with the characteristics of the *Akidah Akhlak* subject poses a challenge in assessing these skills. Therefore, it is essential to develop HOTS-based questions to help students practice and evaluate their critical thinking abilities.

The novelty of this research lies in developing HOTS-based questions that not only focus on HOTS indicators but also integrate Islamic values relevant to the context of *Akidah Akhlak* learning. Thus, this study is expected to significantly improve the critical thinking skills of Madrasah Ibtidaiyah students while enriching the literature on HOTS-based religious education.

This research aims to develop HOTS-based questions to measure the critical thinking skills of fifth-grade students at MI Tarbiyah Islamiyah Mandah. The study focuses on two main issues: (1) What is the procedure for developing HOTS-based questions to measure the critical thinking skills of fifth-grade students at MI Tarbiyah Islamiyah Mandah? and (2) To what extent are these HOTS-based questions effective in measuring students' critical thinking skills?

Higher-order thinking Skills (HOTS) are advanced cognitive skills applicable in education. HOTS enables students to practice and enhance their critical thinking abilities. According to Musrikah (2018), many countries have integrated HOTS as an essential component of classroom learning. This is evident in how students solve various problems, including mathematics questions, which reflect differences in their higher-order thinking capabilities. Given the unique nature of human beings, each student's thinking ability varies significantly.

Pratiwi (2019) emphasizes the crucial role of teachers in developing HOTS-based questions. Teachers must have a solid understanding of cognitive processes ranging from Lower Order Thinking Skills (LOTS) to HOTS. Widana (2017) also highlights that teachers play a key role in optimizing HOTS assessments, whether through daily tests, end-of-semester evaluations, or school examinations. These assessments aim to train students and determine their categories of higher-order thinking skills.

However, several studies reveal that the implementation of HOTS in schools still faces challenges. Schulz and FitzPatrick (2016) found that many teachers feel uncertain about the concept of HOTS and are not prepared to teach or assess it. Retnawati's research (2018) also indicates that teachers' knowledge of HOTS, their ability to enhance students' HOTS, and their implementation of HOTS-based assessments remain low. Similarly, Driana and Ernawati (2019), noted that elementary school teachers still lack a comprehensive understanding of HOTS despite attending training sessions.

Observations conducted at MI Tarbiyah Islamiyah Mandah reinforce these findings. Although teachers recognize the importance of HOTS and have attended

related workshops, its implementation remains suboptimal. Most of the questions used are still at the LOTS level (C1 to C3), while HOTS-level questions (C4 to C6) are limited (Yuliati & Lestari, 2018). The low use of HOTS-based questions impacts students' readiness to tackle complex problems in the 21st century (Arifin & Retnawati, 2017).

HOTS is defined as the ability to engage in complex thinking, which includes breaking down material, critically evaluating it, and creating solutions to solve problems (Budiarta, 2018). Thomas dan Thorne (2009) explain that HOTS involves connecting facts and concluding a situation. This process goes beyond mere recall or memorization, requiring students to analyze, evaluate, and create based on their identified relationships.

Annuuru, dkk. (2017) further explain that HOTS combines facts and ideas to analyze, evaluate, and create solutions or judgments based on the studied facts. This process is reflected in Benjamin S. Bloom's cognitive taxonomy (1956), later revised by Anderson and Krathwohl (2001). The taxonomy consists of six levels: C1 (remembering), C2 (understanding), C3 (applying), C4 (analyzing), C5 (evaluating), and C6 (creating). According to Tanujaya (2017), levels one to three (C1–C3) fall under LOTS, while levels four to six (C4–C6) represent HOTS. Therefore, HOTS encompasses analysis, evaluation, and creation skills, which are crucial for helping students solve complex problems and face challenges in the modern era.

Research Methods

According to Tessmer, the R&D method is combined with the instructional research model. In formative research, there are 5 steps: preliminary, design phase, formative evaluation (self-evaluation, expert reviews, one-to-one, small group), field test, and revision. In the initial step, the researcher begins to review the planning, focuses on the subject, analyzes the curriculum, and determines the content to be tested next. In the design phase step, compiling the initial product and relevant theories and self-evaluation, there are two steps: analysis and design. In the analysis stage, the researcher analyzes the questions developed. 1. The last stage is expert evaluation. This is an evaluation of questions conducted by expert teachers, also known as expert teacher validation. After the teacher provides suggestions for improvement, the questions are made into final products and tested on several students in small groups. The field test, the field, ends with the Revision stage.

In addition, this study aims to create questions based on high-level critical thinking skills (HOTS) to assess students' abilities. The tools used in this study are test instruments and validity Validation sheets, which have 5 answer options that will be converted into scores: "very appropriate," "appropriate," "quite appropriate," "less appropriate," and "inappropriate." Three validator teachers (PAI teachers) made the validation sheet.

The data analysis method used is quantitative analysis. The purpose of this analysis is to evaluate the validity and feasibility of the questions as a tool to determine

thinking skills. The results of the question validation sheet provided by the expert teacher are used as a source of quantitative data. The characteristics of this study's achievements include validity characteristics. The validity of the questions is based on the validation of normal values given by experts or validator teachers.

Analysis of the validation sheet study on questions shows a product's feasibility analysis. An evaluation tool must have high validity. Data analysis is carried out through the following stages for the validation sheet of questions: (1) The validators collect all data for each component and sub-component of the assessment details, and (2) The validators then analyze the questions they validate. The assessment results of each question are then averaged, producing an average score. Several validators then recalculate this result to obtain an average validity, determining whether the question is valid. On this assessment scale, there is an analogy with a score scale ranging from 0-4. Therefore, the validity test determines the instrument's feasibility level. According to Sudjana (Riyani, 2017), the validity component is analyzed using the formula:

$$Va = \frac{\sum_{i=1}^n \bar{V}_l}{n}$$

Information:

VR = Validity Average

$\sum_{i=1}^n \bar{V}_l$ = Average score of each validator

n = Many validators

Tabel 1. *Validation Criteria*

Average expert assessment (validator)	Criteria
$4 \leq VR < 5$	Very Valid
$4 \leq VR < 4$	Valid
$2 \leq VR < 3$	Less Valid
$1 \leq VR < 2$	Invalid

Discussion

This development resulted in ten HOTS-based question packages to measure students' critical thinking skills. Grade V students of MI Tarbiyah Islamiyah Mandah studied material on understanding information from print and electronic media. In the process of making this product, a series of steps have been taken, including,

Preliminary Stage Preparation Steps: The initial stage in this development is the preparation step. At this stage, the applied curriculum is analyzed based on the

Akidah Akhlak learning syllabus for grade V according to the 2013 Curriculum Revised in 2019.

This step aims to determine the object of research at the school level, namely MI (Madrasah Ibtidaiyah), with a test completion duration of 70 minutes. Content determination is based on relevant essential competencies (KD): honest, trustworthy, and responsible behavior material. These basic competencies include KD 3.2 (C5 - Evaluation): Assessing the importance of honest, reliable, and accountable behavior towards social relations in schools, families, and communities. KD 3.3 (C4 - Analysis): Analyzing the benefits of honest, trustworthy, and responsible behavior towards social relations in families, schools, and communities. KD 4.4 (C6 - Creation): Designing a program to create words and sentences of slogans for honest, trustworthy, and responsible behavior as school citizens and before Allah SWT. And adjust the material according to the needs of students.

Desain phase Stage, The researcher analyzed HOTS-based questions in books and online media as an initial step. Next, the researcher compiled 10 questions, starting with designing the instrument by compiling a grid, determining the score based on previous analysis, and designing the question card. In the process, the researcher conducted a self-evaluation in two stages. The first stage was analyzing HOTS-based questions in online media, observing how the questions were compiled and the needs needed to compile the questions. The results of this analysis determined the number of questions set as many as 10 items, followed by compiling a grid based on the difficulty level of the questions and the appropriate scoring system. After that, the design of the question card that had been made was discussed with the supervising lecturer, resulting in prototype 1.

At this stage, expert validation is carried out on prototype 1 to ensure that the questions prepared have met the validity criteria and are suitable for use in Higher Order Thinking Skills (HOTS)-based testing. Validation is carried out by experts with educational backgrounds and expertise in developing HOTS questions by assessing aspects of relevance, clarity, difficulty level, validity, and question construction. The experts provide input and recommendations for improving the questions based on the validation results. The input is then used to revise the prototype so that the questions align with the expected learning objectives and measurement standards. This step ensures that the questions in prototype 1 are ready to be tested empirically or used in actual testing.

Formative Evaluation Stage, Expert Review, Expert validation is carried out through several systematic steps. First, select experts willing to validate the product; second, compile review criteria that serve as assessment guidelines; and third, submit

the product to be validated by the experts. Fourth, input from the validation process must be collected. Fifth, analyze the feedback provided by the validation team. Sixth, making improvements or refinements to the product based on input analysis. Seventh, implementing revisions to the expectations and recommendations received.

Expert validation was conducted at the review evaluation stage. Based on the validator's recommendations, prototype 1 was revised by an expert teacher. The validation results showed that the questions created were classified as "very valid." In addition, qualitative data in the form of recommendations for improvement were used to consider revising the questions. This stage produces output in the form of a test of the feasibility of questions that have met the standards for use in HOTS-based testing.

One to One Evaluation, One-to-one is conducted by holding a direct meeting between the researcher and the respondent. At this stage, the researcher focuses on identifying the weaknesses and strengths of the questions that have been prepared. This direct interaction allows the researcher to obtain more in-depth feedback regarding the respondents' understanding of the questions and technical aspects, such as clarity of instructions and suitability of difficulty level. The results of this stage become the basis for revising and refining the questions to be more effective in measuring the expected skills.

In the Small Group stage, the testing is conducted on a small group of five students. This phase aims to evaluate the effectiveness and reliability of the questions that experts have validated. Through this trial, the researcher observes how the students comprehend, interpret, and answer each question provided. Additionally, the student's responses at this stage serve as an initial indicator of how well the instrument can measure the intended competencies. Feedback from the students, including any difficulties encountered or suggestions for improvement, is utilized as a basis for further revisions. This refinement is crucial to ensure the questions are well-prepared and ready for implementation in a larger-scale trial phase.

The Field Test is a phase of field trials conducted to assess the feasibility of the questions after undergoing the validation process. In this study, validity testing was performed by three experts/validators, consisting of teachers: Validator 1 (V₁), Validator 2 (V₂), and Validator 3 (V₃). Each validator evaluated the validity of the questions based on three main aspects: content, construct, and language.

The validation results indicate that the questions are categorized as highly valid, with an average validity score ranging from 3 to 4. This assessment confirms that the questions meet the characteristics and indicators of HOTS-based questions and can effectively measure students' critical thinking skills. In this stage, revisions are carried out based on feedback from validators and the results of previous trials. Inputs from validators, such as improvements in content, construct, or language, as well as findings from the field tests, are used to refine the questions. The revisions focus on enhancing question clarity, alignment with HOTS indicators, and eliminating potential biases or misunderstandings that students may encounter. The outcome of

this stage is a set of validated and refined questions ready to be used for assessing students' competencies on a larger scale.

The resulting questions consist of a collection of structured and limited essay questions. These questions include several integrated inquiries within a single problem, while others require detailed and concise answers. Established standards design these questions. The process begins by determining the objective of the questions, which is to assess students' critical thinking skills. Subsequently, students are evaluated based on their critical thinking abilities, with the test topics carefully chosen, both in printed and electronic formats. The distribution of question items is then determined based on Competency Standards (KD), subject matter, and assessment methods. A blueprint is created, followed by expert validation of the question items, referred to as specialist lecturer validation in this context. Finally, these validated question items are prepared as a comprehensive exam instrument.

Validation of HOTS-Based Questions, These questions have been based on the characteristics of HOTS questions. Namely, they obtain real-life context, are descriptive, and can be arranged with descriptions. In addition, to solve them, students must have critical thinking skills at levels C4 and C5, which require critical thinking skills. In this question, it is described through the steps in solving problems that meet each critical thinking criterion. These steps include writing what is known and asked, writing concepts or formulas (assessments), compiling a way to solve or calculate the right one, and concluding the critical thinking scoring guide according to the question scoring guide. Initially, by making question products, researchers made test designs and then analyzed the curriculum and content they wanted to include to meet the test objectives, namely grade V MI students. The following is an example of the revision process of several parts of the questions from before being consulted with the supervisor to becoming the final product:

Table 2. Validation Criteria

Question Items	V ₁	V ₂	V ₃	Li	Va
1	4	4	4	4.0	4.3
2	4	4	5	4.6	
3	4	4	4	4.0	
4	4	4	4	4.0	

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5	4	4	5	4.6
6	4	4	5	4.6
7	4	4	4	4.0
8	4	4	5	4.6
9	4	4	5	4.6
10	4	4	4	4.0

The table above shows that each question has a fairly high *Ii* value and a fairly high *Va* score. Therefore, with a *Va* score of 4.3, which exceeds the lowest valid score, the prototype can be considered valid.

Analysis of Critical Thinking Skills Results Data, The student's critical thinking ability test results are based on the final score of the validated HOTS-based questions. The results of this test are then reviewed as qualitative data to understand the level of students' critical thinking skills. To do this, the percentage created by Arikunto—adapted by Junaidi (2017)—is used to analyze qualitative data: ($P = F/N \times 100\%$) With Information: *P* = Percentage, *f* = Frequency of student answers, *n* = Total score (maximum score) and 100% = Fixed number. Students' critical thinking ability is seen in the answers to the questions about their critical thinking abilities. Students' critical thinking ability is seen from several things, namely;

Table 3. Critical Thinking Ability Criteria

Interval	Kriteria
$80\% < P \leq 100\%$	Sangat Tinggi
$60\% < P \leq 80\%$	Tinggi
$40\% < P \leq 60\%$	Cukup
$20\% < P \leq 40\%$	Rendah

Evidence shows that students' critical thinking skills are mainly in the good category, with values exceeding the standard average. However, the interpretation indicator of students' abilities reached 56.4 percent, the analysis indicator reached 64.8 percent, and the inference indicator reached 66.2 percent, so the overall indicators are in the high category, with students' average critical thinking ability at 63.2 percent. The following table shows each subject's critical thinking ability percentage according to their scores.

Table 4. Results of Students' Critical Thinking Ability Test

No	F	%	Interval	Criteria
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1	3	15.00	80 - 100	Very Good
2	11	55.00	60 - 80	Good
3	5	25.00	40 - 60	Quite Good
4	1	5.00	20 - 40	Low
5	0	0.00	0 – 20	Very Low
Jlh	20	100		

Of the 20 test subjects, 3 students (15.0%) were included in the category of very good critical thinking skills; 11 students (55.5%) were included in the category of good critical thinking skills; 5 students (25.0%) were included in the category of reasonably good essential thinking skills; one student was included in the category of very poor critical thinking skills; and there were no impoverished students.

The development of the Tessmer model involves several stages, including self-evaluation, prototyping stage (expert review, one-to-one, small group), and field trial and revision stages. Finally, the product has been created. The product functions as a test tool intended to measure students' critical thinking skills. The first thing to note is to determine the quality criteria of the test instrument to determine the extent of the success of the product created. Before the development process begins. An instrument quality criterion has been established. Judging from the validation of HOTS questions by the validity criteria.

Test questions Table 4 above shows the validation results of three Islamic Religious Education teachers, which show that HOTS is considered valid if the score is at least 4 from the validity criteria. So, to measure students' critical thinking skills, HOTS-based questions that meet valid criteria, with an average of 4.3, are created. Students have good High-level thinking skills on average because Most are good because their scores exceed the standard average.

Conclusion

The development of ten HOTS (Higher Order Thinking Skills)-based question packages for grade V students of MI Tarbiyah Islamiyah Mandah has been successfully designed by the research objectives, namely to measure students' critical thinking skills in the material of understanding information on print and electronic media. The questions developed meet the validity criteria based on content, construct, and language aspects, with an average validity score of 4.3. This finding indicates that these questions can be relied on as evaluation instruments that support HOTS-based

learning. Students' critical thinking skills measured using these questions show that most students are in the "good" category, with an average critical ability score of 63.2%. This proves that HOTS-based questions effectively achieve learning objectives and improve students' critical thinking skills.

Suggestion

This study can be a reference for the development of HOTS-based question instruments at other levels of education, both at lower and higher levels. Further researchers are advised to expand the scope of the trial by involving a more significant population so that the validity and reliability of the questions can be tested more comprehensively. In addition, integrating technology in the delivery of questions, such as using a digital platform, is also worth studying to increase the accessibility and effectiveness of learning evaluation. Further research can be focused on developing HOTS-based questions with other themes or materials relevant to students' needs in facing the challenges of 21st-century learning.

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