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Development of local wisdom-based IPAS teaching modules integrated with the Pancasila student profile in elementary school

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ABSTRACT

Natural and Social Sciences (IPAS) learning in elementary schools is often delivered in a theoretical manner and remains insufficiently connected to students' real-life experiences. In contrast, the Merdeka Curriculum emphasizes contextual learning and character development by integrating Pancasila Student Profile values. This highlights the need for teaching materials that support conceptual understanding while reflecting local cultural contexts. This study aimed to develop a local wisdom–based Natural and Social Sciences teaching module integrated with the Pancasila Student Profile for elementary school students. The module was developed using the ADDIE model and implemented with 182 students in Grades 3, 4, and 5. Data were collected through expert validation, teacher response questionnaires, and student learning outcomes. The results indicated that the developed module achieved a high level of validity (76.62) and was considered highly practical by teachers. Statistical analysis also confirmed that the module was significantly effective in improving students' learning outcomes. The implementation produced average scores of 81.41 in Grade 3, 81.35 in Grade 4, and 80.40 in Grade 5. These findings demonstrate that integrating local wisdom into teaching modules can enhance contextual learning while strengthening students' cultural identity. Therefore, the module offers a relevant instructional resource to support the effective implementation of the Merdeka Curriculum in elementary education.

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1. INTRODUCTION

Natural and Social Sciences (IPAS) learning in elementary schools plays an important role in helping students understand natural and social phenomena in their surrounding environment. Through IPAS learning, students not only acquire conceptual knowledge but also develop critical thinking skills, problem-solving abilities, and scientific attitudes that

are essential for everyday life. At the elementary education level, IPAS learning is expected to build a foundation of scientific and social literacy while fostering students' awareness of their natural and social environments.

The role of IPAS in elementary schools has been highlighted by scholars, who state that IPAS plays an important role in equipping students with conceptual knowledge, scientific thinking skills, and the attitudes and values necessary to understand natural and social phenomena in their surrounding environment [1]–[3]. At the elementary education level, learning in natural and social sciences is not only directed toward mastery of concepts but also toward character development, literacy enhancement, and the development of critical and contextual thinking skills in accordance with students' developmental stages [4], [5] Therefore, meaningful learning processes are required that are relevant to students' daily lives and can connect instructional content with students' real-life experiences [6], [7].

However, the reality of learning in elementary schools in natural and social sciences indicates that various problems persist. One of the main issues is the limited availability of contextual teaching materials that align with students' socio-cultural characteristics. The teaching modules commonly used tend to be generic, textbook-oriented, and insufficiently integrated with local potential as a learning resource [8], [9]. These conditions have resulted in low levels of students' active engagement in learning, shallow conceptual understanding, and suboptimal learning outcomes. In fact, learning experiences that are closely connected to students' lives and cultural backgrounds are believed to significantly enhance learning motivation and the quality of conceptual understanding [10], [11].

The integration of local wisdom into learning in Natural and Social Sciences represents a relevant approach to addressing these issues. Local wisdom reflects the values, knowledge, and practices of communities that have been developed and transmitted across generations and are closely aligned with students' environmental contexts [8]. The use of local wisdom as a learning context in Natural and Social Sciences can assist students in understanding concepts more concretely, linking instructional content to real-life experiences, and fostering a sense of appreciation for local culture and the surrounding environment [12]–[14]. A growing body of research indicates that local wisdom–based learning has a positive effect on elementary school students' learning outcomes, conceptual understanding, and attitudes [14]–[17]. Thus, Natural and Social Sciences learning functions not only as a means of knowledge transfer but also as a medium for the internalization of cultural and social values.

In line with the implementation of the Merdeka Curriculum, strengthening the Pancasila Student Profile has become a fundamental basis for organizing learning in elementary schools [18], [19]. The Pancasila Student Profile emphasizes the development of learners who are faithful and devoted to God Almighty, embrace global diversity, are independent and collaborative, are capable of critical reasoning, and are creative. Natural and Social Sciences learning has significant potential to integrate these dimensions through contextual, collaborative, and reflective learning activities [20], [21]. Therefore, the development of teaching materials needs to systematically incorporate strengthening the Pancasila Student Profile, so that learning is not oriented solely toward cognitive aspects but also toward the formation of students' character.

Local wisdom-based Natural and Social Sciences teaching modules integrated with the Pancasila Student Profile are now urgently needed. Designed with context and integration in mind, these modules aim to make learning experiences more meaningful, increase students' active participation, and boost learning outcomes [22]. These teaching modules also offer teachers alternative instructional materials that align Natural and Social Sciences learning with the Merdeka Curriculum principles.

Although previous studies have explored local wisdom-based learning materials, limited research has developed integrated IPAS teaching modules that simultaneously incorporate local wisdom and the Pancasila Student Profile within the Merdeka Curriculum framework. Therefore, this study aims to develop a local wisdom–based Natural and Social Sciences teaching module integrated with the Pancasila Student Profile for elementary school students. The development of this module is expected to produce teaching materials that are valid, practical, and effective in supporting contextual learning while strengthening students' character and cultural identity.

2. METHOD

This study used a Research and Development (R&D) approach. The team developed an e-module for learning in Natural and Social Sciences that integrates Sasambo local wisdom and provides culturally relevant content. The team adopted the ADDIE instructional design model, which includes Analysis, Design, Development, Implementation, and Evaluation [23].

Figure 1. Stages of the ADDIE Development Model

The analysis stage involved conducting a needs analysis, learner analysis, and content analysis. During the design phase, the researchers developed a prototype of a local wisdom–based teaching module and integrated it with the Pancasila Student Profile. In the development phase, the team produced a first draft of the module and validated it with media and subject-matter experts. The researchers then revised the validated product in line with the experts' suggestions. At implementation, a field trial evaluated the practicality and effectiveness of the teaching module. The trial involved implementing learning activities. In

the final stage, evaluation, the researchers assessed the module by analyzing field trial results.

The research was conducted at cluster 2 elementary schools in Cakranegara, specifically SDN 11 Cakranegara and SDN 15 Cakranegara. The data collection instruments used in this study consisted of validation questionnaires, product practicality questionnaires, and learning achievement tests. The validation questionnaires took the form of assessment sheets administered to media experts and subject-matter experts to evaluate the feasibility of the developed teaching module. The product practicality questionnaire was administered to teachers to assess the practicality of the local wisdom–based Natural and Social Sciences teaching module. Finally, the module's effectiveness was measured using students' learning achievement tests.

The research data were analyzed to answer questions about the product's quality—validity (how well it meets its goals), practicality (ease of use), and effectiveness (success in achieving outcomes). Qualitative data, such as comments and suggestions, were used to revise the product. Data from validation and teacher response questionnaires were analyzed with descriptive statistics. These analyses determined the validity and practicality score ranges.

Table 1. Validity and Practicality Criteria of Local Wisdom–Based Teaching Modules Integrated with the Pancasila Student Profile

Interval	Validity Score Range	Practicality Score Range	Criteria
$X > \bar{X}_i + 1{,}8\,Sbi$	$X > 68$	$X > 40{,}8$	Very Valid / Very Practical
$\bar{X}_i + 0{,}6\,Sbi < X \leq \bar{X}_i + 1{,}8\,Sbi$	$56 < X \leq 68$	$33{,}6 < X \leq 40{,}8$	Valid / Practical
$\bar{X}_i - 0{,}6\,Sbi < X \leq \bar{X}_i + 0{,}6\,Sbi$	$44 < X \leq 56$	$26{,}4 < X \leq 33{,}6$	Fairly Valid / Fairly Practical
$\bar{X}_i - 1{,}8\,Sbi < X \leq \bar{X}_i - 0{,}6\,Sbi$	$32 < X \leq 44$	$19{,}2 < X \leq 26{,}4$	Less Valid / Less Practical
$X \leq \bar{X}_i - 1{,}8\,Sbi$	$X \leq 32$	$X \leq 19{,}2$	Invalid / Impractical

To examine the effectiveness of the Natural and Social Sciences teaching module, which is based on local wisdom and integrated with the Pancasila Student Profile, statistical analysis was conducted using SPSS. A one-sample t-test was used to assess the experimental class that received this module.

3. RESULTS AND DISCUSSION

3.1. Results

In this study, the local wisdom-based Natural and Social Sciences teaching module was developed using the ADDIE model. This model has five steps: analysis, design, development, implementation, and evaluation. The steps taken in making this teaching module are explained below.

1. Analysis Stage

The analysis stage in this study comprised a needs analysis, content analysis, and analysis of students' characteristics. The needs analysis was conducted to examine the existing conditions in schools regarding the necessity of teaching modules as instructional guidelines. Observations conducted in several elementary schools revealed that teachers predominantly relied on textbooks and general teaching modules obtained from publishers or online sources. The modules used tended to be generic and paid little attention to students' real-life contexts. In addition, teachers had not sufficiently linked instructional content to local cultural contexts.

Furthermore, there was no explicit integration between Natural and Social Sciences learning and the values of the Pancasila Student Profile. As a result, learning in Natural and Social Sciences learning was often perceived as abstract and disconnected from students' daily experiences. Teachers said they needed more contextual teaching materials. Such materials would help students better understand scientific concepts and relate them to daily life. Contextual teaching modules may also enhance students' active learning while fostering the internalization of Pancasila character values.

Furthermore, content analysis was conducted to determine the scope, depth, and suitability of Natural and Social Sciences content for the teaching module. This analysis identified specific topics and learning outcomes for Grades 3, 4, and 5, integrated local wisdom, and included the components of the Pancasila Student Profile. Key findings identified the topics most suitable for module development, ensuring alignment with learning outcomes and local values. These results served as the foundation for developing the teaching module presented below.

Table 2. Results of the Content Analysis for Teaching Module Development

Phase/Grade	Topic	Learning Outcomes	Integration of Local Wisdom	Pancasila Student Profile
Phase B / Grade 3	Chapter 3: Living in Harmony with Nature Topic: The Inhabitants of Nature	Students can understand the concept of ecosystems and their constituent components through local wisdom relevant to their region.	Ecosystems of animals and plants characteristic of West Nusa Tenggara.	Faith in and devotion to God Almighty; collaboration; critical reasoning
Phase B/ Grade 4	Chapter 3: Forces Around Us Topic: Muscular Force and Friction	Students can describe various types of forces and their benefits in everyday life.	Forces involved in traditional Presean performances, Gendang Beleq music, and pottery making.	Faith in and devotion to God Almighty; independence; collaboration; critical reasoning
Phase C/Grade 5	Chapter 7: My Proud Region Topic: What Is My Local Culture Like?	Students understand the diversity of national cultures within the context of unity in diversity, grounded in local wisdom values prevailing in their region.	Traditional clothing, traditional houses, customary traditions, and traditional arts.	Faith in and devotion to God Almighty; independence; collaboration; critical reasoning; global diversity

Following the content analysis, an analysis of elementary school students' characteristics was conducted, indicating that students are at the concrete operational stage

of cognitive development according to Piaget's theory. At this stage, students more easily understand concepts when learning is connected to tangible objects, surrounding events, or everyday experiences. Therefore, the teaching module to be developed should incorporate experiential and engaging learning activities that enable students to learn through play.

2. Design Stage

The design stage involved planning the structure, components, and initial layout of the teaching module before finalization. At this stage, the researchers considered the results of the needs analysis, content analysis, and analysis of students' characteristics, which were then translated into a teaching module design aligned with the curriculum and oriented toward the Pancasila Student Profile. The teaching module was designed to assist teachers in delivering Natural and Social Sciences learning that is more contextual, grounded in local wisdom, and easy to use. It also aims to encourage students' active learning through collaborative activities and simple experiments, while systematically integrating the values of the Pancasila Student Profile into each learning activity. The prototype of the teaching module developed is presented as follows.

Table 3. Prototype Design of the Teaching Module

Component	Description
Cover Page	Contains the title, subject, topic, grade level, and background illustrations reflecting local wisdom
General Information	Includes module identity, prerequisite competencies, Pancasila Student Profile, facilities and infrastructure, target learners, as well as instructional approaches, models, methods, and learning media
Core Components	Consists of learning outcomes, learning objectives flow, learning objectives, meaningful understanding, guiding questions, learning activities, and assessment
Learning Materials	Contain instructional content aligned with the topic of each module for Grades 3, 4, and 5
Student Worksheets	Include individual and group activities used in learning, integrated with local wisdom relevant to the local context.

The teaching module prototype in this study serves as an initial depiction of the module before entering the development stage. During the design stage, the selection of visual materials and instructional content to be used in the development of the teaching module was carried out. In addition, a digital platform was selected to design the teaching module to enhance its visual appeal. In this study, Canva was used as the digital design platform.

3. Development Stage

This stage involved transforming the designed prototype module into a usable teaching module for instructional purposes. The main activities in the development stage included preparing the initial product (a draft teaching module), expert validation, product revision, and limited trials. The local wisdom–based Natural and Social Sciences teaching module integrated with the Pancasila Student Profile was developed in accordance with the

established prototype and a comprehensive structure. The teaching module was developed in printed form with an engaging visual design. The results of the development of the Natural and Social Sciences teaching module are presented as follows.

Figure 2. Display of the Natural and Social Sciences Teaching Modules for Grades 3, 4, and 5

The developed Natural and Social Sciences teaching modules were printed on 260-gram art paper, laminated, and spiral-bound. This material ensured high print quality and durability. After printing, a validation questionnaire was administered to three experts to evaluate all modules and determine their feasibility for instructional use.

Data on validity came from validation results for the locally developed modules integrated with the Pancasila Student Profile. Three validators, a Natural Sciences expert, a Social Sciences expert, and a language expert, conducted the evaluation. The results of their validation are presented below.

Table 4. Results of the Validation of the Natural and Social Sciences Teaching Module

No	Aspect	Score			Average Score
		Validator 1	Validator 2	Validator 3	
1	Content Aspect	25	26	28	26,33
2	Language Aspect	16	16	15	15,67
3	Presentation Aspect	24	23	24	23,67
4	Integration of the Pancasila Student Profile and Natural and Social Sciences	10	12	11	11
	Total	75	77	78	76,67
	Category				Very Valid

The table above indicates that the average score obtained from the assessments of the three validators is 76.67, which, according to the validity criteria, falls into the very valid category. Therefore, it can be concluded that the Natural and Social Sciences (IPAS) learning module, based on local wisdom and integrated with the Pancasila Student Profile, is feasible to implement on a trial basis with Grade 3, 4, and 5 students, subject to several revisions suggested by the validators. These revisions include the addition of project-based strengthening activities, the provision of more examples within local cultural contexts,

particularly in the topic of forces, the enhancement of trigger questions to facilitate better Higher Order Thinking Skills (HOTS), the improvement of the clarity of ecosystem-level illustrations, the correction of punctuation errors in the learning objectives, and the completion of scoring guidelines for knowledge assessment.

4. Implementation Stage

The implementation stage involved a trial of the Natural and Social Sciences (IPAS) learning module, based on local wisdom, that had been developed. The trial was conducted in Grades 3, 4, and 5 at SDN 11 Cakranegara and SDN 15 Cakranegara. The number of students participating in the trial was 56 Grade 3 students, 71 Grade 4 students, and 55 Grade 5 students, for a total of 182 students as research subjects. Classroom teachers served as facilitators, using the learning module as the primary guide throughout the instructional process. The implementation was carried out over three meetings, totaling six instructional hours. The documentation of the IPAS learning module implementation activities for the research subjects is presented below.

Figure 3. Documentation of the Implementation Stage of the IPAS Learning Module

The results of the implementation indicate that students demonstrated high enthusiasm, actively participated in discussions, and understood the learning materials more easily because the learning activities were connected to their daily lives. Teachers provided positive feedback, noting that the module supported the teaching process by making it more systematic and practical. At this stage, data on students' learning outcomes after using the IPAS learning module based on local wisdom and integrated with the Pancasila Student Profile were also collected. In addition, data on the practicality of the module were obtained through teacher questionnaires to determine the extent to which the developed learning module was practical for classroom use.

5. Evaluation Stage

The evaluation stage is the final phase of the ADDIE development model. This stage produces data on the practicality and effectiveness of the IPAS learning module, grounded in local wisdom and integrated with the Pancasila Student Profile. The practicality of the module was determined using questionnaire data completed by teachers. Meanwhile, the effectiveness of the developed IPAS learning module was examined using students' learning outcomes data collected after the implementation of its learning activities. The results of the data analysis related to the practicality aspect are presented in the following table.

Table 5. Summary of Practicality Questionnaire Results

Teaching Module	Respondent	Score	Average	Category
Grade 3 Teaching Module	Teacher A	48	46,5	Very Practical
	Teacher B	42		
	Teacher C	48		
	Teacher D	48		
Grade 4 Teaching Module	Teacher E	45	47	Very Practical
	Teacher F	48		
Grade 5 Teaching Module	Teacher G	45	46	Very Practical
	Teacher H	45		
	Teacher I	48		
	Teacher J	48		

Based on Table 5 above, the IPAS teaching modules, grounded in local wisdom and integrated with the Pancasila Student Profile for Grades 3, 4, and 5, fall into the very practical category. The detailed results are as follows: the Grade 3 IPAS module was evaluated and trialed by four classroom teachers, with an average questionnaire score of 46.5 out of a possible maximum, indicating a very practical level according to the evaluation criteria. Furthermore, the Grade 4 IPAS module was evaluated and implemented by two classroom teachers, achieving an average questionnaire score of 47 out of a possible maximum, also categorized as very practical. Meanwhile, the Grade 5 IPAS module was evaluated by four classroom teachers and obtained an average score of 46 out of a possible maximum, which likewise falls within the very practical category.

Data on the effectiveness aspect were obtained from students' IPAS learning outcomes. First, a normality test was conducted to determine whether the obtained data were normally distributed. Then, the learning outcome data were analyzed using a one-sample t-test. The effectiveness of the developed teaching modules was analyzed separately for each grade level. The research hypotheses were formulated as follows: H_0 states that the mean IPAS learning outcome score of students equals the standard value of 70, while H_1 states that the mean IPAS learning outcome score of students does not equal the standard value of 70. The results of the normality test for the three grade levels after implementing the developed IPAS teaching modules are presented below.

Table 6. Normality Test Analysis of IPAS Learning Outcomes

	Kolmogorov-Smirnov[a]			Remark
	Statistic	df	Sig.	
IPAS Learning Outcomes (Grade 3)	.100	56	.200*	Normal
IPAS Learning Outcomes (Grade 4)	.072	71	.200*	Normal
IPAS Learning Outcomes (Grade 5)	.086	55	.200*	Normal

Based on the Kolmogorov–Smirnov normality test, the significance values for the IPAS learning outcome data for Grades 3, 4, and 5 were all greater than 0.05. This indicates that the data from all three grade levels are normally distributed. Therefore, hypothesis testing could proceed with the one-sample t-test. The results of the statistical analysis are presented as follows.

Table 7. Results of the Hypothesis Testing Analysis

One-Sample Test				
	Test Value = 70			
	t	df	Sig. (2-tailed)	Mean Difference
IPAS Learning Outcomes (Grade 3)	10.244	55	.000	11.411
IPAS Learning Outcomes (Grade 4)	11.325	70	.000	11.352
IPAS Learning Outcomes (Grade 5)	10.483	54	.000	10.400

Based on the results of the above analysis, the significance values obtained from the one-sample t-test for the learning outcome data of Grades 3, 4, and 5 were all less than 0.05. Therefore, H_0 is rejected, and H_1 is accepted, indicating that the mean scores of students' IPAS learning outcomes are significantly different from the standard score of 70. Based on these findings, it can be concluded that the IPAS teaching module, grounded in local wisdom and integrated with the Pancasila Student Profile, meets the effectiveness criterion for improving students' IPAS learning outcomes. A comparison of the mean IPAS learning outcome scores after implementing the developed teaching module is presented in the following graph.

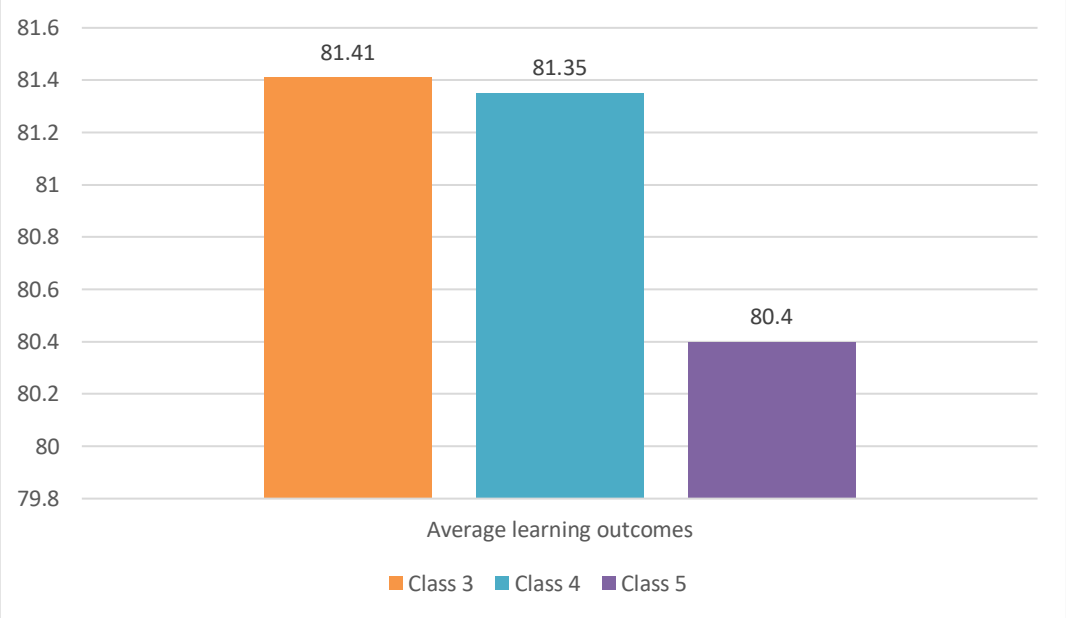

Figure 4. Comparison Graph of Students' IPAS Learning Outcomes

The comparison of mean IPAS learning outcomes after implementing the developed IPAS teaching module shows average scores of 81.41 for Grade 3, 81.35 for Grade 4, and 80.40 for Grade 5 students. Overall, the evaluation results demonstrate that the IPAS teaching module, based on local wisdom and integrated with the Pancasila Student Profile, is valid, practical, and effective for learning. The module improves students' learning outcomes and fosters character values such as cooperation, independence, environmental awareness, and gratitude. Thus, this module is recommended as an effective, contextually relevant teaching material.

3.2. Discussion

The results of the study indicate that the locally wisdom–based Natural and Social Sciences (IPAS) teaching module developed in this study demonstrates high validity, practicality, and effectiveness in elementary school learning. These findings suggest that integrating local wisdom into teaching materials can be a relevant strategy to enhance the quality of IPAS learning. Local wisdom integrated into the learning module provides a context that is closely related to students' everyday lives, thereby helping them understand IPAS concepts in a more meaningful way [24], [25]. When learning materials are connected to students' experiences and cultural environments, the learning process becomes easier to understand because students can relate abstract concepts to phenomena they encounter in their daily lives [26]–[29]. Thus, local wisdom serves as a bridge between scientific knowledge and students' real-life experiences, thereby enhancing their conceptual understanding.

Furthermore, the use of local wisdom–based modules also supports the creation of contextual and meaningful learning. Contextual learning enables students to actively engage in the learning process because the materials studied are directly relevant to their social and cultural environments. This condition can increase students' motivation and engagement in learning [30], [31]. When students perceive that the learning materials are related to their lives, they tend to be more interested in exploring, questioning, and discussing the concepts being studied [8]. This finding is consistent with the constructivist learning approach, which emphasizes that students actively construct knowledge through meaningful learning experiences.

The findings of this study also demonstrate that the developed teaching module significantly improves students' learning outcomes. This improvement indicates that learning approaches integrating cultural contexts and local experiences can support more effective learning processes [12]. The integration of local wisdom in learning not only enriches learning resources but also strengthens students' cultural identity and fosters appreciation for their social and cultural environments [21].

From the perspective of implementing the Merdeka Curriculum, these findings have important implications for the development of teaching materials in elementary schools. The Merdeka Curriculum emphasizes contextual, student-centered learning and character development through the values of the Pancasila Student Profile. The local wisdom–based IPAS teaching module developed in this study can serve as an alternative instructional resource to support the implementation of the curriculum. By integrating local cultural values and the Pancasila Student Profile into learning activities, teachers can create experiences that not only focus on conceptual mastery but also foster students' character and cultural identity.

Overall, this study's results demonstrate that the development of local wisdom–based IPAS teaching modules represents an innovative approach to supporting contextual learning in elementary schools. This approach not only enhances students' conceptual understanding and engagement in learning but also strengthens character values and cultural identity in line with the goals of education within the framework of the Merdeka Curriculum.

4. CONCLUSION

This study developed a local wisdom–based Natural and Social Sciences (IPAS) teaching module integrated with the Pancasila Student Profile for elementary school students. The results indicate that the developed module is valid, practical, and effective for use in classroom learning. The integration of local wisdom into the module provides contextual learning experiences that help students connect scientific concepts with their real-life environments, thereby improving conceptual understanding and learning outcomes. In addition, the module supports student engagement and strengthens cultural identity and character values in line with the objectives of the Merdeka Curriculum.

The findings suggest that local wisdom–based teaching modules can serve as an alternative instructional resource to support contextual and culturally relevant learning in elementary schools. Teachers are encouraged to integrate local cultural contexts into teaching materials to enhance student engagement and meaningful learning. Future studies should examine the implementation of similar modules in different regions and with larger and more diverse samples. Further research may also explore integrating local wisdom with other subject areas or learning approaches to broaden the application of contextual learning in elementary education.

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