JPPIPA 11(10) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Integration of Lubuklinggau Local Wisdom in the Development of Mathematics Teaching Modules for PGSD UNPARI Students

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Received: August 02, 2025
Revised: September 08, 2025
Accepted: October 25, 2025
Published: October 31, 2025

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DOI: 10.29303/jppipa.v11i10.12381

Abstract: Local wisdom represents a valuable source of cultural knowledge that can be integrated into mathematics education to promote meaningful and contextual learning. In the Lubuklinggau region, however, such integration has not been optimally realized, particularly in the development of higher education teaching materials. This research seeks to design and validate a mathematics teaching module incorporating Lubuklinggau's local wisdom for PGSD students at UNPARI. Employing a research and development (R&D) approach with the ADDIE framework—comprising analysis, design, development, implementation, and evaluation—data were gathered through interviews, literature review, expert assessment, and limited classroom trials. Descriptive and qualitative analyses were applied to evaluate the results. Validation outcomes demonstrated high levels of validity with average scores of 0.85 (content), 0.87 (media), and 0.89 (language). Lecturers and students also provided very positive responses, with practicality scores of 4.6 and 4.43, respectively. The findings indicate that the developed module is both feasible and effective in improving students' contextual understanding of mathematics while fostering the appreciation and preservation of local cultural values within the university setting.

Keywords: Tteaching modules, contextual mathematics, Local wisdom, Lubuklinggau, PGSD.

Introduction

In the era of globalization, education must continuously evolve to address the challenges of modern learning. Mathematics, as a universal language of science, plays a vital role in developing logical, analytical, and problem-solving skills. However, mathematics is often perceived as abstract and difficult to understand by students (Fitriani et al., 2021). Consequently, innovation in mathematics education is essential to make learning more meaningful, contextual, and relevant to students' everyday experiences. Integrating local cultural contexts into learning materials reflects a universal educational value—the need to connect global competencies with local identities and social realities.

Contextual and culture-based learning approaches have long been recognized as effective strategies for improving conceptual understanding and learning motivation (Sari, D. P., & Putra, 2020). In this regard, local wisdom serves as a rich and authentic source of contextual knowledge that supports cultural preservation while enhancing educational quality. Lubuklinggau City, known for its diverse traditions and unique cultural practices, offers significant potential for the development of mathematics teaching modules grounded in local wisdom (Rahmawati, N., Santoso, B., & Lestari, 2022). The use of local languages in teaching, as demonstrated in the Mawng language project in

How to Cite:
Luthfiana, M., & Fitriyana, N. (2025). Integration of Lubuklinggau Local Wisdom in the Development of Mathematics Teaching Modules for PGSD UNPARI Students: Kearifan Lokal, Modul Ajar Matematika, Lubuklinggau, PGSD,. *Jurnal Penelitian Pendidikan IPA*, *11*(10), 975–976. https://doi.org/10.29303/jppipa.v11i10.12381

Australia, not only assists in the understanding of mathematical concepts but also reinforces important local cultural knowledge, thus contributing to cultural preservation. Studies such as (Edmonds-Wathen & Gumurdal, 2024) have shown that uncorporating local languages and cultural elements into instruction not only strenghens understanding of abstract conceptsbut also contributes to cultural sustainability (Sakti et al., 2024). The development of local wisdom-based mathematics teaching modules also has the potential to improve the pedagogical competence of PGSD students in teaching mathematics innovatively and contextually Wijaya et al (Wijaya, T., Nugroho, S., & Prasetyo, 2021). The integration of STEM (Science, Technology, Engineering, and Mathematics) principles into teaching modules is aligned with the Merdeka Curriculum, ensuring that the content is relevant and up-to-date with current educational standards (Putri et al., 2023).

The development of accessible and engaging learning modules for mathematical concepts is essential to enhance students' understanding and application of mathematics across a range of educational contexts. Such modules should facilitate a deep understanding of mathematical ideas, allowing learners to connect abstract concepts with practical applications, (Chance et al., 2024). This module is expected to be a learning resource that is easily accessible, and interesting, and facilitates an in-depth understanding of mathematical concepts. In addition, the integration of local culture into learning also contributes to strengthening students' character, especially a sense of love for culture (Hartono et al., 2021).

Despite numerous studies highlighting the importance of integrating cultural contexts into learning, then implementation of local wisdom in mathematics teaching materials pasticularly at the higher education level remains limited. Most available teaching modules focus primarily on cognitive outcomes, with less attention to cultural and affective dimensions of learning (Sulastri & Ramadhan, 2022; Nurhayati et al., 2023). incorporating local wisdom into character education has been shown to increase cultural awareness and community involvement in education Sakti et al (Sakti et al., 2024) This shows the importance of developing teaching materials that are not only oriented toward cognitive aspects but also cultural and affective.

In developing teaching modules, validation by material and media experts is a crucial part of ensuring the quality and effectiveness of the module (Aditya, R., & Sari, 2020). A well-validated module can increase the effectiveness of learning, as evidenced in the research of (Dewi, R. K., Wulandari, F., & Ananda, 2021). While learning modules are generally effective, their success does not solely depend on their structure. Factors such as time allocation, practice opportunities, and application of new skills in real-world settings also play an important role in improving learning outcomes Tariga et al (Tariga et al., 2022). In addition, the use of digital learning media based on local culture also supports the increase in learning motivation of PGSD students (Prasetyo & Lestari, 2023). Incorporating local knowledge into learning materials not only motivates students but also helps preserve their cultural identity (Usman & Ibrahim, 2023).

At the international level, a study by (Smith, J., & Jones, 2020) confirmed that learning materials containing local cultural contexts can improve students' critical thinking skills and mathematical creativity. (Wulandari, E., Nugroho, S., & Hartono, 2019). Also revealed that cultural contexts help students understand abstract math concepts more concretely and meaningfully. The importance of developing mathematics teaching modules based on local wisdom is increasing along with the demands of education which not only focuses on cognitive aspects but also affective and psychomotor aspects. Eastern culture-based art education is used to strengthen national identity by embedding moral and philosophical values into the curriculum. This approach involves classifying, identifying, and applying cultural arts in education to enhance students' understanding of local culture (Setyawan & Dopo, 2020). This is in line with the Merdeka Curriculum, which emphasizes contextual and local culture-based learning as an effort to strengthen national identity and the relevance of learning to daily life (Kemdikbud, 2021). Integrating local wisdom into the curriculum also helps preserve cultural identity and promotes more meaningful learning experiences, as seen in the integration of Malay local wisdom in learning (Aditya, R., & Sari, 2020).

addition, recent literature confirms that mathematics learning that connects concepts with local experiences can increase students' engagement and active participation in the learning process, This approach allows students to explore mathematical concepts in a social and interactive environment (Cevikbas & Kaiser, 2022). Local wisdom-based modules have been shown to significantly improve student engagement and understanding (Nurhayani et al., 2024). The integration of augmented reality with local wisdom in science education has also been shown to improve learning outcomes and student motivation making abstract concepts more real and interesting (Yulia & Suttrisno, 2024).

The integration of design, culture, and innovation in pedagogy creates immersive learning experiences that develop critical thinking and problem-solving skills while promoting cultural appreciation (Gamaliia et al.,

2024). More innovative and accessible teaching modules, including digital-based modules that integrate local cultural elements (Rahmawati, N., Santoso, B., & Lestari, 2022). In addition, while digital modules can improve cultural literacy and critical thinking, there is a need for careful design to ensure that they are relevant and effective in meeting educational objectives (Eko Wahyudi et al., 2025). This is very relevant for PGSD students as prospective educators who must be able to use modern learning media while preserving culture (Wahyuni & Putra, 2022). Research by Sutrisno and Ambarwati (2020) shows that the development of digital modules based on local wisdom can significantly increase students' learning motivation and mathematical problem-solving skills. High levels of student satisfaction and engagement with digital modules contribute to improved learning outcomes (Parinduri et al., 2022). modules based on Ethno-Realistic Mathematics Education have shown the potential to significantly improve students' problem-solving skills, validated through expert reviews and student evaluations (Alghiffari et al., 2024).

Recent international studies have also highlighted the importance of cultural context in mathematics learning, where students learning with a local cultural contextualized approach showed significant improvements in concept understanding and higher-order thinking skills (Zhang et al., 2023; Lee & Kim, 2022). This proves that this approach is not only locally relevant but also globally recognized as an effective and innovative learning strategy. Modules developed with an ethnomathematical approach are valid, practical, and effective in improving student understanding and engagement (Triwahyuningtyas et al., 2020). The use of multimodal digital modules incorporating ethnomathematical issues has also been validated as highly effective, with students achieving high scores and showing better learning outcomes (Suryawan et al., 2023).

Based on these various research results, the development of a mathematics teaching module based on local wisdom in Lubuklinggau City is a strategic step that supports improving the quality of mathematics education in Indonesia, especially for PGSD UNPARI students. This module is expected to be able to bridge the theory and practice of mathematics learning with the cultural context inherent in the student's environment so that learning becomes more meaningful and in-depth (Santoso & Wulandari, 2021).

Based on this scientific and practical foundation, the present study focuses on developing a mathematics teaching module that integrates the local wisdom of Lubuklinggau City. The developed module aims to bridge theoretical mathematics content with students' cultural experiences, thereby promoting meaningful learning and cultural appreciation. This research is urgent as it contributes to the advancement of contextualized mathematics education, enhances the pedagogical competence of PGSD students, and supports the preservation of local cultural identity within the framework of national education goals.

Method

This research uses the *Research and Development* (R&D) method which is an approach or a series of systematic actions that aim to create a new product or improve existing products, R&D is defined as a scientific process that identifies educational needs, develops products, and validates them to meet these needs effectively (Bonotto, 2023). The R&D approach is also used to develop instructional materials, such as teaching materials in numerical methods and social arithmetic. These materials undergo validation by experts and are tested for practicality and effectiveness through trials with students ((Zulyadaini, 2020), (Rahmawati & Rizki, 2017). The research and development method (*Research and Development*) is a scientific process to research, design, produce, and test the validity of the resulting product. This research produces products in the form of modules. The development model used is the ADDIE model whose stages have been adapted to the needs of this study, as explained by(Dewi, R. K., Wulandari, F., & Ananda, 2021) The ADDIE model is a systematic instructional design framework used widely in educational research, including mathematics education, to develop effective teaching and learning materials. It consists of five phases: Analysis, Design, Development, Implementation, and Evaluation. The selection of this model is in line with the research objectives set by the researcher. The ADDIE model consists of five different stages, namely Analysis, Design, Development, Implementation, and Evaluation, as visually depicted in Figure 1.

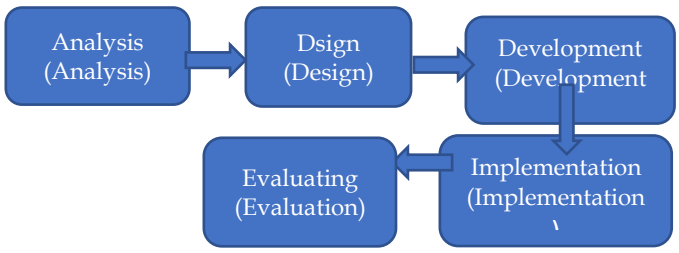

Figure 1. Flowchart of Research Procedure

At the development stage, it is sufficient for a learning tool to meet three criteria, namely valid, practical, and effective (Sudijono, 2011). In module development a comprehensive needs analysis is

conducted, including curriculum and material analysis, (Rejeki et al., 2023), then design focuses on integrating higher-order thinking skills into the assessment framework (Maxnun et al., 2024), material development stage and expert assessment to ensure theoretical validity (Rahman et al., 2022), then implementation is limited to producing a valid and practical product (Susanti et al., 2022) and evaluation of different teaching modules involves post-test assessment to measure effectiveness (Nurfadilah et al., 2024). The instruments used in this study consisted of three main types tailored to the purpose of evaluating the developed learning module. First, the module validation sheet**,** which is an instrument used to obtain data and input from experts (validators) on the module prepared at the initial design stage.

Validation is carried out on three aspects, namely content or material validation, construction or media display validation, and language validation, each of which is outlined in a separate assessment sheet. Second, the module practicality sheet**,** which is an instrument in the form of a questionnaire given to lecturers and students as direct users of module products. This questionnaire aims to measure the level of practicality of the module that has been validated. The assessment is carried out based on the experience of using the module in learning activities, including ease of use, clarity of display, and usefulness of the material. Third**, the** module effectiveness sheet is an instrument used to measure the effectiveness of the module in improving student learning outcomes. According to Prasetyo (2012) and Purwasi & Fitriyana (2020), a teaching material product can be said to be effective if it meets the criteria for individual and classical completeness and gets a positive response from students. This instrument consists of two main components, namely a questionnaire of students' responses to the module, and a test of students' learning outcomes.

The content validity of the module was calculated using Aiken's V formula as described by Azwar (2012). The V value interpretation categories can be seen in Table 1.

Table 1. Module Validity Criteria

Correlation Coefficient	Validity Interpretation
V > 0,80	High Enough
0.60≤ V < 0.80	High Enough
0.40≤ V< 0.60	Bad
0≤ V< 0.40	

The developed module is declared practical if the average value of practicality (P≥3). The criteria for determining the practicality of a module developed are guided by the following Table 2.

Table 2. Criteria for Module Practicality

Value	Practicality Category
4≤ P≤ 5	Very Practical
3≤ P < 4	Practical
2≤ P< 3	Less Practical
1≤ P< 2	Not Practical

The effectiveness of the module was analyzed by calculating the N-Gain from the pretest and posttest scores. The interpretation of the N-Gain value can be seen in Table 3.

Table 3. N-Gain Category (g)

N-Gain Range (g)	Practicality Category
g > 0,7	High
0.3≤ g≤ 0.7	Medium
g< 0.3	Low

Result and Discussion

Define Stage

The defining stage is the initial phase in the development process which aims to identify the main problems in learning and formulate the need for developing teaching materials systematically. In the context of this research, the defining stage is carried out in stages through four forms of analysis, namely end-start analysis, task analysis, concept analysis, and formulation of learning objectives.

Start and End Analysis

The initial analysis focused on exploring the root of the problems faced by PGSD students in participating in the Basic Mathematics Concepts course at PGRI Silampari University. The results of this stage show that most students have difficulty understanding the concepts of relations and functions. One of the main causes is the absence of teaching materials that are contextual and relevant to their needs. Therefore, a needs assessment was conducted by identifying students' level of understanding, topics that are considered difficult, and mathematical skills that need to be developed. This information became an important basis in the preparation of the learning module to be developed.

Task Analysis

The next step is to analyze the types of learning tasks that will be given to students. The tasks are designed to support the achievement of learning objectives set out in the Semester Learning Plan (SSP), particularly on the topic of relations and functions. The tasks in the module are based on the Indonesian Realistic Mathematics Education (PMRI) approach, which focuses on solving contextual problems related to

students' daily lives. In the process, students are invited to understand the problem situation, discuss it, solve it independently or in groups, and finally reflect on the mathematical concepts learned. This strategy aims to make mathematical concepts not only procedural but also meaningful and applicable in real life.

Concept Analysis

Concept analysis was conducted to identify and categorize the content of the material to be developed in the module. Relation and function materials were analyzed systematically to determine the core concepts that must be understood by students. The concepts are then organized into modules that are adapted to the cultural context and local wisdom of Lubuklinggau City. The integration of local values is expected to increase students' involvement and understanding of the material studied.

In the early part of the module, local wisdom was introduced through contextual stories related to local community figures. For example, a family structure involving a well-known local leader in Lubuklinggau City was used to illustrate the concept of "relations." Furthermore, the contextualization was expanded through real-life examples familiar to students, such as local tourist attractions (Bukit Sulap, Air Terjun Temam, Masjid Agung As-Salam, and Taman Olahraga Silampari) and traditional culinary dishes (Sambal Tempoyak, Burgo, and Pindang Patin). These cultural and geographical contexts were intentionally chosen to connect mathematical concepts of relations and functions with students' everyday experiences. Through such integration, the module reflects the local identity of Lubuklinggau while supporting the PMRI principles that emphasize meaningful, culturally grounded learning.

Learning Objective Specification

Based on the results of concept and task analysis, researchers formulated learning objectives that reflect the competencies to be achieved. These objectives were then translated into specific and measurable indicators of achievement. The formulation of objectives is done carefully so that the direction of module development does not deviate from the initial needs and remains relevant to the established competency standards. With the right formulation of objectives, the developed module is expected to be an effective and directed teaching tool.

Design Stage

The *design* stage is an important process in the development of learning tools, which aims to prepare the initial design of teaching modules to suit the learning objectives and characteristics of students. In this stage, several main activities are carried out, namely the preparation of test instruments, media selection, and determination of the format and structure of the teaching modules to be developed.

Drafting the Test Instrument

The evaluation instruments developed at this stage consisted of pretest and posttest questions focused on relation and function material. The form of questions developed in the form of essays as many as five items, which are designed to measure students' conceptual understanding in depth. The substance of the questions includes an understanding of the definition of relations and functions, sequential pair analysis to identify whether a relation is a function, and the ability to determine the domain, codomain, and range. In addition, students are asked to describe relations in the form of arrow diagrams and provide examples of the application of functions in everyday life along with their mathematical explanations. The design of this question aims to evaluate students' skills from theoretical understanding to applicative aspects.

Media Selection

The visual and technical aspects of the module were also an important concern in the design stage. Media selection was done by paying attention to typography and layout elements to ensure readability and visual comfort for users. The fonts used consist of *Lucida Bright, Times New Roman*, and *Cambria*, with font sizes ranging from 12 to 20 pt. The module is organized using A5 paper size with margins: top 4 cm, bottom 3 cm, left 3 cm, and right 3 cm. The dominant colors used are blue and beige, which were chosen to create a friendly and professional visual impression.

Determination of Module Format and Structure

Table 4. General Structure of Module Format

Module Section	Module Content
Initial Section	Front cover, preface, table of contents, introduction (instructions for use, PMRI, core & basic competencies, achievement indicators), concept map
Contents	Activities 1 (understanding forms presentation relations) and Activity 2 (understanding the characteristics of functions), with exercises
Final Section	Glossary, bibliography, back cover

The module structure is systematically designed into three main parts, namely the initial part, the content part, and the final part. The initial part includes elements such as the cover page, preface, table of contents, and introduction which includes instructions for using the module, an introduction to the PMRI approach, core and basic competencies, and indicators of competency achievement. The content section consists of two learning activities, each of which is accompanied by exercise questions, namely understanding the form of presentation of relations and recognizing the characteristics of functions. The final part of the module contains a glossary, a bibliography, and a cover in the form of a back cover page. The structure of this preparation is presented in Table 4.

Initial Module Design

After the structure and content were designed, the researcher compiled the module using Microsoft Word 2010 to ensure that the text and materials were arranged systematically. Visual elements such as the cover, header, and footer were designed through the Canva application to enhance the visual appeal of the module. Once the drafting was complete, the module was saved in PDF format to maintain consistency of appearance when distributed and then printed in color version. This stage is designed to ensure that the module is not only content-wise in line with the learning needs but also aesthetically appealing and professional so as to increase students' interest in learning. The visualization of the initial design of the module is presented in Figure 2 to Figure 4, including contextual exercises based on Lubuklinggau's cultural identity, as shown in Figure 4.

These figures display the cover, preface, table of contents, introduction to PMRI, and examples of contextual problems that integrate elements of local wisdom, such as local tourist attractions and traditional foods from Lubuklinggau City.

Figure 2. Cover, preface, and table of contents

Figure 3. Introduction, PMRI, and core competencies

Figure 4. Example of contextual problems in the module integrating local wisdom of Lubuklinggau City through tourism and traditional culinary contexts.

Development Stage

The *development* phase is an advanced phase in the development process that aims to produce a final product in the form of a learning module that has gone through a thorough revision process based on input from experts. The integration of Lubuklinggau's local culture and daily life situations was consistently maintained during the module development, ensuring that each problem and illustration reflected authentic local wisdom. In this study, the module developed was based on the context of local wisdom of Lubuklinggau City and aimed at first-semester students. The development process was carried out with an evaluative approach through three main forms of testing, namely validity, practicality, and effectiveness tests.

Validation was conducted on three main aspects, namely the content of the material, media or appearance, and language used in the module. To support this process, researchers used a Likert scale-based validation sheet with a score range of 1 to 5. The score description consists of: very bad (1), bad (2), enough (3), good (4), and very good (5). Validators were asked to provide an assessment of the feasibility of the module based on the aspects they mastered, as well as provide comments and suggestions for improvements needed to make the module suitable for use in learning.

Module Validity Test

The validity test aims to ensure that the content, appearance, and language used in the module are in accordance with higher education standards and learner

characteristics. The validity assessment involved three experts with different fields of expertise, namely material experts, media/construction experts, and language experts. These experts come from competent lecturers at PGRI Silampari University. The following are the results of validation from 3 experts, as presented in Table 5.

Table 5. Results of Expert Validation of the Module

Validator	Aiken's V Index	Category
Material Expert	0.85	Valid
Media Expert	0.87	Very Valid
Linguist	0.89	Very Valid

The validation results from the three validators showed that the module obtained high scores in each aspect. This assessment shows that the module content is considered relevant, the visual presentation is considered attractive and functional, and the use of language is considered communicative and in accordance with the ability of students. Overall, the validity test results provide a strong foundation that the module is feasible to proceed to the practicality and effectiveness test stages. Comprehensive validation from experts helped ensure that the product developed was not only academically appropriate but also technically and linguistically appropriate to support meaningful learning.

Module Practicality Test

The practicality test was conducted to assess the extent to which the developed module was easy to use by lecturers and students in the learning process. The instruments used in this test consisted of three types, namely the implementation observation sheet, lecturer response questionnaire, and student response questionnaire. This evaluation aims to ensure that all module components can be applied efficiently, and effectively, and support meaningful learning activities.

Implementation Observation

Observation of the implementation was conducted by the lecturer of the Basic Concepts of Elementary Mathematics course, Mrs. Lucy Asri Purwasi, M.Pd.Mat., who observed the process of using the module during the lecture activities. The assessment was conducted on three main aspects: introductory activities, core activities, and closing activities. The observation results showed that the introductory activities obtained an average score of 5, the core activities 4.5, and the closing activities also amounted to 4.5. Thus, the overall average reached 4.7 which is included in the very practical category (see Table 6).

Table 6. Results of Implementation Observation of the Module in Learning Activities

Assessment Indicator	Average	Category
Preliminary Activity	5.00	Very Practical
Learning Activities	4.50	Very Practical
Closing Activities	4.50	Very Practical
Average	4.70	Very Practical

This shows that the module has been optimally implemented and supports all stages of learning.

Lecturer Response

The practicality of the module was also tested through a questionnaire given to the lecturer. The assessment includes four aspects, namely content feasibility, visual appearance, language use, and module benefits. Based on the analysis, the average score of each aspect was: content feasibility 4.25; display 5.0; language 4.5; and benefits 4.6. The overall average reached 4.6 with a very practical category (see Table 7).

Table 7. Results of Lecturer Response Questionnaire

Assessment Indicator	Average	Category
Content Feasibility	4.25	Very Practical
View	5.00	Very Practical
Language	4.50	Very Practical
Benefits	4.60	Very Practical
Average	4.60	Very Practical

This positive response from lecturers supports the statement of Hartono et al. (2021) who emphasized that the availability of practical teaching materials plays an important role in helping lecturers act as effective learning facilitators.

Student Response

Students' responses to the practicality of the module were also analyzed. The module was implemented in class 1. C of PGRI Silampari University consisting of 32 students. After the learning process was completed, students were asked to fill out a questionnaire consisting of four aspects of assessment, namely content feasibility, appearance, language, and benefits. The results of the analysis showed that the average value for content feasibility was 4.45; appearance 4.47; language 4.4; and benefits 4.41. The overall average reached 4.43 which is classified as very practical (see Table 8).

Table 8. Results of the Student Response Questionnaire

Assessment Indicator	Average	Category
Content Feasibility	4.45	Very Practical
View	4.47	Very Practical
Language	4.40	Very Practical
Benefits	4.41	Very Practical
Average	4.43	Very Practical

To see the overall picture of the module's level of practicality, a recapitulation of the three instruments was carried out. The results of the analysis showed that the overall average of implementation observation, lecturer response, and student response was 4.54 which was categorized as very practical. These results indicate that the developed module has met all indicators of practicality. This module is considered easy to use, has an attractive appearance, uses communicative language, and provides real benefits in the learning process. This is in line with the opinion of Wardani and Hartono (2020) that time efficiency and ease of use are important elements in independent teaching materials. In addition, this finding is also reinforced by the results of Pratama and Wijaya's study (2021) which states that teaching materials are said to be practical if they are theoretically assessed to be used with minimal revision, and empirically get a positive response from users.

Module Effectiveness Test

Field trials were conducted on 32 first-semester students of class 1. C PGRI Silampari University. The effectiveness of the Mathematics Module based on the local wisdom of Lubuklinggau city was analyzed from the results of student learning tests. The test results show changes in student scores from *pretest* to *posttest*. Furthermore, the values obtained were analyzed to find the average student learning outcomes test results, gain, and N-gain which can briefly be seen in Table 9.

Table 9. Average Test Results

Group	Pretest	Posttest	N-Gain	N-Gain Interpretation
Average	45.78	83.75	0.700	High

Based on Table 9, shows that the average *pretest* value of student learning outcomes before learning by researchers in the trial class was 45.78125, then increased in the *posttest* with an average of 83.75. Furthermore, the N-gain value in the experimental class showed an increase in students' mathematical problem-solving ability with a value of 0.700288 thanks to the high category. From this calculation, it can be concluded that the Mathematics Module based on the local wisdom of Lubuklinggau city is said to be effective for use in elementary mathematics basic concepts courses.

Conclusion

Based on the findings of this study, it can be concluded that the mathematics teaching module based on the local wisdom of Lubuklinggau City for the topic of relations and functions fulfills the criteria of being valid, practical, and effective. The module's validity is supported by expert evaluations in material, media, and language aspects, yielding Aiken's V scores of 0.85, 0.87, and 0.89 respectively, all categorized as high validity. In terms of practicality, the module demonstrated very positive results, with an average score of 4.6 from implementation observations, 4.6 from lecturer responses, and 4.43 from student responses, indicating a very practical level. Furthermore, its effectiveness is shown through the significant improvement in students' learning outcomes, with an average N-Gain score of 0.7 categorized as high. These results suggest that the developed module is feasible and suitable as a supplementary teaching material for mathematics learning, particularly in the topic of relations and functions for PGSD students at UNPARI.

From a broader perspective, the integration of local wisdom into mathematics learning materials contributes to strengthening contextual and culturally responsive pedagogy. It supports the idea that connecting mathematical concepts with students' real-life and cultural contexts can enhance conceptual understanding, engagement, and appreciation of mathematics. Therefore, this study provides an important implication for curriculum developers and teacher educators to further explore the integration of cultural elements into STEM education.

However, this research has several limitations. The implementation was conducted on a limited sample within one institution, which may affect the generalizability of the findings. Moreover, the focus of the module was restricted to one topic, namely relations and functions. Future research is recommended to expand the development of local wisdom-based learning materials to other mathematical topics and to test their effectiveness in broader educational settings and different cultural contexts. In addition, further studies could examine the long-term impact of such culturally integrated learning materials on students' mathematical reasoning, critical thinking, and attitudes toward mathematics.

Acknowledgments

Based on the results of the research that has been done, it can be concluded that the Lubuklinggau City local wisdom-based math module on the material of relations and functions meets the criteria of valid, practical, and effective. The validity level of the module is supported by the validation results from material, media, and language experts who each obtained

Aiken's V scores of 0.85, 0.87, and 0.89 which are included in the high validity category. In terms of practicality, the module showed excellent results with an average score of 4.6 from the implementation observation, 4.6 from the lecturer response questionnaire, and 4.43 from the student response, all of which were in the very practical category. Meanwhile, the effectiveness of the module is reflected in the significant increase in student learning outcomes, indicated by the average N-Gain value of 0.7 which is in the high category. Thus, this module is feasible to be used as a supporting teaching material in learning mathematics in college, especially on the topic of relations and functions.

Acknowledgments
The author would like to thank all those who have provided support in the implementation and preparation of this research article.

Author Contributions
Conceptualization, M.L. N.F.; methodology, Y.F.; formal analysis, M.L. N.F.; investigation; M.L. N.F.; resources,. M.L.; data curation: M.L. N.F.; original draft writing: M.L. .NF.; review and editing: M.L; visualization: N.F. All authors have read and approved the published version of the manuscript.

Funding
This research was funded by the Universitas PGRI Silampari.

Conflicts of Interest
The researchers in this study were assigned by institution with the aim of improving the lecturers' resources from Universitas PGRI Silampari, Indonesia.

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