

# Development Of Local Wisdom-Based Natural And Social Science (Ipas) Teaching Materials For Grade Iv Of Alauddin Madani Madrasah Ibtidaiyah Madani Makassar

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**Abstract:** This research aims to develop Science teaching materials Natural and Social Sciences (IPAS) based wisdom local for students class IV at Madrasah Ibtidaiyah Civil Alauddin . The research was conducted to answer need will appropriate teaching materials with curriculum national and relevant with life culture students . With lift theme social and cultural diversity in Indonesia, this research combines material curriculum with wisdom local nearby with the student environment , in particular wisdom local South Sulawesi. Development This teaching material uses the 4D model ( Define, Design, Develop, Disseminate ). The Define stage done through analysis needs that include observation curriculum and teacher interviews , which show the need strengthening contextual and close science and technology material with culture local . Design Stage produce initial prototype of interesting and interactive teaching materials . At the Development stage , validation by experts materials , media, and teachers show that suitable teaching materials used with only minor improvements. Prototype Then tested through pre-test and post - test students , who show existence improvement understanding material diversity culture . The teacher gives response positive towards practicality and effectiveness teaching materials . t astage Disseminate , teaching materials are tested in scope limited without seminar or dissemination to schools other reasons . This is due to the following reasons: strategic and limitations source power . However , trials in class IV showed significant results with improvement results Study students and positive feedback from teachers. The results of this study confirm that The teaching materials developed are valid, practical and effective in increase understanding students' awareness of social and cultural diversity in Indonesia. Integration wisdom local make learning becomes contextual , interesting and meaningful for student . The conclusion of this study emphasizes importance development based teaching materials wisdom local as a supporting medium contextual and relevant learning . The results are expected can be a reference for teachers in designing teaching materials that not only support achievements curriculum , but also build character and pride in culture local.

**Keywords:** Teaching materials , science knowledge nature and social, wisdom local , education , Madrasah Ibtidaiyah

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## 1. INTRODUCTION

Indonesia is known as a country with the highest cultural diversity in the world, encompassing diverse languages, customs, arts, and traditions across every province and island . This diversity provides a wealth of learning resources that can enrich the curriculum, particularly in Natural and Social Sciences (IPAS) subjects, which intrinsically demand cross-disciplinary understanding. Utilizing local wisdom in learning has been shown to increase student engagement and motivation . However, IPAS teaching materials in many madrasas are still general and lack local context, making it difficult for students to relate scientific concepts to their cultural environment . In fact, cultural integration in learning not only strengthens identity but also facilitates understanding of concepts through real experiences around students .

At Madrasah Ibtidaiyah Madani Alauddin Makassar, science and science learning activities still rely heavily on centralized textbooks without adapting the Makassar context to Bugis-Makassar cultural heritage. Initial observations indicate low levels of active student participation during cultural discussions and low retention of material when not linked to local experiences. Teachers acknowledged the lack of teaching materials specifically designed to systematically integrate local wisdom into the structure of science and science materials . This situation has triggered the need to develop teaching materials based on proven models.

Science learning at MI Madani Alauddin Makassar is able to utilize local cultural richness as a learning context, so that students not only understand scientific concepts but also grow in love and care for cultural heritage . Teaching materials must include field exploration activities, interactive, and multimodal, inviting students to observe local traditions and then relate them to science principles. The ideal learning system also supports teachers with clear guidance on how to facilitate discussions

of local wisdom, adaptive student worksheets, and assessments that measure contextual understanding . Thus, knowledge transfer can take place effectively and enjoyably.

The reality on the ground shows a lack of teaching materials that specifically integrate Makassar's local wisdom in science and science, resulting in a gap between cultural potential and learning practices . Furthermore, although local culture modules are available for other subjects, there is no science and science module based on an integrated development model. The second gap lies in the lack of teacher involvement in designing teaching materials; so far, teachers have only adapted general materials without going through the stages of needs analysis, design, and continuous development . This results in suboptimal quality teaching materials and a lack of responsiveness to student needs.

This research is expected to produce valid, practical, and effective science and science teaching materials, which link science and social concepts with Makassar local wisdom. Thus, students are able to understand the material in depth, improve critical thinking skills, and foster an appreciative attitude towards culture . In addition, teachers are expected to obtain guidelines for the development and implementation of teaching materials based on the 4-D model ( Define, Design, Develop, Disseminate ), so they can carry out learning innovations independently and sustainably .

This research offers a first novelty: the application of Makassar local wisdom to explore scientific and social phenomena in science teaching materials. This concept has never been formalized in the official MI Madani Alauddin Makassar module. Second, the development of teaching materials uses a 4-D model with adaptations to content digitalization (the inclusion of multimedia and virtual field activities) that align with the demands of independent learning. This approach is expected to streamline the validation, testing, and dissemination processes of the modules, making them more efficient and sustainable.

## 2. METHOD

This study uses a 4-D development model consisting of four stages: Define, Design, Develop, and Disseminate . In the Define stage , researchers conducted a needs analysis by conducting observations and interviews with teachers and students at Madrasah Ibtidaiyah Madani Alauddin Makassar to identify gaps in science teaching materials related to local cultural diversity . In addition, literature on local wisdom and Indonesian culture was reviewed in depth to formulate learning objectives and expected material characteristics .

Design stage , researchers designed the content framework of the teaching materials, including module structure, concept maps, and learning activities that integrate cultural elements such as traditional dances, regional languages, and socio-cultural practices . This design was also initially validated through focus group discussions (FGDs) with a team of curriculum experts and local cultural experts in Makassar to ensure the relevance and accuracy of the content . The validation results were used to refine the module draft before proceeding to the development stage.

Develop phase includes the creation of prototypes of printed and digital teaching materials, including illustrations, short videos, and student worksheets . The prototypes are tested in a limited group (small group tryout) in one class to obtain feedback on the clarity of instructions, student engagement, and the appropriateness of font size and layout . Finally, in the Disseminate phase , the final teaching materials are socialized through teacher training and published on the Madrasah website, with initial monitoring to ensure adoption and effectiveness of use.

## 3. FINDINGS AND DISCUSSIONS

### 1. Research result

#### a. Define Stage of Student Needs and Characteristics Analysis

Researchers began by analyzing the Merdeka curriculum, student observations, and interviews with science teachers at Madrasah Ibtidaiyah Madani Alauddin to formulate the learning needs of fourth graders. They found that science materials were generally general and lacked contextualization of local wisdom, making it difficult for students to connect concepts to their everyday experiences. Furthermore, students' learning characteristics are highly diverse, predominantly visual and kinesthetic, and they come from diverse cultural and economic backgrounds, demanding inclusive, engaging, and accessible teaching materials for all students, regardless of their home environment.

**Table 1.11 Prototype**

No	Design Components	Prototype 1	Prototype 2
1	Module title	module : social and cultural diversity in Indonesia based on daily life local	module : social and cultural diversity in Indonesia based on daily life local
2	Class	Grade IV Elementary School	Grade IV Elementary School
3	Learning objectives	Identifying various forms of social and cultural diversity in Indonesia Explain values wisdom local from several regions in Indonesia Appreciate social and cultural diversity as riches nation Show attitude tolerance and respect for differences in life daily	Identifying various forms of social and cultural diversity in Indonesia Explain values wisdom local from several regions in Indonesia Appreciate social and cultural diversity as riches nation Show attitude tolerance and respect for differences in life daily
4	Module structure	Part 1 introduction . Contains identity module , objectives learning , profile students Pancasila , and activities learning . Part 2 discussion material . Contains detailed explanations about : Diversity ethnic group nation in Indonesia diversity in Indonesia Diversity culture in Indonesia Social and cultural diversity based wisdom local in Indonesia Part 3 closing . Containing practice questions to deepen students' understanding	Part 1 introduction . Contains identity module , objectives learning , profile students Pancasila , and activities learning . Part 2 discussion material . Contains detailed explanations about : Diversity ethnic group nation in Indonesia diversity in Indonesia Diversity culture in Indonesia Social and cultural diversity based wisdom local in Indonesia Kearian local in South Sulawesi Part 3 closing . Containing practice questions to deepen students' understanding
5	Learning methods	Contextual approach by linking material to students' daily lives Group-based and interactive learning Use of visual media and multimedia such as images accompanied by information short to explain social and cultural diversity	Contextual approach by linking material to students' daily lives Group-based and interactive learning Use of visual media and multimedia such as images accompanied by information short to explain social and cultural diversity
6	Instructional Media	Images of traditional clothing, traditional houses, traditional dances from various tribes in Indonesia	Images of mosques, traditional clothing, traditional houses, musical instruments , traditional dances from various tribes in Indonesia and South Sulawesi
7	Assessment and evaluation	Formative assessment: using practice questions and individual assignments in the module	Formative assessment: using practice questions and individual assignments in the module

	<p>Summative assessment: conducting assessments through the results of group discussions and assessments of understanding of the material based on students' answers to practice questions.</p>	<p>Summative assessment: conducting assessments through group discussion results and assessments of understanding of the material based on students' answers to practice questions.</p>
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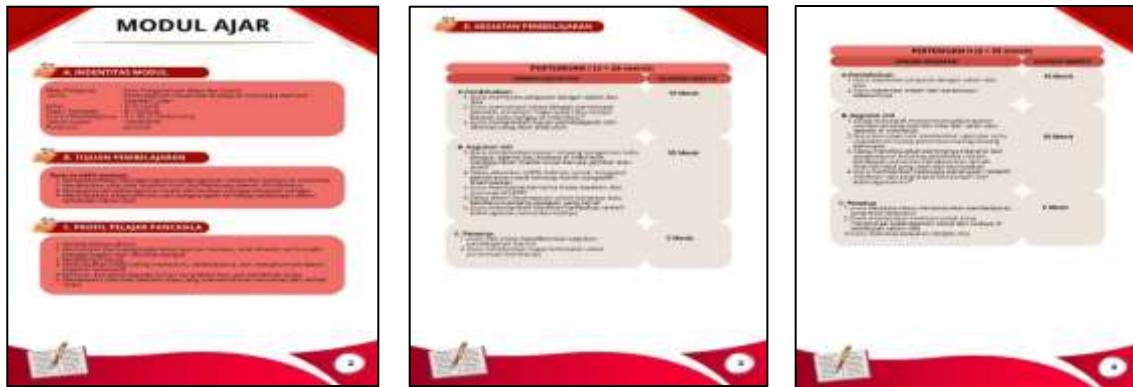
**b. Design Stage of Module Prototype Preparation**

Based on the definition results, two module prototypes were developed with the theme "Social and Cultural Diversity in Indonesia Based on Local Wisdom." Prototype 1 contains a basic module structure (introduction, general material, exercises), simple visual media, and contextual-interactive methods. Prototype 2 refines the content by adding a special subsection on South Sulawesi local wisdom, media images of mosques and local musical instruments, and cultural project-based activities. Each module is equipped with LKPD in the form of pictures and multiple-choice questions to support students' visual and kinesthetic learning styles.



**Figure 1.2 Page Cover**

The image shown is the front and back cover design of the Science Teaching Module for grade IV with the theme "Social and Cultural Diversity in Indonesia Based on Local Wisdom".



**Figure 1.3 Page Module Identity**

Learning objectives are listed on the module identity page to provide clear direction regarding the competencies that students must achieve



**Figure 1.4 Teaching Materials Page**

**c. Expert Validation Development Stage**

The module's feasibility was tested through validation by material, media, and language experts in two stages. In the first stage of validation, the average score for each validator ranged from 73–75% (valid) with recommendations for the addition of local materials. After revision, the second stage of validation recorded scores of 90–91% (very valid) for all aspects. The combined validation average reached 91%, confirming that the module met the content, visual, and language standards for fourth-grade students.

**Table 1.5 Results of Validation by Material Experts**

No	Aspect	Score	
		Phase I	Phase II
1	Relevance with syllabus	6	8
2	Relevance with objective learning	6	8
3	Delivery material	6	7
4	Election material	17	22
5	Clarity material	14	18
6	Collapse material	9	9
Amount		58	72
Maximum score		80	80
Percentage		73	90

Table 1.5 shows that the expert validation results in stage I obtained a score of 58, or 73%, which falls into the "valid" category. Stage II obtained a score of 72, or 90%, which falls into the "very valid" category.

**Table 1.6 Media Expert Validation Results**

No	Aspect	Score	
		Phase I	Phase II
1	Appearance module learning	21	26
2	Use Language	18	22
3	Layout and numbering format	12	14
4	Organization	9	11
Amount		60	73
Maximum score		80	80
Percentage		75	91

Based on table 1 . 6 show that results validation media experts in stage I obtain score 60 or in *percentage* of 75%, the assessment falls into the “valid” category . In stage II, the score 73 or in *percentage* at 91%, the assessment falls into the “very valid” category .

**Table 1.7 Results of Validation by Linguists**

No	Aspect	Score
1	Straightforwardness Language	19
2	Communicative	8
3	Compliance with rules Language	15
4	Use terms , signs read and symbol	13
5	Appearance writing	18
Amount		73
Maximum score		80
Percentage		91

Based on table 1 . 7 show that results validation expert Language get score 73 or in *percentage* At 91%, the assessment falls into the “very valid” category . Furthermore, researchers will to explain validation test results in a way overall from the three validators, namely expert material , media experts and experts Language .

Table 1.8 Validation Results

No	Validator	Percentage	Category
1	Subject matter expert	90	Very valid
2	Media expert	91	Very valid
3	Linguist	91	Very valid
Validation average		91	Very valid

Based on table 1 . 8 results validation teaching materials show that expert material give score validation of 90%, which falls into the very valid category . This assessment shows that from aspect content , integration concept and relevance material with students , teaching materials have met good standard . In addition , media experts and experts Language each give score validation of 91%, which is also considered very valid.

#### d. Disseminate Stage of Practicality Test

A practical trial was conducted with science teachers, who found the module very easy to use, relevant to the curriculum, and effective in increasing student engagement. Across four assessment aspects (ease of use, appropriateness to needs, student engagement, and continuity of learning), the module achieved a score of 95% (highly practical). Teachers stated that no further revisions were needed, and that the module's structure and illustrations facilitated the delivery of the material in class.

Table 1.9 Assessment Results Practitioner

No	Aspect	Score
1	Convenience use module	8
2	Compliance with need learning	14
3	Improvement involvement student	12
4	Sustainability learning	4
Amount		38
Maximum score		40
Percentage		95

Based on table 1 . 9 show that teaching materials got a total score of 38 out of maximum score of 40, with *percentage* practicality by 95%, which is classified as in “very practical ” category .

#### e. Effectiveness of Pre-Test and Post-Test Results

In one study group (27 students), the average pre-test score was 52 and the average post-test score was 83, with an average increase of 31 points. The N-Gain calculation yielded 0.64 (a fairly effective category), indicating that the module was able to significantly improve student understanding, although it still has potential for improvement. These results indicate that the local wisdom-based science and science teaching materials have effectively assisted the learning process, although the researchers recommend further development to achieve a higher level of effectiveness.

Table 1.10 Pre-Test and Post-Test Values Student

No	Student Name	Student Grades		Difference
		Pre-Test	Post-Test	
1	A Muh Virzha Pratafi Islam	50	80	30
2	Abidzar Al-Ghifari Rusman	40	80	40
3	Nada Aufa Kalila	20	80	60
4	Ainun Mahya	90	90	0
5	Alfi Andra Aditya	60	80	20
6	Janeta Kayyis	40	90	50
7	Alsyzani Alfarezqi Hidayat	80	90	10
8	Andi Rifadli Alfath Basri	20	70	50
9	Ayatullah Ali Ishad	50	89	39
10	Barie Elfattah Mahawira	30	90	60
11	Darmawan Setiadi	60	100	40
12	Faruq Al Mubarak	30	80	50
13	Filzah Fariha	70	90	20
14	Ghaitsa Grytha Hasyim	80	80	0

15	Ghina Salsabila Maulidya	90	90	0
16	Halifa Adawia Hairah	50	70	20
17	Mohammad Dzaki Al Fath	60	90	30
18	Muh Akhdan Fakhrie Zhafran	30	80	50
19	Muh Fauzan Adi Putra	40	80	40
20	Muhammad Aditya El Romansyah	60	70	10
21	Muhammad Haidar Almairy Tsaqib	40	80	40
22	Muhammad Rafa	30	60	30
23	Miftah Afiyah Rifhan	40	100	60
24	Nadin Syafira	90	90	0
25	Siti Raysa Mukhtazza	60	80	20
26	Syafiqah S	50	80	30
27	Xaquillio Fausta Tasrival	50	80	30
Rata-Rata		52	83	31

Based on table 1 . 10 so furthermore done calculation effectiveness use N-Gain formula is as follows:<sup>1</sup>

$$N\text{-Gain} = \frac{\text{Skor Posttest} - \text{Skor Pretest}}{\text{Skor maksimal} - \text{Skor pretest}}$$

$$= \frac{83 - 52}{100 - 52}$$

$$= \frac{31}{48} = 0.64 \text{ or } 64\%$$

Based on results N- Gain calculation score , average increase understanding student class IV at Madrasah Ibtidaiyah Civil Alauddin after use teaching materials amounting to 0.64 or 64%, are in the " sufficient " category . effective ” .

## 2. DISCUSSION

This study developed local wisdom-based Natural and Social Sciences (IPAS) teaching materials for fourth-grade students of Madrasah Ibtidaiyah Madani Alauddin with a 4-D model framework (Define, Design, Development, Disseminate). This model was chosen because it provides a systematic process starting from defining learning needs, designing modules according to student characteristics, developing interactive materials based on expert input, to disseminating and testing the effectiveness of teaching materials before widespread implementation <sup>2</sup>. At the Define stage, curriculum analysis, observation, and teacher interviews were conducted to identify student difficulties, especially in understanding complex scientific terms and dominant visual and kinesthetic learning styles. By referring to Vygotsky's ZPD theory and Piaget's constructivism, teaching materials were designed to integrate the context of local wisdom and simple language so that the material is more familiar, contextual, and supports in-depth understanding based on students' direct experiences <sup>3</sup>.

The Design stage includes designing a module consisting of an illustrative cover, a teaching material identity containing learning objectives and the Pancasila Student Profile, main material on ethnic diversity, religion, culture, general and specific local wisdom of South Sulawesi, and Student Activity Sheets (LKPD) <sup>4</sup>. Illustrations, images, and exploration activities are designed to facilitate multimodal learning styles, in accordance with Fleming & Mills' multimodal theory, so that students can understand abstract concepts concretely. In the Development stage, teaching materials were validated by material, media, and language experts repeatedly in early and mid-February 2025. The first input highlighted the expansion of the South Sulawesi local wisdom material and the addition of visual elements; subsequent revisions were declared complete and in accordance with the objectives.

Mayer's multimedia theory and Paivio's dual coding underpin the addition of illustrations to enhance cognitive processing through text and image pathways <sup>5</sup>. The Disseminate stage included a module trial on a fourth-grade group (27 students) using pre-test and post-test methods on February 12, 2025, and teacher response sheets were completed. Teachers assessed the module as feasible without

<sup>1</sup>Amini and Nurman Ginting, *Research Methods: Qualitative, Quantitative, PTK and R&D* (Medan: UMSU Press, 2024), p.101.

<sup>2</sup>Fadilah, D., Rohini.

<sup>3</sup>Marwia Tamrin, St. Fatimah S. Sirate, and Muh. Yusuf, 'Vygotsky's Learning Theory in Mathematics Learning', *Sigma (Intellectual Voice of Mathematical Style)* , 3.1 (2011), 40-47.

<sup>4</sup> et al. Sunarti, 'Development of Scrapbook Media in Thematic Learning to Increase Learning Interest of Grade I Elementary School Students', *Indonesian Elementary School Teacher Education Journal* , 7.1 (2021), 23-32.

<sup>5</sup> RE Clark, RC, & Mayer, *Multimedia Learning* (Cambridge University Press, 2009).

revision—systematic structure, communicative language, engaging illustrations, and effective student worksheets (LKPD) to measure understanding. The results of the practical evaluation were in line with Skinner's behaviorism theory, where visual reinforcement and interactive activities stimulated student engagement and motivation. Overall, the validity of the teaching materials was very high (91% on average), the practicality of the modules was very good (95%), and the learning effectiveness showed an N-Gain Score of 0.64 (“quite effective”). Although the teaching materials had improved student understanding and engagement, the study recommended further development with the integration of multimedia elements, discussion methods, and a project-based approach to boost effectiveness to the “high” category and support critical and creative thinking skills.

#### 4. CONCLUSION

Based on the results of research and discussion on the development of local wisdom-based science teaching materials for fourth-grade students of Madrasah Ibtidaiyah Madani Alauddin, it can be concluded that the development stages (define, design, development, disseminate) have succeeded in producing teaching materials that are appropriate to the characteristics of students. At the define stage, visual and kinesthetic approaches are combined with illustrations of South Sulawesi local wisdom, so that the material becomes easier to understand. The systematic design of teaching materials including five main subjects and LKPD facilitates active student involvement.

Expert validation showed high feasibility after refinement of materials, media, and language, and field trials confirmed the effectiveness of the module through a significant increase in post-test scores compared to pre-tests, making it suitable for use in contextual science learning. In terms of validity, the teaching materials obtained an average percentage of 91% (“very valid”), with the linguistic aspects having met the criteria from the beginning without revision. Although improvements were needed in the materials and media in the initial stage, the revision process succeeded in increasing the validation score to meet academic and pedagogical standards without the need for further revision.

The practicality of the learning materials was also very high, with a score of 95%; teachers reported that the modules were easy to use, aligned with the curriculum, effective in increasing student engagement, and supporting the continuity of learning, allowing for optimal implementation. Regarding learning effectiveness, the learning materials showed an N-Gain Score of 0.64 (category “quite effective”), which means they were able to significantly improve student understanding, although they did not yet reach the category “very effective.” To further optimize the learning, interactive elements and linking the material to students' real-life experiences are needed, thereby increasing the module's relevance and appeal, which is expected to drive effectiveness to a higher level.

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