

The Role of Riau Malay Culture-Based Ethnoscience on the Character Formation of Elementary School Students

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ABSTRACT

Character education is a foundational aspect of elementary education, particularly when aligned with local cultural values. Ethnoscience, as a form of traditional knowledge rooted in local wisdom, offers potential for contextualizing moral and social learning. This study explores how Riau Malay culture-based ethnoscience contributes to the character formation of elementary school students. This qualitative research was conducted over six months (January–June 2025) at an elementary school in West Maredan Village, Perawang. Data were collected through participatory observation, in-depth interviews with school principals, teachers, and 36 students from grades IV to VI, as well as documentation of learning processes. Data were analyzed using Miles and Huberman's interactive model. Findings reveal that integrating Riau Malay ethnoscience—through folklore, proverbs, local practices, and environmental customs—effectively supports the development of students' religiosity, responsibility, social care, and ecological awareness. Observable changes included increased participation in collective prayers (from 60% to 88%), mutual cooperation (45% to 78%), and proper waste sorting (40% to 75%). The integration of ethnoscience into classroom activities contextualizes character education and bridges academic learning with students' lived cultural experiences. This model aligns with the Pancasila Student Profile and demonstrates that cultural-based learning can foster sustainable character development in early education.

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1. INTRODUCTION

Changing the direction of education policy through the Deep Learning approach has major consequences for the implementation of education at the elementary school level. This orientation shift not only touches on the curriculum aspect, but also the perspective in shaping students. If previously character education emphasized more on the concept of Pancasila Student Profile, now the emphasis has shifted to achieving graduate profiles with eight dimensions, namely faith and piety, citizenship, critical reasoning, creativity, independence, collaboration, health, and communication.

This new policy requires schools to not only be a space for knowledge transfer, but also a space for real character formation. Students are expected to be able to appreciate and practice the eight dimensions of the graduate profile in daily life. This is in line with Tilaar's (2012) view that education is not just an intellectual process, but also a cultural process that is loaded with values and meanings of life. Thus, the role of elementary schools is increasingly strategic as the foundation for the formation of students' identities from an early age.

Although much research on character education has been conducted, attention to the integration of local culture, especially Riau Malay ethnosience, is still very limited. Most of the research still focuses on the development of character education theories in general, without linking them deeply to local wisdom and Deep Learning frameworks. In fact, this gap is important to fill so that education is truly relevant to the socio-cultural context of students.

Riau's Malay culture has a wealth of values that are not only ceremonial but also serve as a guideline for life. Koentjaraningrat (2009) emphasized that culture is a value system that is inherited between generations and shapes the way of thinking and acting in society. Therefore, Riau's Malay cultural values actually have great potential to strengthen character education in elementary schools, although until now its application has not been systematically mapped.

Various Malay cultural practices reflect moral values that can be internalized in education. For example, Raja Ali Haji's Gurindam Twelve contains a message of religiosity and responsibility; the tradition of mutual cooperation reflects social concern and a sense of community, while the tradition of Pacu Lane emphasises the importance of discipline, cooperation, and sportsmanship. These values basically represent a fundamental aspect of character formation that is relevant to basic educational needs.

The integration of cultural values is in line with the view of Lickona (2012) who emphasizes that effective character education must be rooted in universal moral values and practiced consistently. Likewise, Koesoema (2015) emphasized that character education will be more meaningful if it is associated with real experiences that can be felt directly by students. Thus, Riau Malay culture can be a source of learning that is contextual, applicable, and easy for students to understand.

In addition to literature and tradition, Malay ethnosience also holds great potential to support Deep Learning-based learning. Local knowledge, such as the use of traditional medicinal plants, can be leveraged in science learning to teach concepts of health, ecology, and sustainability. Suastra (2010) stated that the ethnosience approach is able to increase the relevance of learning while fostering a sense of pride in one's own culture. It is important that students not only understand scientific concepts, but also have a strong ecological awareness and cultural identity.

However, research that specifically links Riau's Malay cultural values with the eight dimensions of graduate profiles is still very limited, especially in the aspects of planning, learning strategies, and evaluation (Banks, 2008). On that basis, this research is focused on answering several important questions, namely what are the Riau Malay cultural values that are relevant to the formation of the character of elementary school students, how these values are internalized through contextual learning practices in the classroom, and what are impacts that can be observed on the development of students' characters. With this focus, this research is expected not only to enrich the literature on character education based on local wisdom but also to provide practical guidelines for teachers in designing learning that is meaningful, reflective, and rooted in the nation's culture.

2. METHOD

This research uses a qualitative approach because the main focus is to understand the meaning, process, and context of the application of Riau Malay culture-based ethnosience in the formation of the character of elementary school students. The qualitative approach was chosen because it is able to capture social reality naturally, explore the experiences of teachers and students in depth, and interpret educational phenomena in the context of cultural living in society. The orientation of this research is not on numbers or statistical generalizations, but on presenting rich and in-depth descriptions of cultural value-based learning practices.

The research was carried out in one of the elementary schools located in West Maredan Village, Perawang. This location was chosen because the people still hold fast to the traditions and local wisdom of Riau Malays which are relevant to the focus of the research. By focusing on elementary schools in rural areas, this research is expected to capture the dynamics of character education rooted in local culture. The socio-cultural environment of the school and the surrounding community is an important foothold for understanding learning practices rooted in ethnosience.

Meanwhile, research informants consist of various parties who have a strategic role in the education process. The principal is involved as a policy maker at the education unit level, while six classroom teachers and subject teachers play the role of learning implementers who directly interact with students. In addition, 36 students from grades IV to VI were selected as main informants because they were at a relatively mature stage of cognitive and social development and were ready to receive ethnosience-based character learning. This diversity of informants allows researchers to obtain a more comprehensive and richer perspective.

Furthermore, the research process is divided into three main stages. The first stage is pre-field, which includes licensing management to the school, introduction to the school environment and the surrounding community, and the preparation of research instruments. This stage is important to ensure that researchers can build trust (rapport) with informants and understand the entire field context before conducting intensive data collection.

The second stage is the core research activities in the field. At this stage, the researcher carried out participatory observations in the classroom and school environment, conducted in-depth interviews with teachers, principals, students, and parents, and collected various learning documents. This process takes place simultaneously and iteratively so that researchers can capture the dynamics of contextual learning practices. The field stage is at the heart of the research because it is where the real interaction between cultural values, teachers, and students is observed directly.

The third stage is post-field, which is the activity after the researcher leaves the field. At this stage, data verification, initial analysis, and clarification of findings are carried out with informants through the member checking process. This step ensures that the data collected is not only the result of the researcher's unilateral interpretation, but also in accordance with the experience and understanding of the informant. Thus, the results of the research are more valid and reflect the reality in the field.

Data collection in this study was carried out through three main complementary techniques, namely participatory observation, in-depth interviews, and documentation. Participatory observation allows researchers to see firsthand how character values are instilled through ethnosience-based learning in the classroom as well as activities outside the classroom. In-depth interviews are used to explore the experiences, strategies, and views of teachers, students, principals, and parents regarding the application of cultural values in education. One classroom teacher, for example, said: "We try to incorporate the value of mutual cooperation into science lessons. Children were asked to work in groups to plant vegetables in the school yard. That way, they learn science and learn cooperation." This quote shows how teachers consciously integrate cultural values into daily learning activities.

From the student's side, the interview provides an overview of how these values are understood and internalized. A grade V student stated: "*Learning to use Gurindam stories is fun, ma'am. I learned that helping each other is not just a school rule, but it is a Malay teaching from the beginning.*" This phrase shows that students not only understand the subject matter, but are also able to relate it to their cultural identity. The same thing was also emphasized by the principal who said: "*We fully support teachers' efforts to link learning with local culture. That way, children are not only academically smart, but also have character according to Malay values that have become their identity.*" This view shows that the integration of ethnosience is not only a teacher's initiative, but also receives structural support from the school.

Meanwhile, the documentation includes Learning Implementation Plans (RPP), evaluation notes, photos, videos, and local cultural artifacts such as Gurindam Dua Belas and the practice of using traditional medicinal plants. With a combination of observations, interviews, and documentation enriched by direct quotes from teachers, students, and principals, the research data becomes more vivid, contextual, and reflects the reality of learning in more depth.

Furthermore, the research instruments used consist of observation guidelines, interview guidelines, and documentation sheets. The instruments are compiled based on relevant research objectives and literature, then tested on a limited basis to ensure clarity and consistency. In addition, researchers also used field notebooks, cameras, and voice recorders as aids in documenting data. With the combination of these instruments and devices, research can produce more complete and verified data.

The collected data were analyzed using the interactive analysis model of Miles & Huberman (1994) which included three main steps: data reduction, data presentation, and conclusion drawing and verification. In contrast to the linear model, this study emphasizes the cyclical nature of qualitative analysis. The data obtained is reduced, displayed, verified, and reduced again when new information appears. This process takes place iteratively until a strong conclusion is reached. To clarify the flow of analysis, this study is equipped with a Data Analysis Technical Chart that describes the cyclical relationship between stages. The flow of data analysis can be described in the following chart:

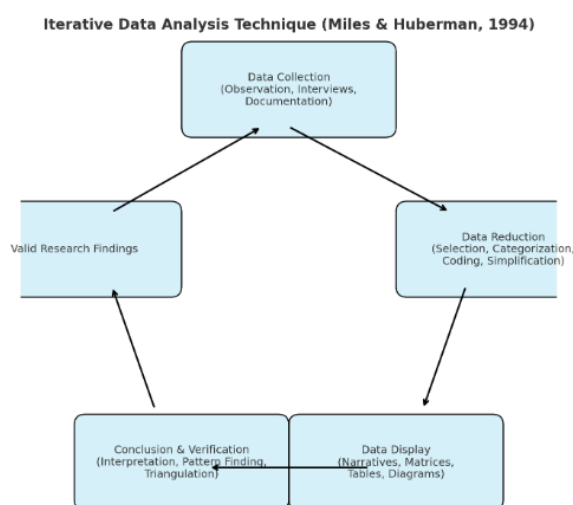


Figure 1. Data Analysis Techniques Chart

The Iterative Data Analysis Technique chart (Miles & Huberman, 1994) shows that qualitative data analysis takes place on a cyclical and repetitive basis. The process starts from data collection through observation, interviews, and documentation, then continues with data reduction through selection, coding, and simplification of information. The reduced data is presented in the form of narratives, tables, matrices, or diagrams to make patterns and relationships between themes more visible. Furthermore, the researcher draws and verifies conclusions through interpretation, pattern search, and triangulation to ensure the validity of the data. This cycle continues to repeat until it produces valid research findings, so that the analysis is not linear but dynamic and reflective.

To maintain the validity of the data, this study applies three main strategies, namely triangulation, member checking, and trail audit. Triangulation is carried out by comparing data from various sources (teachers, students, principals, and parents) as well as by various techniques (observation, interviews, documentation). Member checking is carried out by confirming the results of the interpretation with the informant so that there is no misunderstanding of the meaning. Trail audits are carried out through recording the details of the research process, from planning to analysis, so that each step can be traced.

The ethical aspect is also the main concern in this study. All research participants, both teachers, students, and parents, have given consent based on the principle of informed consent. The identity of the informant is kept confidential to ensure anonymity, while student involvement is carried out with the permission of parents and the school. The research also pays attention to the principle of sustainability, so that research activities do not interfere with the teaching and learning process in schools. Data saturation is determined when the data obtained from interviews and observations no longer produce

new themes or information. At that point, the data is considered sufficient to answer the focus of the research comprehensively.

3. FINDINGS AND DISCUSSION

Based on the results of interviews, observations and documentation carried out, the following findings were obtained.

3.1 *Ethnoscience Values in Riau Malay Culture*

The findings of the study show that Riau's Malay culture holds a lot of local wisdom that is very relevant to the character formation of elementary school students. These values are not only implied in speech and proverbs, but also manifested in people's daily behavior, such as the tradition of mutual cooperation, deliberation in making decisions, and respect for parents and teachers. The tradition of mutual cooperation, for example, is still very strong in West Maredan Village, where people are used to doing joint activities such as cleaning ditches, repairing village roads, or helping neighbours who are holding celebrations. From these activities, children who participated in seeing and being directly involved got a real example of the importance of cooperation and social concern. One teacher confirmed this by saying, "The children here are used to seeing their parents in mutual cooperation. So when we talk about cooperation in the classroom, they quickly understand what it means, because there are real examples that they have witnessed." The statement shows how character values are easier to internalize when relying on concrete cultural experiences.

The value of ethnoscience is also reflected in the wisdom of the Malay community in maintaining the balance of nature. The customary prohibition against destroying forests or cutting down trees indiscriminately, for example, contains ecological knowledge related to environmental sustainability. This is in line with the statement of a student who recalled his father's message, "If we destroy the forest, it will flood." This expression proves that traditional knowledge inherited through parental advice plays a direct role in fostering children's ecological awareness. Teachers also often associate science learning with the Malay proverb "nature develops into a teacher", which teaches that nature is a source of knowledge as well as a guideline for life. In this way, the values of responsibility, caring, and religiosity are not only understood in the abstract, but are completely grounded in the child's life.

When compared to other cultures in Indonesia, the ethnoscience values of Riau Malay show similarities as well as distinctiveness. For example, Suastra's (2010s) research on Balinese ethnoscience found that traditional knowledge of Tri Hita Karana (the harmonious relationship of humans with God, others, and nature) became the basis for contextual and character-oriented science learning. Similar things are also found in Sundanese society, where the concepts of *silih ahon*, *silih asih*, *silih asuh* are used as a framework for ethnoscience-based character education (Rahayu, 2016). In the Minangkabau community, research by Syafruddin (2018) shows that the traditional saying of *takambang* becomes a teacher who functions as a learning resource that instils religious values, togetherness, and ecological concern. Similarly, in Java, Prasetyo (2019) revealed that the cultural practice of *kenduri* and *slametan* teaches children to understand the values of solidarity, spirituality, and mutual cooperation.

This comparison confirms that although each ethnicity has its own characteristics, there is a common thread in the form of the use of local knowledge as a means of character formation. The uniqueness of Riau's Malay culture lies in the role of oral literature such as Raja Ali Haji's *Gurindam Dua* which contains universal moral advice, as well as social practices such as *track and field* that emphasizes the values of discipline, cooperation, and sportsmanship. Unlike Sundanese or Javanese, which emphasise more on the philosophy of social balance, Malay culture is stronger in the dimension of religiosity and adherence to customary norms. This shows that Riau Malay ethnoscience is not only locally relevant, but also contributes to the national discourse on character education based on local wisdom.

Thus, ethnoscience values in Riau Malay culture are not just traditional knowledge, but educational mechanisms that internalize moral, social, and ecological values from an early age.

Compared to similar studies on Sundanese, Minang, Javanese, and Balinese ethnicities, Riau Malay values show distinctiveness as well as connectedness in building students' character. This culture-based approach is very strategic for primary education because it unites cognitive, affective, and psychomotor aspects in one contextual learning process that is in accordance with the child's reality.

3.2 Internalization of the Value of Ethnoscience in the Learning Process

This research shows that the internalization of ethnoscience values in elementary school learning is carried out by connecting subject matter with local cultural experiences that are familiar to students. For example, teachers not only explain scientific concepts in the abstract, but also relate them to real-life examples. When discussing the water cycle, the teacher not only described the process of evaporation and rain, but related it to the experience of the Malay community who used the river as a source of life. In this way, students can more easily understand scientific concepts while growing awareness to keep the river clean.

Furthermore, one of the teachers emphasized, *"When I teach about water, I always associate it with the Siak River. I said that rivers are the source of life, so they must be kept clean. Children become more sensitive and instantly connected to what they see every day."* From this statement, it can be seen that learning that is connected to the cultural context makes students more excited and easier to understand the value of character. This proves that the internalization of ethnoscience values not only strengthens the aspect of knowledge, but also shapes attitudes.

In addition, Malay folklore is also used as a strategy to instill moral values. The story of the Lancang, for example, contains a message about arrogance and its consequences. Teachers use this story to foster a humble attitude in students. One student even said, *"I love the story of The Lancang, because there is advice not to fight your parents. So I remember to stay home."* This quote shows that folklore is not just entertainment, but a means of internalizing values that are easier for children to accept.

Not only through stories, the use of Malay proverbs and rhymes has also proven to be effective. Teachers often start or close lessons with rhymes that contain moral messages, for example, about diligent learning or the importance of respecting teachers. This method makes students more enthusiastic and at the same time feel close to their culture. Thus, the internalization of values does not feel rigid, but rather fun and in accordance with the child's world.

When viewed through the framework of Bloom's Taxonomy, the internalization of this ethnoscience value includes three domains. First, the cognitive realm, where students acquire knowledge (e.g. understanding the water cycle by relating it to the Siak River). Second, the affective realm, which is reflected in the attitude of students in respecting the environment and respecting parents through folklore. Third, the psychomotor realm, seen when students are directly involved in activities such as maintaining the cleanliness of the river or the practice of mutual cooperation at school. This mapping shows that the integration of ethnoscience not only focuses on the aspect of knowledge, but also touches on real attitudes and skills.

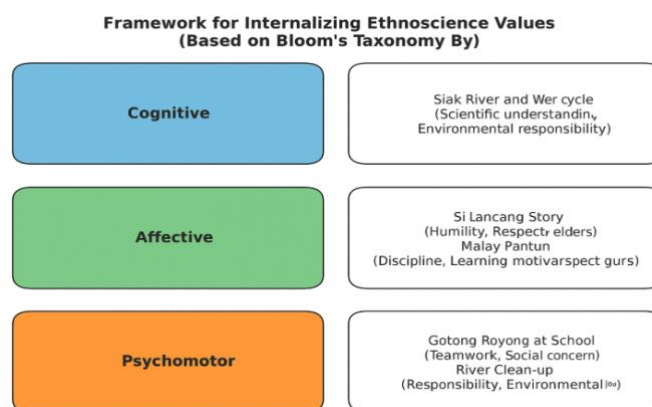


Figure 2. Ethnoscience Internalization Chart

Based on the chart above, it shows that in the cognitive realm, students understand scientific concepts such as the water cycle by associating it with the Siak River so that a sense of responsibility for protecting the environment grows. In the affective realm, students absorb moral values through Malay folklore and rhymes that foster humility, discipline, and respect for teachers and parents. Meanwhile, in the psychomotor realm, students practice these values in real activities, such as mutual cooperation at school and maintaining the cleanliness of the river.

In line with Vygotsky's (1978) theory, effective learning is when new knowledge is associated with the child's social and cultural experiences. By paying attention to this, it can be emphasized that the internalization of ethnoscience values in elementary school learning is able to connect science with culture, so that learning is more meaningful. Through a culturally based contextual approach, students not only understand academic concepts, but also form characters that align with their local culture.

3.3. The Role of Teachers in Integrating Ethnoscience

The findings of the study show that teachers have a central role in integrating Riau Malay culture-based ethnoscience into the learning process and character formation of students. Teachers are not only transmitters of knowledge, but also role models as facilitators, role models, cultural liaison, collaboration mentors, and guardians of local values to remain relevant to the lives of the younger generation. In practice, teachers in West Maredan Village take advantage of the cultural experiences that students have, then connect them with the subject matter. Thus, learning not only adds academic insight, but also instills character values through a more contextual path.

These roles can be seen more clearly in the following table, which maps the relationship between the role of teachers, the ethnoscience strategies used, and the targeted characters.

Table 1. The Role of Teachers in Integrating Ethnoscience (Riau Malay Culture)

| The Role of the Teacher | Ethnoscience Strategy | Targeted Characters |
|-------------------------|---|--|
| Facilitator | Relate science material to cultural experiences (e.g. activities in the fields/gardens, Siak River) | Responsibility, caring for the environment |
| Role model | Exemplify manners, greetings, and respect for differences | Manners, respect for others |
| Cultural Liaison | Using folklore, proverbs, and rhymes as learning media | Humility, discipline, respect for parents and teachers |
| Collaboration Mentor | Encouraging group work with the analogy of the value of cooperation in Malay culture | Cooperation, social solidarity |
| Local Value Keeper | Internalizing customary customs in the daily learning process | Cultural identity, love of the homeland |

One teacher interviewed said, *"I usually start lessons with children's stories or experiences. For example, when discussing plants, I ask who their parents go to the fields or gardens. From there I came up with stories about the importance of caring for plants, and connecting them to the value of responsibility."* This quote shows how teachers utilize simple interactions to build connections between science, student experience, and cultural values.

In addition, observations show that teachers often integrate cultural values through collaborative learning methods. When students are asked to work in groups, teachers emphasize the importance of cooperation which is a key value in Malay culture. One of the students said, *"If we study in a group, we have to be compact, said the teacher, like villagers if we work together."* From this statement, it can be seen that teachers use cultural analogies to reinforce the meaning of cooperation in learning.

The role of teachers in integrating ethnoscience is also seen in the formation of a classroom atmosphere that reflects cultural values. For example, teachers make it a habit for students to respect

each other when speaking, not interrupting a friend's conversation, and to give a greeting before starting the lesson. This simple practice, although seemingly small, has proven to contribute significantly to the formation of religious character, good manners, and mutual respect.

This view is in line with Tilaar (2000) who emphasizes that multicultural and local culture-based education requires teachers to act as a link between traditional values and modern needs. In the context of this research, teachers play the role of guardians of Malay cultural values that are internalized in learning, while ensuring that students do not lose their roots even when faced with the current of globalization.

Thus, it can be understood that teachers are a key factor in the successful implementation of ethnoscience based on Riau Malay culture. Through their role as facilitators, role models, cultural liaison, collaborative mentors, and guardians of local values, character values can be instilled systematically and sustainably. Therefore, an educational strategy based on local wisdom can only succeed if teachers are truly aware of the importance of this role and are able to actualize it in daily learning practices.

3.4. The Impact of Ethnoscience on the Formation of Students' Character

The results of the study show that the application of ethnoscience based on Riau Malay culture has a significant impact on the formation of the character of elementary school students, especially in the aspects of religiosity, responsibility, social concern, and environmental awareness. These changes can be seen through comparisons before and after ethnoscience-based learning. Before implementation, students tended to care less about the cleanliness of the school environment, rarely greeted teachers, and were passive in group work. However, after learning progressed, students began to show positive changes, such as being more concerned about disposing of garbage in its place, more diligent in greeting teachers, and actively participating in group work. At the beginning of the semester, only about five to seven students are really actively involved in group discussions, while by the end of the learning almost all students in the class (more than 80%) are able to start collaborating with their peers without having to be directed by the teacher.

This change was also recorded in student interviews: *"Now I am more diligent in throwing garbage in its place, because teachers often tell us that dirty rivers can make us sick. So I remember it constantly."* The quote emphasizes that the internalization of values through ethnoscience does not stop at the level of knowledge, but enters into real behavioral awareness. In addition to the environmental aspect, the improvement of religious and moral attitudes is also clearly visible. Prior to the integration of ethnoscience, students often forgot to pray before studying or spoke without good ethics. After the learning took place, they got used to praying together, giving greetings, and speaking more politely. One teacher confirmed: *"Children now greet more often and look more polite when they speak. I think this is because they see the cultural values that we keep repeating in learning."*

In terms of social concern, the transformation is also quite significant. If previously students tended to be individualistic and reluctant to share stationery, then after the application of ethnoscience they are easier to work with and sensitive to friends who are experiencing difficulties. One of the students even said, *"If a friend forgets to bring a pencil, I'll borrow it, because the teacher says we should help each other."* This shows the formation of social solidarity as part of daily practice. This finding is in line with the view of Lickona (1991) who emphasizes that character education is only effective if it is manifested in real daily habits. In the context of this research, ethnoscience learning is not only to introduce Riau Malay culture, but to make it a means of habituation that fosters religiosity, social concern, responsibility, and ecological awareness.

To clarify this transformation, here is a comparison table before–after the application of ethnoscience which is also linked to the dimension of the Pancasila Student Profile in the Independent Curriculum:

Table 2. Comparison Before–After the Application of Ethnoscience

| Character Aspects | Before the Application of Ethnoscience | After the Application of Ethnoscience | Relevance to Pancasila Student Profiles |
|----------------------|---|---|---|
| Religiosity | Often forgetting to pray before studying, not being polite when interacting | Getting used to praying together, greeting, speaking more politely | Faith, fear of God, and noble character |
| Responsibility | Less care about maintaining cleanliness, inconsistent completion of tasks | Diligently dispose of garbage in its place, more responsible for tasks | Independent, Critical Reasoning |
| Social Care | Tends to be individualistic, reluctant to share stationery or help friends | More cooperative in group work, likes to help friends who are in difficulty | Working together, With global diversity |
| Ecological Awareness | Considering rivers/environments is not an important part of learning | Caring more about the river and the environment, keeping the school clean | Critical thinking, Mutual Cooperation |

If it is associated with the Pancasila Student Profile in the Independent Curriculum, the results of this study show a strong relationship. The aspect of religiosity is reflected in the dimension of faith and noble character, environmental concern is in line with the dimension of critical reasoning and global diversity, social concern reflects the dimension of working together, while increasing student responsibility is in line with the independent dimension. Thus, the integration of ethnoscience based on Riau Malay culture has proven to be relevant in supporting the achievement of the profile indicators of the Independent Curriculum graduates, as well as providing a contextual model for strengthening character education based on local wisdom.

3. 5. Figures, Tables, and Schematics

3.5.1 Student Activities in Culture-Based Learning



Figure 3. Student Activities in Malay Culture-Based Learning in Riau

The picture above shows the classroom atmosphere at West Maredan State Elementary School, where the teacher seems to be actively guiding students in discussion activities that connect science lessons with local wisdom, especially maintaining the cleanliness of the river as a source of community life. Students are seen sitting in groups, exchanging opinions, and showing enthusiasm as they relate scientific concepts to their daily experiences. The presence of teachers in the middle of the discussion emphasized that the role of educators is not only as a presenter of the material, but also as a facilitator who connects knowledge with local culture.

Furthermore, the classroom atmosphere depicted shows that the application of ethnoscience based on Riau Malay culture is able to create contextual, fun, and meaningful learning. The activities of students who actively discuss and care about environmental issues prove that this learning has a real effect on character formation, such as a sense of responsibility, social concern, and ecological awareness. One of the teachers of West Marelan State Elementary School said, "When children learn through stories about rivers and Malay customs, they can easily understand the importance of protecting the environment, and they even become accustomed to reminding their friends who litter." Thus, this image is clear evidence that the integration of local culture into learning in primary schools can strengthen character education from an early age.

Table 3. The Impact of the Application of Ethnoscience on Student Character

| Character Aspects | Indicators of Change | Observation Results |
|-------------------------|---|------------------------------------|
| Religiosity | Familiarize yourself with pre-study prayers, greetings, and manners | Students pray and greet more often |
| Responsibility | Completing assignments on time, taking care of school supplies | Students are more disciplined |
| Social Care | Help friends who are struggling, work together in groups | Significant improvement |
| Environmental Awareness | Dispose of garbage in its place, keep classrooms and school grounds clean | Pay more attention to cleanliness |

The table above illustrates the change in the behavior of elementary school students after participating in ethnoscience-based learning with the content of Riau Malay culture. From the results of the observations made, it can be seen that the four aspects of character, namely religiosity, responsibility, social concern, and environmental awareness, show quite real developments in the daily lives of students.

First, in the aspect of religiosity, it can be seen that students are increasingly accustomed to starting learning activities with prayer, saying greetings when entering class, and showing good manners in interacting with teachers and friends. This shows the internalization of religious values that is consistently strengthened through habituation, as is also emphasized in the Riau Malay culture which places religious values as the basis of daily behavior.

Second, the responsibility aspect has also experienced a significant increase. Students are getting used to completing assignments on time and are more concerned about maintaining their study supplies. This habit indicates that the integration of ethnoscience which is loaded with the value of hard work and discipline is able to foster an attitude of responsibility in students. This change is very important because responsibility is one of the main foundations in the formation of independent character.

Furthermore, in the aspect of social care, it can be seen that students become more sensitive to the needs of others, such as helping friends who have difficulty understanding lessons or working together in group assignments. This increase in social awareness reflects the strong value of mutual cooperation in Riau Malay culture, where each individual is taught to help each other for the common good. Thus, these values are successfully realized in real practice in the school environment.

Finally, the environmental awareness aspect also shows quite significant changes. Students are increasingly concerned about throwing out trash instead, keeping classrooms clean, and participating in caring for school grounds. This attitude shows that ethnoscience is able to instill ecological awareness contextually and close to the daily lives of students, because it directly sees the positive impact of maintaining environmental cleanliness.

Overall, the explanation of this table shows that Riau Malay culture-based ethnosience is not only a means of learning science, but also effective in instilling character values. The four aspects studied, namely religiosity, responsibility, social concern, and environmental awareness—experienced positive changes that proved the success of educational strategies based on local wisdom in shaping the personalities of elementary school students.

3.5.2 Flow Scheme of Ethnosience Integration in Character Formation

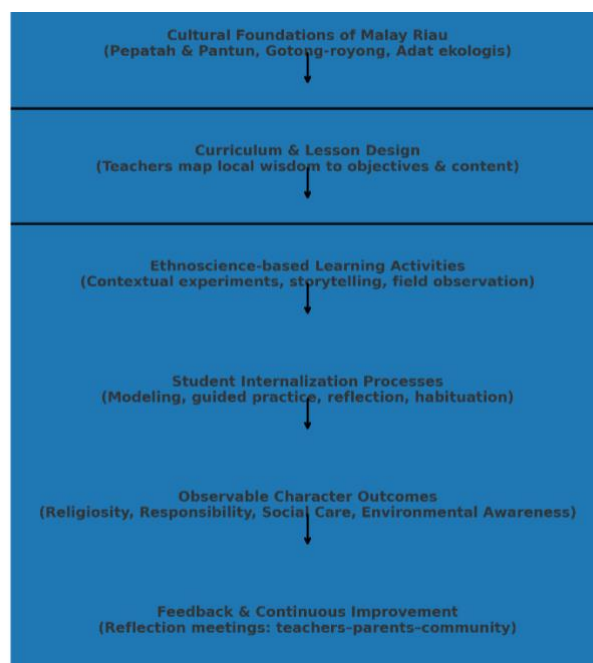


Figure 4. Ethnosience Integration Scheme in Character Building

The scheme of integrating ethnosience in the formation of student character starts from the foundation of Riau Malay culture which is the main basis in learning design. Local values such as proverbs, pantun, mutual cooperation, and ecological customs not only function as cultural identity, but also as a source of moral values that can be instilled in students. These cultural values are then translated by teachers into curriculum design and learning design, so that educational goals not only emphasize the cognitive aspect, but also build attitudes and behaviors that are appropriate to the socio-cultural context in which students grow. Thus, learning is inseparable from the roots of local culture, but increasingly relevant and meaningful in everyday life.

Furthermore, the implementation of the curriculum is realized in ethnosience-based learning activities, such as contextual experiments, storytelling activities, and field observations. This activity not only provides scientific experience to students, but also instills cultural values naturally through direct interaction with the environment. The contextual learning process is then continued with the internalization of values through teacher examples, directed exercises, self-reflection, and consistent habituation. It is at this stage that students begin to transform the knowledge gained into real attitudes and behaviors that are in accordance with cultural values, so that character education does not stop at the theoretical level, but is actually realized in daily life.

From this process, clearly observable character outputs are born, including religiosity, responsibility, social concern, and environmental awareness. For example, students are more diligent in praying before studying, more disciplined in completing assignments, willing to help friends who are in difficulty, and care about keeping the school clean. However, this scheme does not stop at the final results, because there are stages of continuous feedback and improvement through joint reflection between teachers, parents, and the community. With this cycle, ethnosience-based character education

can continue to be evaluated, adjusted, and strengthened according to the needs of student development and the dynamics of the socio-cultural environment, so that the character formed is really solid and sustainable.

Discussion

The results of this study show that the application of ethnoscience based on Riau Malay culture in West Mardian State Elementary School has a real influence on the formation of student character. The values of religiosity, responsibility, social concern, and environmental concern are able to be internalized well when the learning process is associated with local wisdom. For example, the habit of praying before studying is not only seen as a routine, but is also associated with Malay cultural values that uphold sharia customs, namely sharia with Kitabullah. This shows that the cultural values that live in the community can be a strong foundation in strengthening the religiosity of students.

Furthermore, this research supports the view of Tilaar (2004) who emphasizes that education based on local wisdom plays an important role in strengthening cultural identity as well as shaping the personality of the younger generation. For example, through Malay folklore such as Batu Belah Batu Bertangkup, students are invited to understand the moral message about responsibility and the consequences of negligent attitudes. Teachers who integrate these stories in science or Indonesian learning help students not only understand the content of the story, but also relate the value of responsibility to everyday life, such as completing assignments on time and taking care of school supplies.

In addition, elements of Riau Malay culture are also seen in the practice of gotong royong or bantu which is a noble value of the local community. In the context of schools, this is realized when students work together to clean classrooms and school yards, or help each other friends who are having difficulties. This finding is in line with Lickona (1991) who emphasized that effective character education is realized through real habituation. Thus, mutual cooperation activities carried out at school are not only physical activities, but also the process of internalizing the value of social care that strengthens the bonds between students.

Finally, environmental awareness is also formed through the local wisdom of the Riau Malay community who have long coexisted with the river. For example, the advice of Malay parents who say that "river water is the source of life" became the basis for science learning in the classroom that taught the importance of maintaining clean water. This is proven when students are more diligent in disposing of garbage in its place because they understand the direct impact of river pollution on health. By integrating these cultural elements, teachers not only deliver academic material, but also instill the value of ecological responsibility. Therefore, ethnoscience based on Riau Malay culture can be considered an effective strategy to make character education more contextual, integrated with life, and rooted in local traditions.

However, although the results of this study provide a positive picture, there are some limitations that need to be considered so that the conclusions are not overinterpreted. First, this study was only conducted in one elementary school in West Mardian Village, so the findings obtained do not necessarily fully reflect the conditions of other schools in the Riau region or Indonesia as a whole. Second, potential bias is still possible because most of the data is obtained through observation and interviews, which can be influenced by the proximity of the researcher to the participants. Third, the relatively short observation time makes this study not able to capture changes in student character in the long term in more depth.

Realizing these limitations, it is important to reflect on the extent to which this model of ethnoscience based on Riau Malay culture can be applied in other educational contexts with different characteristics. The question then arises is whether this model can also be adapted in urban schools, multiethnic schools, or environments with religious plurality. The results of the reflection show that the principles of ethnoscience are actually quite flexible, as long as teachers are able to relate learning to relevant local wisdom in each environment. In urban schools, for example, integration can be done

through urban cultural practices related to the environment, technology, or local art. Meanwhile, in multiethnic schools, this approach needs to highlight universal values such as mutual cooperation, responsibility, and environmental concern so that it can be accepted by all students without creating an exclusive impression of a particular culture or religion. Thus, this model has the potential to be transferred, as long as teachers are able to adapt local content to inclusive and contextual values.

These findings are even more meaningful when compared to the results of similar studies in various regions in Indonesia which also emphasize the importance of local wisdom in character education. Research in Java shows that puppet stories are used to instill leadership and responsibility values (Suyanto, 2015). In Bali, the study on the integration of the Tri Hita Karana philosophy has been proven to be able to strengthen students' ecological awareness as well as spirituality (Sudarsana, 2017). Meanwhile, research in Aceh confirms that Islamic values rooted in local wisdom can strengthen students' religiosity and discipline (Ismail, 2018). Thus, the results of research in Riau enrich the treasures of education based on local wisdom by adding the dimension of the river and Malay culture as a learning medium for ethnosience, as well as emphasizing that local wisdom in various regions can be a relevant and meaningful source of learning for the formation of students' character.

4. CONCLUSION

The results of this study show that ethnosience-based learning by fostering Riau Malay culture has a real influence on the formation of the character of elementary school students. The change can be seen from the daily attitude of students who are increasingly religious, responsible, caring for others, and having an awareness of protecting the environment. With an approach that is close to the lives of students, character values become more acceptable and practiced in real activities at school.

The integration of local cultures also makes the learning process more lively and meaningful. The habit of praying and giving greetings that are in harmony with Malay customs, the use of folklore to strengthen moral messages, and the teaching of maintaining the cleanliness of the river are real means that foster ecological awareness as well as social character. Because it is connected to the daily experience of students, the learning process not only enriches knowledge, but also fosters awareness of behaving according to societal values.

This finding is in line with Licona's view that character education must be realized through concrete habituation, not just theory. In this context, Riau Malay culture-based learning has presented positive habits such as discipline in doing assignments, good manners towards teachers, helping, and maintaining the cleanliness of the school environment. Thus, ethnosience based on Riau Malay culture has proven to be relevant in shaping the character of students at SD Negeri Maretan Barat and has the potential to be developed in other schools, because this approach instills knowledge while preserving cultural heritage that strengthens students' identity.

Future research may adopt a longitudinal approach to look at the sustainability impact of ethnosience learning, as well as comparative studies between schools or between ethnic groups to explore the contribution of local wisdom from different cultures to character education. Practically, this study shows the effectiveness of integrating ethnosience in basic education. Theoretically, this research reinforces insights into how the internalization of local culture can be a framework in character education, adding new perspectives in educational theory especially in the framework of Deep Learning Approach, where knowledge, attitudes, and skills are not only learned cognitively but are internalized through contextual real-world practice.

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such as religiosity, responsibility, social concern, and environmental awareness are increasingly embedded in students, and become valuable provisions in their lives in the future.

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