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Mapping The Implementation of The Ethnoscience Approach In Early Childhood Education To Improve Children's Science Skills In Mataram City

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Abstract: This study aimed to describe the implementation of the ethnoscience approach in early childhood education and to identify teachers' competence in applying it. A descriptive quantitative method was employed, complemented by Focus Group Discussions (FGDs) to validate the data and research findings. A total of 161 early childhood education teachers in Mataram City were selected through purposive sampling. Data were collected using observations, questionnaires, in-depth interviews, and documentation, and analyzed through data reduction, data display, and conclusion drawing. The findings revealed that the implementation of ethnoscience varied across districts. Ampenan and Mataram achieved a good category (72%) by integrating local culture through project-based and experimental learning activities. Meanwhile, Selaparang (70%), Cakranegara (70%), Sekarbela (69%), and Sandubaya (68%) were classified as fairly good due to teachers' limited understanding, insufficient training, and the continued use of conventional teaching methods with minimal integration of local culture. Overall, the implementation of ethnoscience was reasonably effective; however, further professional development, mentoring, and the development of instructional media and learning models are needed to ensure more equitable and effective implementation.

Keywords: ethnoscience, early childhood education, preschool teachers, local culture, early childhood learning

***Abstrak**: Penelitian ini bertujuan mendeskripsikan penerapan pendekatan etnosains dalam pembelajaran anak usia dini serta mengidentifikasi tingkat keterampilan guru dalam mengimplementasikannya. Penelitian menggunakan metode deskriptif kuantitatif yang diperkaya dengan Focus Group Discussion (FGD) untuk memvalidasi data dan hasil penelitian. Sebanyak 161 guru PAUD di Kota Mataram dipilih secara purposive sebagai responden. Data dikumpulkan melalui observasi, angket, wawancara mendalam, dan dokumentasi, kemudian dianalisis menggunakan teknik reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa penerapan etnosains bervariasi di setiap kecamatan. Kecamatan Ampenan dan Mataram memperoleh kategori baik (72%) melalui pembelajaran berbasis proyek dan eksperimen yang mengintegrasikan budaya lokal. Sementara itu, Kecamatan Selaparang (70%), Cakranegara (70%), Sekarbela (69%), dan Sandubaya (68%) berada pada kategori cukup baik akibat keterbatasan pemahaman guru, minimnya pelatihan, serta dominasi metode konvensional. Secara umum, penerapan etnosains telah berjalan cukup baik, namun masih memerlukan pelatihan, pendampingan, serta pengembangan media dan model pembelajaran agar implementasinya lebih merata dan efektif.*

***Kata Kunci:** etnosains, pembelajaran anak usia dini, guru PAUD, budaya lokal, pendidikan anak usia dini*

INTRODUCTION

Early childhood refers to children between 0 and 6 years of age. This period is widely regarded as the golden age, a sensitive phase during which children are highly receptive to the stimulation of knowledge and skills appropriate to their stage of growth and development (Masita, 2021). Early Childhood Education (PAUD) plays a critical role in children's early development,

encompassing cognitive, social, emotional, and physical aspects. At this age, children begin to recognize the world around them, interact with their environment, and develop the critical-thinking abilities that form the foundation for later learning. One of the fundamental competencies that should be introduced and nurtured at this stage is science skills, namely the ability to observe, question, explore, and draw conclusions about natural phenomena. However, science learning in most early childhood education institutions in Indonesia, including in Mataram City, still tends to rely on methods detached from children's everyday experience. Science instruction that remains largely theoretical and disconnected from children's lived context makes it difficult for them to understand and relate scientific knowledge to the real world. In some cases, this approach also reduces children's interest in learning science, as they are confronted with abstract concepts that bear little relevance to the culture and traditions of their surroundings.

The ethnoscience approach offers a solution to this problem. Ethnoscience integrates scientific knowledge with local wisdom and community culture, allowing children to learn science within a context they can readily understand. This approach addresses present-day challenges by enabling learners to engage in contextual learning that draws on their environment as a learning resource. Educational institutions are the spaces in which the intellectual character of future generations is shaped and developed. Through the ethnoscience approach, students are taught in ways that optimize a blended, contextual mode of learning while strengthening the role of the environment as a learning resource (Fahrozy et al., 2022).

According to Pannen, as cited in Sardjiyo (2005), one way of implementing ethnoscience-based learning is to connect the scientific knowledge being taught to the culture from which learners originate. Sayakti (2003) emphasizes the importance of using local culture and the surrounding environment that is, the ethnoscience approach as a learning resource so that the learning process becomes more meaningful for students. Emdin (2011) demonstrates that connecting science with culture can enhance learners' academic achievement. Similarly, Rahayu et al. (2006) found that learning based on local culture produced better outcomes, as it rendered the learning process more meaningful for students. Ethnoscience-based learning is grounded in the recognition of culture as a fundamental component of education, serving as both an expression and a vehicle for the communication of ideas and the advancement of knowledge (Joseph, 2010).

In Mataram City, the capital of West Nusa Tenggara Province and home to a rich cultural diversity, applying the ethnoscience approach in early childhood education is particularly relevant. Through this approach, children can connect scientific concepts with the local culture surrounding them (Sudarmin, 2014), including agriculture, traditional crafts, natural traditions, and other forms of local knowledge that the community has practiced for centuries. The use of the ethnoscience approach in early childhood education in Mataram City is expected to enhance children's science skills in a more holistic and meaningful way. This approach allows children to learn in a more contextual manner, grounded in direct experience and relevant to their daily lives. As a result, they are likely to find it easier to understand and appreciate the scientific concepts introduced to them, while simultaneously preserving and valuing their local culture.

Although the ethnoscience approach holds considerable potential to enhance early-childhood science skills, its implementation in Mataram City remains limited and lacks a clear structure. It is therefore important to map how this approach is being applied in early childhood education institutions across the city. Such a mapping exercise is expected to provide a clear picture of how ethnoscience is implemented in early childhood learning and the extent to which the approach has succeeded in improving children's science skills. In addition, mapping is essential for identifying the barriers that may arise during implementation and for formulating appropriate solutions so that the ethnoscience approach can be applied effectively across early childhood education institutions throughout Mataram City.

This study aims to develop a deeper understanding of how the ethnoscience approach is implemented in early childhood education and how it can improve children's science skills. By examining this implementation, the study seeks to clarify which practices remain relevant and worth sustaining, as well as the challenges that teachers and parents face in embedding cultural

values within children's learning processes. The findings are expected to contribute to the development of more effective and sustainable ethnoscience-based learning programs, to support the preservation of local culture, and to strengthen lecturers' capacity to integrate the ethnoscience approach into the education curriculum, so that younger generations can understand and appreciate their ancestral cultural heritage.

This study offers a novel contribution by mapping the implementation of ethnoscience-based learning in early childhood education, encompassing the identification of relevant local wisdom that can be integrated into learning, effective strategies for teaching culturally grounded science concepts, and the development of learning tools and media appropriate for young children. The study is expected to generate rich empirical findings on the ethnoscience approach in early-childhood learning and to inform curriculum development that embeds ethnoscience values, helping younger generations understand and value their ancestral heritage. It provides a foundation for using local wisdom as an innovative approach to strengthening children's science skills from an early age by integrating cultural perspectives with the development of scientific competence. Based on the background described above, the research problem addressed in this study is formulated as follows: how is the ethnoscience approach implemented in early childhood education to improve children's science skills in Mataram City?

METHODS

This study employed a descriptive quantitative method with a survey approach. According to Sugiyono (2018), a survey is a quantitative research method used to obtain data on the beliefs, opinions, characteristics, or behaviors of a particular sample drawn from a population. Data are collected through observation, interviews, or questionnaires, and the results can be generalized. The survey method is well suited to mapping the implementation of the ethnoscience approach in early childhood education in Mataram City, as it supports data collection that is extensive, efficient, and standardized.

This study was conducted at early childhood education (PAUD/TK) institutions in Mataram City. The research subjects comprised 161 PAUD/TK teachers, distributed across six districts: 27 teachers each in Ampenan, Mataram, Sekarbela, Selaparang, and Cakranegara, and 26 teachers in Sandubaya.

The data were collected using two techniques: a closed-ended questionnaire and semi-structured interviews. The questionnaire was administered to 161 respondents using a four-point Likert scale (1–4), which eliminated neutral responses and encouraged participants to indicate either agreement or disagreement, thereby facilitating quantitative data analysis. In addition, semi-structured interviews were conducted with school principals to obtain in-depth information regarding the planning, implementation, and evaluation of the ethnoscience approach. The interviews followed a flexible structure that allowed further exploration of emerging issues while maintaining alignment with the research objectives.

Once data collection was complete, the data were analyzed. Data analysis refers to the process of transforming data into information so that its characteristics can be understood and used to address the problems under investigation, particularly those relevant to the research questions. This study employed descriptive statistical analysis, a technique used to analyze data by describing the data as collected, without seeking to generate generalizable conclusions (Sugiyono, 2018).

RESULT AND DISCUSSION

This study was conducted in Mataram City with 161 teachers as research subjects, distributed across six districts: 27 teachers in Selaparang, 27 in Cakranegara, 26 in Sandubaya, 27 in Mataram, 27 in Ampenan, and 27 in Sekarbela. A preliminary study was carried out prior to the main investigation. Following the preliminary study, the research instruments were designed and the subjects were selected; the data were then collected, analyzed, and used to draw conclusions. After the preliminary study was completed, the next steps involved preparing the research proposal and reviewing the instruments. Based on this instrument review, the researchers developed a

questionnaire, an interview guide, and a documentation instrument. The subsequent steps consisted of data collection, interpretation, and analysis. The data obtained from the questionnaire administered to the 161 PAUD teachers in Mataram City regarding the implementation of the ethnoscience approach in early childhood education, by district, are presented in the figure 1.

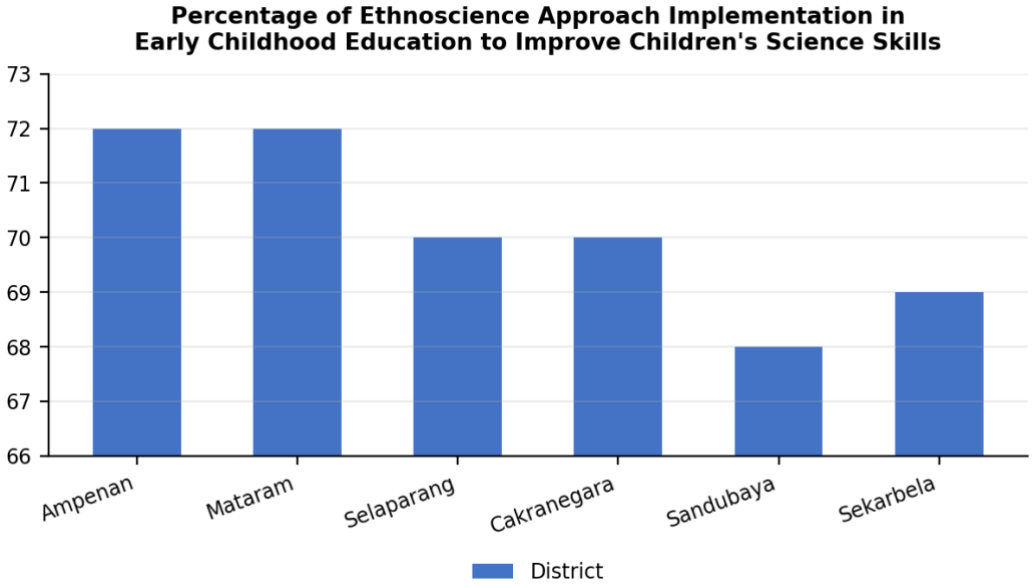

Figure 1. Percentage results for the implementation of the ethnoscience approach in early childhood education to improve children's science skills, by district

The data above represent the average results for teachers in each district regarding the implementation of the ethnoscience approach in early childhood education to improve children's science skills. As shown in the figure, teachers in Ampenan and Mataram districts recorded the highest scores, at 72%, placing them in the "good" category for implementing the ethnoscience approach. Teachers in Selaparang, Cakranegara, Sekarbela, and Sandubaya districts fell into the "fairly good" category. The percentage scores were 70% for Selaparang and Cakranegara, 69% for Sekarbela, and 68% for Sandubaya.

Teachers in Ampenan and Mataram districts have been able to implement ethnoscience-based learning effectively in enhancing students' science skills. This is reflected, among other things, in the varied teaching methods used by teachers in these two districts, such as conducting projects or hands-on experiments that combine cultural and scientific elements. One example observed directly by the researchers was a STEAM activity grounded in ethnoscience, implemented through an experiment in preparing traditional food. During this activity, the children showed strong enthusiasm and engagement in the learning process, gaining a valuable experience of getting to know and directly preparing traditional food.

The fairly good results obtained by teachers in Selaparang, Cakranegara, Sandubaya, and Sekarbela districts, based on the interviews conducted, were attributed to teachers' limited understanding of how to implement ethnoscience-based learning to enhance children's science skills. Several teachers reported difficulties in developing ethnoscience-based lesson plans (RPP), indicating a need for further training. In addition, because instruction tended to focus on direct delivery of content and discussion, the selection of content and the design of lesson plans had not yet fully integrated elements of local culture. Teachers also reported difficulty in determining an appropriate learning model that combines cultural and scientific elements to strengthen children's understanding of science concepts at an early age. The methods used remained relatively simple, with little variation in instructional media, limiting their effectiveness in enhancing children's understanding of science concepts.

The ethnoscience-focused approach is one means of introducing students to the culture and local wisdom present in their environment. In implementing ethnoscience-focused learning, teachers must also consider three aspects: planning, implementation, and evaluation (Alfiana & Fathoni, 2022). In line with this view, it is important for teachers to receive training on the ethnoscience-based approach in early childhood education, so that it can optimally improve early childhood understanding of science concepts as well as other aspects of children's development. Early-childhood learners are in an exploratory stage, in which the learning process is more effective when delivered through concrete experiences, direct interaction, and contextually meaningful activities (Suryana, 2021). The ethnoscience approach represents an appropriate method in this regard: connecting elements of local culture to the learning process enables children to understand science concepts more concretely through direct experience, while also nurturing local-wisdom values from an early age. The implementation of the ethnoscience approach in early childhood education is therefore necessary, as it can optimally enhance multiple aspects of children's development. Nuralita (2020) similarly explains that ethnoscience-based learning represents a new breakthrough in education that combines culture with science. Ethnoscience draws on culture and local wisdom as objects of learning, thereby making the learning process more meaningful.

Lestari (2025) found that the ethnoscience approach has significant potential to enhance students' understanding of science concepts, particularly in remote areas. By integrating local wisdom with modern knowledge, learning becomes more relevant, meaningful, and contextual. This approach not only sharpens critical, analytical, and creative thinking but also encourages students' active participation in learning activities. Ethnoscience also plays a role in preserving local culture; as such, the approach not only enriches the learning experience but also strengthens learners' cultural identity. The ethnoscience approach involves the use of local knowledge, traditions, and practices in the science-learning process, aiming to help students recognize and understand the relationship between their cultural background and scientific concepts (Yuliana, 2017).

The ethnoscience approach brings children's real-life context into the learning process; learning content is adapted to the surrounding environment and to children's everyday experience. Fahrozy et al. (2022) state that ethnoscience makes learning more contextual and easier to understand because it draws on themes close to children's lives, such as local food, plants in the surrounding environment, and community customs. The implementation of ethnoscience has a positive influence on science learning in schools, enhancing a range of student abilities and skills, including thinking skills, problem-solving skills, process skills, and scientific literacy (Pratama & Jumadi, 2023).

CONCLUSION

This study involved 161 PAUD teachers across six districts in Mataram City. The findings show that teachers in Ampenan and Mataram districts have been able to implement the ethnoscience approach effectively in early childhood education to enhance children's science understanding, as reflected in an average score of 72% for both districts. Meanwhile, teachers in Selaparang and Cakranegara districts (70%), Sekarbela (69%), and Sandubaya (68%) fell into the "fairly good" category. These results indicate that, although teachers have made efforts to integrate ethnoscience into their teaching, several constraints remain, including limited teacher understanding, difficulty in developing ethnoscience-based lesson plans, insufficient variation in methods and media, and the as-yet suboptimal integration of local cultural elements into lesson plans.

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