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Development of a HOTS-Based Ethnomathematics Module of the Sasambo Tribe on Spatial Geometry for Elementary School Students

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Abstract: This study aims to develop a valid and practical HOTS-based ethnomathematics module rooted in the cultural context of the Sasambo Tribe to enhance elementary school students' understanding of spatial geometry. The module demonstrates how cultural contexts can make abstract mathematical concepts more concrete and engaging, providing a model for integrating local wisdom into the national curriculum. The study employed a Research and Development (R&D) method using the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. Quantitative data were analyzed using descriptive statistical techniques, with percentage scores calculated for each instrument. Qualitative data in the form of suggestions and comments from validators, students, and teachers were analyzed thematically to inform revisions at each stage. The validity test results indicated media validation at 92.4% and material validation at 94%, both categorized as highly valid. In the practicality test, the module achieved 92% in the small-group trial and 96.2% in the large-group trial based on student assessments, while teachers' evaluations reached 100%, indicating a highly practical classification. The findings revealed that integrating Sasambo ethnomathematics with a HOTS approach increased student engagement in learning. The study concludes that the developed module meets the criteria of high validity and practicality and is suitable for use as an alternative teaching material in elementary mathematics instruction. Its structured design facilitates straightforward implementation by teachers, enhancing cultural relevance and fostering critical thinking skills in the classroom.

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Introduction

Education is inherently connected to culture, and effective educational practices should consistently incorporate cultural dimensions within the learning process (Widyastuti, 2021). Integrating cultural elements into education serves multiple purposes, including enhancing cultural literacy and civic awareness, equipping students with cultural knowledge and understanding as essential resources for addressing future life challenges (Putri & Nurhasanah, 2023). Instilling cultural values is important to impart to every individual from an early age, so that they can interpret, understand, appreciate, and recognize their importance in everyday life (Rahmawati et al., 2025). Integrating cultural values into education can also improve the quality of learning by making it more contextualized and delivered effectively, and by reducing the emergence of learning problems (Syifa, 2024).

Learning problems are often encountered in mathematics instruction. The most common problem is students' difficulty understanding mathematical concepts and problem-

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solving steps, which often impacts learning outcomes, particularly for low-performing students (Joefanny et al., 2024). Students frequently perceive mathematics as a challenging subject due to its abstract nature, which encompasses facts, concepts, operations, and principles that demand strong cognitive abilities for proper understanding (Aprilia & Fitriana, 2022). In addition, mathematics is often perceived as lacking relevance to real-life contexts, which contributes to students' low interest and limited engagement with the subject (Zulmaulida et al., 2021).

The material on the volume of geometric shapes is often considered difficult by students, leading to poor understanding and poor learning outcomes (Tampubolon, 2025). In research conducted by Puspitasari et al. (2021), it was found that fifth-grade students are experiencing learning problems, where students have not been able to properly understand the concept of geometric shapes in the cube material, have difficulty determining the numbers to be entered into the formula, and have difficulty when identifying elements in the cube geometric shape. Further tests were conducted to address the problems or learning obstacles students experienced with the geometric shape material. The test results indicated that, on average, students were unable to answer the questions correctly. Of the 20 students, only 2 met the Minimum Mastery Criteria (KKM) by providing correct responses (Puspitasari et al., 2021).

To address this issue, several strategic efforts are required, including the development of curriculum frameworks, instructional modules, and other educational innovations to improve the learning process (Zakiah et al., 2019). One effective measure to address suboptimal student learning outcomes is the development of instructional modules. Among the various types available, ethnomathematics-based modules are particularly effective in improving student learning. The problem addressed in this study focuses on students' learning outcomes. (Alditia et al., 2023). Their study demonstrated that implementing ethnomathematics-based learning modules significantly improved students' learning outcomes, with mastery levels increasing from 37.5% to 93.75%. Beyond enhancing students' learning outcomes, implementing ethnomathematics-based learning modules has been shown to strengthen students' problem-solving abilities (Nurhayati & Susilo, 2022). Moreover, Achor et al. (2009), highlight that the success of mathematics education in several developed educational contexts, such as China and Japan, is closely associated with the integration of ethnomathematics into instructional practices.

Ethnomathematics is all the results of mathematical activities carried out and developed within a community group. This concept involves the application of mathematical principles to various cultural products, including heritage artifacts such as temples and inscriptions, traditional buildings, pottery, and household utensils, as well as local measurement systems, *batik* and embroidery patterns, traditional games, and community settlement or residential patterns (Diantina et al., 2023). Mathematical culture takes various forms as it evolves alongside developments in the community (Purbaningrum, 2021). Ethnomathematics-based modules can be interpreted as specialized learning modules or tools designed by teachers to support mathematics teaching and learning activities in the classroom related to Culture (Bidiyah et al., 2024). The development of ethnomathematics-based modules can be adapted from products or results of indigenous cultural developments in the region. (Siregar, et al., 2025). Ethnomathematics as mathematics in culture can be found in the local wisdom of the Sasambo Tribe. The Sasambo Tribe, an indigenous tribe inhabiting the island of Lombok, has various forms and cultural symbols that incorporate mathematical concepts, ranging from traditional buildings, handicrafts, household utensils, musical instruments, and other cultural products. Fitriyah & Syafi'i (2022) explained the existence of

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mathematical concepts in the traditional building of the Sasambo Tribe, namely the bale lumbung. In the process of making it, they also use mathematical concepts to produce a sturdy building. Fauzi & Setiawan (2020) use cultural products as media for learning in elementary schools, including traditional buildings and traditional snacks. Because of the many forms of ethnomathematics in the Sasak culture and their relationship with various mathematical content in mathematics lessons, the variety of local wisdom of the Sasambo Tribe can serve as a reference for implementing learning packages in ethnomathematics-based learning modules.

Learning modules based on local or ethnomathematics have been proven effective in increasing learning (Latif & Talib, 2021). Several studies have been conducted in this context. For instance, Alvan (2022) developed an ethnomathematics-based e-module grounded in the local wisdom of the Sasambo Tribe, focusing on quadrilateral and pentagon concepts. Similarly, Nurika et al. (2022) developed a related module titled *"My Ambition"* for fourth-grade students. Even though research serves several purposes, the local Sasambo Tribe adapts with material, type, and product wisdom; local wisdom tends to be limited and does not provide special wisdom to deepen the related product or type wisdom it already possesses.

In many cases, local wisdom is used merely as a medium to explain or deliver learning materials. This limited utilization may reduce the expected educational benefits, as ethnomathematics-based learning media are intended not only to help students understand instructional content but also to foster deeper understanding and appreciation of local wisdom and the cultural values embedded within it (Serepinah & Nurhasanah, 2023). Additionally, the modules that have already been produced do not integrate Higher Order Thinking Skills (HOTS) orientation into the context material, geometry, and space in a unique way. The majority of them continue to focus on diverse content (e.g., get-up-flat or topic-themed), elements with limited local knowledge, and draft spatial activities that are not yet built to practice students' ability analysis, evaluation, and creation.

The development of learning modules based on local wisdom or ethnomathematics has been widely implemented because it has been proven effective in improving learning outcomes (Yuliana et al., 2023a). Several studies conducted in the context of developing local wisdom-based modules include Alvan, (2022) who conducted research to develop a product in the form of an ethnomathematics e-module based on the local wisdom of the Sasambo Tribe on the material of quadrilaterals and pentagons, then Nurika et al., (2022), also conducted a similar study, namely to develop a module based on the local wisdom of the Sasambo Tribe in learning the theme of my ideals in grade IV. The development of learning media for ethnomathematics modules carried out in these studies presented several local wisdoms of the Sasambo Tribe, adapted to the material presented. Still, the types or products of local wisdom tended to be limited and lacked a dedicated section for discussion. The products or types of local wisdom raised were used only as media to convey the material to be learned. Such an approach may limit its educational impact, as the development of learning products or media based on ethnomathematics or other cultural perspectives is intended not only to enhance students' understanding of the subject matter but also to deepen their knowledge of local wisdom and the cultural values represented (Serepinah & Nurhasanah, 2023). Therefor, this study aims to develop an HOTS-oriented ethnomathematics module grounded in the local wisdom of the Sasambo Tribe to teach spatial geometry to elementary school students. This research is expected not only to help address students' difficulties in understanding abstract geometric concepts but also to provide

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an innovative contribution to the advancement of culturally grounded mathematics learning media that support critical and higher-level thinking.

Research Method

The research uses the development research method with the ADDIE Model, which consists of five phases: analyze, design, develop, implement, and evaluate. Each stage was carried out through specific activities to ensure the development of a valid, practical, and HOTS-oriented ethnomathematics learning module based on the Sasambo Tribe.

At the analysis stage, data were collected through classroom observations and teacher interviews to identify students' learning difficulties in spatial geometry topics and to examine the alignment of the material with the existing curriculum. The results of this analysis served as the basis for formulating learning objectives and constructing the overall framework of the module. The design stage involved preparing a module blueprint, including organizing content outlines, developing an integrated learning flow, initial visual design, and constructing validation instruments. This stage resulted in a conceptual draft of the module (Prototype I). Subsequently, the development stage focused on transforming the design into instructional materials and visual media using Adobe InDesign software. Expert validation was conducted by material and media specialists, and their feedback was used to revise and improve the module, resulting in a more refined version (Prototype II).

At the implementation stage, Prototype II was tested in real classroom settings through two types of trials: a small-group trial and a large-group field trial conducted at SDN 14 Cakranegara. Practicality data were gathered using student and teacher response questionnaires and observations of the learning implementation. Feedback obtained from these trials was used as the basis for final revisions, leading to the development of the final product (Prototype III). The evaluation stage consisted of a comprehensive reflection on all stages and the collection of data to assess whether the module met the criteria of validity and practicality, allowing for conclusions regarding its feasibility as a learning product. Through the systematic application of the ADDIE model, the module development process was conducted transparently, targetedly, and data-drivenly at each revision stage.

The instruments developed and used to collect data during the validation and testing stages consisted of the following: The instruments employed in this study included: (1) Media Expert Validation Sheet, which is used to evaluate the feasibility of the module in terms of appearance, design, and language; (2) Material Expert Validation Sheet, which is used to assess the appropriateness of the content, the depth of concepts, and alignment with the curriculum; and (3) Student and Teacher Response Questionnaires, which are used to measure the level of module practicality based on aspects of appearance, ease of use, clarity of language, and usefulness of the material. All instruments utilized a 4-point Likert scale (e.g., 1 = Very Bad, 4 = Very Good).

The data analysis techniques applied in this study included descriptive quantitative analysis, with percentage scores calculated from each instrument. Qualitative data in the form of suggestions and comments from validators, students, and teachers were analyzed thematically and used as the basis for revising and improving the module at each stage of development. The interpretation of the percentage scores referred to the following criteria: 81–100% (Very Valid/Very Practical), 61–80% (Valid/Practical), 41–60% (Quite Valid/Quite Practical), and ≤40% (Invalid/Not Practical). Through this mixed-methods analytical approach, the module assessment became more comprehensive by integrating quantitative evidence of feasibility with qualitative feedback to support continuous improvement.

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Results and Discussion

Analysis

The analysis phase was structured into two main components: needs analysis and curriculum analysis. The needs analysis was conducted to identify existing learning needs and challenges as the foundation for product development. The findings revealed that students experienced significant difficulties in mathematics learning, particularly in understanding the concept of the volume of three-dimensional shapes. These difficulties were primarily attributed to the abstract nature of the instructional materials and their limited connection to students' everyday experiences. In contrast, the curriculum analysis focused on the content structure and instructional components implemented in schools to ensure alignment and relevance, thereby providing a systematic basis for developing the proposed learning product.

Design

The design stage focuses on planning and structuring the learning product to be developed (Sandri & Mailani, 2021). The HOTS-oriented ethnomathematics module for elementary school students is designed to address volume in three-dimensional geometry, encompassing flat-faced solids such as cuboids, cubes, triangular prisms, and rectangular pyramids, as well as curved-surface solids such as cylinders and cones. These mathematical concepts are systematically integrated with elements of local wisdom from the Sasambo Tribe to ensure the module is contextual, meaningful, and supportive of the development of higher-order thinking skills.

Develop

The development stage represents the realization of the product design formulated in the previous phase. At this stage, the learning module is produced in *Adobe InDesign* (Kartika & Mampouw, 2021). The development process begins with organizing and structuring the module content, followed by designing the module's visual appearance, including the creation of icons, backgrounds, and other supporting graphical elements (Sosonev, 2024). In addition to product development, validity testing was also conducted at this stage. The ethnomathematics module developed in this study, based on the local wisdom of the Sasambo Tribe and focused on the volume of three-dimensional shapes for fifth-grade students, consists of a series of systematically organized components. These components include the cover, title page, foreword, table of contents, list of figures, introduction, learning activities, summary, competency test, answer key, reflection, glossary, and bibliography. Each section is intentionally designed to support the instructional objectives and to enhance the overall quality and effectiveness of the module as a learning medium.

The module begins with a cover (as shown in Figure 1) that serves as the primary visual and informational introduction. This section provides essential information, including the module title, target users, semester details, and the author's name (Education, 2008). It is complemented by images and illustrations that represent elements of the Sasambo Tribe's local wisdom to establish cultural relevance from the outset.

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Figure 1. Cover View

Following the cover, the title page presents more detailed information, including the complete module title and the names of the authors, supervisors, and expert validators involved in the module development process (Education, 2008).

Implementation

The implementation stage involved testing the developed module in actual classroom learning activities. In this study, the trial implementation took place at SDN 14 Cakranegara and involved students from classes V-A and V-B, as well as the Class V teacher. The implementation was carried out in two phases: an initial small-group trial followed by a large-group trial to evaluate further the module's practicality and applicability in a broader learning context.

Evaluation

The evaluation stage represents the final phase in the ADDIE development model (Purnamasari, 2020). This stage is conducted to comprehensively review all implemented development phases and refine aspects that have not yet achieved optimal results. In general, the evaluation process focuses on making improvements based on findings from validation and trial activities.

The Validity and Practicality Test of the Module

Validity Test Results

Validity test module carried out by media expert validators and material experts. Assessment results are served in Tables 1 and 2.

Table 1. Validity Test Results by Media Experts

No	Rated aspect	Percentage (%)	Category
1.	Design and Layout Feasibility	93	Very Valid
2.	Quality Illustrations and Images	92	Very Valid
3.	Language Appropriateness to Student Level	92	Very Valid
Overall Average 92.4		**Very Valid**	

The module is considered highly valid from a media perspective, with an average score of 92.4%. The validator provides input on special-related icon improvements to make them more contextual with the culture of Sasambo, who has revised the stage development.

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Table 2. Validity Test Results by Material Experts

No	Rated aspect	Percentage (%)	Category
1.	Depth and Accuracy of Content	95	Very Valid
2.	Compliance with Curriculum	94	Very Valid
3.	Integration of Local Wisdom with Draft Mathematics	93	Very Valid
Overall Average		**94**	**Very Valid**

Content material module was rated as very valid with an average of 94%. The validator suggested an additional module at the end of the module, which was then integrated into the product.

Practicality Test Results

The practicality test was conducted in two stages: a small-group trial involving six students and a large-group trial involving nineteen students and one teacher. The results of these trials are presented in Tables 3 and 4.

Table 3. Results of the Practicality Test in the Small Group Test

No	Aspect Evaluation	Percentage (%)	Category
1.	Convenience Use	91	Very Practical
2.	Clarity of Language	92	Very Practical
3.	Benefits of Material	93	Very Practical
Overall Average		**92**	**Very Practical**

The module has fulfilled the practicality aspect since the early trials, with a score of 92%. Students can follow channel learning with Good, even though in a small group.

Table 4. Results of the Practicality Test in the Large Group Test

Respondents	Aspect Evaluation	Percentage (%)	Category
Student	Appearance and Design	97	Very Practical
	Readability and Language	96	Very Practical
	Benefits of Learning	95.8	Very Practical
Average Student	**96.2**	**Very Practical**	
Teacher	Compliance with RPP	100	Very Practical

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Respondents	Aspect Evaluation	Percentage (%)	Category
	Convenience Implementation	100	Very Practical
Average Teacher	**100**	**Very Practical**	

The module was described as very practical by students (96.2%) and teachers (100%). Teachers provided input on an additional variation example, such as wisdom from local figures like *Cukli*, as enrichment material.

Discussion

The high levels of validity and practicality obtained in this study are consistent with the findings of Alditia et al. (2023) and Erva et al. (2022b), which highlight the effectiveness of ethnomathematics-based modules in learning. Nevertheless, a notable distinction emerges: the present study develops a module focused on Higher Order Thinking Skills (HOTS) within the context of spatial geometry, a topic commonly perceived as challenging by students, whereas previous studies have predominantly focused on plane geometry or thematic learning contexts.

The present findings converge with those of Kumar et al. (2018) and Fitriana et al. (2024) regarding increased learning motivation, reinforcing the role of cultural contextualization in enhancing student engagement. In contrast, divergence is observed in the depth of cultural integration, as this study does not merely employ local wisdom as illustrative content but positions it as an integral component of the reasoning process underpinning HOTS development. For instance, students are encouraged to analyze the structural design of traditional barns to develop a conceptual understanding of volume.

From a theoretical perspective, this study's findings reinforce the role of ethnomathematics as a cognitive bridge between informal and formal knowledge, particularly in spatial reasoning. From a pedagogical standpoint, the developed module provides empirical evidence that a Higher Order Thinking Skills (HOTS) approach can be effectively integrated with culture-based learning without compromising conceptual depth; instead, both elements mutually reinforce one another. These findings imply that the development of similar instructional materials should give balanced attention to both cultural and cognitive dimensions, positioning local culture not merely as decorative content but as a meaningful medium for reasoning, creativity, and higher-level thinking.

The validity test was conducted to evaluate the feasibility level of the developed product. In this study, validity assessment focused on several key aspects, including module appearance, language use, and content suitability (Herawati & Muhtadi, 2018). The validation process involved expert reviewers, including media and material experts. Media experts conducted the initial validity test to assess the module's appearance and language. The results showed a validity percentage of 92.4%, placing the module in the *very valid* category. This score was derived from the accumulation of evaluations across all indicators related to module appearance and language, which met feasibility standards and received positive assessments. These indicators included visual suitability and consistency, systematic presentation, color usage, layout design, font selection, and the appropriateness, effectiveness, and clarity of language in relation to students' cognitive levels.

Overall, the validation results indicate that the developed module meets the criteria for a high-quality, appropriate learning media product for use in the instructional process. Nevertheless, during this initial validation stage, several aspects requiring improvement were identified based on the expert validators' comments and suggestions. The feedback primarily

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concerned the module's design elements, particularly the use of icons, which were considered insufficiently engaging and not fully aligned with the representation of the *Sasak* ethnic local wisdom embedded in the module. As a result, the validators recommended redesigning the icons to better reflect the intended cultural context. In addition, suggestions were also provided regarding the material content, specifically the absence of a comprehensive summary covering the entire module. The existing summaries were limited to individual subtopics, leading to a recommendation to include an overall summary that synthesizes the complete learning material.

Based on these suggestions, the next step was to revise and refine the module product. Revision is a crucial phase in product development, as it aims to enhance the quality and effectiveness of the final product. Alditia (2023) emphasizes that revision is a core component of the development process, in which improvements are systematically implemented based on assessment outcomes and feasibility evaluations of the developed product.

After the module was confirmed to meet the practicality criteria in the first trial stage, a second trial was conducted using a large-group scheme. At this stage, the research subjects comprised 19 students and 1 teacher. The trial implementation involved distributing the module to both students and the teacher for use as a learning medium during classroom instruction. The learning activities were carried out under the teacher's guidance and followed the instructional stages outlined in the module. Upon completion of the learning process, students and the teacher were asked to complete response questionnaires to evaluate the module on appearance, language use, content, and overall effectiveness. The assessment used a 4-point Likert scale (1-4) for each evaluation indicator. Based on the accumulated scores from the student response questionnaires, the module achieved a practicality level of 96.2%, placing it in the *very practical* category. Similarly, the accumulated results from the teacher response questionnaire indicated a practicality level of 100%, also classified as *very practical*.

During the second implementation trial, no issues were identified regarding the practicality elements of the developed module. The module was effectively used by both students and the teacher, indicating that it served as an effective learning medium. Throughout the learning process, students demonstrated strong interest in the module's visual design, followed the instructional stages appropriately, understood the learning content, and actively participated in discussions on the contextual problems and cultural aspects embedded in the module. In addition, the teacher smoothly managed and coordinated the learning activities in accordance with the instructional stages outlined in the module. Nevertheless, the teacher provided constructive feedback for further improvement, particularly suggesting the inclusion of a greater variety of local wisdom products within the module, such as *cukli* handicrafts and other forms of Sasambo local cultural products, to enrich the learning experience further and strengthen cultural contextualization.

Based on the two trial stages conducted, the developed module was found to have met the practicality criteria overall. The practicality assessment encompassed evaluations of several module aspects, including appearance, language, content, and effectiveness. Regarding appearance, the small-group trial in the first stage yielded a practicality percentage of 94.7%. In comparison, the second-stage large-group trial resulted in practicality scores of 97% based on student responses and 100% based on the teacher's assessment. This evaluation aspect comprised four indicators: the assessment of the module's visual design; the influence of image use on students' learning motivation; the role of images in supporting students' understanding of the learning material; and the appropriateness of the font type used in the

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module. The evaluation results indicate that the module offers an appealing visual presentation through the integration of Sasak ethnic cultural elements. The inclusion of local wisdom images related to the Sasak culture positively influenced students' learning motivation. At the same time, the selected font type further increased students' interest by being visually attractive and easy to read.

These findings are consistent with Fatimah's (2024) results, which indicate that the use of learning media integrating cultural elements or local wisdom can enhance students' enthusiasm and learning motivation. This effect occurs because the learning process becomes more contextual and closely connected to students' lived experiences. Another aspect evaluated was the linguistic aspect. Based on assessments conducted during the trial stages, the practicality score reached 86.5% in the first trial. In the second trial stage, the practicality increased to 96% from students' responses and 100% from teachers' responses. The language aspect comprised two indicators: the appropriateness of word and sentence usage in the module, and the suitability of the language in facilitating students' ability to follow the learning stages presented in the module. The evaluation results indicate that the selection and use of words and sentences in the module were appropriate and effective.

The final aspect evaluation is cargo material and effectiveness, based on the assessment carried out during the trial stage. In the trial stage, aspects of material and effectiveness received practicality ratings of 98.3% in the first trial stage and 98.1% in the second trial stage, with students receiving 98.1% and teachers receiving 100%. Aspects This consists of the five indicators which include evaluation to influence cargo story and aspects culture Sasak tribe with motivation Study students, research influence use module to level understanding students, assessment to cargo steps activity learning on modules, assessment level ability students finish question training and competency tests as well as evaluation to influence implementation exercise questions and competency tests in increasing student knowledge related material that has been studied. From the results evaluation, it can be seen that the module containing draft ethnomathematics based on the local wisdom of the Sasak tribe on the material of volume of shapes and space can increase students' motivation and understanding, thereby improving abilities and learning outcomes. The findings are consistent with research conducted by Fitriana et al. (2024), which shows that the use of ethnomathematics-based learning media effectively enhances students' learning motivation. Increased motivation is closely associated with improved understanding of the material, which, in turn, contributes to higher learning outcomes and academic achievement (Umar et al., 2023). Alditia (2023) reports that implementing ethnomathematics-based learning media improves students' abilities, as evidenced by higher learning outcomes and academic achievement. In addition, providing practice questions enhances students' understanding of the learning material (Otania & Asi, 2019). Regular engagement with practice exercises encourages students to recall and apply previously learned concepts. A higher frequency of completing practice questions has been shown to strengthen students' comprehension of the material studied significantly (Malisda et al., 2023).

The findings indicate an improvement in students' learning motivation, consistent with the results of Fitriana et al. (2024). The study reports that the use of ethnomathematics-based learning media is effective in increasing students' motivation. Motivation was measured through participatory observation and student response questionnaires, which revealed that integrating cultural contexts into mathematics learning creates a more relevant and engaging learning environment. Students not only became more active in discussions but also showed increased interest in learning materials that had previously been perceived as abstract. These findings suggest that an ethnomathematics approach functions not only as a

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strategy for delivering instructional content but also as a psychological catalyst that stimulates curiosity, enhances emotional engagement, and encourages active student involvement in the learning process.

Conclusion

This study successfully developed a HOTS-based ethnomathematics module rooted in the Sasambo Tribe culture for elementary school students. The module was found to be highly valid and highly practical based on expert validation and user trials involving teachers and students. It effectively integrates local cultural wisdom with spatial geometry concepts, enhances student engagement and learning motivation, and supports teachers in delivering abstract mathematical concepts in a contextualized manner. Academically, this study contributes to the development of culturally responsive, HOTS-oriented learning media and has strong potential for further application across different mathematical topics and cultural contexts.

Recommendation

Based on the findings of this study, several recommendations can be proposed for relevant stakeholders:

1) Teachers are encouraged to integrate the HOTS-based ethnomathematics module into the teaching of spatial geometry, particularly in schools with culturally relevant contexts. To achieve optimal effectiveness, teachers may participate in training programs or workshops focused on implementing ethnomathematics approaches and developing HOTS-oriented questions, enabling them to adapt and design similar learning materials for other mathematics topics.
2) HOTS-based ethnomathematics approaches may be considered for adoption in the development of elementary mathematics teaching materials, especially for abstract concepts. It is important to design clear guidelines or integration models that incorporate a broader range of local wisdom and to encourage further research to evaluate the long-term impact of this approach on students' higher-order thinking skills and cultural literacy.
3) Schools can support the dissemination and implementation of this module by facilitating its use among teachers and providing supporting resources, such as collections of local cultural artifacts or access to cultural resource persons. Collaboration with local communities, traditional leaders, or cultural experts is also recommended to enrich the cultural content and strengthen the cultural validity of the developed teaching materials.

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