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Integrasi Budaya Islam Indonesia dalam Pengembangan Soal HOTS untuk Mengoptimalkan Kemampuan Berpikir Kritis Siswa

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Abstrak

Kemampuan berpikir kritis sangat penting. Namun, banyak siswa di Indonesia memiliki kemampuan berpikir kritis yang rendah. Penelitian ini mengembangkan soal HOTS dengan konteks budaya Islam Indonesia untuk meningkatkan keterampilan berpikir kritis siswa sekolah dasar. Metode yang digunakan adalah metode penelitian pengembangan yang terdiri dari analisis, desain, evaluasi dan revisi. Tahapan pengembangan soal ini melalui tahapan *preliminary* dan *prototyping* dengan alur *formative evaluation*. Sebanyak 50 siswa kelas 6 dari SD Negeri 1 Dilem dan SD negeri 1 Mangunrejo Kabupaten Malang menjadi subjek dari penelitian ini, serta 3 pakar yang terlibat dalam tahap prototyping. Data dikumpulkan menggunakan *walk through*, dokumentasi, angket, tes, dan wawancara. Penelitian ini menghasilkan soal HOTS dengan konteks kebudayaan islam Indonesia sebanyak 5 butir dengan kategori valid, praktis, dan mempunyai efek potensial. Berdasarkan hasil analisis, prototipe 3 memiliki potensi untuk mengukur keterampilan berpikir kritis siswa sekolah dasar, yang ditunjukkan melalui jawaban siswa. Keterampilan berpikir kritis siswa dinilai berdasarkan empat indikator: 1) interpretasi, yaitu 90% siswa menunjukkan pemahaman dengan mengidentifikasi informasi yang diberikan dan yang diminta secara akurat; 2) analisis, dengan 70% siswa berhasil membangun hubungan antara pernyataan, pertanyaan, dan konsep melalui pemodelan matematika dan penjelasan yang tepat; 3) evaluasi, di mana 50% siswa menerapkan prosedur yang sesuai untuk menyelesaikan dan menghitung permasalahan dengan benar; serta 4) kesimpulan, yaitu 45% siswa mampu merumuskan kesimpulan dengan tepat berdasarkan langkah-langkah penyelesaian mereka. Indikasi lain dari efektivitas juga terlihat dari keseriusan dan ketertarikan siswa saat menyelesaikan soal. Rekomendasi untuk penelitian selanjutnya yaitu dapat dikembangkan lagi soal dengan konteks yang lebih beragam dengan konteks kebudayaan Indonesia.

Kata Kunci: budaya islam Indonesia, keterampilan berpikir kritis, soal HOTS

Utilizing Indonesian Islamic Culture in HOTS Task Design to Enhance Students' Critical Thinking

Abstract

Critical thinking skills are very important. However, many students in Indonesia have low critical thinking skills. This study developed HOTS questions with the context of Indonesian Islamic culture to improve the critical thinking skills of elementary school students. The method used is the development research method, which consists of analysis, design, evaluation, and revision. The stages of developing these questions go through preliminary and prototyping stages with a formative evaluation flow. A total of 50 6th-grade students from SD Negeri 1 Dilem and SD Negeri 1 Mangunrejo Malang Regency became the subjects of this study, as well as three experts involved in the prototyping stage. Data were collected using walk-through, documentation, questionnaires, tests, and interviews. This study produced 5 HOTS questions in the context of Indonesian Islamic culture, with valid, practical, and potential effect categories. Based on the results of the analysis, prototype 3 has the potential to measure the critical thinking skills of elementary school students, as shown through student answers. Students' critical thinking skills are assessed based on four indicators: 1) interpretation, namely 90% of students show

understanding by identifying the information given and requested accurately; 2) analysis, with 70% of students successfully establishing relationships between statements, questions, and concepts through mathematical modeling and appropriate explanations; 3) evaluation, where 50% of students applied proper procedures to solve and calculate problems correctly; and 4) conclusion, where 45% of students were able to formulate conclusions correctly based on their solution steps. Another indication of effectiveness is also seen in the seriousness and interest of students when solving problems. Recommendations for further research include developing problems in more diverse contexts, with the context of Indonesian culture.

***Keywords**: critical thinking skill; HOTS; Indonesian Islamic culture*

INTRODUCTION

Incorporating Indonesian culture into teaching and learning can significantly enhance the educational experience for students, making it more meaningful and effective in several ways. The integration of cultural elements into the curriculum fosters a deeper connection between students and their heritage, promotes engagement, and supports holistic development (Oktiningrum, Zulkardi, & Hartono, 2016). Moreover, one of the primary benefits of integrating culture into education is students' increased engagement and motivation. When lessons are connected to students' cultural background, they find the content more relatable and interesting (Ekowati, Kusumaningtyas, & Sulistyani, 2017).

Indonesia is rich in culture, particularly Islamic culture. This is because Muslims are the vast majority of the Indonesian population. So, integrating Islamic cultural components into the curriculum can develop a stronger connection between students and their religious heritage (Kurniawati, Miftah, Kadir, & Muin, 2021). Furthermore, students feel more motivated to learn when they see the importance of their religious heritage reflected in their academics (Setianingrum, Hadiati, & Nasution, 2024). This reinforcement of their ethnic backgrounds and religious identities contributes to a positive educational atmosphere in which students feel valued and respected (Murdy & Ekawati, 2022). In addition, Wardhani & Oktiningrum (2022) by making culture the context in teaching learning or the context of the task, it will be easier for students to understand the learning mathematics. Thus, this study contributes to culturally responsive mathematics education by systematically designing and assessing HOTS tasks within the framework of Indonesian Islamic culture. The results emphasize that integrating Islamic cultural values into mathematics enhances students' comprehension, engagement, and appreciation of the subject matter and their cultural heritage.

On the other hand, integrating Indonesian Islamic Culture into education encourages critical thinking and global awareness in students, especially primary students (Richardo, Martyanti, & Suhartini, 2019). Students are encouraged to analyze information, consider multiple perspectives, and formulate contextually appropriate solutions through contextualized activities. In the context of Islamic education, the incorporation of religious values into mathematics not only presents unique opportunities and challenges but also serves as an effective strategy for increasing student engagement and deepening their understanding of mathematical concepts (Mastuti, Sehuwaky, & Nuru, 2024). This process fosters higher-order cognitive abilities like analysis, synthesis, and assessment. Students are pushed to use their knowledge critically and creatively to solve complicated situations rather than just memorizing facts (Andriani & Izzati, 2020). Many contextual assignments encourage students to collaborate, share ideas, and discuss various ways. This collaborative process improves communication skills, fosters teamwork, and exposes students to a variety of opinions, thereby strengthening their critical thinking ability (B. Anwar, Munzil, & Hidayat, 2017).

As the world becomes increasingly complex, the ability to think critically, analyse information, and solve problems effectively has become a fundamental requirement for success (Zakaria, 2021). Critical thinking skills are essential for academic achievement and serve as a foundation for lifelong learning and personal growth (Taufiqurrahman, 2023). Critical thinking skills training is crucial because it can cultivate students' attitudes and perceptions to acquire and assimilate abilities, improve their knowledge, actualise the significance of knowledge, and cultivate beneficial thinking behaviours (S. Anwar & Setyaningrum, 2021). Critical thinking is an activity that involves thinking about ideas or

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concepts related to a given concept or problem (Susanto, 2013). Cavus & Uzunboylu (2009) stated that critical thinking is solving problems based on previous experiences or knowledge and evaluating them to achieve behavioural change. In line with this, Wijaya (2010) defines critical thinking skills as analyzing ideas, identifying, examining, and evaluating. Meanwhile, Santrock (2011) explains that critical thinking is reflective and productive and involves the evaluation of evidence.

Although critical thinking skills are essential, many Indonesian students still lack them. Various studies and reports highlight a decline in students' critical thinking skills, which presents serious problems for both society at large and the students' future success (Wulan, Rahayu, Izza, Milla, & Araiku, 2024). Both international assessments and national studies consistently show that the critical thinking skills of primary school students in Indonesia are still at a low level. Results from the PISA assessments reveal that Indonesian students continue to struggle with tasks requiring higher-order thinking skills, particularly in reading, mathematics, and science (Kurniawati et al., 2021), while national studies, such as those by Wijayanti (2020) and Lestari & Annizar, 2020) elementary students demonstrated low proficiency in critical thinking indicators, with performance scores often below 40%. Furthermore, the educational system is one of the leading causes of the reduction in critical thinking skills of students, especially primary students (Andriyani & Saputra, 2020). Wardhani & Oktiningrum (2022) express that traditional teaching methods often emphasize rote memorization and passive learning over active engagement and critical analysis. Standardized tests sometimes push students to memorize facts and statistics, giving factual recall precedence over comprehension and application. Students are not encouraged to critically question, examine, or assess facts with this teaching approach (Indriastuti, Ratnaningsih, & Siregar, 2021). In addition, the curriculum and test questions may not explicitly address critical thinking skills or provide sufficient opportunities for students to practice and apply them.

Thus, this study will develop an HOTS task using Indonesian Islamic Culture as the context. This task is designed to improve the critical thinking skills of primary students. HOTS tasks are particularly effective, as they challenge students to engage in higher-level cognitive processes such as application, analysis, synthesis, and evaluation, all of which are essential in promoting and refining critical thinking (Lian, 2023). Moreover, the HOTS task is essential for applying, linking, and altering current knowledge to effectively solve new problems, as it requires the application and manipulation of previously learned information to respond to new situations, making higher-order thinking capacity (HOTS) (Widana, 2018). It is therefore closely linked to critical thinking, a valuable skill that students can develop and enhance through instruction.

The celebration of the Prophet Muhammad's birthday (Maulid) is part of the Islamic culture selected for this study. Maulid is a joyous occasion for all Muslims worldwide, especially those in Indonesia, to commemorate the birth of the Prophet Muhammad. There are several different kinds of Maulid festivities in Indonesia. Such as, (1) Solo's Sekaten Fair and Carnival: A sizable market fair with exhibitors offering a variety of local cuisines, toys, handicrafts, and souvenirs is also a feature of Sekaten; (2) The Endog Endogan Festival from Banyuwangi: a hundreds of eggs are arranged on a bamboo stalk festooned with paper flowers during this celebration, and called endhog flowers; (3) Tolangga which is a container or place to arrange various types of cakes and other foods in large quantities which are then taken to the mosque, and usually Tolangga is filled with Kolombengi cake.

These diverse Maulid traditions reflect the rich cultural heritage of Indonesia and provide meaningful contexts for learning. By incorporating Maulid celebrations into HOTS task development, students can engage with mathematical concepts through real-life cultural events, making learning more relevant and relatable. For instance, students can explore geometry through the structure of Tolangga, analyze patterns in the arrangement of Endog Endogan decorations, or apply financial literacy concepts in the economic activities of the Sekaten Fair. Integrating these cultural elements enhances students' critical thinking skills and fosters a deeper appreciation of their heritage, creating a holistic and engaging learning experience. Additionally, this approach bridges the gap between cultural relevance and academic rigour and empowers students to see the practical applications of mathematics in their daily lives and cultural celebrations. As a result, it ensures that students are developing critical thinking skills and building a deeper connection to their cultural heritage through education.

The research questions are designed to promote students' critical thinking abilities. Islamic culture can be used as a context to increase students' motivation and make it easier for students to solve

mathematics problems. This research aims to develop and evaluate HOTS (Higher Order Thinking Skills) tasks in Indonesian Islamic culture to enhance primary students' critical thinking skills. This study aims to integrate culturally relevant elements into mathematics education, fostering a more profound understanding, engagement, and appreciation of the subject and students' cultural identities. Through a design research approach, the study seeks to ensure the effectiveness and practicality of the developed tasks, ultimately improving critical thinking in primary education. The innovation of this research lies in its unique integration of Indonesian Islamic culture into the design of HOTS tasks for primary school mathematics, using cultural practices such as Maulid celebrations and local decorations to make learning more relevant and engaging. This distinctive approach focuses on primary school students, fostering critical thinking and a deeper connection to their cultural heritage, an area rarely explored in previous studies.

METHODS

This study is designed as a type of development study. The formative evaluation contained in this research consisted of a preliminary stage and a prototyping phase, which included self-evaluation, expert reviews, one-to-one, small group, and a field test (Zulkardi, 2002). This research aims to create Indonesian Islamic-based HOTS questions that validly and effectively assess students' critical thinking. Valid questions in this context refer to instruments that are both valid and reliable, meaning they measure what they are intended to measure with consistency and without researcher bias (Mohajan, 2017). Meanwhile, effective questions are those that can appropriately challenge students' higher-order thinking skills, distinguish varying levels of critical thinking ability, and are practical and engaging for use in educational settings (Oktiningrum et al., 2016).

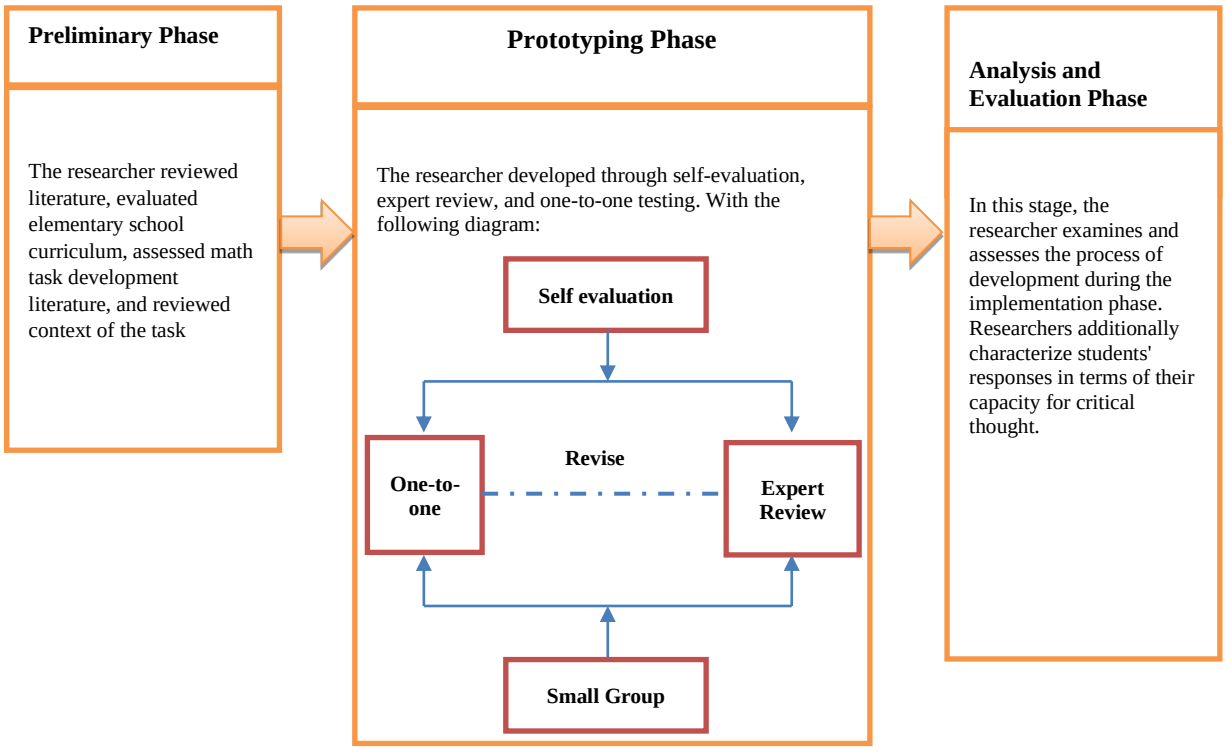

Figure 1. The Flow of the research

In Figure 1, the Preliminary phase comprises three phases: preparation, analysis, and design. During the preparation phase, preliminary observations will be conducted to select schools, determine research subjects, analyze the curriculum, and review the HOTS task, especially with cultural context. Following these observations, the next step will be selecting appropriate subjects for the study. This will involve

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choosing primary school students, specifically from grades 5 to 6, who are engaged in subjects that integrate Islamic teachings. The selection will ensure students have the foundational knowledge to engage with higher-order thinking tasks. The research will also include teachers responsible for these subjects to ensure alignment between the HOTS tasks and the curriculum. The selection of research subjects is based on specific criteria, particularly students who meet the minimum competency standards in mathematics as determined by the school. In the analysis phase, an assessment of students, curriculum, and learning materials will be carried out in alignment with the curriculum of SD Negeri 1 Dilem Kabupaten Malang. The curriculum in these schools follows Kurikulum Merdeka, which emphasizes flexible, student-centred learning. It supports problem-based learning and allows for contextually integrating Islamic teachings, focusing on developing critical thinking, problem-solving, and collaboration skills. Lastly, in the problem design phase, the focus will be on creating problems incorporating Islamic cultural context, particularly within the subject areas of numbers, arithmetic, and geometry.

The HOTS task with an Islamic cultural context aims to support students' critical thinking. The indicators of critical thinking abilities are as follows: (1) interpretation, which verifies understanding of the problem by precisely recording what is known and what is asked in the question; (2) analysis, which verifies the activity of determining connections between statements, questions, and concepts provided in the question by precisely constructing a mathematical model and offering a precise explanation; (3) Using suitable procedures, students finish and accurately calculate the problem during the evaluation stage; (4) during the inference stage, students accurately draw conclusions based on the order in which they solved the problem (Karim & Normaya, 2015). The context of the task is part of the Islamic culture that was selected for this study. Maulid is a joyous occasion for all Muslims worldwide, especially those in Indonesia, to commemorate the birth of the Prophet Muhammad. There are several different kinds of Maulid festivities in Indonesia. Such as, (1) Solo's Sekaten Fair and Carnival: A sizable market fair with exhibitors offering a variety of local cuisines, toys, handicrafts, and souvenirs is also a feature of Sekaten; (2) The Endog Endogan Festival from Banyuwangi: a hundreds of eggs are arranged on a bamboo stalk festooned with paper flowers during this celebration, and called endhog flowers; (3) Tolangga which is a container or place to arrange various types of cakes and other foods in large quantities which are then taken to the mosque, and usually Tolangga is filled with Kolombengi cake; and (4) Calender Masehi dan Hijriah. Moreover, the researcher will develop instrument validation sheets, tests, interview guidelines, and questionnaires at this stage. Meanwhile, the researcher will review and assess the created task during the prototyping stage (formative evaluation) and the self-evaluation stage. The outcome of this review and evaluation is the prototype of the task. In the Expert Review stage, validators will validate the prototype compiled and evaluated by the researcher.

At the one-to-one stage, the prototype of the worksheet, which has been developed and evaluated by the researcher, will be tested individually to assess the clarity of the questions, ease of use, and student engagement. Additionally, a questionnaire will be used during the prototyping stage (formative evaluation) to gather feedback. In the self-evaluation stage, the researcher will independently review and refine the worksheet, resulting in the initial prototype. During the Expert Review stage, the validator will assess and validate the prototype compiled and evaluated by the researcher. These results gave significant suggestions and revised the task to reevaluate those in a small group. The small group phase involved 10 students with various academic abilities to solve the task in 75 minutes.

This research's data collection and analysis methods include walkthroughs, interviews, tests, and questionnaires. A walkthrough was conducted to gather feedback and suggestions from expert reviews to assess the validity of the task in terms of construct, content, and language. The expert review in this study involved two Mathematics Education lecturers from the State University of Malang and a mathematics teacher from SD Negeri 2 Glanggang Kabupaten Malang. This interview was conducted during the one-to-one and small-group stages to gather students' comments and suggestions regarding the practicality of the task. The feedback collected is then used to refine and improve the task. A closed-ended questionnaire assesses student responses to the developed task and evaluates its practicality. The questionnaire is used at both the one-to-one and small-group stages. The validity of the task is analyzed using the following formula.

$$\text{Percentage level of validity} = \frac{\text{The number of score obtained}}{\text{maximum scores}} \times 100$$

The instrument's validity was assessed using a scoring scale of 1 to 4, based on the percentage interval of the obtained scores and predetermined interpretation criteria.

Table 1. Percentage Validity Criteria

Criteria	Category
85% - 100%	Very Valid
75% - 85%	Valid
60% - 75%	Quite Valid
50% - 50%	Less Valid
< 50%	Very Invalid

Source : (Utami, Sudirman, & Sukoriyanto, 2021)

The analysis of test data using the formula :

$$T = \frac{\text{The number of score obtained}}{\text{scores}} \times 100$$

The students' final grade classification is based on Table 2.

Table 2. Value classification

Criteria	Category
81 – 100	Very Good
61 – 80	Well
41 – 60	Enough
21 – 40	Not Enough
0 – 20	Very Less

Source : (Wardhani & Oktiningrum, 2022)

The test was conducted during the field test stage to gather data on students' ability to understand concepts, apply critical thinking skills, and solve problems using the developed task. Initially, data were collected on how students approached solving the task by analyzing the variations in their answers. This data was then used to evaluate students' performance and critical thinking skills during the field test. The field test involved 50 sixth-grade students from SD Negeri 1 Dilem Kepanjen and SD Negeri 1 Mangunrejo, Kabupaten Malang. All materials and methods used in this study must be clearly stated, with subtitles included when necessary.

RESULTS

The outcome of this research is a HOTS (Higher Order Thinking Skills) task, using Indonesian Islamic culture as the context, aimed at primary school students. The development of this task involves two stages: the Preliminary phase and the Prototyping phase.

Preliminary Phase

During the preparation phase, researchers conducted a comprehensive literature review and collected relevant information on the curriculum implemented in primary schools, with a particular emphasis on the Merdeka Curriculum. They examined various learning materials and pedagogical approaches to ensure alignment with educational standards. Additionally, they analyzed the structure and scope of mathematical concepts relevant to the study, focusing on how they are integrated into real-world contexts. To create a meaningful learning experience, researchers carefully reviewed the cultural context for the questions, selecting representations of Indonesian Islamic culture that resonate with students' backgrounds. This process involved identifying culturally significant traditions, artefacts, and practices that could be embedded into mathematical problems. The complexity of the questions was

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structured according to Bloom's Taxonomy, ensuring a balance between lower-order and higher-order thinking skills.

The researcher implemented a learning approach that utilized a HOTS (Higher Order Thinking Skills) task incorporating Indonesian Islamic culture as the central context. This approach was designed to enhance students' critical thinking skills by engaging them in problem-solving and analytical reasoning. The mathematical content covered in the task included fractions, ratios, and social arithmetic, with problem scenarios inspired by cultural elements such as Jenang Alot from the Sekaten Festival, Endog-Endogan from Banyuwangi, Tolangga from Gorontalo, and Calendar Hijriah. At the self-evaluation stage, the researcher conducted a detailed review of the initial prototype, assessing its clarity, feasibility, and effectiveness. Necessary revisions were made to refine the content and structure, resulting in the development of Prototype 1. This iterative process ensured the task was pedagogically sound, engaging, and culturally relevant for students.

Prototyping Phase

The self-evaluation step in the prototype process involves thoroughly reviewing the completed HOTS Task to assess its phrasing, substance, organization, and effectiveness in promoting critical thinking skills. This step ensures that the task is coherent, well-structured, and aligned with the intended learning objectives, particularly in enhancing students' ability to analyze, evaluate, and create solutions. The researcher carefully examined the clarity of instructions, the complexity of the problems, and the appropriateness of the cultural and mathematical context used. Any issues identified during this review were refined to improve the overall quality of the prototype before moving forward with expert validation and one-on-one testing. The refined prototype was then evaluated by an expert, specifically a lecturer in mathematics education, to determine whether the language, structure, context, and content were suitable for fostering HOTS and critical thinking skills. The expert review focused on ensuring that the task encouraged students to think deeply, make logical connections, and apply problem-solving strategies rather than rely on memorization. The feedback obtained from this assessment was used to make necessary adjustments and improvements, particularly in developing questions that challenge students to justify their reasoning and explore multiple solutions.

The one-on-one testing phase was conducted with six students after the expert review. This stage aimed to evaluate the clarity of the language, the usability of the task, and students' ability to apply critical thinking skills in solving the problems. The students' responses, challenges, and feedback were analyzed to identify potential barriers to understanding and enhance the task's effectiveness in fostering higher-order thinking. In addition to expert review and one-on-one testing, a questionnaire was distributed to collect qualitative and quantitative data on students' perceptions of the task. This feedback provided valuable insights into the task's practicality, cognitive demand, and effectiveness in developing critical thinking skills. The iterative refinement process ensured that the final prototype was well-developed, engaging, and capable of encouraging students to think critically, solve problems creatively, and make meaningful connections between mathematical concepts and real-world contexts.

Basic Competency :Solving problems involving the use of properties of arithmetic operations on natural numbers.

Problem Description :Determining the best strategy for purchasing drinks according to the applicable terms and conditions.

Level : 4

Question:

The birthday of Prophet Muhammad SAW (Maulid Nabi Muhammad SAW) is commemorated on the 12th of Rabiul Awal in the Hijri calendar, which is a lunar calendar based on the moon's orbit. However, the date of Maulid in the Gregorian calendar, which is a solar calendar based on the Earth's orbit around the Sun, shifts every year. This difference in calendar systems is caused by the fact that the Hijri year is shorter than the Gregorian year. Please observe the following:

The dates of Maulid Nabi Muhammad SAW in the Gregorian and Hijri calendars from 2018 to 2025 are as follows:

In 2018, Maulid Nabi fell on November 20, 2018.
In 2019, Maulid Nabi fell on November 9, 2019.
In 2020, Maulid Nabi fell on October 29, 2020.
In 2021, Maulid Nabi fell on October 19, 2021.
In 2022, Maulid Nabi fell on October 8, 2022.
In 2023, Maulid Nabi fell on September 27, 2023.
In 2024, Maulid Nabi fell on September 15, 2024.
In 2025, Maulid Nabi will fall on ..... (fill in the blank).

Solution:

Mathematically, based on the calculation of the difference in the number of days between the Hijri and Gregorian years, the date of Maulid Nabi Muhammad SAW in 2025 (12 Rabiul Awal 1448 H) will fall on **September 5, 2025** in the Gregorian calendar.

This calculation assumes a shift of about 10-11 days earlier each year.

Figure 2. The Task with Islamic Culture (Before Revision)

As shown in Figure 2, the task asks students to compare and contrast the Gregorian and Hijri calendars, particularly emphasizing Maulid Nabi Muhammad SAW's commemoration. Given a list of Maulid dates spanning 2018 to 2024, students are asked to predict the Masehi calendar's date of the 12th of Rabiul Awal 1448 H. Mathematical proficiency, awareness of culture, and practical mathematical application are all encouraged by this task.

Table 3. Comments on the expert review and one-to-one stage

The aspect reviewed	Comment/ Responds	Decision
Content	Questions 1 and 2 are straightforward and do not yet stimulate the students' critical thinking skills; it would be better to create more complex questions.	• Revise the question sentences for numbers 1, 2, 3, 4, and 5 • Revise the answer choices for questions 1 and 2 • Clarify the images and tables in the questions
Context	The context used for question number 4 is inappropriate; it would be better to use a context related to decorating or embellishing something.	
Construct	Overall, the questions align with the HOTS type; nevertheless, more diverse questions are required.	
Language	The questions in each problem need to be clarified further, such as "make a table to facilitate your work process" or "explain in detail how your calculation process works."	

Table 3 includes recommendations and expert feedback as reference material for refining and improving the task. The task underwent revisions based on input from experts and one-on-one testing, and after incorporating the suggested improvements, it was returned for further evaluation. As a result,

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Prototype 1 evolved into Prototype 2, reflecting modifications based on expert assessments and individual testing.

Basic Competency:
Solve problems involving the use of properties of operations on whole numbers.
Problem Description:
Determine the strategy to buy drinks correctly according to the applicable terms and conditions.
Level: 4
Question:
The birthday of Prophet Muhammad SAW (Maulid Nabi) is commemorated every 12th of Rabiul Awal in the Hijri calendar, which is a lunar calendar based on the moon's orbit. However, the Maulid celebration in the Gregorian (Masehi) calendar, which is a solar calendar based on the sun's orbit, shifts every year. The difference in these calendar systems is due to the fact that a year in the Hijri (Hijriah) calendar is shorter than a year in the Gregorian (Masehi) calendar. Observe the following table:

Year	Maulid Date (Masehi)	Maulid Date (Hijriah)
2018	20 November 2018	12 Robiul Awal 1440 H
2019	9 November 2019	12 Robiul Awal 1441 H
2020	29 Oktober 2020	12 Robiul Awal 1442 H
2021	19 Oktober 2021	12 Robiul Awal 1443 H
2022	8 Oktober 2022	12 Robiul Awal 1444 H
2023	27 September 2023	12 Robiul Awal 1445 H
2024	15 September 2024	12 Robiul Awal 1446 H
2025	.....	.....

Solution:
Mathematically, based on the calculation of the difference in the number of days in the Hijri and Gregorian years, the Maulid Nabi celebration in 2025 (12 Rabiul Awal 1448 H) will fall on **5 September 2026** in the Gregorian (Masehi) calendar.
This calculation assumes a shift of approximately 10–11 days earlier each year.

Figure 3. The Task with Islamic Culture (After Revision)

Figure 3 indicates that the question has been revised based on the results from Table 3. In the previous version of the question, the context was focused solely on identifying the date of Maulid Nabi Muhammad SAW each year without emphasizing the mathematical reasoning behind the calendar shift. After the revision, the question has been improved by incorporating a more precise pattern of date changes across years, supported by a more structured table. This allows students to analyze the pattern quantitatively and understand the difference in year lengths between the Hijri and Gregorian calendars.

Prototype 2 was then tested on a small group of ten fifth-grade students from SD Negeri 1 Dilem and SD Negeri 1 Mangunrejo to evaluate its practicality and effectiveness. While the task demonstrated a good reliability coefficient of 0.70, specific tasks were identified as empirically invalid, prompting the researcher to analyze each item to determine whether it should be removed, revised, or retained. To ensure a thorough and data-driven revision, the researcher administered questionnaires to gather students' opinions, analyzed their responses, and conducted small-group interviews to explore readability, aid schemes, or contextual understanding difficulties. Based on these evaluations, necessary refinements were made, leading to the development of Prototype 3, which was then tested in a field trial involving 50 students from SD Negeri 1 Dilem and SD Negeri 1 Mangunrejo, Kabupaten Malang. This

trial aimed to assess the potential impact of the task on student learning and evaluate their critical thinking skills while solving HOTS (Higher Order Thinking Skills) tasks contextualized in Indonesian Islamic culture. The field trial provided valuable insights into students' ability to analyze, evaluate, and create solutions based on real-world cultural contexts and the effectiveness of integrating culturally relevant contexts into mathematical problem-solving to enhance engagement, reasoning skills, and deeper conceptual understanding.

Description of Students' Answer

Following the completion of the activity by the students, the researcher distributed questionnaires to each student and conducted interviews with four of them to gather information regarding the possible impact. The responses to the questionnaire from the students are displayed below.

Table 4. Critical Thinking Skills of Students

No.	Indicator of Critical Thinking Skill	Response of Students
1	Interpretation: which verifies understanding of the problem by precisely recording what is known and what is asked in the question	90%
2	Analysis: which verifies the activity of determining connections between statements, questions, and concepts provided in the question by precisely constructing a mathematical model and offering a precise explanation.	70%
3	Evaluation: Using suitable procedures, students finish and accurately calculate the problem	50%
4	Conclusion: Students accurately draw conclusions based on the order in which they solved the problem	45%

Table 4 suggests that students have applied critical thinking abilities when answering HOTS questions within a context of Islamic culture in Indonesia. From the table, it can also be observed that reasoning and argumentation, essential components of critical thinking, were commonly applied by most students when solving the problems, while mathematizing was the least used. This indicates that students could analyze, evaluate, and justify their answers, demonstrating their ability to think critically in mathematical problem-solving. However, the lower occurrence of mathematizing suggests that students may need further support in applying mathematical concepts to real-world contexts, a crucial aspect of critical thinking skills. Additionally, the data reveal variations in students' approaches, with some demonstrating systematic problem-solving strategies, while others rely on trial-and-error methods. The findings highlight the importance of instructional improvements encouraging critical thinking through mathematical representation, logical reasoning, and structured problem-solving. Moreover, the table below presents the students' responses after completing the task. It provides deeper insights into their engagement, understanding, and challenges while applying critical thinking skills in solving HOTS tasks contextualized in Indonesian Islamic culture.

Table 5. Students Respons

No.	How enjoyable is the task?	Response of Students
1	I am fully interested and committed to working on all the tasks.	15%
2	I am only interested and committed to working on specific tasks.	5%
3	I am not interested in any of the tasks at all.	1%
4	The context used in the questions is highly engaging and enhances my knowledge.	75%
5	The questions with this context are very dull and unengaging.	2%
6	The questions are challenging and complex.	2%

Table 5 shows that students' responses to the HOTS questions within the context of Indonesian Islamic culture are very positive. A significant 75% of students found the context highly engaging and

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felt that it enhanced their knowledge, particularly about celebrating the Prophet's birthday across different regions in Indonesia. Additionally, 15% of students expressed full interest and commitment to solving all the tasks, while only a small percentage (12%) found the questions unengaging or overly complex. Students also noted that the questions were highly challenging, requiring a complex thought process, which encouraged them to analyze, evaluate, and construct logical arguments—all essential critical thinking skills. The results indicate that contextualizing mathematical problems within culturally relevant themes increases student engagement and fosters higher-order thinking. Furthermore, the responses suggest that using real-world cultural contexts in HOTS tasks helps students develop reasoning skills, problem-solving strategies, and the ability to make connections between mathematical concepts and their everyday lives. These findings reinforce the importance of incorporating critical thinking and contextual learning into mathematics education to improve student motivation, engagement, and cognitive skills.

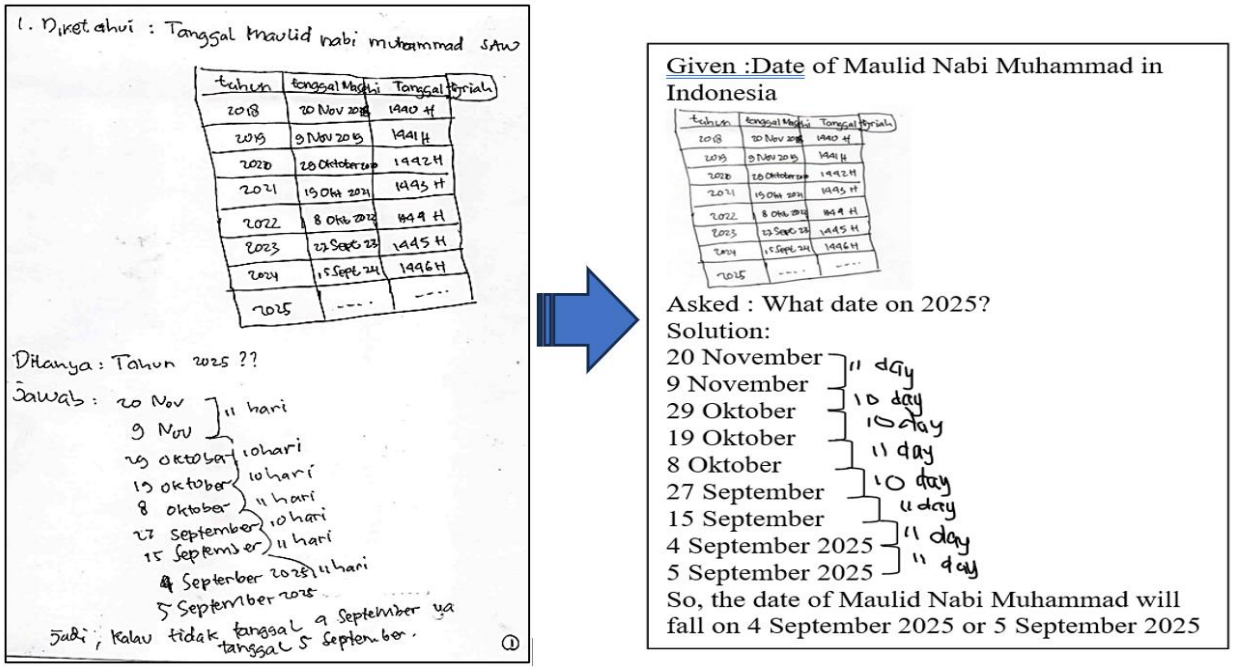
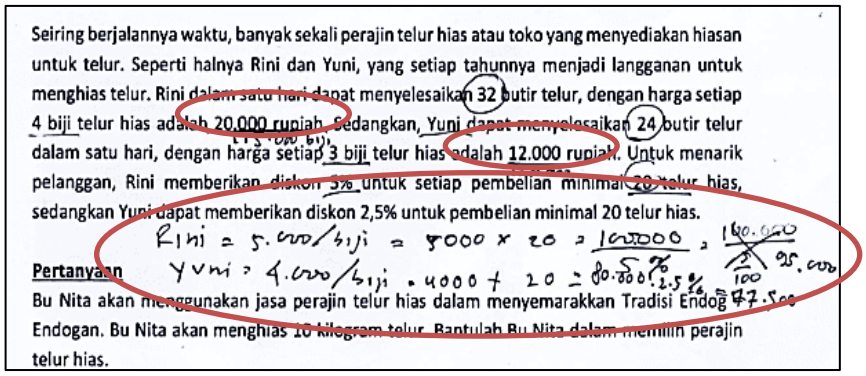


Figure 4. The students answer with the interpretation phase

Figure 4 illustrates that students respond to questions by identifying the known information, determining what is being asked, and analyzing what has been answered. This ability demonstrates their skill in interpreting a question into a mathematical expression, a fundamental aspect of critical thinking skills. Students can effectively transform narrative sentences into mathematical statements, making the problems more straightforward to comprehend and solve. Students exhibit logical reasoning and problem-solving abilities by systematically breaking down problems, recognizing patterns, and selecting appropriate mathematical operations. This process reflects their capacity to analyze information, connect concepts, and formulate structured solutions. The findings suggest that HOTS tasks contextualized in Indonesian Islamic culture enhance students' engagement and develop their critical thinking and mathematical literacy, enabling them to approach complex problems with confidence and accuracy.


Seiring berjalannya waktu, banyak sekali perajin telur hias atau toko yang menyediakan hiasan untuk telur. Seperti halnya Rini dan Yuni, yang setiap tahunnya menjadi langganan untuk menghias telur. Rini dalam satu hari dapat menyelesaikan 32 butir telur, dengan harga setiap 4 biji telur hias adalah 20.000 rupiah. Sedangkan, Yuni dapat menyelesaikan 24 butir telur dalam satu hari, dengan harga setiap 3 biji telur hias adalah 12.000 rupiah. Untuk menarik pelanggan, Rini memberikan diskon 5% untuk setiap pembelian minimal 20 telur hias, sedangkan Yuni dapat memberikan diskon 2,5% untuk pembelian minimal 20 telur hias.

Rini = 5.000/biji = 5000 × 20 = 100000, 100.000 − 5% = 95.000

Yuni = 4.000/biji = 4000 × 20 = 80.000, 80.000 − 2,5% = 77.500

Pertanyaan

Bu Nita akan menggunakan jasa perajin telur hias dalam menyemarakkan Tradisi Endog-Endogan. Bu Nita akan menghias 10 kilogram telur. Bantulah Bu Nita dalam memilih perajin telur hias.

Over time, many decorative egg artisans or stores have offered egg decoration services. Among them are Rini and Yuni, who are regulars every year in providing egg decorations. Rini can finish decorating 32 eggs per day, and the price for every 4 eggs is 20,000 rupiah. Meanwhile, Yuni can decorate 24 eggs per day, and the price for every 3 eggs is 12,000 rupiah. To attract customers, Rini offers a 5% discount for a minimum purchase of 20 decorated eggs, while Yuni offers a 2.5% discount for a minimum purchase of 20 decorated eggs.

Question:

Mrs. Nita plans to use the services of an egg decoration artisan to celebrate the Endog-Endogan Tradition. She will

Student's Thought Process Interpretation

The student compared Rini and Yuni's prices to help Bu Nita choose the cheaper egg decorator. They calculated the cost per egg (Rini: 5,000 IDR, Yuni: 4,000 IDR) and applied the respective discounts for 20 eggs (Rini: 5%, Yuni: 2.5%). After the discount, Rini's total was 95,000 IDR, while Yuni's was 78,000 IDR. The student concluded that **Yuni is the more affordable choice**.

Figure 5. The students answer with the analysis phase

Figure 5 shows the student's analysis process in solving the given problem. Before writing the answer in a structured manner, the student first identifies the key information and attempts to calculate the price of each egg by dividing the total number of eggs by the overall price. After successfully determining the price per egg, the student proceeds to the next step, which involves calculating the price after applying the discount. This process demonstrates that the student engages in logical reasoning, step-by-step problem-solving, and critical thinking skills before arriving at the final answer. By analyzing the problem, organizing their calculations, and verifying their results, the student exhibits a structured approach to problem-solving. Additionally, this structured thinking process highlights their ability to decompose complex mathematical tasks into smaller, more manageable steps, reinforcing the importance of higher-order thinking skills (HOTS) in mathematics education. This indicates that students can apply mathematical concepts in real-world scenarios, demonstrating mathematical literacy and critical thinking development through contextualized learning.

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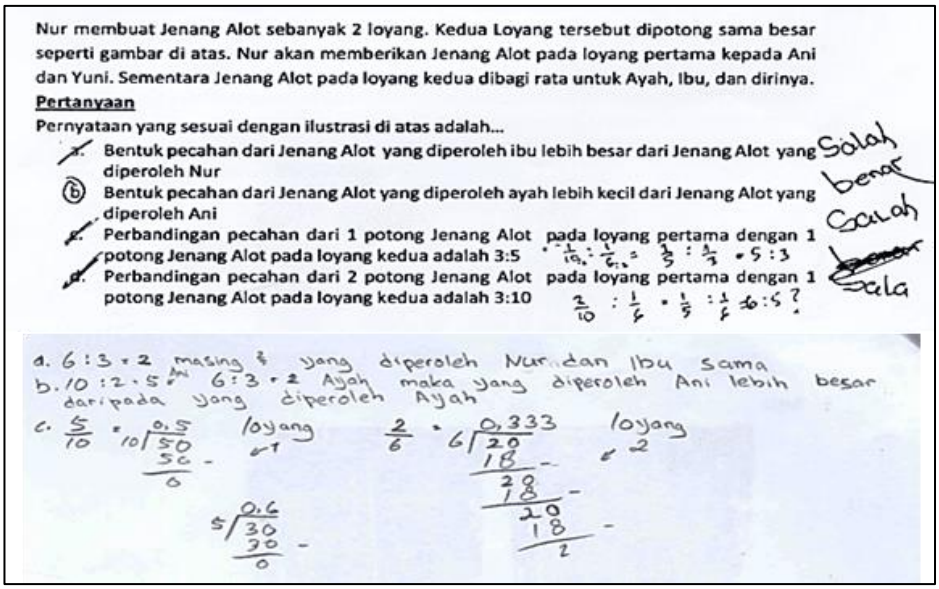

Nur made two trays of *Jenang Alot*. Each tray was cut evenly as shown in the picture above. Nur gave the first tray of *Jenang Alot* to Ani and Yuni. The second tray was equally divided among Father, Mother, and herself.

Question:

Which statement is correct based on the illustration above?

A. The fraction of *Jenang Alot* received by Mother is greater than that received by Nur

B. The fraction of *Jenang Alot* received by Father is smaller than that received by Ani

C. The fraction of 1 piece of *Jenang Alot* from the first tray compared to 1 piece from the second tray is 3:5

D. The fraction of 2 pieces of *Jenang Alot* from the first tray compared to 1 piece from the second tray is 3:10

Student's Thought Process Interpretation :

In completing the problem, the student followed a structured reasoning process. In **Section A**, the student carefully evaluated each multiple-choice option by comparing them to the information presented in the diagram. They marked Options A and C as incorrect and selected Option B as the correct answer, indicating their understanding that the portion received by the father (1/3) is smaller than the portion received by Ani (1/2). In **Section B**, the student translated the visual representation into fractions by noting that Ani and Yuni shared one tray equally (each receiving 1/2), while the second tray was divided among the father, mother, and Nur (each receiving 1/3). This showed that the student understood how to represent the problem context mathematically. Finally, in **Section C**, the student conducted calculations to compare the different portions. They converted fractions into decimals and used basic arithmetic to verify the relationships between portions, such as 3:5 and 3:10. This final step confirmed that the student not only selected the correct answer but also supported it with sound mathematical reasoning.

Figure 6. The students answer with the evaluation phase

Based on observations, when answering question number 2, the student discussed with their seatmate, then tried to guess right or wrong, before attempting to verify the answer. This is an evaluation process, where the student tries to evaluate the answer before concluding.

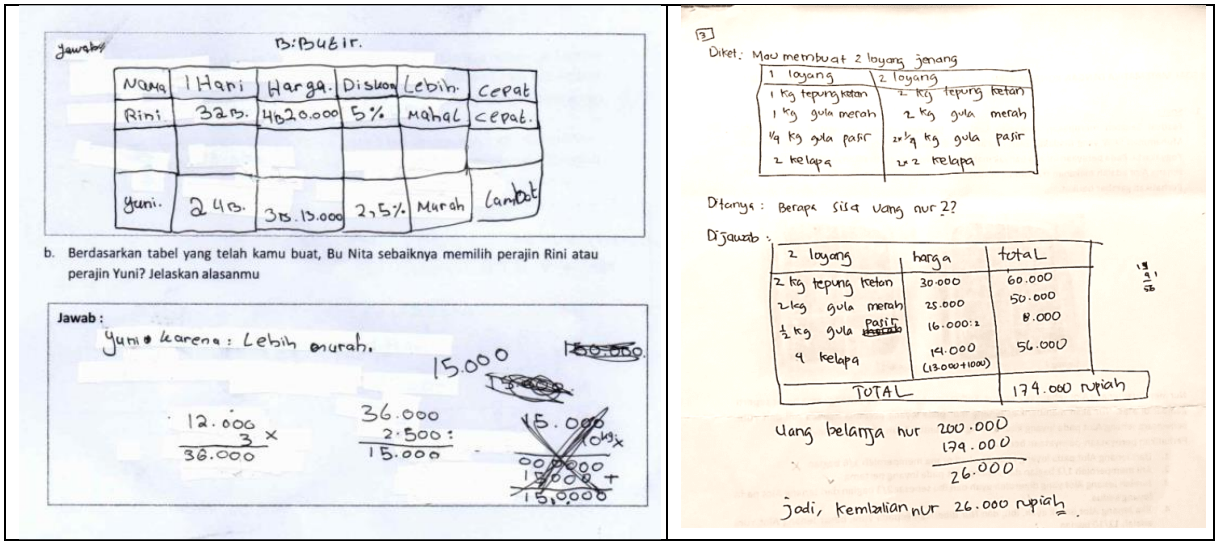

Figure 7. The students answer with the conclusion phase

Figure 7 represents the Conclusion Phase, the final stage of a problem-solving or analytical process where students draw conclusions based on the information gathered, analyzed, and evaluated. In this phase, students synthesize all their previous steps, including discussing, calculating, and evaluating, to arrive at a definitive answer or decision. This stage is crucial as it reflects their ability to connect different concepts, justify their reasoning, and make informed conclusions, which are essential critical thinking skills.

Based on the analysis of student responses, it can be concluded that the HOTS (Higher-Order Thinking Skills) task, contextualized within Indonesian Islamic culture, is considered practical and effective in enhancing students' engagement and cognitive development. Students across different ability levels—low, medium, and high—demonstrated an understanding of both the task's objectives and its application, indicating that the contextual approach helped them relate mathematical concepts to real-life situations. Moreover, the students' answers revealed the use of critical thinking skills, such as analyzing data, formulating logical arguments, making connections between concepts, and systematically solving problems. These findings highlight the importance of integrating context-based mathematical tasks in fostering higher-order thinking, improving problem-solving abilities, and preparing students for real-world challenges.

DISCUSSION

The results of this study suggest that the task using the context of Indonesian Islamic culture can be developed through the preliminary and prototyping stages, primarily to assess the validity and practicality of the task. In line with the formative evaluation suggested by Zulkardi (2002), the process involves conducting a preliminary review and using prototypes for expert evaluation to assess the instrument's validity. Additionally, testing with purposive sampling, which includes individuals with varying abilities, can be used to determine the task's practicality (Rati, Kusmaryatni, & Rediani, 2017). Purposive sampling is proper for purposefully choosing participants based on particular population traits and study goals (Sugiyono, 2023). Qualitative research makes extensive use of this non-probabilistic sampling technique. With the help of math instructors, the researcher used the purposive sample approach in this study to choose students with different degrees of mathematical proficiency (Sari & Manurung, 2021).

This study shows that elementary school students possess good critical thinking skills. However, they are not accustomed to working on questions that require higher-order thinking skills. HOTS (Higher Order Thinking Skills) questions serve as instruments to assess students' high-level thinking abilities, encouraging them to memorize or restate information and develop their ideas and concepts (Ahmad et al., 2018). Therefore, HOTS questions invite students to explore existing concepts and solve problems.

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Regarding the thinking skills being assessed, HOTS questions are used to evaluate skills such as analyzing (C4), evaluating (C5), and creating (C6).

The questions developed in this study are HOTS questions designed to measure students' critical thinking skills. The indicators of critical thinking are (1) interpretation, (2) analysis, (3) evaluation, and (4) conclusion. All indicators of critical thinking skills were demonstrated by students when solving problems, especially essay questions. This indicates teachers can understand students' critical thinking processes by answering essay questions. Word problems can enhance students' understanding of language, symbols, and concepts in determining the steps to solve them (Kurz, Gómez, & Jimenez-Silva, 2017). Word problems require a more profound understanding of the relationship between the given problem and the model and the steps for solving it. According to (Prasetyaningrum, Amir, & Wardana, 2022), a word problem is considered a problem if it contains descriptive statements in its language and elements that must be analyzed in its solution.

Developing word problems based on HOTS (Higher Order Thinking Skills) can help students improve their thinking skills as a result of the learning assessment process (Oktiningrum & Rahayu, 2022). Furthermore, developing HOTS-based problems can assist students in getting accustomed to organizing ideas, expressing opinions, and creating projects, particularly as they are used in international assessments (Andriyani & Saputra, 2020). Apart from HOTS essay questions, students' critical thinking abilities can be improved by asking questions that provide cultural context. The work and responses from the students attest to this. Students claimed that contextual questions are highly applicable to real-world situations and can help them learn more. Contextual inquiries can also enhance one's capacity for critical, inventive, and creative thought (Khoirudin, Hobri, Irfan, Guswanto, & Purwandi, 2020).

CONCLUSION

The results of this study indicate that the HOTS (Higher-Order Thinking Skills) task, developed within the context of Indonesian Islamic culture, fulfils the criteria for validity and practicality. The task's validity is supported by expert evaluations, confirming its appropriateness in content, construct, and language. A rigorous review and revision process conducted by experts and researchers ensures that the task aligns with educational standards and effectively promotes higher-order thinking. In addition, the practicality of the task is demonstrated through its clarity, accessibility, and usability for students with different levels of mathematical ability. Students successfully engaged with the task during the one-to-one and small-group testing stages, showcasing critical thinking skills through analysis, logical reasoning, and structured problem-solving. Their active participation, enthusiasm, and dedication to completing the problems indicate that the contextualized task enhances student motivation and engagement. Given these outcomes, this study recommends that teachers and educators integrate culturally relevant HOTS tasks into mathematics instruction, particularly those rooted in Indonesian heritage. Implementing such tasks in diverse educational settings can support students in developing higher-order thinking skills, strengthen their conceptual understanding, and apply mathematical concepts to real-world situations. Further research is encouraged to explore and refine context-based learning approaches, ensuring their continued effectiveness in fostering deeper mathematical comprehension.

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