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EXPLORING LOCAL WISDOM THROUGH PROJECT-BASED LEARNING: A CASE STUDY OF THE APPLICATION OF ETHNOSCIENCE MODELS

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Abstract
Local wisdom is a valuable cultural heritage and needs to be preserved. One way to preserve it is to integrate it into learning. This research explores how the ethnoscience model can be applied in project-based learning to explore local wisdom. This research uses a qualitative approach. The data collection technique in this research is a literature study. The data that has been collected is then analyzed in three stages, namely data reduction, data presentation, and drawing conclusions. The research results show that the ethnoscience model is an effective tool for exploring local wisdom through project-based learning, which can be implemented by identifying local wisdom, organizing projects, combining knowledge, developing critical thinking skills, and implementing an ethnoscience approach. The ethnoscience approach can be carried out by reconstructing natural science in the customs and culture that exist in society to be developed into scientific science. Applying the ethnoscience model can help students understand scientific concepts, increase curiosity and interest in science, appreciate local wisdom, and develop 21st-century skills.
Keywords: Local Wisdom, Project Based Learning, Ethnoscience Model

INTRODUCTION

Local wisdom is a collection of understandings, views, and life strategies that local communities have long practiced to overcome various problems they face in meeting their living needs. This term is often known by foreign language terms such as "local wisdom", "local knowledge", or "local genius" (Fajarini, 2014). On the other hand, modern science is often seen as a way to manipulate nature and culture by objectively examining all aspects of life, sometimes omitting aspects of "values" and "morality". In the view of modern science, the elements of "value" and "morality" are considered irrelevant to the understanding of science (Choliq, 2020).

Local wisdom is a valuable cultural heritage, formed from experience and knowledge that has been passed down from generation to generation in a society. In order not to be forgotten, the involvement and preservation of skills, values, and traditions contained in local wisdom becomes important (Aisara et al., 2020). According to (Marfai, 2019), local wisdom is important to maintain a community's balance with its environment. In addition, local wisdom also plays a role in preserving the environment and serves as a step to reduce the impact of disasters that may occur. One effective preservation approach is integrating it into a project-based learning process.

Project-based Learning is a learning approach that utilizes projects or activities as the main means of learning (Santoso, 2022; Jagantara et al., 2014). According to the Ministry of Education and Culture in this model, students explore, assess, interpret, synthesize, and present information to create various learning outcomes. Project-based learning is a learning method that takes problems as a starting point in

collecting and integrating new knowledge, which is based on real experiences experienced by students (Yuliarini, 2021).

Project-based learning can use various learning models in its implementation, one of which is the application of ethnoscience models. Ethnoscience refers to a strategy for creating learning environments and designing learning experiences that incorporate cultural elements as an integral part of the learning process in elementary schools. Integrating ethnoscience in learning provides a clear picture of the peculiarities of subject matter, classrooms, learning environments, learning methods, and culturally based learning approaches. The effectiveness of the learning process can be achieved when ethnoscience is integrated into learning themes as the main focus of learning. For example, topics such as knowledge about traditional rituals, the use of traditional medicinal plants, traditional house architecture, and other cultural knowledge relevant to the learning theme can be included in the learning process (Wahyu, 2017).

Previous research by (Jacinda&Surtikanti, 2023) shows that ethnoscience-based learning is very influential in creating meaningful biology learning. Learning like this can increase students' understanding of the material because ofthe relationship between culture and the surrounding environment. Ethnoscience learning can be applied to learning methods, teaching materials, and assessment. Ethnoscience can be implemented in various biological materials such as the digestive system, excretory system, biotechnology, scientific method, environmental changes, and classification systems of living things.

Another study by (Laksono et al., 2023) shows that there is a positive perception of prospective chemistry teachers towards ethnoscience, namely being able to understand and elaborate ethnoscience approaches in basic science lectures. The main problem prospective chemistry teachers face in the ethnoscience approach is that they are not used to linking science content based on chemical context with local culture. The ethnoscience approach can be implemented with Contextual Learning. This learning provides an opportunity for prospective chemistry teachers to further explore the culture of the surrounding community more tangibly. Contextual Learning helps and bridges the process of discovering concepts and contexts that exist in learning.

The novelty of this research is from the object of its research, namely the application of ethnoscience models in project-based learning to explore local wisdom that has never been studied before. This research contributes to understanding the importance of integrating local wisdom in science learning. Its theoretical implications include a deeper understanding of how ethnoscientific models can be applied in formal educational contexts and how this can strengthen the relationship between modern and traditional science. This study aims to explore how ethnoscience models can be applied in project-based learning to explore local wisdom.

RESEARCH METHODS

This research design is a *literature review study*. This research uses a qualitative approach. Qualitative research methods are research approaches used to understand social phenomena in a deep and comprehensive way. This approach focuses on interpreting and understanding meaning from various social, cultural, and individual contexts (Roosinda et al., 2021). The data collection technique in this study is by literature study. Researchers collect information and understand research topics from various literature sources such as books, scientific journals, articles, research reports, and other related documents from Google Scholar (Nilamsari, 2014). The data that has been collected is then analyzed in three stages, namely data reduction, data presentation, and conclusions.

RESULT AND DISCUSSION

Education is a process that is deliberately designed and carried out to direct the development of students towards achieving certain goals. The input given to students includes various kinds of material, experience, and knowledge expected to form certain results by predetermined goals (Ananda et al., 2017). The importance of education cannot be doubted in improving the human resources of a nation. Through education, individuals can develop the skills, knowledge, attitudes, and values needed to contribute

positively to society and the country (Rohmawati, 2020). Collectively, improving the quality of human resources will impact a nation's progress (Purwananti, 2016; Budiharto et al., 2018; Asmiyati, 2018).

Education in the 21st century demands a paradigm shift in preparing learners to face the challenges of the evolving modern world (Hanipah, 2023; Abdillah &; Hamami, 2021; Mother Earth et al., 2024). According to Halimah and Indriani (2021), there are various important skills that individuals must master; these skills include learning to know, learning to do, learning to be, and learning to live together. In addition to these individual skills, 21st-century education also emphasizes aspects of collaboration, creativity, and communication skills. The concept of "learning to know" emphasizes the importance of acquiring knowledge, understanding new concepts, and developing critical thinking skills. This shows the importance of learning based on understanding and analysis, not just memorizing facts. Second, "learning to do" highlights the importance of practical skills and the ability to apply knowledge in real-world situations. Then, "learning to be" focuses on developing a positive personality and values. Finally, "learning to live together" emphasizes the importance of the ability to interact effectively in a multicultural and global society (Zubaidah, 2016).

The National Education Standards Agency also emphasizes the importance of having quality human resources in achieving the ideals of the Indonesian nation to become a prosperous, honorable, and equal nation with other nations. The characteristics of quality human resources are the ability to be independent, have a will, and have strong abilities. Independent and strong capable humans can be formed through the education sector, namely by forming students who have learning independence (Dinata et al., 2016).

Project-based learning can then be an effective solution in increasing student learning independence. Project-based learning is learning that provides opportunities for students to conduct an investigation (Arizona et al., 2020; Fahrezi &; Taufiq, 2020). In this project-based learning, students encounter complex tasks and deep problems, so they must solve problems, provide opinions, and train children to be independent (Norhikmah et al., 2022). It can also be explained that project-based learning is an authentic learning approach where students are directly involved with their learning content (Ismail, 2018).

The project-based learning model is a learning approach that puts students at the center to increase student independence (Saputri, 2021). In this model, students are given the opportunity to plan their learning activities within the framework of the project. The project-based approach gives students the freedom to plan their learning activities, which has an impact on increased academic achievement, a deeper understanding of the subject matter, and higher learning motivation (Insyasiska et al., 2017). In addition, this model encourages the development of learning products that allow students to build their knowledge. While the role of the teacher is only as a facilitator who guides students to gain experience that allows students to construct (Baidowi et al., 2016)

Students can integrate project-based learning that encourages student independence to learn one of the local wisdom. The importance of studying local wisdom is based on the fact that Indonesia is a country rich in noble values, and local wisdom must be appreciated and preserved (Mimin, 2023). Despite advances in the field of science and technology (IPTEK), this should not cause the Indonesian nation to lose its identity. On the contrary, many ethnic groups in the archipelago have a rich civilization and can be explored and revitalized (Mahendra, 2018). In terminology, the term local wisdom means local wisdom, which is interpreted as a wise local ideathat is valuable and used as a guide for the community. Meanwhile, suppose you examine it from the point of view of anthropology. In that case, the term local wisdom meanslocal knowledge, namely the ability of local people to carry out a selection process to enter other cultures adapted to a local culture, which is a characteristic or cultural identity (Setiawan & Mulyadi, 2020).

Although culture and local wisdom are recognized as important factors in the formation of the personality of individual human beings, the implementation of learning on this subject in schools is still limited. Culturesignificantly shapes individuals for good or bad (Salahuddin et al., 2023). Therefore, there is a need to incorporate cultural elements into the classroom as an innovation in formal education. This approach is based on the findings in research by Wahyu (2017), which states that the success of the

learning process in schools is strongly influenced by the cultural background of students or the community where the school is located. Therefore, it is important to incorporate cultural elements into learning as a way to enrich students' learning experience and increase the relevance of learning to their social and cultural context (Ismiyanti &; Afandi, 2022). Then, one innovation in learning related to the culture of local wisdom can be utilized, namely ethnoscience.

Ethnoscience is an activity that involves the transformation between traditional science knowledge of society and modern science (Yasir &Hartiningsih, 2023). This traditional science knowledge is reflected in local wisdom, which is a growing understanding among the community of nature and surrounding culture (Novitasari et al., 2017; Mustakim et al., 2024). Another opinion, according to Sardjiyo (2005) and (Pertiwi & Firdausi, 2019), is that the ethnoscience approach is a strategy for creating a learning environment and designing learning experiences that integrate cultural elements as an integral part of the learning process. Science learning should guide students in understanding science and technology more deeply. Meanwhile, research (Wae & Kaleka, 2022) concluded that ethnoscience is a learning approach that uses local knowledge as a source/object of learning, which can be integrated into learning that is presented contextually. Learning that presents learning objects in a real way according to students' daily lives is also one of the characteristics of Natural Science (Science) learning.

In the learning system, it is important to comprehensively combine scientific concepts with the potential of local wisdom in the community. The natural environment can also be used as an important learning resource by linking people's original knowledge with science (Hadi et al., 2019). This means that the ethnoscience model is emerging as an effective tool for exploring local wisdom through a project-based learning approach to encourage student independence. The ethnoscience approach promotes the reconstruction of natural science concepts in the context of indigenous and cultural communities (Fahrozy et al., 2022). This approach integrates the science concepts taught with local values and cultural practices, which are then developed into more formal scientific knowledge (Endang, 2022).

Ethnoscience learning is very relevant to the philosophical foundation of the 2013 Curriculum development. The 2013 curriculum was developed using a philosophy that contains several principles, including, (Aji, 2017):

1. Education is rooted in the nation's culture to build the nation's present and future life.
   The ethnoscience approach combines local and traditional knowledge with modern science concepts, thus accommodating the nation's cultural values in the learning process. This is in line with the principle that education must reflect and enrich the nation's cultural heritage to build present and future life.
2. Students are creative heirs to the nation's culture
   In the ethnoscience approach, students are considered not only as recipients of knowledge but also as developers and makers of new knowledge. They are invited to use their creative intelligence to explore and reconstruct local knowledge into more formal scientific knowledge.
3. Education is aimed at developing intellectual intelligence and academic excellence through disciplinary education
   The ethnoscience approach allows the development of students' intellectual and academic intelligence through the integration of local knowledge with science concepts in specific disciplines, such as biology, physics, or chemistry.
4. Education to build a better present and future life
   The implementation of local wisdom into learning using an ethnoscientific approach helps students develop intellectual, communicating, as well as social attitudes and concerns relevant to their culture. This is in accordance with education's purpose to create competitive individuals and contribute positively to building a better society and nation.

Project-based learning models in ethnoscience can be implemented through steps that include the identification of local wisdom, relevant project planning, integrating scientific knowledge, developing critical thinking skills, and applying ethnoscience approaches in learning. The first step is to identify local wisdom that exists in the community, such as traditions, practices, knowledge, or values held by a

particular community. In this case, teachers need to make this identification in order to develop learning related to local wisdom, which can be integrated into the discussion of certain subjects (Widyaningrum, 2018). Next, after identifying local wisdom, the next step is to plan relevant learning projects. If identification is carried out for all subjects, the teacher integrates local wisdom values into the learning design (Widyaningrum, 2018). The project should be designed so that students can explore and understand local wisdom through practical and experimental approaches.

Then, in planning the project, scientific knowledge must be integrated with the local wisdom that has been identified. Teachers should guide students to link scientific concepts with relevant local practices so that students can understand the interrelationships between the two aspects. During the implementation of the project, students are directed to develop critical thinking skills. They are invited to question, analyze, and evaluate the information they encounter from local wisdom and scientific knowledge. This will help students deepen their understanding of the topic being studied as well as hone their critical thinking skills. Finally, in the application of project-based learning with an ethnoscience approach, teachers also need to ensure that the ethnoscience approach is used consistently in the learning process. This includes recognition and appreciation of local wisdom, as well as the application of ethnoscientific principles in the development of more formal scientific knowledge of identified local wisdom.

As a result, students can experience more holistic and relevant learning to their local wisdom. According to previous research by Atmojo (2018), ethnoscience learning has a significant positive impact. Integrated science learning using an ethnoscience approach has proven effective in improving the quality of learning, both in terms of students' activities and cognitive learning outcomes. This shows that the integration of local wisdom in science learning can provide tangible benefits in improving the quality of learning and student achievement in terms of understanding scientific concepts.

Several previous studies have shown that ethnoscience learning positively impacts students. One of them is science learning based on local wisdom, which increases love for people's traditional knowledge as part of the nation's culture andimpacts the conservation of natural resources and environmental balance (Tresnawati, 2018). Temuningsih et al. (2017) found that ethnoscience approaches have the potential to improve students' critical thinking skills. In addition, (Rapsanjani et al., 2023) show that ethnoscience learning is able to explore the indigenous science culture of the Malind tribe, which can be integrated into science learning in elementary schools.

Other findings by Fahrudin and Maryam (2022) show that ethnoscience-based learning significantly impacts student learning outcomes. In addition to increasing the understanding of scientific concepts, this approach also contributes to improving students' critical thinking skills, science literacy, creativity, and learning motivation. Applying ethnoscience-based learning that integrates local culture and wisdom helps students better understand the learning material and maintain their identity. In addition, the findings highlight the importance of environmental (cultural) education, which should be integrated into the educational curriculum. It aims to preserve local culture and maintain students' cultural identity.

Based on these results, by applying an ethnoscience approach to learning, students can explore science concepts better, increase their interest in science, and appreciate local wisdom contained in the culture of the community. In addition, this approach also helps students develop relevant skills for success in this modern era. This 21st-century skill is very important so that students will be better prepared to face the various challenges in this era by having quality human resources.

CONCLUSION

The ethnoscience model is emerging as an effective tool for exploring local wisdom through a project-based learning approach. This model can be implemented with steps such as identifying existing local wisdom, planning relevant projects, integrating scientific knowledge, developing critical thinking skills, and applying ethnoscience approaches in the learning process. The ethnoscientific approach encourages the reconstruction of the concept of natural science in the context of indigenous and cultural peoples, which is then developed into more formal scientific knowledge. By applying the ethnoscience model, students can better understand the concept of science, increase interest in science, appreciate local

wisdom possessed by the community, and develop 21st-century skills needed to succeed in this modern era.

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