



Effectiveness and responses of using Melayu Riau culture-based teaching materials in IPAS learning at SDN 189 Pekanbaru

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Article info	Abstract
Keywords Effectiveness, IPAS, Melayu Riau, responses, teaching materials	Analysing instructional material needs in elementary science education is crucial to ensure alignment with student developmental characteristics and the current curriculum. This research aims to evaluate the effectiveness of teaching materials grounded in the Melayu Riau cultural context for IPAS (<i>Ilmu Pengetahuan Alam dan Sosial</i>) in fifth-grade elementary classrooms. Additionally, the study seeks to assess the perceptions of both teachers and students regarding the implementation of these culturally-based materials. A quantitative quasi-experimental approach was employed, utilising a one-group pretest-posttest design. Data were collected through student assessments administered before and after the intervention, complemented by questionnaires completed by teachers and students to gather feedback on using the teaching materials. The findings revealed that the normality tests for the pretest ($\alpha = 0.178$) and post-test ($\alpha = 0.086$) produced values greater than the threshold of $\alpha = 0.05$, indicating that the data were normally distributed. The average student score increased from 64.48 on the pretest to 80.57 on the post-test. Furthermore, the N-Gain score analysis yielded a value of 0.5277, categorised as medium, demonstrating a moderate improvement in student learning outcomes. Teacher responses to using the Melayu Riau culture-based IPAS teaching materials averaged a score of 82.97, classified as "Very Good." Similarly, student responses averaged 83.2, within the "Very Good" category. These results suggest incorporating local cultural elements into science teaching materials can positively influence student engagement and academic achievement in IPAS for fifth-grade students.

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1. Introduction

The rapid development of digital technology has brought significant changes to instructional methods. The introduction of computers and the internet has given rise to various digital learning tools, including interactive applications, virtual classrooms, and educational video content. These

technological innovations have made learning more personalised and flexible, accommodating the diverse needs of students (Kunwar et al., 2025). Teaching materials refer to content developed explicitly for instructional purposes within a particular discipline, typically prepared by subject matter experts. These materials are designed to be coherent, user-friendly, and aligned with the learning objectives, thereby supporting instructional programs at both school and university levels (Dewi & Suniasih, 2023). In primary education, teaching materials help teachers in learning by providing structured and accessible content for students. Effective teaching materials should be systematically organised, engaging, easy to comprehend, and conform to established writing and pedagogical standards (Fanani et al., 2022). Ensuring the availability of appropriate teaching materials also improves student concentration, as it eliminates the need for students to share learning resources, such as textbooks (Liu et al., 2020). Moreover, aligning teaching materials with local history, cultural traditions, customs, and regional natural resources can enrich the content and enhance its relevance, particularly in the context of IPAS (*Ilmu Pengetahuan Alam dan Sosial*) instruction in elementary schools. Such integration supports meaningful learning experiences and promotes cultural awareness and contextual understanding among students.

Teaching materials serve as both informational resources and instructional media that facilitate active, engaging, and meaningful learning experiences for students (Kurniawati et al., 2017). The effectiveness of these materials is influenced by several key quality indicators, including content integration, readability, alignment with the students' learning context, and their practical usability by educators. These criteria ensure that teaching materials not only convey knowledge but also support the overall teaching and learning process in a coherent and accessible manner (Majid, 2020). The effectiveness of IPAS (*Ilmu Pengetahuan Alam dan Sosial*) teaching materials is closely linked to the perceptions and responses of their primary users—teachers as instructional facilitators and students as active participants in the learning process. High-quality IPAS materials should convey academic content and foster the development of essential 21st-century competencies, including foundational literacy, critical thinking, communication, collaboration, and creativity. In line with the demands of contemporary education, IPAS instruction must also aim to cultivate scientific literacy and social consciousness from an early stage (OECD, 2019). Teaching materials that encourage critical engagement with local and global environmental, social, and technological issues are instrumental in achieving these goals. By promoting inquiry-based learning and contextual relevance, such materials contribute significantly to preparing students for active and informed citizenship in a rapidly changing world (Sukma et al., 2023).

High-quality teaching materials are integral to the success of IPAS (*Ilmu Pengetahuan Alam dan Sosial*) instruction, especially in fostering the cognitive development of elementary school students. As a subject that encompasses both natural and social phenomena, IPAS aims to impart foundational knowledge and seeks to cultivate critical thinking, problem-solving abilities, and a comprehensive understanding of scientific and social concepts. Empirical studies indicate that well-structured and pedagogically sound teaching materials can effectively stimulate students' cognitive processes. Such materials support deeper conceptual understanding and promote the development of analytical and evaluative skills, thereby enhancing the overall quality of student learning outcomes in IPAS education (Nirwana et al., 2024).

Teachers' responses to teaching materials serve as important indicators of the practicality and effectiveness of those materials in supporting lesson planning, implementation, and assessment. As instructional facilitators, teachers are also well-positioned to provide pedagogical and technical feedback on the design and structure of teaching materials. Conversely, students assess teaching materials based on their readability, level of engagement, visual design, and ability to stimulate curiosity and interest in learning (Alwasilah, 2002). Consequently, assessing teachers'

and students' perceptions and experiences is a critical component in the evaluation and ongoing development of IPAS instructional materials.

Previous research emphasises the significance of well-designed teaching materials in enhancing student learning. A study conducted by Silvia Handayani in 2022 demonstrated that the use of thematic teaching materials contributed to increased motivation and better academic performance among primary school students (Handayani & Desyandri, 2022). Similarly, research by Juniati in 2023 found that applying teaching materials led to a significant improvement in learning outcomes, confirming their effectiveness in enhancing science achievement among fourth-grade students (Juniati et al., 2023). The present study builds upon these findings with distinct innovations. Unlike previous research, the teaching materials developed in this study are specifically aligned with the current "Merdeka Curriculum" implemented in Indonesian elementary schools. Moreover, this study incorporates elements of regional culture, specifically integrating Riau Malay cultural content, thereby offering localised, contextually relevant instructional resources that support students' cognitive and cultural development.

This study aims to survey elementary school teachers and students regarding the use of Melayu culture-based IPAS teaching materials and to evaluate the effectiveness of these materials in primary schools based on indicators such as content alignment with learning outcomes, integration of science and social studies, visual appeal, attractiveness, ease of understanding for students, and ease of use for teachers in the learning process. The focus is on social learning materials within IPAS, specifically in grade 5 Topic A (What is My Regional Culture Like), Topic B (Economic Conditions in My Region), and Topic C (Wow, My Region is Amazing).

2. Literature Review

2.1 Teaching materials

Teaching materials encompass all types of instructional resources educators utilise to facilitate the teaching and learning process, aiming to achieve learning objectives effectively and efficiently. Within the context of IPAS (*Ilmu Pengetahuan Alam dan Sosial*) instruction, these materials might consist of textbooks, student worksheets, digital modules, visual aids, and various other media designed to integrate scientific and social studies concepts. To ensure their effectiveness, teaching materials must adhere to several fundamental principles: alignment with the curriculum, coherence and integration of content, clarity and accessibility for students, and the capacity to stimulate student interest and engagement. The quality of teaching materials is crucial in shaping the learning experience and directly influences student outcomes (Latifah et al., 2023). This is especially important at the elementary level, where foundational cognitive development takes place and where well-designed materials can significantly enhance comprehension and long-term academic growth (Sugih et al., 2023).

2.2 Merdeka Curriculum

The Kurikulum Merdeka or Merdeka Curriculum adopts an integrated approach to science and social studies, aiming to provide students with a comprehensive understanding of natural and social phenomena in their immediate environment (Panduan Pembelajaran Dan Asesmen Kurikulum Merdeka, 2022). This interdisciplinary model emphasises the development of cognitive, affective, and psychomotor domains, encouraging critical thinking, collaboration, and scientific literacy. This approach reflects students' contextual realities and encourages active participation in exploratory learning and problem-solving activities. Rooted in the constructivist paradigm, the curriculum views knowledge acquisition as a process built through direct, meaningful experiences. As such, teaching materials must be contextually relevant, connected to students' real-life

environments, and structured to explore environmental and social issues from ecological and socio-cultural perspectives.

Adequate teaching resources should encourage students to observe, conduct simple experiments, and reflect on their findings. Additionally, materials should include age-appropriate visual aids such as images, graphs, and hands-on activities to enhance comprehension and engagement. Collaborative learning strategies, which are frequently embedded in IPAS teaching materials, have also positively impacted students' cognitive development. Working in groups enables students to exchange ideas, provide mutual support in addressing problems, and cultivate essential communication and teamwork skills. This cooperative learning approach enhances academic understanding and strengthens social interaction and critical thinking abilities. Within IPAS instruction, group-based investigations of environmental or social issues effectively deepen content knowledge while building collaboration and analytical skills.

2.3 IPAS learning in primary schools

IPAS is a crucial subject in primary education that integrates scientific and social studies content, covering topics such as nature, technology, the environment, geography, history, and culture (Suhelayanti et al., 2023). Several learning theories, including constructivism, cooperative learning, and project-based learning, support the pedagogical foundation of IPAS. These approaches collectively aim to deepen students' understanding of their world and immediate environment while equipping them with practical knowledge applicable to daily life (Wijayanti & Ekantini, 2023). Under the Merdeka Curriculum, IPAS instruction is structured to promote student autonomy and creativity through a flexible, context-driven approach. This curriculum empowers educators to tailor teaching strategies and materials to align with students' individual needs, interests, and the specific characteristics of their learning environments. IPAS learning emphasises a profound understanding of fundamental concepts, facilitated through hands-on exploration and project-based activities. Such methods aim to help students recognise the interconnectedness of scientific principles and social realities, thereby fostering a deeper appreciation for IPAS as a subject (Siregar et al., 2023). The integrative nature of the Merdeka Curriculum enables students to examine multiple disciplines within a unified thematic context. For instance, students might simultaneously explore environmental, ecological, and societal issues, allowing them better to perceive the links between scientific and social phenomena. This holistic approach supports the development of critical thinking skills and enhances students' ability to apply interdisciplinary knowledge to real-life situations. Moreover, the curriculum encourages teachers to develop locally relevant teaching modules, enabling students to engage with real-world problems in their communities and to formulate contextually appropriate solutions. This localised, student-centred approach reinforces the practical value of IPAS learning and strengthens students' connection to their socio-cultural and environmental surroundings (Sarifah et al., 2025).

2.4 Melayu Riau culture

The Melayu culture in Riau Province represents the honour and identity of the Riau community, with roots extending back to ancient times. This cultural heritage has evolved through the customs and life principles handed down by ancestors across generations (Badri et al., 2022). The preservation and development of Melayu culture within Riau society can be effectively facilitated through educational means, including incorporating cultural elements into the school curriculum (Sepsa & Mulyani, 2023). Melayu Riau culture-based learning in elementary education strategically integrates local cultural heritage into the teaching and learning process. This approach enriches the curriculum by embedding culturally relevant values that reinforce students' sense of identity as

members of the Melayu community. By incorporating local cultural expressions such as folklore, traditional games, and arts, students gain exposure to their cultural origins, fostering pride and a sense of responsibility toward cultural preservation. Furthermore, this culture-based pedagogy deepens students' appreciation of Melayu Riau culture's social, moral, and spiritual dimensions (Shahwa et al., 2024). A significant aspect of this approach is emphasising language as a vital conduit linking younger generations to their cultural heritage. In this context, the Melayu language transcends its communicative function, embodying community values and norms that shape identity. Integrating the Melayu language in elementary education enables students to internalise local linguistic nuances that influence their modes of communication and cognition, distinguishing them from foreign cultural frameworks (Kholifah & Tegeh, 2024).

3. Method

3.1 Data Collection

This study employs a quantitative research approach utilising a quasi-experimental design, specifically a one-group pretest-posttest model, to evaluate the effectiveness of IPAS teaching materials based on Melayu Riau culture for fifth-grade elementary school students. Applying tests within this design is essential, as it allows for assessing changes or improvements in learning outcomes following the intervention. In this procedure, assessments are administered twice: initially, before the intervention (pretest) and after the intervention (posttest).

In addition to the experimental tests, data collection included a survey method whereby participants completed questionnaires to gather information relevant to the research variables. The quantitative data obtained from the survey facilitates broader generalisations about the population based on the sample studied (Creswell, 2012). This research involved 40 students who participated in the effectiveness testing. Responses regarding the teaching materials were collected from 3 teachers and the same cohort of 40 students. All data collection activities were conducted at SDN 189 Pekanbaru.

3.2 Data Analysis

During the pretest phase, participants are evaluated to determine their initial abilities or baseline conditions before any treatment or intervention is applied. The data gathered at this stage act as a benchmark for assessing subsequent changes after the intervention. Afterwards, the researcher administers a specific treatment, which may involve introducing a new instructional method, using particular media, or targeted skill development activities.

After completing the intervention, a posttest with an equivalent or identical assessment is administered to evaluate the outcomes following the treatment. The main focus of analysis is comparing pretest and posttest scores. A statistically significant improvement in posttest results indicates that the intervention has had a measurable effect on the targeted variable.

Table 1. One-group pretest-posttest design model.

Pretest	Treatment	Posttest
T1	X	T2

The N-Gain test was carried out using the following categories to measure the effectiveness of using IPAS teaching materials in elementary schools.

Table 2. N-gain category

Score (%)	Category
N-Gain < 0,3	Low
0,3 > N-Gain > 0,7	Medium
N-Gain > 0,7	High

The N-Gain test was conducted to measure the improvement in student learning outcomes before and after using Melayu Riau culture-based teaching materials in IPAS learning. The next step is for teachers and students to complete a response questionnaire regarding the use of Melayu Riau culture-based teaching materials in IPAS teaching.

After the effectiveness test was carried out, the next step was to measure the responses of teachers and students using a questionnaire that aimed to determine their responses to the teaching materials used.

Table 3. Rating scales

Score	Category
4	Strongly agree
3	Agree
2	Disagree
1	Strongly disagree

The questionnaire filled out by teachers and students aims to determine how teachers and students respond to using teaching materials. After the assessment, the scores will be converted as shown in the following table.

Table 4. Interval average scores

Interval Average Score (%)	Category
82-100	Very Good
63-81	Good
44-62	Not Good
25-43	Very not good

4. Results

4.1 The effectiveness of using Melayu Riau Culture-based teaching materials in IPAS Learning

Pretest and posttest assessments, which consisted of objective questions, were administered to evaluate the effectiveness of the teaching materials in improving students' cognitive learning outcomes. Before conducting the effectiveness analysis, a normality test was performed on the data. The results of this normality assessment are shown in the table below.

Table 5. Result of normality test

	Shapiro-Wilk.		
	Statistic.	Df.	Sig.
Pretest	.964	40	.178
Post-test	.956	40	.086

The normality of the data was assessed using the Shapiro-Wilk test, which was selected due to the sample size being fewer than 100. The test results indicated a significance value of $\alpha = 0.178$ for the pretest and $\alpha = 0.086$ for the post-test. Both values exceed the threshold of $\alpha = 0.05$, suggesting that the data from the pretest and post-test are normally distributed. Following the normality assessment, descriptive statistical analysis was performed. The outcomes of this analysis are presented in the table below:

Table 6. Result of t-test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest Post-test using teaching materials	-15.90099	7.24720	1.09818	-18.10711	-13.70711	-14.750	40	.000

The t-test results, as presented in the output table, indicate a significance value of 0.000, below the threshold of $\alpha = 0.05$. This finding demonstrates a statistically significant difference in students' knowledge levels before and after implementing Melayu Riau culture-based IPAS teaching materials.

Table 7. Average pretest and posttest of students

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest using teaching materials	64.4807	40	6.31857	.94099
	Post-test using teaching materials	80.5700	40	5.49243	.74099

The descriptive analysis revealed that the average student score on the pretest was 64.48. In contrast, the average post-test score increased to 80.57, indicating a notable improvement in students' knowledge following instruction with Melayu Riau culture-based social studies teaching materials. Consequently, it can be inferred that using these culturally grounded teaching materials significantly enhances students' knowledge acquisition. To further assess the magnitude of this improvement, the N-Gain score was calculated to compare learning outcomes before and after the intervention. The detailed results are presented in Table 8.

Table 8. Result of N-gain test

Descriptive Statistics					
	N	Min.	Max.	Mean	Std. Deviation
NGain_score	40	.55	1.00	.5726	.22329
NGain_percent	40	55	100	57.26	22.329
Valid N (listwise)	40				

The pretest and post-test average scores analysis yielded an N-Gain value of 0.5277, which falls within the medium category. This indicates a moderate improvement in the learning outcomes of fifth-grade elementary students.

4.2 Teacher response to using Melayu Riau culture-based teaching materials in IPAS learning

Following the assessment of students' learning improvements, a questionnaire was distributed to teachers to gauge their perceptions of the Melayu Riau culture-based teaching materials used in IPAS instruction. The results of the teachers' responses are shown in the table below.

Table 9. Result of teachers' responses

Assessment Indicators	Teacher Response Result Score			Mean (%)	Category
	Teacher1	Teacher2	Teacher3		
Attractive display of teaching materials	86	82	83	83,67	Very Good
The grammar presented in the Teaching Materials is understandable	81	85	83	83,00	Very Good
Punctuation accuracy	75	79	80	78,00	Good
Conformity of Teaching Materials with the Applicable Curriculum	84	84	82	83,33	Very Good
Teaching materials can increase students' knowledge	81	83	84	82,67	Very Good
Ease of use of teaching materials	87	85	88	86,67	Very Good
Teaching materials can be used independently	83	85	86	84,67	Very Good
The Attractiveness of Teaching Materials	78	77	82	79,00	Good
Accuracy of images used in teaching materials	84	86	85	85,00	Very Good
Accuracy of assignment orders and exercises in Teaching Materials	82	85	84	83,67	Very Good
Mean			82,97	Very Good	

The data presented in Table 9 indicate that the average response score from the three teachers was 82.97, which falls within the "Very Good" category. Based on Melayu culture, these findings suggest that the developed teaching materials effectively support teachers in delivering IPAS instruction to fifth-grade elementary students.

4.3 Student response to using Melayu Riau culture-based teaching materials in IPAS learning

At this stage, students are asked to complete a questionnaire to assess their perceptions of using Melayu Riau culture-based teaching materials in IPAS instruction. The data presented in Table 10 reveal that the average response from individual students and small groups regarding the developed Melayu culture-based teaching materials was 83.2, classified within the Very Good category. These results indicate that the teaching materials effectively support fifth-grade students' learning in IPAS and are suitable for independent use by elementary school learners.

Table 10. Result of students' responses

Assessment Indicators	Mean (%)	Category
The material contained in the teaching materials can be understood	84	Very Good
The display of teaching materials is attractive	81,5	Very Good
Assignment and training instructions are clear	85	Very Good
Teaching materials can be used independently	84,5	Very Good
The images presented in the teaching materials are interesting	81	Very Good
Average	83,2	Very Good

5. Discussion

The incorporation of cultural literacy within teaching materials enables students to utilise external representation systems as epistemic tools, thereby enhancing their cognitive processes (Ribosa & Duran, 2022b). Such teaching materials encourage greater student engagement with their environment beyond the classroom, as these materials are developed based on a tutorial model. This approach fosters increased interest in autonomous learning activities outside of school, positively influencing student learning outcomes (Irkhamni et al., 2021). Moreover, teaching materials facilitate teachers' more systematic and practical delivery of content, aiding students in achieving the desired competencies. Engaging and well-designed teaching materials contribute to improved student comprehension (Sari et al., 2024). Additionally, students are motivated to cultivate the ability to analyse issues from multiple perspectives, allowing them to appreciate the complexity of problems and consider a range of interpretations and solutions (Setiawan et al., 2025).

The incorporation of teaching materials in the learning process enhances its effectiveness, efficiency, and practicality, while also increasing student engagement (Fransisca, 2019). Their use fosters greater student focus and enjoyment during lessons (Putri & Nurafni, 2021). Additionally, students are empowered to create teaching materials for their peers, further supporting collaborative learning (Ribosa & Duran, 2022a). Teaching materials can be adapted by students to meet their individual learning needs, thereby improving academic outcomes (Anwar et al., 2020). For educators, these materials facilitate the delivery of comprehensive instruction. Moreover, research on the application and various dimensions of teaching materials aims to optimise learning environments, particularly in classrooms with diverse age groups (Carrete-Marín & Domingo-Peñafiel, 2022).

The effectiveness of utilising learning products is demonstrated by the improvement in student learning outcomes observed before and after their implementation (Al Fajar & Mayar, 2023). Teaching materials have the potential to enhance students' creative thinking abilities, as they are tailored to align with students' conditions and support the achievement of learning objectives (Fadli & Kartini, 2025). An increase in student learning outcomes, as evidenced by comparative pretest and post-test scores, further indicates the positive impact of these teaching materials on academic performance (Pratiwi et al., 2024).

Overall, teaching materials contribute to enhancing the effectiveness of IPAS instruction and serve as key indicators for the improvement of student engagement, motivation, and academic achievement (Idayanti & Suleman, 2024). These materials support students in initiating steps toward improving their learning outcomes, while fostering interest that encourages autonomous learning beyond the school setting (Suprihatin & Manik, 2020).

6. Conclusion and Implications

The study findings revealed that the normality test results for the pretest and post-test were $\alpha = 0.178$ and $\alpha = 0.086$, respectively. These values exceed the significance threshold of $\alpha = 0.05$, indicating that the pretest and post-test data are typically distributed. The mean pretest score was 64.48, while the mean post-test score increased to 80.57. The analysis of the average scores yielded an N-Gain value of 0.5277, classified as Medium, signifying moderate improvement in the learning outcomes of fifth-grade elementary students.

Teacher responses regarding using Melayu Riau culture-based teaching materials in IPAS learning resulted in an average score of 82.97, categorised as Very Good. Similarly, student responses averaged 83.2, also within the Very Good category. These results suggest that implementing Melayu Riau culture-based IPAS teaching materials effectively enhances the learning outcomes of fifth-grade elementary students.

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