

ETHNOSCIENCE AS A LEARNING APPROACH IN ELEMENTARY SCHOOL: RAISING CULTURAL AWARENESS THROUGH SCIENCE

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Abstract

This research examines the role of ethnoscience as a learning approach in primary schools in enhancing students' cultural awareness through science. Ethnoscience integrates local knowledge with science concepts, allowing students to relate the subject matter to their cultural context and surrounding environment. The research methods used include literature studies and data analysis from various related studies. The results show that the application of ethnoscience not only enriches the education curriculum, but also increases students' motivation and understanding of the subject matter. Students become more engaged in learning, develop critical thinking skills and strengthen their cultural identity. Despite implementation challenges, such as the lack of training for teachers, the positive response to ethnoscience shows great potential as an effective educational tool. This research recommends developing learning strategies that integrate ethnoscience to create a more holistic and relevant learning experience.

Keywords: Learning Approach, Cultural Awareness, Science

INTRODUCTION

Ethnoscience as a learning approach in elementary schools is very important in integrating local culture with science, which in turn can increase students' cultural awareness. The concept of ethnoscience refers to scientific knowledge generated from local cultural practices in the context of science, including the understanding, experiences and values held by a particular community (Rahmawati & Atmojo, 2021). By applying ethnoscience, students are not only taught science theories in a rigid form, but also invited to understand how these scientific concepts are realized in their daily practices. For example, when students learn about ecosystems, they can explore how local communities utilize natural resources in a sustainable way, as well as understand the values that govern their interactions with the environment. This approach makes learning more relevant and contextualized, as students can see a direct connection between science and their own lives. Thus, ethnoscience not only broadens students' scientific horizons, but also strengthens their cultural identity, creates a sense of pride in local heritage, and builds awareness of the importance of preserving local wisdom in the face of global challenges (Setyowati et al., 2023).

One of the benefits of using ethnoscience in learning is increased student interest

and engagement in the learning process. Research shows that the identification of relevant cultural elements, such as in the ethnoscience study of Surabaya Submarine Monument, can introduce historical and social aspects that enrich science lessons for elementary school students (Solihin et al., 2024). By linking science with local cultural heritage, students not only learn about science concepts theoretically, but also understand the social and historical context behind them. For example, through the exploration of the Submarine Monument, students can learn about maritime technology while understanding the important role of submarines in the history of the nation's struggle. As a result, students gain greater insight into the relationship between cultural heritage and science, which also strengthens their love for culture and nationality. This approach is particularly important in an educational context that seeks to build students' character and awareness of their cultural identity, because by understanding and appreciating local culture, students will be more motivated to actively engage in learning and develop a sense of responsibility for the preservation of their cultural heritage in the future (Solihin et al., 2024).

However, the application of ethnoscience in learning is also faced with various challenges that need to be overcome in order to maximize the benefits. One of the main challenges is teachers' lack of understanding of how to integrate the curriculum with ethnoscience, which often hinders teaching effectiveness (Alfiana & Fathoni, 2022). In addition, time constraints in the implementation of learning are a significant obstacle, making it difficult for teachers to explore the material in depth. Therefore, the importance of training teachers so that they can develop ethnoscience-based lesson plans is a key element in improving the quality of education at the primary school level (Siregar, 2021). This training not only provides basic knowledge about ethnoscience, but also practical skills to link local cultural elements with science materials. Involving the community in the learning process and stimulating student engagement in scientific exploration through local cultural elements is expected to build deeper information and knowledge, so that students not only learn theoretically but also experience contextualized and relevant learning (Atmojo, 2018). Thus, while such challenges exist, planned and collaborative efforts can create a richer and more rewarding learning environment for students.

By making ethnoscience a learning approach, elementary schools have the opportunity to integrate various elements of local culture into the science curriculum. This approach allows students to not only acquire academic knowledge, but also understand the social and cultural values that surround them, serving as a bridge between science and greater cultural awareness (Ilhami, 2019). Through ethnoscience, students can learn how scientific concepts relate to everyday cultural practices, thus making learning more relevant and interesting. For example, when studying local ecosystems, students can explore the traditional ways used by local communities in protecting the environment, which not only provides scientific insights but also fosters a sense of love and responsibility for their culture. Therefore, this study aims to examine more deeply the effectiveness of ethnoscience in education and how to effectively implement it in the curriculum at primary schools. By understanding the challenges and opportunities that exist, it is hoped that this research can provide practical recommendations for educators in creating holistic and contextualized learning experiences for students.

RESEARCH METHODS

This research uses a qualitative approach that emphasizes inductive analysis, in contrast to the deductive approach often used in quantitative research. This type of research is descriptive analysis, which aims to describe existing phenomena, both natural and human-made (Moleong, 2016). In this context, the main focus of the research is to describe systematically, factually and accurately the application of ethnoscience in learning in elementary schools. As stated by Moleong (2016), good research must be supported by relevant data and data sources. Data in this research is used to explain the results obtained, while data sources include words, actions, and other related documents. In this case, the research data is taken from the analysis of articles that discuss the application of ethnoscience in the context of learning in elementary schools. The main data sources were obtained from research articles that specifically discussed aspects of ethnoscience.

The literature study conducted in this research is based on an in-depth review of relevant articles, focusing on various aspects of ethnoscience. The data collection technique used the documentation method, where researchers collected and analyzed information from the articles. Furthermore, the data analysis technique used is content analysis, which allows researchers to explore the meanings and patterns that emerge from the data that has been collected. With this approach, it is expected that the research can provide a clearer and deeper picture of how ethnoscience is applied in learning in elementary schools, as well as its impact on students' cultural awareness.

RESEARCH RESULTS AND DISCUSSION

Integration of Ethnoscience in the Curriculum

The integration of ethnoscience in the Indonesian education curriculum is increasingly considered important to build relevance and context in the teaching and learning process. Ethnoscience refers to local knowledge that has been owned by the community, which can be utilized to help students understand science concepts better and more meaningfully. Previous studies have shown that the application of ethnoscience not only enriches the educational curriculum, but also increases students' motivation and understanding of the subject matter (Rahman et al., 2023). By linking science learning with local cultural experiences, students become more engaged and enthusiastic in the learning process, as well as more appreciative of their cultural heritage.

Table 1. Research Findings related to the Integration of Ethnoscience in the Education Curriculum

No	Aspects Found	Research Results
1	Implementation of Ethnoscience Approach in Schools	Only a small number of teachers use ethnoscience in learning, and there is a need to develop learning models that include cultural elements (Rikizaputra et al., 2021).
2	Influence on Student Ability	The ethnoscience approach helps improve students' motivation and understanding of science concepts, including the use of locally relevant teaching aids (Rahman et al., 2023; Rahmawati & Atmojo, 2021).
3	Learning Design and Methods	The development of ethnoscience-based modules shows high validation results and is feasible to implement in the classroom, with a score of 87% and 86.2% for practicality

(Nurhayati et al., 2021).		
4	Integration with Merdeka Curriculum	Research shows that the implementation of an independent curriculum brings positive changes with innovations in ethnoscience learning to improve student learning outcomes (Lince, 2022; Alhayat et al., 2023).
5	Use of Ethnoscience-Based Learning Resources	Identification of the need for ethnoscience-based learning resource development is stated to be important in improving the quality of learning, through the adaptation of local culture (Alfiana & Fathoni, 2022).

Various studies have shown that the ethnoscience approach has great potential in integrating science learning with local wisdom, as well as encouraging students to be more actively involved in the learning process. This approach allows students to relate science concepts to the experiences and cultural knowledge around them, so that learning becomes more relevant and meaningful. However, the challenges in implementing ethnoscience in the field are still quite significant. Many teachers have not fully utilized this approach, both in lesson plans and in classroom implementation (Alfiana & Fathoni, 2022). This indicates the need for more training and support for teachers so that they can integrate ethnoscience effectively, so that the benefits of this approach can be maximally felt by students.

Ethnoscience integration not only brings academic benefits, but also plays an important role in increasing students' awareness of the environment and culture around them. By linking science learning with local wisdom, students are invited to understand and appreciate the cultural values that exist in society. This approach helps them build a character that is more familiar with the environment, making them more concerned and responsible for the preservation of culture and natural resources. This not only enriches the learning experience, but also shapes a generation that is more aware of their identity and cultural heritage, and able to contribute positively to society (Asbanu & Kasseh, 2021).

Impact of Ethnoscience on Students' Cultural Awareness

The impact of ethnoscience on students' cultural awareness is an issue that is attracting increasing attention in the current educational context. Research conducted shows various significant impacts of ethnoscience, not only on cultural awareness, but also on students' science skills and critical thinking ability. By integrating local knowledge into learning, students become more sensitive to the cultural values around them, while strengthening relevant science skills. This approach facilitates students in developing critical thinking skills through analysis and reflection on their own culture. The following table presents a summary of findings related to the impact of ethnoscience on students' cultural awareness, illustrating how this integration can enrich the learning experience and shape better student character.

Table 2: Research Findings related to the Impact of Ethnoscience on Students' Cultural Awareness

No	Aspects Found	Research Results
1	Improved Science Literacy Skills	Ethnoscience-based chemistry learning can significantly improve students' science literacy skills, with the average competency score reaching 72% in the experimental class (Wibowo & Ariyatun, 2020).

2	Critical Thinking Skills	The ethnoscience approach in learning helps improve students' critical thinking skills. The results showed higher posttest scores in classes that used this approach (Oktapia et al., 2024).
3	Integration of Local Culture	Various ethnosciences identified from local areas can be integrated in science learning, so that students can relate science concepts to their own culture (Puspita et al., 2022).
4	Increasing Learning Interest	The implementation of ethnoscience-based learning attracts students' interest in science, which has a positive impact on learning motivation and student engagement in the learning process (Fahrudin & Maryam, 2022).
5	Creativity and Solving Problems	Creativity and Problem Solving

Based on the table above, it can be concluded that ethnoscience not only plays a role in improving students' scientific understanding, but also in building stronger cultural awareness. The learning process that integrates local cultural elements makes students feel more relevant to the material being taught, thus allowing them to learn in a more contextualized and meaningful way. By linking science concepts to the cultural experiences and values around them, students become more engaged and motivated in learning. This not only enriches their academic knowledge, but also shapes their identity and sense of responsibility towards their culture and environment, making learning more holistic and sustainable.

The summarized studies show that ethnoscience can be an effective tool in building students' cultural awareness, strengthening critical thinking skills, and facilitating a better understanding of science concepts. By integrating local wisdom and student culture into the learning process, students not only learn science theory, but also understand its application in the context of their daily lives. Referring to this, it is important for educators to continue developing learning strategies that integrate science with local wisdom, in order to maximize learning outcomes. This approach will encourage students to engage more actively, think critically and appreciate their cultural heritage, thus creating a generation that is more aware and responsible for the environment and society.

Teacher's Role in the Implementation of Ethnoscience

The role of teachers in the implementation of ethnoscience is very important to improve students' understanding of science learning and to integrate cultural values in education. Ethnoscience, which combines scientific knowledge with local cultural contexts, requires teachers who are not only skilled in learning materials, but also able to be effective facilitators in the classroom. With a deep understanding of local wisdom and the ability to relate science concepts to students' cultural experiences, teachers can create a contextualized and meaningful learning environment. This not only helps students understand the material better, but also strengthens their awareness of their cultural identity and surrounding environment.

Therefore, it is important for teachers to receive training and professional development that includes ethnoscience so that they can teach more effectively. In this context, Wati (2020) emphasized that teachers should act as facilitators who not only convey knowledge, but also help students understand the relationship between science

and local culture. With proper training, teachers can develop the skills to link science concepts with local wisdom, thus creating a more holistic and relevant learning experience. This will encourage students to be more actively and critically involved in learning, and to appreciate the cultural values around them.

Table 3. Research Findings related to the Role of Teachers in the Implementation of Ethnoscience

No	Aspects Found	Research Results
1	Teacher's Role	The teacher acts as an important facilitator in integrating ethnoscience with learning materials (Rahmawati & Atmojo, 2021).
2	Challenges in Implementation	Teachers' difficulties in implementing ethnoscience-based learning include a lack of training and understanding of the Learning Implementation Plan (RPP) (Alfiana & Fathoni, 2022).
3	Teacher Response	Positive teacher response to the application of ethnoscience can improve learning quality and student motivation (Andayani et al., 2021).
4	The Effect of Ethnoscience on Critical Thinking Skills	There was a significant increase in students' critical thinking skills after the implementation of a learning model integrated with ethnoscience (Verawati et al., 2023).
5	Validity and Practice of Learning Tools	Well-designed ethnoscience-based learning has proven to be feasible and practical to use in learning (Nurhayati et al., 2021).

The role of teachers in the implementation of ethnoscience is very important. Research shows that teachers not only function as teachers, but also as facilitators who help students link scientific knowledge with the local cultural context (Rahmawati & Atmojo, 2021; Wati, 2020). With this approach, students can see the relevance between science and their daily lives, so that understanding of the subject matter becomes deeper and more meaningful. Teachers who are able to integrate cultural elements in teaching not only increase student engagement, but also help them develop an awareness of their cultural identity and environment. This creates a dynamic and contextualized learning atmosphere, which is essential in sustainable science education.

However, the implementation of ethnoscience also faces some challenges. One of the main challenges identified in research is the lack of adequate training for teachers in developing ethnoscience-based lesson plans (Alfiana & Fathoni, 2022). Many teachers find it difficult to integrate the material with the surrounding environment, which hinders the effectiveness of ethnoscience-based learning. Nonetheless, teachers' responses are generally positive towards ethnoscience-integrated learning. Research shows that when teachers apply ethnoscience in teaching, the quality of learning and student motivation improve significantly (Andayani et al., 2021). This suggests that with the right approach and enough support, ethnoscience can be an effective tool in improving students' learning experience, making them more engaged and motivated to learn.

CONCLUSIONS

Integration of Ethnoscience in the Curriculum

The integration of ethnoscience in the education curriculum in Indonesia shows that this approach is increasingly important to build relevance and context in the teaching and learning process. Ethnoscience, which refers to local knowledge, helps students understand science concepts in a more meaningful way. Research shows that the application of ethnoscience not only enriches the curriculum, but also increases students' motivation and understanding of the subject matter. By linking science learning to local cultural experiences, students become more engaged and enthusiastic, and appreciate their cultural heritage more. However, challenges in the implementation of ethnoscience are still significant, with many teachers yet to fully utilize this approach. This suggests the need for more training and support for teachers to integrate ethnoscience effectively. In addition to the academic benefits, the integration of ethnoscience also increases students' awareness of the surrounding environment and culture, helping them build caring and responsible characters towards the preservation of culture and natural resources. Thus, ethnoscience not only enriches the learning experience, but also shapes a generation that is more aware of their cultural identity and heritage.

Impact of Ethnoscience on Students' Cultural Awareness

The impact of ethnoscience on students' cultural awareness is an issue that is attracting increasing attention in education today. Research shows that ethnoscience not only enhances cultural awareness, but also students' science skills and critical thinking ability. By integrating local knowledge into learning, students become more sensitive to the cultural values around them, while strengthening relevant science skills. The results showed significant improvements in students' science literacy, critical thinking skills, learning interest and creativity through the ethnoscience approach. The integration of local cultural elements makes learning more contextual and meaningful, so students are more engaged and motivated. By linking science concepts with cultural experiences and values, students not only enrich their academic knowledge, but also build identity and a sense of responsibility towards culture and the environment. Therefore, ethnoscience can be an effective tool to create a generation that is more aware and responsible towards their cultural heritage, making learning more holistic and sustainable. With the right support from educators, ethnoscience can optimize learning outcomes and significantly strengthen students' cultural awareness.

Teacher's Role in the Implementation of Ethnoscience

The role of teachers in the implementation of ethnoscience shows that teachers have a very important role in improving students' understanding of science learning and integrating cultural values in education. Ethnoscience, which combines scientific knowledge with local cultural contexts, requires teachers who not only have skills in learning materials, but are also able to function as effective facilitators. By understanding local wisdom and linking science concepts with students' cultural experiences, teachers can create a contextualized and meaningful learning environment. However, challenges in the implementation of ethnoscience still exist, especially related to the lack of adequate training for teachers in developing ethnoscience-based lesson plans. Nonetheless, teachers' responses to the implementation of ethnoscience tend to be positive, and research shows that the implementation of this approach can improve learning quality and student motivation. With proper training, teachers can develop the

necessary skills to integrate ethnoscience, which in turn will encourage students to actively and critically engage in learning, as well as appreciate the cultural values around them.

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