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Implementation of Ethnoscience-Based Electronic Student Worksheets on Ecosystem Material in Elementary Schools to Improve Students' Curiosity Character

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Abstract
This study explores the implementation of ethnoscience-based electronic student worksheets to enhance elementary students' understanding of ecosystem concepts and curiosity. By integrating local cultural wisdom with digital learning tools, the study offers a contextual and engaging approach to science education. Using an experimental pretest-posttest control group design, 60 fifth-grade students were divided into experimental and control groups. The experimental group utilized ethnoscience-based electronic worksheets, while the control group followed conventional learning methods. Data collection involved ecosystem concept tests and curiosity questionnaires, analyzed using descriptive statistics and t-tests. Results revealed that the experimental group demonstrated significant improvements in understanding ecosystem concepts (mean increase of 22.9 points) and curiosity (mean increase of 1.2 points), compared to the control group, which recorded increases of 11.9 points and 0.6 points. These findings underscore the effectiveness of integrating local wisdom into teaching materials to bridge the gap between theoretical knowledge and real-life applications. The worksheets encourage students to observe, question, and explore, fostering both cognitive and affective learning outcomes. This approach not only strengthens conceptual understanding but also promotes cultural appreciation and pride among students. The study's novelty lies in its combination of ethnoscience with digital technology, offering an innovative and interactive educational resource that aligns with modern educational demands while preserving cultural heritage. It concludes that ethnoscience-based electronic worksheets are a valuable tool for holistic learning.

Keywords: Curiosity; Ecosystem; Ethnoscience; Worksheets

INTRODUCTION

Science education meets the requirements that can help students participate in solving everyday scientific problems. Science education in elementary schools includes subjects of natural and social sciences (Hanif, 2020; Harefa et al., 2023). Natural and social sciences are one of the important subjects to understand scientific facts that occur in everyday life (Kalogiannakis et al., 2021). The Ministry of Education and Culture states that science refers to efforts to obtain information about nature systematically, so that science

is not just managing a collection of information in the form of facts, concepts, and principles, but about the processes that it states exist (Ismail et al., 2022; Siponen & Klaavuniemi, 2021). Learning natural and social sciences must also be the main basis of education, where students can get to know natural and social sciences in the context of real life in their environment and can implement them in everyday life. The ethnoscience approach is one of the effective strategies in learning natural and social sciences (Hikmawati et al., 2020; Yuliyanti et al., 2024). Ethnoscience connects modern science with local and traditional knowledge possessed by a community (Khusniati et al., 2023; Zulirfan et al., 2023). In the context of learning in elementary schools, the ethnoscience approach helps students understand scientific concepts through local wisdom in their environment. For example, studying the process of photosynthesis by observing plants growing around the house or school, or understanding the water cycle by relating it to the traditional irrigation system used by local farmers.

Through the ethnoscience approach, students not only learn about scientific facts and theories, but also how this knowledge is applied in everyday life. This not only makes learning more relevant and contextual, but also strengthens a sense of pride and appreciation for local culture and the environment (da Silva et al., 2023; Gray et al., 2022). In addition, ethnoscience can help develop critical and creative thinking skills, because students are invited to observe, analyze, and solve problems based on their experiences and knowledge (Patricia et al., 2022; Sari et al., 2024). In practice, the ethnoscience approach can be integrated into the curriculum through various methods, such as field projects, interviews with community leaders, and simple experiments based on local knowledge.

The term ethnoscience is a knowledge that exists in a nation or knowledge possessed by a particular ethnic group and social group. As for the culture that can be manifested in community activities and can produce a product, all of it is processed based on local community knowledge that can be obtained from generation to generation and become a characteristic in society (Carayannis & Morawska-Jancelewicz, 2022; Yeh et al., 2021). The characteristics of the community that can be used as a source of ethnoscience-based learning are that it can bring students closer to the community (Lestari, 2023)v. However, in line with the development of the times, there will be changes in resources physically, socially, politically, religiously and culturally. Because in the era of globalization, the role of ethnoscience is very important to maintain the existence of this local wisdom, so that it will always exist in the next generation (Hikmawati et al., 2021). Local wisdom is all forms of knowledge, understanding and insight as well as customs or ethics. Local culture-based learning is the creation of a learning environment and the design of learning experiences that integrate local culture as part of the learning process (Sartika et al., 2024). Learning based on local culture, culture is integrated as a tool for the learning process to motivate students in applying knowledge (Sakti et al., 2024). The values adopted by indigenous people are full of local wisdom values (Pranata et al., 2021). The use of local culture in learning is very beneficial for the meaning of the process and learning outcomes because students get contextual learning experiences. Students are expected to grow a sense of and appreciate ancestral heritage wisely so that it can have an impact on students' learning abilities at school and outside of school.

This ethnoscience approach involving local and traditional knowledge is very relevant to the cognitive development stage of elementary school children/Islamic elementary schools. The assessment study conducted by Piaget revealed that the age of elementary school children/Islamic elementary schools is a phase where the child is in the concrete operational stage, at this age they have minds that are starting to be organized, a turning point from the beginning of the development of logical thinking, can apply logic to physical objects, but cannot yet think abstractly or hypothetically (Aseeri, 2020). In this session, children can think logically facing concrete events and classifying objects into different forms (Druga & Ko, 2021). The ability to classify something already exists, but has not been able to dismantle abstract problems. Concrete dissection is a reversible mental action related to real concrete objects. This theory should be able to be used as one illustration that at the elementary school age children need a special approach in carrying out learning natural and social sciences. Some students in elementary schools/Islamic elementary schools are even better at memorizing, but are less skilled in applying the knowledge they have. Ecosystem material requires students to be able to analyze the concept of ecosystems, distinguish between various types of ecosystems, components of ecosystems and so on. A good understanding is achieved when students

complete problem solving and have the ability to connect ecosystem concepts with real phenomena in the environment. Tulang Bawang Regency, as a location with local potential rich in ecosystems and cultural wisdom that can be integrated into learning. The use of an ethnoscience-based approach will strengthen the relationship between learning materials and local wisdom, providing added value in the education process.

Ecosystem material in natural and social science learning is often considered difficult by students because it requires a deep understanding of concepts, such as the relationship between living organisms and their environment. This encourages the importance of developing teaching materials that are able to explain these concepts contextually and interestingly. Ethnoscience-based Electronic Student Worksheets as an effort to improve students' understanding of ecosystem material. Through technology integration, it is expected to attract students' interest in studying and linking ecosystem concepts with real phenomena.

The character of curiosity encourages students to explore and dig deeper into every material they learn, including ecosystem material that requires an understanding of complex concepts. With a high curiosity, students will be encouraged to ask, observe, and investigate the concepts presented in the ethnoscience-based electronic student worksheets (Andani et al., 2020; Gross et al., 2020). Through this approach, it is hoped that the learning process will not only be more interesting, but also more effective in forming contextual and meaningful understanding (Wagstaff et al., 2021).

Previous studies have highlighted the importance of the ethnoscience approach in science learning in elementary schools, such as the use of ethnoscience-based poster media that integrate natural science learning materials with local phenomena to improve student learning outcomes. For example, previous studies used various media such as posters, comics, and ethnoscience-based booklets that focused on integrating local wisdom to strengthen understanding of the material and improve students' critical thinking skills (Fiteriani et al., 2021). Previous research also found that the Development of Problem Based Learning Student Worksheets Based on Lombok Local Wisdom to Support the Independent Curriculum on Colloid Material can improve critical thinking skills, improve students' generic science skills and there are positive responses given by students (Suryati et al., 2024).

However, the gap or emptiness that has not been reached by previous studies is the use of Electronic Student Worksheets based on ethnoscience integrated with digital technology and utilizing local wisdom more intensively in the context of ecosystem learning. While previous studies generally used print media or other physical media, the current study offers a more modern and contextual approach through the integration of technology in learning. This study presents a novelty in the form of the integration of technology and local wisdom in ecosystem learning through electronic student worksheets based on ethnoscience.

This study makes an important contribution in building students' curiosity character through ethnoscience-based learning. Students are encouraged to actively ask questions, explore, and understand learning materials by linking them to real phenomena around them. The urgency of this study lies in efforts to increase the effectiveness of learning in a way that is relevant and contextual for students. The main objective of this study is to improve the curiosity character of elementary school students in understanding ecosystem material through the use of electronic student worksheets based on ethnoscience, so that they can connect the knowledge gained with real life and the environment around students.

RESEARCH METHODS

Research Design

This study uses an experimental method with a pretest-posttest control group design approach. This study involved two groups of students, namely the experimental group and the control group. The experimental group will be given treatment in the form of using electronic student worksheets based on ethnoscience, while the control group will use conventional learning methods. This design aims to compare the effectiveness of learning using electronic media based on ethnoscience in increasing students' curiosity about ecosystem material.

Research Target/Subject

The subjects of this study were fifth grade elementary school students in Tulang Bawang Regency, who were selected purposively based on their suitability to the ecosystem learning material. The total number of students involved was 60 people, with 30 students in the experimental group and 30 students in the control group. The selection of the research location took into account the local potential that is rich in cultural wisdom and ecosystems that are relevant to be applied in ethnoscience-based learning.

Research Procedure

This study began with a preparation stage involving the development and validation of an ethnoscience-based electronic student worksheet. The researchers compiled this worksheet based on the curriculum and characteristics of the ecosystem material, and integrated elements of local wisdom that were relevant to the students' environment. After that, the research instrument in the form of a multiple-choice test to measure students' understanding of the ecosystem concept and a Likert scale questionnaire to assess students' curiosity was developed and validated by experts. This instrument was then tested on a small group of students to ensure its reliability and validity.

In the implementation stage, students from two randomly selected classes were divided into an experimental group and a control group. The experimental group was given treatment in the form of learning using ethnoscience-based electronic worksheets, while the control group learned using conventional learning methods. Before learning began, a pretest was conducted to measure students' initial abilities both in understanding the ecosystem material and their level of curiosity. Learning took place over four meetings where the experimental group used an electronic worksheet designed to connect the ecosystem concept with local phenomena and technology.

After learning was complete, a posttest was conducted to measure the increase in students' understanding of the ecosystem material and changes in their level of curiosity. The pretest and posttest data from both groups were then collected for analysis. The final stage of the research involved quantitative data analysis using t-tests to determine significant differences between the experimental and control groups in terms of understanding of ecosystem material and students' levels of curiosity.

Instruments, and Data Collection Techniques

The instruments used in this study consisted of an ecosystem concept understanding test and a student curiosity questionnaire. The ecosystem concept understanding test was compiled in the form of 10 multiple-choice questions, covering various cognitive levels according to Bloom's taxonomy, from remembering to analyzing. The grid is as follows:

Table 1. Ecosystem Concept Understanding Test (Multiple Choice)

No	Indicators	total items	Cognitive Level (Bloom)
1	Identifying biotic and abiotic components in an ecosystem	2	C1 (Remember)
2	Distinguishing various types of ecosystems	3	C2 (Understand)
3	Explaining the relationship between components in an ecosystem	3	C3 (Apply)
4	Analyzing the impact of damage to an ecosystem	2	C4 (Analyze)
	Total		10 Questions

The curiosity questionnaire was compiled using a Likert scale with four levels, ranging from strongly disagree to strongly agree. This questionnaire consists of 10 statements designed to assess students' behavior in showing curiosity. The grid is as follows:

Table 2. Curiosity Questionnaire (Likert Scale)

No	Indicators	total items
1	Shows interest in asking questions to understand the subject matter	3
2	Actively observes phenomena related to the subject matter	3
3	Likes challenges to solve problems in learning	2
4	Tries to find additional information related to the subject matter through other sources	2
Total		10 item

Data were collected through two stages, namely pretest and posttest. Concept understanding test and curiosity questionnaire were given before learning to determine students' initial abilities. After the treatment was given, the same two instruments were used again to measure the increase in concept understanding and changes in students' curiosity. The data collection process was carried out in both groups, both the experimental group and the control group, with direct supervision from the researcher to ensure the validity of the data.

Data analysis technique

Quantitative data obtained from the pretest and posttest were analyzed using descriptive statistics to describe the average results, standard deviations, and distribution of data in each group. Furthermore, an independent sample t-test was used to determine whether there was a significant difference between the results of the experimental group and the control group. This analysis aims to test the research hypothesis regarding the effectiveness of using ethnoscience-based electronic worksheets in improving students' understanding of ecosystem concepts and curiosity.

RESULTS AND DISCUSSION

The results of this study are descriptive statistics that present the average value and standard deviation of the pretest and posttest results of understanding the ecosystem concept in the experimental and control groups, which are summarized in the following table.:

Table 3. Descriptive statistical results of students' understanding

Group	N	Mean Pretest	SD Pretest	Mean Posttest	SD Posttest	Improvement
Experimental	30	62.5	5.2	85.4	4.7	22.9
Control	30	63.2	5.4	75.1	5.6	11.9

Based on the descriptive statistical results presented, the experimental group using ethnoscience-based electronic worksheets showed a greater average increase in understanding of ecosystem concepts compared to the control group using conventional learning methods. In the experimental group, the average posttest score increased by 22.9 points from the pretest, indicating significant development in student understanding. Meanwhile, the control group experienced an increase of 11.9 points. This difference in increase indicates that the use of ethnoscience-based electronic worksheets is more effective in improving students' understanding of ecosystem material and their curiosity compared to conventional learning methods. The average and standard deviation of the pretest and posttest results of students' curiosity are summarized in the following table:

Table 4. Descriptive statistical results of students' curiosity character

Group	N	Mean Pretest	SD Pretest	Mean Posttest	SD Posttest	Improvement
Experimental	30	3.1	0.5	4.3	0.4	1.2
Control	30	3.2	0.4	3.8	0.5	0.6

Based on the results of descriptive statistics in Table 4 regarding the character of students' curiosity, it can be interpreted that the experimental group using ethnoscience-based electronic worksheets showed a greater increase in the character of curiosity compared to the control group. The average pretest score of

the experimental group was 3.1 with a standard deviation of 0.5, and after treatment, the average posttest score increased to 4.3 with a standard deviation of 0.4, providing an increase of 1.2 points. This increase indicates a positive change in the curiosity of students in the experimental group after using ethnoscience-based learning media. Meanwhile, the control group using conventional learning methods also experienced an increase, but not as large as the experimental group. The average pretest score of the control group was 3.2 with a standard deviation of 0.4, and the posttest score increased to 3.8 with a standard deviation of 0.5, providing an increase of 0.6 points.

This comparison shows that although both groups experienced an increase in curiosity, the experimental group using ethnoscience-based electronic worksheets experienced a more significant increase, indicating that ethnoscience-based learning is more effective in stimulating students' curiosity compared to conventional learning methods. The results of the research that have been obtained are first analyzed by the assumption test. The results of the normality assumption test can be seen in table 5 below:

Table 5. results of the normality test

Group	Class	Signifikansi (p-value)	Distribusion
Experimental	Pretest	0,200	Normal
	Posttest	0,250	Normal
Control	Pretest	0,182	Normal
	Posttest	0,193	Normal

Based on the results of the normality test presented in the experimental group, the results of the normality test for the pretest showed a p-value of 0.200, which is greater than 0.05, so that the pretest data of the experimental group were normally distributed. Likewise, the posttest in the experimental group, which had a p-value of 0.250, which was also greater than 0.05, showed that the posttest data of the experimental group were also normally distributed. Likewise, in the control group, the normality test for the pretest produced a p-value of 0.182, which was greater than 0.05, so that the pretest data of the control group were normally distributed. The results of the normality test for the posttest of the control group showed a p-value of 0.193, which was also greater than 0.05, so that the posttest data of the control group were also normally distributed. Overall, the data on the pretest and posttest for both groups, both experimental and control, were normally distributed, meaning that parametric statistical analysis such as the t-test can be applied to test for significant differences between the groups.

After obtaining the results of the normality test, the homogeneity assumption test is continued, which is presented in table 6 below.

Table 6. homogeneity test results

Group	Significance (p-value)	Distribution
Experimental	0.220	Homogeneous
Control	0.108	Homogeneous

Based on the results of the homogeneity test presented, for the experimental group, the p-value is 0.220, which is greater than 0.05, indicating that the experimental group data is homogeneous (has the same variance). Likewise for the control group, the p-value is 0.108, which is also greater than 0.05, meaning that the control group data is also homogeneous.

These results indicate that both groups, experimental and control, have homogeneous variances. Thus, the assumption of homogeneity of variance has been met for both groups, allowing for further statistical analysis, such as the independent t-test, to test for significant differences between the experimental and control groups.

After the normality and homogeneity assumption tests are met, the data can be analyzed using the t-test hypothesis as seen in table 4 below.

Table 4. Independent t-test results

Curiosity character		Mean	df	t-count	t-table	Sig. (2-tailed)
Posttest	Experiment	4,3	60	6,356	1,670	0,000
	Control	3,8				

Based on the results of the independent t-test, it shows that there is a significant difference between the experimental group and the control group regarding the character of students' curiosity as measured by the posttest score. The average posttest score for the experimental group was 4.3, while the control group had an average of 3.8. The t-count value obtained was 6.356, which is greater than the t-table value of 1.670, with a degree of freedom (df) of 60. In addition, the p-value is 0.000, which is less than 0.05, which means there is a significant difference between the two groups. These results indicate that the experimental group, which used an ethnoscience-based approach, experienced a greater increase in their curiosity character compared to the control group using conventional learning methods. Thus, ethnoscience-based learning is proven to be more effective in stimulating students' curiosity and increasing their involvement in ecosystem material.

The integration of ethnoscience approaches into electronic student worksheets is a significant innovation in the contextualization of science learning at the elementary school level. The results of this study indicate that students in the experimental group, who used ethnoscience-based worksheets, experienced an increase in understanding of ecosystem concepts and a higher curiosity character compared to the control group. This proves that connecting local cultural knowledge with science concepts not only facilitates cognitive learning but also builds affective attributes such as curiosity and appreciation for local wisdom.

Ecosystem material often requires students to understand the complex relationships between living organisms and their environment. By inserting examples of local ecosystems and cultural practices into learning materials, ethnoscience-based worksheets make abstract concepts more real and relevant. The experimental group showed an average increase in posttest results of 22.9 points, far exceeding the increase of 11.9 points in the control group. This confirms the effectiveness of using contextual and culturally relevant examples in bridging the gap between theory and real-world applications.

Curiosity, an important trait for lifelong learning, showed a significant increase in students in the experimental group. By encouraging students to explore local phenomena and ask questions about their surroundings, the ethnoscience approach stimulates an investigative mindset. Curiosity scores in the experimental group increased by an average of 1.2 points, compared to an increase of 0.6 points in the control group. This suggests that culturally rich and interactive learning materials can significantly increase student engagement.

Previous research conducted by Copriady, (2024) support this study by highlighting the importance of integrating an ethnoscience approach into electronic-based student worksheets to improve students' character values and conservation attitudes. The findings of the study indicate that an ethnoscience approach applied in problem-based learning (PBL) can make students better understand scientific concepts by linking them to local wisdom, so that learning becomes more meaningful and relevant. This is in line with current research that uses an ethnoscience approach to improve students' understanding of ecosystem concepts and curiosity. Both studies emphasize how ethnoscience can be used to bridge the gap between scientific theory and its practical application in everyday life contexts, as well as how this approach can increase student engagement and the positive values they develop during the learning process.

One of the unique features of this research is the integration of ethnoscience with digital technology. Unlike traditional printed learning resources, the use of electronic worksheets offers an interactive and engaging learning experience. This combination not only modernizes the delivery of the material but also fits with students' increasing familiarity with digital platforms. Technology enhances the accessibility and appeal of learning materials, ensuring that students remain motivated to explore and connect concepts to real phenomena.

The findings of this study highlight the potential of electronic ethnoscience-based worksheets in shaping a more holistic approach to education. By combining cultural knowledge with modern learning tools, educators can create engaging and meaningful learning environments. This approach not only improves students' academic achievement but also fosters a sense of pride in their cultural heritage, thereby contributing to the preservation of local wisdom in the digital age.

CONCLUSION

The conclusion of this study is that the findings of this study provide strong evidence of the effectiveness of ethnoscience-based electronic worksheets in enhancing students' understanding and curiosity. By bridging traditional knowledge with modern technology, this approach not only enriches the learning experience but also contributes to the preservation and appreciation of local culture, making it a valuable educational model in the 21st century. Future research should explore the application of similar approaches to other subjects and age groups to test broader relevance. In addition, longitudinal research can provide insights into the lasting impact of ethnoscience-based education on students' academic and personal development.

REFERENCES

Andani, D. T., Gani, A., Pada, A. U. T., & Rahmatan, H. (2020). Ethnoscience-Based Student Worksheet Development to Improve Senior High School Student Creativity. *Jurnal Penelitian Pendidikan IPA*, *7*(1), 26–33. https://doi.org/10.29303/jppipa.v7i1.457

Aseeri, M. M. Y. (2020). Abstract Thinking of Practicum Students at Najran University in Light of Piaget's Theory and Its Relation to Their Academic Level. *Journal of Curriculum and Teaching*, *9*(1), 63. https://doi.org/10.5430/jct.v9n1p63

Carayannis, E. G., & Morawska-Jancelewicz, J. (2022). The Futures of Europe: Society 5.0 and Industry 5.0 as Driving Forces of Future Universities. *Journal of the Knowledge Economy*, *13*(4), 3445–3471. https://doi.org/10.1007/s13132-021-00854-2

Copriady, J. (2024). Development of PBL Based E-Student Worksheet Using an Ethnoscience Approach to Improve Students' Character Values and Conservation Attitudes on Redox Material. *Jurnal Penelitian Pendidikan IPA*, *10*(4), 1495–1505.

da Silva, C., Pereira, F., & Amorim, J. P. (2023). The integration of indigenous knowledge in school: a systematic review. *Compare*, *54*(7), 1210–1228. https://doi.org/10.1080/03057925.2023.2184200

Druga, S., & Ko, A. J. (2021). How do children's perceptions of machine intelligence change when training and coding smart programs? *Proceedings of Interaction Design and Children, IDC 2021*, 49–61. https://doi.org/10.1145/3459990.3460712

Fiteriani, I., Ningsih, N. K., Irwandani, I., Santi, K., & Romlah, R. (2021). Media Poster dengan Pendekatan Etnosains: Pengembangan Bahan Ajar IPA Siswa Sekolah Dasar. *Jurnal Pendidikan Sains Indonesia*, *9*(4), 540–554. https://doi.org/10.24815/jpsi.v9i4.20984

Gray, T., Tracey, D., Truong, S., & Ward, K. (2022). Community gardens as local learning environments in social housing contexts: participant perceptions of enhanced wellbeing and community connection. *Local Environment*, *27*(5), 570–585. https://doi.org/10.1080/13549839.2022.2048255

Gross, M. E., Zedelius, C. M., & Schooler, J. W. (2020). Cultivating an understanding of curiosity as a seed for creativity. *Current Opinion in Behavioral Sciences*, *35*, 77–82. https://doi.org/10.1016/j.cobeha.2020.07.015

Hanif, M. (2020). The development and effectiveness of motion graphic animation videos to improve primary school students' sciences learning outcomes. *International Journal of Instruction*, *13*(4), 247–266. https://doi.org/10.29333/iji.2020.13416a

Harefa, D., Sarumaha, M., Telaumbanua, K., Telaumbanua, T., Laia, B., & Hulu, F. (2023). Relationship Student Learning Interest To The Learning Outcomes Of Natural Sciences. *International Journal of Educational Research & Social Sciences*, *4*(2), 240–246. https://doi.org/10.51601/ijersc.v4i2.614

Hikmawati, H., Suastra, I. W., & Pujani, N. M. (2020). Ethnoscience-Based Science Learning Model to Develop Critical Thinking Ability and Local Cultural Concern for Junior High School Students in Lombok. *Jurnal Penelitian Pendidikan IPA*, *7*(1), 60–66. https://doi.org/10.29303/jppipa.v7i1.530

Hikmawati, Suastra, I. W., & Pujani, N. M. (2021). Local wisdom in Lombok island with the potential of ethnoscience for the development of learning models in junior high school. *Journal of Physics: Conference Series*, *1816*(1). https://doi.org/10.1088/1742-6596/1816/1/012105

Ismail, I., Ali, H., & Anwar Us, K. (2022). Factors Affecting Critical and Holistic Thinking in Islamic Education in Indonesia: Self-Concept, System, Tradition, Culture. (Literature Review of Islamic Education Management). *Dinasti International Journal of Management Science*, *3*(3), 407–437. https://doi.org/10.31933/dijms.v3i3.1088

Kalogiannakis, M., Papadakis, S., & Zourmpakis, A. I. (2021). Gamification in science education. A systematic review of the literature. *Education Sciences*, *11*(1), 1–36. https://doi.org/10.3390/educsci11010022

Khusniati, M., Heriyanti, A. P., Aryani, N. P., Fariz, T. R., & Harjunowibowo, D. (2023). Indigenous science constructs based on Troso woven fabric local wisdom: a study in ethnoscience and ethnoecology. *Journal of Turkish Science Education*, *20*(3), 549–566. https://doi.org/10.36681/tused.2023.031

Lestari, N. A. P. (2023). Implementation of Ethnoscience-Based Learning in the Manifestation of Character. *International Conference on Education Innovation and Social Science*, *July*, 318–323.

Patricia, N., Sumarni, W., & Mursiti, S. (2022). Analysis of Students' Critical and Creative Thinking Skills on the Application of A Problem-Based Learning Model Contained with Etno- Science (Etno-PBL). *International Journal of Active Learning*, *7*(1), 77–85.

Pranata, J., Wijoyo, H., & Suharyanto, A. (2021). Local Wisdom Values in the Pujawali Tradition. *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, *4*(1), 590–596. https://doi.org/10.33258/birci.v4i1.1642

Sakti, S. A., Endraswara, S., & Rohman, A. (2024). Revitalizing local wisdom within character education through ethnopedagogy apporach: A case study on a preschool in Yogyakarta. *Heliyon*, *10*(10), e31370. https://doi.org/10.1016/j.heliyon.2024.e31370

Sari, M. P., Muttaqiin, A., Putri, R. E., & Oktavia, R. (2024). Integrating Ethnoscience on Critical-Thinking

Oriented Web-Based E-Module of Secondary School Science. *Jurnal Penelitian Pendidikan IPA*, *10*(1), 371–384. https://doi.org/10.29303/jppipa.v10i1.5928

Sartika, E., Salam, & Semiaji, T. (2024). Local Culture-Based Education: Creating A Learning Environment That Promotes Local Integrity. *International Journal of Teaching and Learning (INJOTEL)*, *2*(6), 1513–1523.

Siponen, M., & Klaavuniemi, T. (2021). Demystifying beliefs about the natural sciences in information system. *Journal of Information Technology*, *36*(1), 56–68. https://doi.org/10.1177/0268396220901535

Suryati, S., Hatimah, H., Zohri, S. A., & Salim, A. (2024). Review LKPD PBL Berbasis Kearifan Lokal Lombok untuk Mendukung Kurikulum Merdeka pada Materi Koloid. *Jurnal Ilmiah IKIP …*, *11*(1). https://e-journal.undikma.ac.id/index.php/jiim/article/view/12531%0Ahttps://e-journal.undikma.ac.id/index.php/jiim/article/viewFile/12531/6116

Wagstaff, M. F., Flores, G. L., Ahmed, R., & Villanueva, S. (2021). Measures of curiosity: A literature review. *Human Resource Development Quarterly*, *32*(3), 363–389. https://doi.org/10.1002/hrdq.21417

Yeh, J. H. Y., Lin, S. C., Lai, S. C., Huang, Y. H., Yi-Fong, C., Lee, Y. T., & Berkes, F. (2021). Taiwanese indigenous cultural heritage and revitalization: Community practices and local development. *Sustainability (Switzerland)*, *13*(4), 1–16. https://doi.org/10.3390/su13041799

Yuliyanti, N., Sarwi, S., Wardani, S., & ... (2024). Integration of Social Science Learning Through A Child-Friendly Ethnoscience Approach. *... on Science, Education …*, *10*, 250–258. https://proceeding.unnes.ac.id/ISET/article/view/3886%0Ahttps://proceeding.unnes.ac.id/ISET/article/download/3886/3309

Zulirfan, Z., Yennita, Y., Maaruf, Z., & Sahal, M. (2023). Ethnoscientific literacy in Pacu Jalur tradition: Can students connect science with their local culture? *Eurasia Journal of Mathematics, Science and Technology Education*, *19*(1). https://doi.org/10.29333/ejmste/12773