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DEVELOPMENT OF TEACHING MODULES ORIENTED TOWARDS REALISTIC MATHEMATICS EDUCATION WITH LUWU CULTURAL CONTEXT, INTEGRATED WITH THE PANCASILA STUDENT PROFILE AND HIGH ORDER THINKING SKILLS

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ABSTRACT

The development of students' potential in learning must be carried out holistically and comprehensively. However, many teachers still struggle to design teaching modules that align with the Merdeka Curriculum and learning needs. This study aims to develop a Merdeka Curriculum Teaching Module oriented towards Realistic Mathematics Education (RME) with a Luwu Cultural context, integrated with the Pancasila Student Profile. The assessment results indicate that this teaching module is effective in improving students' Higher-Order Thinking Skills (HOTS). The validity score shows an average of 77.78%, classified as valid, reflecting the quality of the module in terms of material relevance, completeness of information, and clarity of presentation. The practicality assessment of the teaching module also scored an average of 88%, indicating that the module is highly practical and easy to implement in daily learning. The practicality aspects include ease of use, learning effectiveness, and time efficiency. In the evaluation of students' HOTS abilities, the NSI category indicates that 6% of students still require special intervention, while the Mastery category shows that around 5% of students have excellent HOTS. Most students fall into the Basic and Proficient categories, indicating that the module is effective in developing students' basic and intermediate skills. The practical implications of this research are that the developed teaching module can assist teachers in effectively implementing learning based on the Merdeka Curriculum, integrating local cultural values and the principles of the Pancasila Student Profile. Moreover, the module is considered practical for daily use in the classroom, making a tangible contribution to improving the quality of education in schools.

Keywords: HOTS, Luwu Culture, Merdeka Curriculum, Pancasila Student Profile, RME, Teaching Module

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PRELIMINARY

Curriculum development is an inevitability for improving the quality of education in accordance with its time. The curriculum serves as the core of the educational process in

schools, playing a crucial role in empowering students' potential (Salsabilla et al., 2023). Currently, Indonesia implements the Merdeka Curriculum as an effort toward educational transformation that fosters the Pancasila Student Profile. This curriculum is designed to instill values aligned with Pancasila, providing students with the foundation and skills needed for life (Maulida, 2022; Sumarni et al., 2024). The curriculum aims to develop students with characteristics based on Pancasila values, encompassing key aspects such as independence, creativity, collaboration, and critical thinking (Turnip et al., 2021). However, the success of the Merdeka Curriculum heavily relies on the tools used by teachers, one of which is the teaching module. A teaching module is a systematically designed learning tool containing materials, methods, media, and evaluations to assist teachers in delivering content aligned with the curriculum (Syafari et al., 2024). Teaching modules play a significant role in helping teachers organize structured learning, allowing students to follow the learning process both independently and in a guided manner (Ayu & Syariffuddin, 2021). In the context of the Merdeka Curriculum, the development of teaching modules must not only meet academic demands but also support the character formation of students in line with Pancasila values.

A critical issue faced in the field of education is that teachers need to design teaching modules effectively. However, in reality, many teachers still lack understanding of how to develop teaching modules, particularly those based on the Merdeka Curriculum (Nurhayati et al., 2022). This leads to a misalignment between the learning materials delivered in class and the implemented curriculum, making the teaching-learning process less effective and hindering the achievement of educational goals. The low understanding of teachers regarding the development of teaching modules is a crucial problem that needs immediate resolution. To address this issue, one effective approach in the development of teaching modules is the Realistic Mathematics Education (RME) approach. This approach emphasizes the importance of real-world contexts in mathematics learning, encouraging students to think logically and apply their knowledge in solving problems (Safitri et al., 2022; Irmaya et al., 2024). RME is designed to guide students in rediscovering mathematical concepts through real-life situations, with the teacher's guidance (Ananda, 2018). The core idea of RME is to begin with real-world situations, proceed with problem construction, and use mathematics to solve problems (Baharuddin et al., 2023). Furthermore, it facilitates the transition from the students' existing informal knowledge to formal knowledge through solving contextual problems (Sevinc & Lesh, 2018; Pathuddin & Nawawi, 2021). Therefore,

this approach is highly relevant for designing teaching modules that connect theory with real-world practice.

The RME approach also incorporates didactic phenomenological principles, emphasizing the transformation of phenomena within problem situations faced by students. In this research, the term 'phenomena' refers to situations based on students' experiences. RME is closely related to problem contexts as a trigger for students to think critically and reason logically (Sevinc & Lesh, 2022). Previous studies have explored various approaches to mathematics learning based on RME and local culture, such as the use of traditional games (Cesaria et al., 2022), culture-based worksheets (Voigt et al., 2020), and learning rooted in local wisdom (Aji, 2023; Umbara, 2021). These studies have proven effective in improving students' mathematical understanding, with moderate to high levels of improvement, and in helping students connect abstract mathematical concepts to real-life contexts. However, these studies have not explicitly integrated the dimensions of the Pancasila Student Profile nor targeted the development of HOTS, such as analysis, evaluation, and creativity. Furthermore, they have not produced teaching modules based on specific cultures, such as Luwu culture, that can be directly implemented in learning. This presents an opportunity to fill the gap by integrating the RME approach with the context of Luwu culture, the dimensions of the Pancasila Student Profile, and HOTS. In this case, Luwu culture plays a significant role in the development of RME-based teaching modules.

In this study, the integration of the RME approach with the context of Luwu culture becomes the main focus. Luwu culture originates from the Luwu region in South Sulawesi, known as one of the areas rich in local traditions and customs (Jermias et al., 2024). This culture embodies noble values such as Sipakatau (mutual respect), Sipakalebbi (mutual glorification), and Sipakainge (mutual reminders), which will be integrated with the dimensions of the Pancasila Student Profile. These dimensions include being faithful, pious, and of noble character; independence; collaboration; critical thinking; creativity; and global diversity. These values will serve as the foundation for the development of the teaching module. Therefore, this study aims to develop a Merdeka Curriculum Teaching Module based on RME with the context of Luwu culture, integrated with the dimensions of the Pancasila Student Profile and HOTS, and designed to be valid, practical, and effective. This module is expected to enhance students' mathematical understanding, develop their higher-order thinking skills, and shape their character in accordance with Pancasila values.

METHODS

Research Design and Stages

This study employs the Research and Development (R&D) method using the Four-D (4D) development model, consisting of four main stages: Define, Design, Develop, and Disseminate (Firdaus & Purnawati, 2024). This method was chosen because it produces a learning product in the form of a teaching module tailored to student needs, specifically a module integrated with Luwu culture and the RME approach.

The research design adopts the 4D development model, which includes four stages: The **Define** stage aims to identify problems through literature reviews, observations, and interviews. Activities at this stage involve a needs analysis for learning materials appropriate to the Luwu cultural context and the Pancasila Student Profile. The **Design** stage involves the initial development of the teaching module. This module is designed based on the findings from the Define stage and integrates Luwu cultural values and the RME approach to facilitate a contextual and meaningful learning process. The **Develop** stage involves product validation and revision. Validation is conducted by experts in education, culture, and mathematics to ensure the module aligns with curriculum standards. After validation, the module is tested on a small group of students to evaluate its effectiveness and practicality. Finally, the **Disseminate** stage aims to distribute the revised and field-tested teaching module. The improved module, based on field test results, will be shared with schools and teachers for use in the teaching process.

Research Object and Indicators

This research involves elementary school students in Palopo city. A limited trial will be conducted in one selected class, with the following details: (a) all students will be taught using the RME Teaching Module, (b) after implementation over four meetings, (c) during the implementation, students will be observed regarding their activities related to the use of the RME Teaching Module to assess their responses, (d) at the end, students will be given a questionnaire to gather their feedback on the teaching module, which will serve as a consideration for further improvement of the module. Additionally, teachers will be asked to measure the effectiveness and practicality of the RME Teaching Module by implementing it in their respective classes and completing a questionnaire at the end. The research also involves three experts, consisting of: one expert for construct validation, one expert for content validation, and one cultural expert. These experts will act as observers and validators during the trial to assess the implementation of the developed teaching module.

Data Sources and Collection Techniques

The data collection techniques used in this research aim to establish the quality and feasibility of the developed teaching module. The techniques employed are as follows: (a) preliminary stage: data collection techniques include observation, documentation, and interviews; (b) planning stage: techniques involve observation, documentation, interviews, and literature reviews. Generally, all these techniques are used simultaneously and complement each other; (c) development stage: the data collection technique used for the initial product development involves instrument validation, while for one-on-one trials and small group trials, observation and questionnaires are employed; and (d) dissemination stage: the data collection techniques used at this stage include questionnaires, observation, and assessments of applicability.

Data Analysis Techniques and Conclusion Drawing

The data analysis techniques in this research employ both qualitative and quantitative descriptive analyses. Qualitative descriptive analysis is used to describe the development stages, illustrating the results of observations regarding the implementation and effectiveness of the developed teaching module in the field (Khoirotunnisa et al., 2018). Quantitative data analysis is utilized during the development and dissemination stages. The data analysis approach includes: (a) describing the implementation and results of the teaching module development and its validity in both qualitative and quantitative formats; (b) for one-on-one trials and small group trials, the results of module application tests are analyzed using a quantitative approach; (c) field trials are also analyzed using a quantitative approach. Conclusions are drawn based on valid, practical, and effective measurements or tests of the teaching module for elementary school students, grounded in Bugis cultural values integrated with the Pancasila Student Profile. To assess the quality of the developed teaching module, validity and practicality tests are conducted. The validity test aims to ensure that the module meets the established criteria in terms of content, construct, and cultural relevance, as well as its connection to the Pancasila Student Profile. The calculation formula used for data analysis is as follows:

1. Module Validity Analysis

$$Percentage = \frac{(\sum Scores\ given\ by\ Validators)}{\sum Maximum\ Score} x100\%$$

After obtaining the validity data from experts, the total score for each indicator is classified according to the criteria presented in Table 1. If the result exceeds 60%, the teaching module is considered valid or suitable for use and can be tested.

Table 1. Validity Product Assessment Criteria

Category	Assessment %
Very Valid	80 < N ≤ 100
Valid	60 < N ≤ 80
Fairly Valid	40 < N ≤ 60
Less Valid	20 < N ≤ 40
Not Valid	0 < N ≤ 20

(Source: Riduwan, 2016))

Meanwhile, the practicality test assesses the ease of use and effectiveness of the module in supporting learning. The results of both tests are presented using the following formulas.

2. Module Practicality Analysis

$$Percentage = \frac{(\sum Score\ obtained)}{\sum Maximum\ Score} x100\%$$

The practicality analysis of the teaching module is conducted by distributing questionnaires to teachers and students to gauge their responses to the module that has been applied. According to Table 2, if the result exceeds 60%, the developed teaching module is deemed practical and suitable for implementation in the learning process.

Table 2. Practicality Product Assessment Criteria

Category	Assessment %
Very Practical	80 < N ≤ 100
Practical	60 < N ≤ 80
Fairly Practical	40 < N ≤ 60
Less Practical	20 < N ≤ 40
Not Practical	0 < N ≤ 20

(Source:Riduwan, 2016)

RESULT AND DISCUSSION

The development process of the teaching module for the Merdeka Curriculum, oriented towards RME in the context of Luwu culture integrated with the Pancasila Student Profile, involves a series of activities and stages. This process follows the 4D development model, which includes needs analysis, module design, development, and dissemination of research results. Each phase of this module development focuses on enhancing students' HOTS by combining local cultural contexts with principles of reality-based education. A detailed description of the activities in each development phase is as follows:

1. Define

The activities in the Define stage focus on analyzing students' learning needs and mapping competencies. This analysis discusses Learning Outcomes (LO), Learning Objectives (LO), and the Learning Pathway (LP). Additionally, an analysis of the potential resources and Luwu culture is conducted to instill mathematical concepts and introduce students to the surrounding culture. The outputs of this stage include data on student needs analysis, learning outcomes, competency mapping, and data on Luwu cultural potential.

Four main competencies are the focus of HOTS discussion: Critical Thinking, Creative Thinking, Problem Solving, and Decision Making. The competency mapping will categorize students based on levels: Expert, Competent, Basic, and Need Special Intervention (NSI).

1) Expert Level refers to a category of students who are capable of reasoning well in solving both complex and non-complex problems using mathematics concepts proficiently. They demonstrate a strong ability to apply mathematical knowledge in various contexts.
2) Competent is a category of students who can apply their mathematical knowledge in various situations. They can solve problems using the concepts they have learned, although these may not yet be fully complex.
3) Basic is a category where students possess fundamental mathematical skills such as performing simple computations, solving linear equations, and understanding basic concepts of geometry and statistics. They are able to solve simple, routine problems.
4) Needing Special Intervention (RSI) is a category of students who have limited skills in tackling HOTS questions. They exhibit partial mastery of mathematical concepts and need special intervention to improve their abilities.

The aspects of resource potential and Luwu culture in the students' environment include local foods like Makan Tape Ketan, traditional musical instruments such as Pui-pui and Gandrang Bulo, historical sites like the Old Jami Mosque of Palopo and the Great Mosque of Luwu, cultural dances like Tari Pakarena, as well as Toraja carving art, traditional houses like Rumah Tongkonan and Rumah adat Langkanae, and local games such as Maggasing, Maccukke, and Maggaleceng. These elements foster a cultural connection for the students, providing relevant contexts for learning.

2. Desain

The Design phase focuses on developing the strengths and characteristics of the RME teaching module within the Luwu cultural context. This involves integrating learning with Luwu cultural values, designing the RME teaching module, developing teaching materials and assessments, and creating interactive learning media. In general, there are three

advantages and characteristics of the RME Teaching Module offered, which include (1) the design of mathematical problems using the Luwu context, (2) training students to develop HOTS based on the competency levels of Expert, Competent, Basic, and those needing Special Intervention (NSI), and (3) digital learning media that contains information on the introduction of Luwu culture. The output at the Design stage includes a Draft of the RME Teaching Module, the Design of Advantages and Characteristics of the RME Teaching Module, Learning Devices and Assessments, and Interactive Learning Media.

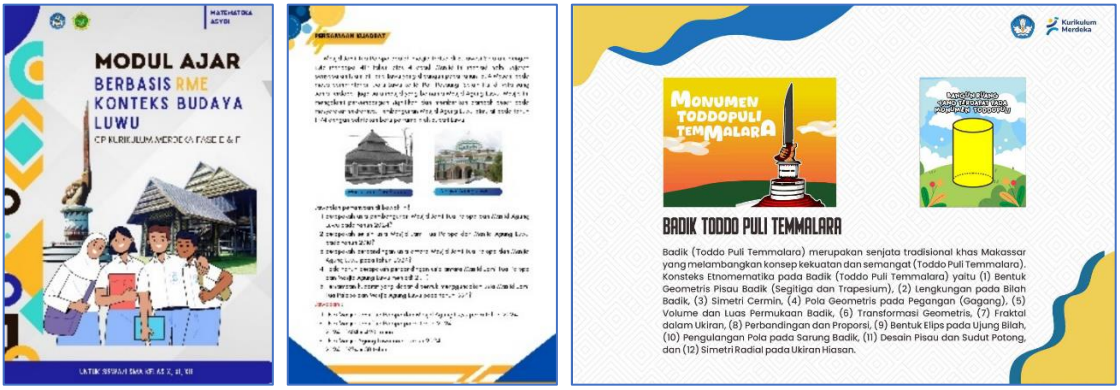

Figure 1. Design and final Product of the Teaching Module

The characteristics of the design of learning devices and assessments are based on HOTS competencies, which include Critical Thinking, Creative Thinking, Problem Solving, and Decision Making.

1. **Critical Thinking** is the process of analyzing and evaluating information or arguments objectively. Students are expected to question assumptions, evaluate evidence, and draw logical conclusions. Critical Thinking helps students make better decisions and solve problems in a structured manner.
2. **Creative Thinking** is the ability to see things from new perspectives and generate innovative ideas. Students engage in thinking beyond traditional boundaries and discover unconventional solutions to problems. Creative Thinking often involves imagination, intuition, and the ability to connect seemingly unrelated concepts.
3. **Problem Solving** is the process of identifying, analyzing, and resolving the issues at hand. Students learn to define problems, gather information, develop alternatives, and evaluate and select the most effective solutions.
4. **Decision Making** is the process of choosing between several alternatives based on available information and desired goals. Students are trained to evaluate the pros and cons of each option and consider short-term and long-term consequences. Good decision-making requires analytical skills and sound intuition.

The characteristics of the RME Teaching Module include the integration of the RME approach, Luwu culture, and the Profile of Pancasila Students. This integration will be presented through the formulation of problems, exercises, language use, and cultural introduction. The cultures to be integrated include food, musical instruments, dance art, architecture, and traditional games. The Luwu cultural context in the RME Teaching Module includes items such as Tape Ketan (sticky rice cake), the Pui-pui musical instrument, Gandrang Bulo musical instrument, the Old Jami Mosque of Palopo, the Grand Mosque of Luwu, Pakarena dance, Toraja wood carving art, Tongkonan houses, Langkanae traditional houses, Maggasing game, Maccukke game, and Maggaleceng game. This integration not only serves as content for the teaching module but also introduces the culture itself to students through interactive learning media, providing information and education related to brief descriptions of the culture.

Each cultural element, ranging from traditional cuisine to musical instruments and traditional houses, is used as a context in statements and questions designed to enhance students' HOTS. The selection of these cultural elements aims to make mathematics learning more relevant and meaningful for students, while also introducing important local cultural values.

3. Develop

The Development Stage focuses on finalizing the initial draft of the RME Teaching Module in the Context of Luwu Culture, Expert Validation (Content, Construct, & Culture), Data Analysis of Validation Results for Construct, Content, and Culture, Revision of the RME Teaching Module in the Context of Luwu Culture, and Limited Development Testing. The outcomes of this development stage include the RME Teaching Module (Initial Product), Results of Expert Validation (Content, Construct, & Culture), and Results of Limited Testing of the RME Teaching Module. To assess the validity of the developed teaching module, two expert validators in the field of mathematics provided evaluations and feedback regarding consistency, language, and the appropriateness of the material to the cultural context. The validators specialized in the RME approach and HOTS. In this research, the validators are Aswar Anas, S.Pd., M.Pd. and Fahrul Basir, S.Pd., M.Pd. Some substantive suggestions provided include:

1) The problem texts and activities should ensure the emergence of creative thinking, critical thinking, and decision-making.
2) The numerical elements should be carefully reviewed to map student competencies such as expert, competent, basic, and those requiring special intervention (NSI).

3) The statements should be written using standardized language. Use a more accessible language for students.
4) The font types used are not uniform, resulting in a less tidy appearance. For instance, a single page or slide contains two different types of fonts. It is advisable to use a more consistent font and avoid excessive variation in font types within the module.
5) When creating statements, it is advisable to maintain consistency with at least three statements and provide clear instructions for solving the problems.

These assessment results provide an overview of how well the module meets the required quality standards for enhancing students' higher-order thinking skills. Below are the overall results for the validity assessment based on HOTS indicators from both validators.

Table 5. Assessment Results of Validity Aspects Based on HOTS Indicators

Assessed Aspects	Average Validator 1	Average Validator 2	Total Average (%)	Validity Category
Relevance	3,75	4,08	78,33 %	Valid
Comprehensiveness	3,50	3,75	72,50 %	Valid
Clarity	4,00	4,25	82,50 %	Very Valid
Overall Average			**77,78 %**	**Valid**

Overall, the teaching module is deemed valid with an overall average of 77.78%, focusing primarily on enhancing students' HOTS abilities through the RME approach integrated with the cultural context of Luwu. This assessment indicates that the teaching module has successfully met the required standards, particularly regarding the clarity of the material, relevance of the content, and completeness of the assessed aspects.

4. Disseminate

The Disseminate stage is carried out through activities such as Final Revision of the RME Teaching Module in the Context of Luwu Culture, Implementation of the RME Teaching Module in the Context of Luwu Culture, Analysis of Data from the RME Teaching Module, Analysis and Description of Practicality and HOTS Data, and Dissemination and Publication of the RME Teaching Module in the Context of Luwu Culture. The output at this stage includes the RME Teaching Module (Final Product), Results of Practicality and Effectiveness Evaluation, and RME Learning Textbook.

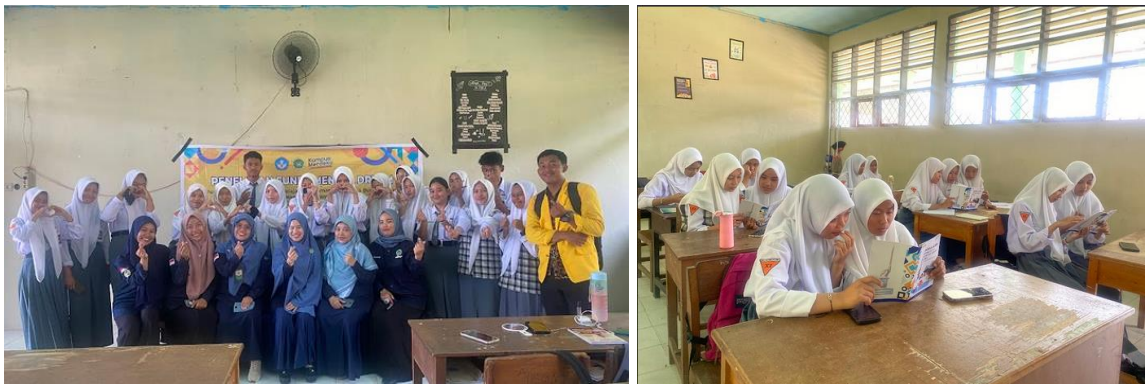

Figure 2. Implementation of Teaching Modules at SMA Negeri 9 Luwu

The implementation takes place at SMA Negeri 9 Luwu with a total of 98 students involved. The purpose of this implementation is to assess the effectiveness of the module in enhancing students' HOTS through the RME approach within the context of Luwu culture, integrated with the values of the Pancasila Student Profile. Students will be taught using the RME Teaching Module oriented towards the Merdeka Curriculum, integrated with the Pancasila Student Profile. The learning process will occur over four meetings, during which students will actively engage with this module to study mathematical concepts related to local Luwu culture. Throughout the learning process, students' activities will be observed to assess the extent to which their HOTS, such as critical thinking, problem-solving, and creativity, develop through the use of this module.

At the end of the process, students will complete a questionnaire to evaluate their responses to the teaching module provided. This evaluation is crucial for obtaining direct feedback from students regarding the module's effectiveness, both in terms of content delivery and the relevance of local culture in enhancing mathematical understanding. Feedback received from students will be used as a consideration for refining the Teaching Module. The practicality test of the module involves teachers and students in the learning activities. The assessment of practicality covers three main aspects: ease of use, effectiveness in learning, and implementation time from the user's perspective. The data obtained from this practicality test will serve as the basis for further refinement, ensuring that the teaching module can be more effective when implemented on a larger scale. The results of the teaching module's practicality assessment can be seen in Table 7.

Table 7. Assessment Results of Practicality Aspects Based on HOTS Indicators

Assessed Aspect	Average Rater 1	Average Rater 2	Total Average (%)	Practicality Category
Ease of Use	4,08	4,25	83,33 %	Very Practical
Effectiveness in Learning	4,00	4,08	80,83 %	Very Practical
Implementation Time	4,08	4,50	85,83 %	Very Practical
Overall Average			**88%**	Very Practical

Table 7 presents the summary of practicality assessment results based on HOTS indicators from two evaluators. In the aspect of ease of use, the module received an average score of 83.33%, indicating that it is very practical to use. The aspect of learning effectiveness obtained an average score of 80.83%, also categorized as very practical, while the aspect of implementation time received the highest score of 85.83%, suggesting that the time required for this module is very appropriate and efficient. The overall average practicality of the module is 88%, demonstrating that this teaching module is highly practical and can be effectively implemented in the classroom.

In evaluating students' HOTS, the focus is on four main indicators: critical thinking, creative thinking, problem-solving, and decision-making. Each indicator is assessed through three competency levels: knowing (L1), applying (L2), and reasoning (L3). This assessment aims to measure the extent to which students can understand and apply HOTS in accordance with the RME approach within the context of Luwu culture. The average scores for each indicator are presented in Table 8.

Table 8. Evaluation of Students' HOTS

HOTS Indicator	NSI		Basic		Competent		Expert	
	Students	%	Students	%	Students	%	Students	%
Critical Thinking	6	6,12%	56	57,14%	33	33,67%	3	3,06%
Creative Thinking	6	6,12%	48	48,98%	39	39,80%	5	5,10%
Problem Solving	5	5,10%	41	41,84%	43	43,88%	9	9,18%
Decision Making	8	8,16%	50	51,02%	35	35,71%	5	5,10%
Overall Average	**6,25**	**6,38%**	**49,74%**	**49,74%**	**37,5**	**38,5%**	**5,5**	**5,61%**

Table 8 displays the evaluation results of students' HOTS across four main indicators: Critical Thinking, Creative Thinking, Problem Solving, and Decision Making. Each indicator is assessed based on four categories of student abilities: NSI (Needs Special Intervention), which indicates students requiring additional attention to achieve basic skills; Basic, for students who have a foundational understanding but have not yet reached full proficiency; Competent, for students who can understand and apply HOTS concepts well; and Expert, for students demonstrating high mastery and deep critical thinking.

For each indicator, the percentage of students in each category is detailed to provide an overview of their HOTS skill distribution. The NSI category shows that around 6% of students in each HOTS indicator still need special intervention. They have not fully mastered the foundational concepts and tend to have limited skills. The Basic category indicates that nearly half of the students fall into this level, with an average of about 49.74%. They possess sufficient basic skills to solve routine math problems but struggle to apply concepts in broader or more complex contexts. The Competent category reflects an improvement in students' abilities, with an average of approximately 38.5%. Students in this category can apply mathematical knowledge in more diverse situations, although they do not consistently solve complex problems. The Expert category records an average of 5.61% of students who have achieved the highest level of competency. They can reason effectively and solve complex problems using mathematical concepts thoroughly.

Overall, the averages indicate that the majority of students are in the Basic and Competent categories, with 49.74% in the Basic category and 38.5% in the Competent category. Only a small proportion falls into the NSI (6.38%) and Expert (5.61%) categories. This suggests that while most students have a reasonable understanding of HOTS concepts, there is a need to enhance their abilities so that more students can reach the Expert category.

Discussion

The development of this teaching module focuses on the integration of the RME approach and the cultural context of Luwu, aligned with the Pancasila Student Profile. This module is designed to enhance students' HOTS across four main dimensions: Critical Thinking, Creative Thinking, Problem Solving, and Decision Making. The module not only introduces mathematical concepts but also emphasizes critical and analytical thinking skills necessary for solving real-world problems.

The fundamental principles of RME focus on horizontal mathematization and vertical mathematization (Fitri, 2016). Horizontal mathematization helps students connect real-world problems with mathematical models, while vertical mathematization encourages students to simplify, formulate, and generalize mathematical concepts. In this study, the teaching module based on RME within the Luwu cultural context successfully integrated these two principles, particularly through activities grounded in real-world problems from Luwu culture, such as Sipakatau, Sipakalebbi, and Sipakainge. This approach has proven effective in enhancing students' critical and creative thinking skills, as reflected in the HOTS categories achieved, with 5% of students classified as Experts. In this module, activities based on Sipakatau values, such as respecting differences of opinion in group discussions,

are designed to foster students' critical thinking in solving mathematical problems. Meanwhile, creative tasks, such as designing traditional Luwu patterns using geometry, enable students to explore new ideas.

The development of this teaching module aims to improve students' abilities within the HOTS categories, which are grouped into four levels: Expert, Competent, Basic, and NSI. The Expert category includes students who can reason well in solving complex and non-complex problems using mathematical concepts effectively. They demonstrate strong abilities in applying mathematical knowledge across various contexts. The Competent category consists of students who can apply their mathematical knowledge in diverse situations. They can solve problems using the concepts they have learned, although they may not fully tackle complex issues. The Basic category includes students who have foundational math skills, such as performing simple computations, solving direct equations, and mastering basic concepts in geometry and statistics. They can handle simple routine problems. The NSI category comprises students whose HOTS skills are still limited. These students exhibit partial mastery of mathematical concepts and require special intervention to enhance their abilities.

Research results indicate that the teaching module developed with the RME approach in the context of Luwu culture, integrated with the Pancasila Student Profile, is deemed very valid for enhancing students' HOTS. The validity assessment was conducted by three experts covering content validity, construct validity, and cultural validity. Based on these evaluations, the module received an average validity score of 77.78%, indicating that it is valid in terms of material relevance, completeness of information, and clarity of presentation. Thus, this module is considered suitable for use in the mathematics learning process within the cultural context of Luwu, focusing on improving students' HOTS and character development based on the dimensions of the Pancasila Student Profile. This finding is supported by research from (Mahanani et al., 2023), which states that teaching modules based on local wisdom integrated with the Pancasila Student Profile can enhance student competency and foster character aligned with Pancasila values. Although this module is effective for the majority of students, challenges arise in the NSI category, which requires more intensive intervention. This aligns with the study by (Sulaiman & Febrianta, 2022), which emphasizes the importance of mastering foundational skills before transitioning to higher-order thinking levels. Potential solutions include the use of visual aids or simple manipulatives.

Regarding the practicality assessment results, the developed teaching module demonstrates high practicality for use. The assessment was based on three main aspects: ease of use, effectiveness of learning, and implementation time. The results indicate that the module achieved an average score of 88%, which falls into the very practical category. This suggests that the teaching module is not only effective but also easy to implement in everyday learning contexts. These findings are also supported by the research of (Imswatama, 2023), which shows that teaching modules designed with a local wisdom context and the RME approach can enhance student engagement and facilitate a more effective learning process. It is further emphasized that developing higher-order thinking skills requires materials that are easily accessible and relevant to students' experiences, as reflected in the design of this module (Sutama et al., 2022). These results indicate that local wisdom-based modules not only improve mathematical skills but also contribute to preserving local culture. Similar modules can be adapted to other cultural contexts, providing more inclusive learning solutions in various regions.

Based on the evaluation of students' HOTS, the NSI category indicates that at least 6% of students still require special intervention, while the Expert category shows that about 5% of students have very good HOTS. However, there is still a need to strengthen more complex problem-solving aspects so that more students can reach this category. The majority of students fall within the Basic and Competent levels, indicating that the teaching module using the RME approach within the cultural context of Luwu is effective in developing students' foundational and intermediate abilities. This is also supported by research conducted by (Wahyudi, 2020), which shows that the RME approach can improve conceptual understanding of mathematics and enhance students' critical and creative thinking skills.

Overall, the development of this teaching module demonstrates that the integration of the RME approach with the cultural context of Luwu and the Pancasila Student Profile effectively enhances students' HOTS. This module not only facilitates the understanding of mathematical concepts but also encourages the development of critical, creative, and problem-solving skills. These findings emphasize the importance of utilizing teaching modules based on local wisdom in education to prepare character-aligned students according to the dimensions of the Pancasila Student Profile.

CONCLUSION

The development of this teaching module demonstrates that the integration of the RME approach within the context of Luwu culture, aligned with the Pancasila Student Profile, is highly effective in enhancing students' HOTS. The validity assessment results indicate that the module achieved an average score of 77.78%, categorizing it as valid, which reflects the module's quality in terms of material relevance, completeness of information, and clarity of presentation. Meanwhile, the practicality assessment of the teaching module garnered an average score of 88%, indicating that it is very practical and easy to implement in everyday learning contexts. The practicality evaluation encompasses three main aspects: ease of use, effectiveness of learning, and implementation time. In the evaluation of students' HOTS, the NSI category shows that 6% of students still require special intervention, while the Expert category indicates that approximately 5% of students have very good HOTS. The majority of students are positioned at the Basic and Competent levels, suggesting that this teaching module successfully develops students' foundational and intermediate abilities. Therefore, this teaching module is not only effective in enhancing the understanding of mathematical concepts but also in developing students' critical, creative, and problem-solving skills. It is thus deemed suitable for implementation in mathematics learning processes in schools, preparing students to become knowledgeable, critical individuals with character aligned with Pancasila values.

This research has limitations, including a limited number of respondents, which may prevent the results from being generalized to a broader population. The short duration of the study may also be insufficient to observe long-term changes in students' HOTS. Additionally, this study did not consider other factors that could influence the outcomes, such as students' educational backgrounds and the impact of the learning environment. For future research, it is recommended to conduct similar studies with a larger number of respondents to enhance the validity of the results. Long-term observations are also crucial for evaluating the impact of the teaching module on students' HOTS over time. Furthermore, developing teaching modules using different approaches or cultural contexts, as well as comparing the effectiveness of these modules, could be valuable. Lastly, examining the integration of other aspects, such as the influence of technology in learning, is expected to contribute more significantly to the advancement of education in Indonesia.

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