THE ROLE OF ETNOSCENCE-BASED LEARNING IN IMPROVING LOCAL KNOWLEDGE OF ELEMENTARY CHILDREN

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ABSTRACT

Ethnoscience is a learning design that integrates science with local culture. When viewed from the facts on the ground, students' interest in studying science is very low, as is their knowledge of local cultures. The results of the PISA (Program for International Student Assessment) study show that on average Indonesian students have scientific literacy which is decreasing from year to year, which is 393 in 2006, 383 in 2009, and in 2012 it is 382. This study aims to describe the role of ethnoscience learning in increasing local knowledge of elementary age children. This research method uses a qualitative approach to the type of literature study. The data sources used are taken from journals and books published in the last 10 years. The results of this study indicate that learning that utilizes local wisdom as a source of learning can increase students' scientific knowledge and Local Knowledge. Local Knowledge development in learning can be done through the preparation of lesson plans, media, teaching materials, methods and models based on ethnoscience. Based on the discussion of the results and research findings, it can be concluded that every learning using media, teaching materials, methods and models based on ethnoscience can increase the Local Knowledge of elementary age children and facilitate the teaching and learning process.

Keywords: Etnosains, Local Knowledge, Primary Age Children

INTRODUCTION

A conducive learning atmosphere and environment for science learning can be created using various approaches. The ethnoscience approach is a method for integrating culture into the process of education and fostering a learning environment for students[1]. Science learning should lead students to be more aware of the importance of science and technology. Therefore, this journal was written in order to balance science at the educational level with local knowledge and make people aware of the importance of ethnoscience-based learning to increase local knowledge. In addition, students can also learn about themselves and their natural surroundings, as well as further development that can be applied directly in everyday life.

Ethnoscience learning has recently become the focus of research in various regions. This learning provides a new breakthrough that mixes local culture and science[2]. Defines Ethnoscience as a system of knowledge and cognition typical of a given culture or a system of knowledge and cognition (ideas or thoughts) that is typical of a particular society. Every society experiences growth and development in accordance with changing needs from time to time, both in science and technology.

The development of science and technology has positive and negative impacts. When viewed from a positive perspective, technological advances can make it easier for us to access information related to education[3]. The development of science and technology is able to give birth to new innovations that improve people's welfare. However, if we look at it from the negative side, we need to consider the use of technology by underage students. They use technology to do something that is not important and can result in low interest in learning[4].

In this era of globalization, humans are required to have scientific and ethnoscientific insights in order to be able to solve problems in everyday life that are increasingly complex due to the rapid development of science and technology[5]. However, when viewed from the field, students' interest in learning science is very low, as is their knowledge regarding local cultures. The results of the PISA (Program for International Student Assessment) The average scientific literacy of Indonesian students, according to a study has decreased from year to year, namely from 393 in 2006, 383 in 2009, and 382 in 2012[6].This is caused by various factors, including the selection of learning resources that are less relevant to the conditions of students and teacher-centered learning.

As a result, learning tends to be boring, and students will have difficulty understanding material in the context of life.Elementary school age is commonly referred to as the golden age, which is the phase where children develop rapidly, which will later affect the developmental stages in their next life. Therefore, it is important to use ethnoscience-based learning as a learning resource so that the process of delivering material is more

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[1] Umni Yatti Rusyda Firdausi Utami Dian Pertiwi, "UPAYA MENINGKATKAN LITERASI SAINS MELALUI PEMBELAJARAN BERBASIS ETNOSAINS," *Indonesian Journal of Natural Science Education (IJNSE)* 2, no. 1 (2019): 120.

[2] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal," *Fakultas Matematika Dan Ilmu Pengetahun Alam, UNNES*, 2014, 1–139, http://lib.unnes.ac.id/27040/1/cover_PENDIDIKAN_KARAKTER_SUDARMIN.pdf.

[3] Fitri Mulyani and Nur Haliza, "Analisis Perkembangan Ilmu Pengetahuan Dan Teknologi (Iptek) Dalam Bidang Kesehatan," *Jurnal Ilmu Kedokteran Dan Kesehatan,* 3 (2021): 101–9.

[4] Mulyani and Haliza.

[5] Febri Heni Masfufah and Ellianawati Ellianawati, "Peningkatan Literasi Sains Siswa Melalui Pendekatan Contextual Teaching And Learning (CTL) Bermuatan Etnosains," *Unnes Physics Education Journal Terakreditasi SINTA* 9, no. 2 (2020): 129–38, http://journal.unnes.ac.id/sju/index.php/upej.

[6] Masfufah and Ellianawati.

meaningful for students[7]. Ethnoscience supports students ability to always add knowledge through the culture that is around them and still be able to maintain it.

Efforts to increase local knowledge can be carried out through education, namely by increasing the learning component in students so that they can contribute to the social environment[8]. Studies on ethnoscience-based learning have been conducted by numerous researchers. However, the studies that have been conducted focus more on two aspects, namely ethnoscience and scientific literacy. Such as the study on "Increasing Student Science Literacy Through the Ethnoscience-Loaded Contextual Teaching and Learning (CTL) Approach"

Another study that raises the topic of ethnoscience-based learning is research conducted by Pertiwi and Rusyda Firdausi (2019) which examines "Efforts to Increase Scientific Literacy Through Ethnoscience-Based Learning". Furthermore (Aza Nuralita, 2020), which discusses "Analysis of the Application of Ethnoscience-Based Learning Models in Elementary Thematic Learning". Meanwhile, this study analyzes the role of ethnoscience learning in increasing the local knowledge of elementary school-age children[9].

METHOD

This research uses a qualitative approach. A qualitative approach is one that is capable of producing descriptive data in the form of the speech, writing, and behavior of the people being observed. The type of research used in this research is a literature study. Literature study is a series of activities that collect library data, read, record, process, and analyze research materials[10].

This study describes and analyzes the role of ethnoscience-based learning in increasing the local knowledge of elementary school-age children. This study analyzes 14 relevant journals from the last 10 years regarding ethnoscience-based learning. Data analysis in this study was carried out by comparing journals obtained and published online. The results of the review of various articles using this literature study can be used to analyze the role of ethnoscience-based learning in increasing the local knowledge of elementary school-age children.

FINDING AND DISSCUSSION

The words ethnoscience and ethnoscience are derived from the Latin word scientia, which means "knowledge," and the Greek word ethnos, which means "nation.". Ethnoscience can be defined as a scientific device owned by a community, obtained using certain methods and procedures, and tested empirically[11]. Ethnoscience, in the anthropology dictionary, is defined as a cultural study obtained by means of an approach using knowledge that is

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[7] Utami Dian Pertiwi, "UPAYA MENINGKATKAN LITERASI SAINS MELALUI PEMBELAJARAN BERBASIS ETNOSAINS."

[8] Masfufah and Ellianawati, "Peningkatan Literasi Sains Siswa Melalui Pendekatan Contextual Teaching And Learning (CTL) Bermuatan Etnosains."

[9] Aza Nuralita, "Analisis Penerapan Model Pembelajaran Berbasis Etnosains Dalam Pembelajaran Tematik SD," *MIMBAR PGSD Undiksha* 4, no. 1 (2020): 1–8.

[10] Mulyani and Haliza, "Analisis Perkembangan Ilmu Pengetahuan Dan Teknologi (Iptek) Dalam Bidang Kesehatan."

[11] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal."

appropriate to the culture of the community being studied[12]. The primary goal of ethnoscience is to understand indigenous people's perspectives and relationships to existence in order to fulfill their worldview. Humans can use science to learn about the environment, resources, and all their uses. The integration between science, culture, technology, and sustainable learning media is an asset in forming a superior and cultured generation[13]. As a paradigm, ethnoscience uses a definition of culture that is different from other paradigms. Culture is one of the ideas in the form of objects and actions that we need to preserve in order to protect history[14].

We know that nature provides whatever humans need, from clothing to food, shelter, and other needs for activities. Cultural elements included in science learning are better known as ethnoscientific[15]. IPA is a science that investigates how social developments affect natural phenomena. If the ethnoscience approach is described using a blended learning framework that incorporates technology, engineering, and mathematics, it is extremely pertinent. In order to deliver comprehensive and holistic student skills from many learning areas, there is a need for further explanation because scientific science cannot stand alone[16]. Most researchers believe that ethnoscience is the expression of scientific facts in the native language or mother tongue. In expressing scientific facts, it is not permitted to use a foreign language. Because the use of a foreign language in conveying scientific facts is a form of deviation from ethnoscientific principles[17], Science education based on local wisdom can be used as a source and learning medium[18]. With the aim of preserving the potential and local wisdom of each particular region or ethnic group.

The term local knowledge comes from the wordlocal, which means local or regional, andknowledge, which means knowledge. So local knowledge can be interpreted as local knowledge or local knowledge that is uniquely owned by certain communities. Local knowledge is customary information specific to a given community or culture that has evolved over time as a result of reciprocal relationships between that community and its environment[19]. This makes local wisdom a culture that is firmly attached to people's lives. The emphasis is on a system or set of knowledge that is unique to a society because it is different from the others. Local wisdom for today's environment is very important for harmony and survival without having to sacrifice the rationality of science. Local knowledge has two main roles: meeting the needs of people's lives and maintaining a harmonious relationship between the community and its environment[20].

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[12] Yuliana Wahyu, "Pembelajaran Berbasis Etnosains Di Sekolah Dasar," *Jurnal Inovasi Pendidikan Dasar* 1, no. 2 (2017): 140–47.

[13] Dian Marta Wijayanti, Farid Ahmadi, and S Sarwi, "Keefektifan Mobile Learning Media Bermuatan Ethnoscience Terhadap Hasil Belajar Siswa Sekolah Dasar," *MODELING: Jurnal Program Studi PGMI* 6, no. 2 (2019): 129–36, https://doi.org/10.36835/modeling.v6i2.463.

[14] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal."

[15] Wijayanti, Ahmadi, and Sarwi, "Keefektifan Mobile Learning Media Bermuatan Ethnoscience Terhadap Hasil Belajar Siswa Sekolah Dasar."

[16] Ahmad Khoiri and Widha Sunarno, "Pendekatan Etnosains Dalam Tinjauan Fisafat," *SPEKTRA : Jurnal Kajian Pendidikan Sains* 4, no. 2 (2018): 145, https://doi.org/10.32699/spektra.v4i2.55.

[17] Atiek Winarti, Almubarak, and Khairiatul Muna, "Modul Ajar Inovasi Pembelajaran Kimia Berbasis Etnosains," 2018, 1–245, -.

[18] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal."

[19] Rosyadi Rosyadi, "Sistem Pengetahuan Lokal Masyarakat Cidaun – Cianjur Selatan Sebagai Wujud Adaptasi Budaya," *Patanjala : Jurnal Penelitian Sejarah Dan Budaya* 6, no. 3 (2014): 431, https://doi.org/10.30959/ptj.v6i3.173.

[20] Deny Hidayati, "Memudarnya Nilai Kearifan Lokal Masyarakat Dalam Pengelolaan Sumber Daya Air," *Jurnal Kependudukan Indonesia* 11, no. 1 (2017): 39, https://doi.org/10.14203/jki.v11i1.36.

Local knowledge is closely related to the surrounding environment, society, and culture in which the community lives and performs its main activities in an effort to sustain life[21]. Local knowledge is a cultural element that is universal and closely relation with the life of the wider community, such as the universe, flora, fauna, objects, activities, and past events. Local knowledge that has been integrated with belief systems, norms, and culture and adhered to for quite a long time is what is called 'local cultural wisdom'[22]. Local knowledge includes Traditional Cultural Expressions (EBT), which include all intangible cultural heritage developed by local people individually and embedded in tradition[23]. Local knowledge includes five social dimensions, namely knowledge, skills, resources, and local social processes[24].

Local knowledge does not appear suddenly but requires a long process so that it is finally proven that it is good for life[25]. Local knowledge is seen as really valuable and beneficial to people's lives. The desire to live, preserve, and prolong life in accordance with the circumstances, demands, capacities, and values that are internalized in the community in question led to its development[26]. In other words, the availability of local knowledge then integrates into the way of life of the community to address and resolve issues, and it can even grow in a sustainable way. Every member of society has different cultural knowledge. This is due to differences in experience, and the learning process they face is not always the same.

Learning of according to the anthropological perspective, teaching is considered cultural transmission and learning is cultural acquisition[27]. Forms of ethnoscience will be easier to identify through educational processes about daily life that are developed by culture, both the process, method, and content[28]. Due to the current state of globalization, students are less familiar with local knowledge and are more exposed to international cultures; this causes a sense of nationalism to fade in elementary school-age children. We need to maintain the existence of local wisdom in elementary school-age children so that it remains strong and creates a sense of love for culture. Generating environmental or ethnic-based moral values to achieve the best educational achievements needs to be done. One effective way to maintain it is to integrate cultural knowledge into the learning process. Regional culture, local wisdom, and the surrounding environment can contribute to student learning experiences in the form of mindsets, attitudes, and behavior patterns.

Learning that utilizes local wisdom as a source of learning can improve students' ability to use scientific knowledge and maintain local culture. The selection of local wisdom in science subjects can instill character values in students because this is closely related to everyday life. The learning process can also be described as inculturation learning. Student-centered learning runs effectively because the processes of assimilation and learning accommodations run effectively. In these activities, students are required to play an active role from the beginning to the end of learning. The students who come to school cannot be likened to an empty glass, which can be filled easily; they already have prior knowledge. They have brought cultural values from the family and community environment. Ethnoscience-based learning has a positive influence if what is learned is in harmony with

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[21] Rosyadi, "Sistem Pengetahuan Lokal Masyarakat Cidaun – Cianjur Selatan Sebagai Wujud Adaptasi Budaya."

[22] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal."

[23] Rinitami Njatrijani, "Kearifan Lokal Dalam Perspektif Budaya Kota Semarang," *Gema Keadilan* 5, no. 1 (2018): 16–31, https://doi.org/10.14710/gk.2018.3580.

[24] Hidayati, "Memudarnya Nilai Kearifan Lokal Masyarakat Dalam Pengelolaan Sumber Daya Air."

[25] Sudarmin, "Pendidikan Karakter, Etnosains Dan Kearifan Lokal."

[26] Njatrijani, "Kearifan Lokal Dalam Perspektif Budaya Kota Semarang."

[27] Wahyu, "Pembelajaran Berbasis Etnosains Di Sekolah Dasar."

[28] Nuralita, "Analisis Penerapan Model Pembelajaran Berbasis Etnosains Dalam Pembelajaran Tematik SD."

students' local cultural knowledge. As teachers, we must be able to incorporate local wisdom into science and non-science learning.

Before carrying out learning, the teacher must prepare a detailed ethnoscience-based plan contained in the Learning Implementation Plan (RPP). Of course, in every lesson, it cannot be separated from the media, teaching materials, methods, and models. Media is something that cannot be separated from creating learning effectiveness in the classroom. The media developed is declared effective if it can be used as a means of achieving learning objectives[29]. Learning media should be chosen according to the objectives, teaching materials, and student characteristics. One of the media that can be used in this learning is worksheets with ethnoscience content. Learning with Ethnoscience-filled LKS media that has been carried out is felt to be able to give students a high interest in literacy. Ethnoscience-laden worksheets can be packaged with colorful pictures or graphics to increase students' enthusiasm and understanding for acquiring knowledge.

Another medium that can be used in ethnoscience-based learning is mobile learning. Learning using mobile learning media containing ethnoscience has proven effective in improving student learning outcomes, especially in science content. Mobile learning media containing ethnoscience that is used in learning is a development product from Ms. PowerPoint that is packaged in the form of an application. The existence of mobile learning with ethnoscience content as a learning medium is a product of the development of the integration of technology and culture in learning.

In addition to media, teaching materials also need to be considered in learning activities. Teaching materials and local cultural knowledge can be integrated according to the curriculum. Fairy stories, songs, games, traditional architecture, customary ceremonies, regional products, and the utilization of nature are examples of cultural knowledge that is taught in the ethnoscience education system. For example, related to medicinal plants, the meaning of traditional houses is local production from the local area, which is used as food, clothing, and clothing needs. As an example of cultural knowledge possessed by certain regions in Indonesia, namely, local ethnicity in the Lampung community in the Sungkai Bunga Mayang community who still use traditional medicine, Pranata Mangsa (calendar system), which has been used as a determinant or forecast for seasons for farmers on the island of Java since the Hindu era, and the conical "ni'ang" house in Manggarai district, and so on.

From the identification above, the culture that we have is very relevant to the learning in the classroom.Another thing that is no less important than the media is the method of learning. In order for learning to be more popular with students, learning methods must be packaged properly and varied. The lecture method is a method that is often used in every lesson. Apart from lectures, there are several other methods that can be used to support ethnoscience-based learning, including observation, demonstrations, discussions, projects, experiments, and field trips[30]. Implementation of appropriate learning methods will definitely increase the effectiveness of learning in the classroom. Each learning method has different characteristics. The project-based learning method has characteristics: making decisions and frameworks, problems whose solutions are not predetermined, and designing processes to achieve results. There are six stages in applying the project learning method: authenticity, academic rigor (adherence to academic values), applied learning (learning in the real world),

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[29] Rian Ningsih Pramunita, "Pengembangan Buku Ajar IPA Berbasis Peta Pikiran Untuk Melatih Berpikir Kreatif Peserta Didik Di Sekolah Dasar," *Jurnal Riset Madrasah Ibtidaiyah (JURMIA)* 1, no. 1 (2021): 40–47, https://doi.org/10.32665/jurmia.v1i1.196.

[30] Nuralita, "Analisis Penerapan Model Pembelajaran Berbasis Etnosains Dalam Pembelajaran Tematik SD."

active exploration (active research), adult relationships (relationships with experts), and assessment (assessment)[31].

Next is the selection of learning models. In developing local cultural values and increasing children's local knowledge, of course, they must use a logical learning model. With the application of ethnoscience-based science learning, it is hoped that students can easily accept the material and be able to apply the knowledge they have acquired to solve problems in everyday life. The role of ethnoscience demands a shift in the learning model, which was originally teacher-centered, to student-centered, emphasizing the application of scientific knowledge and problem solving. Ethnoscience-based learning can be integrated with various models. As in research[32], which uses the ethnoscience-based Contextual Teaching And Learning (CTL) model in science learning, it aims to create an environment and facilitate the learning process. In addition, ethnoscience learning can use Discovery Learning, problem-based learning (PBL), project-based learning (PjBL), constructivism, contextual learning, and others. At the end of the lesson, a quiz can be given, and the group or student who has the highest score will get a reward, so that they are encouraged to compete with each other and understand the material well.

There are several research results which state that ethnoscience can be integrated into learning activities. For example, the results of research on "Increasing Student Scientific Literacy Through the Ethnoscience-Loaded Contextual Teaching and Learning (CTL) Approach" resulted in a positive influence on student scientific literacy both in general and in every aspect of scientific literacy with an N-gain score of 0.583 which is included in the medium category[33]. The second is on the results of research examining "Efforts to Increase Scientific Literacy Through Ethnoscience-Based Learning" with the results of the learning process being more meaningful for students and can affect improving student academic results[34]. Furthermore, from research which discusses "Analysis of the Application of Ethnoscience-based Learning Models in Elementary Thematic Learning" with the result that students more easily understand the subject that departs from everyday life[35].

From the results of the studies above, teachers can carry out ethnoscience-based learning plans contained in the Learning Implementation Plan (RPP). Prepare good media, such as worksheets containing ethnoscience packed with colorful pictures or graphics. One type of the ethnoscience education system involves selecting the appropriate teaching materials to be blended with local culture, such as fairy stories, songs, games, traditional houses, traditional ceremonies, local products, and utilization of nature[36]. Quality methods will affect the effectiveness of learning in the classroom. There are several other methods that can be used to support ethnoscience-based learning, including observation, demonstrations, discussions, projects, experiments, and field trips[37]. The learning model that uses Ethnoscience-based Contextual Teaching And Learning (CTL) in science learning aims to create an environment and facilitate the learning process.

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[31] Winarti, Almubarak, and Muna, "Modul Ajar Inovasi Pembelajaran Kimia Berbasis Etnosains."

[32] Masfufah and Ellianawati, "Peningkatan Literasi Sains Siswa Melalui Pendekatan Contextual Teaching And Learning (CTL) Bermuatan Etnosains."

[33] Masfufah and Ellianawati.

[34] Utami Dian Pertiwi, "UPAYA MENINGKATKAN LITERASI SAINS MELALUI PEMBELAJARAN BERBASIS ETNOSAINS."

[35] Nuralita, "Analisis Penerapan Model Pembelajaran Berbasis Etnosains Dalam Pembelajaran Tematik SD."

[36] Nuralita.

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CONCLUSION AND SUGGESTION

Ethnoscience is a new finding that integrates science and local culture. Efforts to increase the local knowledge of elementary school-age children can be done with ethnoscience-based learning. The success of ethnoscience-based learning is shown when students are able to understand the material and can apply it. Thus, ethnoscience-based learning can be used as a reference as an effort to increase the local knowledge of elementary school-age children.

Based on experience during data collection through various journals, there are some suggestions that are needed, namely, it is hoped that there will be further development related to ethnoscience-based learning, especially in science subjects. This is intended so that learning runs effectively and efficiently and is able to develop local knowledge that students have regarding local culture. The development of entoscience-based learning needs to be followed up with application in the classroom so that the level of learning effectiveness can increase.

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