JOURNAL OF EDUCATIONAL INNOVATION
IN SCIENCE AND TECHNOLOGY
Volume 1, Issue 1, June 2026, page: 1-6

ANALYSIS OF STUDENTS' RESPONSES TO THE ETHNOSCIENCE APPROACH IN SCIENCE LEARNING

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ABSTRACT

The ethnoscience approach is an instructional innovation that integrates local culture with scientific concepts, making learning more contextual and meaningful. In addition to improving learning outcomes, the application of the ethnoscience approach should be examined through students' responses as an indicator of the success of the learning process. This study aimed to analyze students' responses to the application of the ethnoscience approach in science learning on environmentally friendly technology. The study employed a quantitative approach with a one-group pretest-posttest design. The sample consisted of 20 ninth-grade students at SMP Negeri 1 Pulau Banyak. Data on students' responses were collected using a questionnaire that had been tested for validity and reliability. The data were analyzed using percentage analysis based on respondents' scores for each indicator. The findings showed that students' responses to the ethnoscience approach were in the very good category, with an average percentage of 78.5%. These results indicate that students responded positively to ethnoscience-based learning because it was more engaging, easier to understand, and able to connect science concepts with their culture and surrounding environment. Therefore, the ethnoscience approach can serve as an instructional alternative that creates more contextual learning experiences and elicits positive responses from students.

Keywords: Ethnoscience Approach; Student Responses; Science Learning; Environmentally Friendly Technology

1. INTRODUCTION

Science learning aims not only to develop conceptual mastery but also to provide meaningful experiences that help students connect scientific knowledge with phenomena encountered in everyday life (Sakila et al., 2023; Samatowa, 2016). Learning grounded in real-life contexts can make abstract concepts more accessible and encourage students to interpret science through familiar experiences (Kua et al., 2020). Culture-based learning is therefore relevant because it positions students' surroundings and community knowledge as resources for understanding school science (Patras et al., 2023; Safitri et al., 2023).

Ethnoscience integrates local knowledge, traditions, and cultural practices into science education. In Indonesia, this approach has been discussed as a way to reconstruct community knowledge into scientific learning contexts and to support the contextual orientation of the Merdeka Curriculum (Habibullah & Rizal, 2024; Hasibuan et al., 2023; Pratama & Jumadi, 2023). Studies in Aceh and other Indonesian settings also show that local culture can provide interdisciplinary science content and learning resources that are close to students' lives (Aswita et al., 2026; Maysarah et al., 2025; Saminan et al., 2024; Sari et al., 2023; Sari & Ernawati, 2025). In particular, the development of an ethno-ecotourism environmental education model in Aceh illustrates how indigenous governance and coastal environmental practices can be transformed into a structured, culturally responsive educational framework (Aswita et al., 2026).

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Citation: Meriysa, M., Rizal, S., & Saminan, N. F. (2026). Analysis of Students' Responses to the Ethnoscience Approach in Science Learning. *Journal of Educational Innovation in Science and Technology*, 1(1), 1–6.

The expansion of ethnoscience research is reflected in systematic and bibliometric reviews. These reviews identify applications across educational levels and science topics, while also emphasizing scientific literacy, conceptual understanding, science-process skills, critical thinking, and twenty-first-century skills as common outcomes (Fahrudin et al., 2023; Jannah et al., 2022; Jannah et al., 2023; Nurhasnah et al., 2022; Wirama et al., 2023). Reviews of local-wisdom-based science learning further indicate its relevance to education for sustainable development, provided that local knowledge and scientific explanations are connected critically and appropriately (Febrian et al., 2024).

Empirical studies provide additional support for exploring ethnoscience-based instruction. Ethnoscience instruction has been associated with students' attitudes toward science (Fasasi, 2017), while contextual collaborative learning and ethnoscience-based problem-based learning have been studied in relation to scientific literacy (Dewi et al., 2021; Hidayanti & Wulandari, 2023). Other studies report results concerning conceptual understanding and science-process skills in ethnoscience-oriented project and course-review learning (Ardianti & Raida, 2022; Mudana, 2023). At the elementary level, ethnoscience-based science learning has likewise been developed to connect scientific thinking with local cultural content (Suryanti et al., 2021). These findings come from different populations and research designs and therefore should not be treated as direct evidence for the setting examined in the present study.

Students' responses provide evidence of their perceptions and acceptance of an instructional experience. Positive responses indicate that students view the learning activities favorably; however, response data alone do not establish improvement in achievement, motivation, engagement, or attitude. Analyzing such responses is nevertheless useful for evaluating how students perceive the relevance, clarity, and benefits of the learning approach.

Although ethnoscience has been widely examined as a contextual learning resource, evidence concerning students' responses to its application in environmentally friendly technology lessons at SMP Negeri 1 Pulau Banyak remains limited. This study therefore aimed to analyze students' responses to the application of the ethnoscience approach in science learning on environmentally friendly technology at SMP Negeri 1 Pulau Banyak.

2. METHODS

This article reports the post-intervention student-response component of a broader quantitative study that used a one-group pretest-posttest design. The study was conducted at SMP Negeri 1 Pulau Banyak, Aceh Singkil Regency. The participants were 20 ninth-grade students selected as the research sample. The analysis in this article is limited to students' questionnaire responses after they had participated in science learning using the ethnoscience approach.

The instrument was a 15-item student-response questionnaire covering eight indicators: student interest, clarity of material, connection with local culture, student engagement, learning motivation, conceptual understanding, benefits of learning, and attitudes toward learning. The questionnaire was administered after students had completed the learning activities. The source manuscript states that the instrument underwent validity and reliability testing, but the coefficients and decision criteria were not available in the submitted text.

The response data were analyzed descriptively. For each indicator, the obtained score was divided by the maximum possible score and multiplied by 100%. The resulting percentages were interpreted using the study's response categories: very good, good, fair, poor, and very poor. The average reported in Table 1 is the unweighted arithmetic mean of the eight indicator percentages.

3. RESULTS

Students' Responses

Students' responses to the application of the ethnoscience approach in science learning were obtained through a questionnaire administered after the entire learning process had been completed. The questionnaire assessed students' views of the instruction they had received, including their interest, ease of understanding the material, engagement in learning, and perceptions of the benefits of the ethnoscience approach in connecting scientific concepts with local culture.

Table 1. Students' Responses to the Application of the Ethnoscience Approach

No.	Response Questionnaire Indicator	Item No.	Total Score	Percentage (%)	Category
1	Student Interest	1	79	79	Good
2	Clarity of Material	2, 3	153	77	Good
3	Connection with Local Culture	4, 5	166	83	Very Good
4	Student Engagement	6, 7	155	78	Good
5	Learning Motivation	8, 9	153	77	Good
6	Conceptual Understanding	10, 11	167	84	Very Good
7	Benefits of Learning	12, 13	156	78	Good
8	Attitudes toward Learning	14, 15	143	72	Good
Average			**146,5**	**78,5**	**Good**

As shown in Table 1, the average percentage of students' responses was 78.5%, which falls within the good category. This result indicates that most students responded positively to the application of the ethnoscience approach in science learning. Connecting the subject matter with local culture and the surrounding environment created a more engaging learning environment, enabling students to participate in the learning process more easily.

Analysis of Students' Responses by Indicator

Students' responses were subsequently analyzed by indicator to identify the aspects receiving the highest ratings and those still requiring improvement.

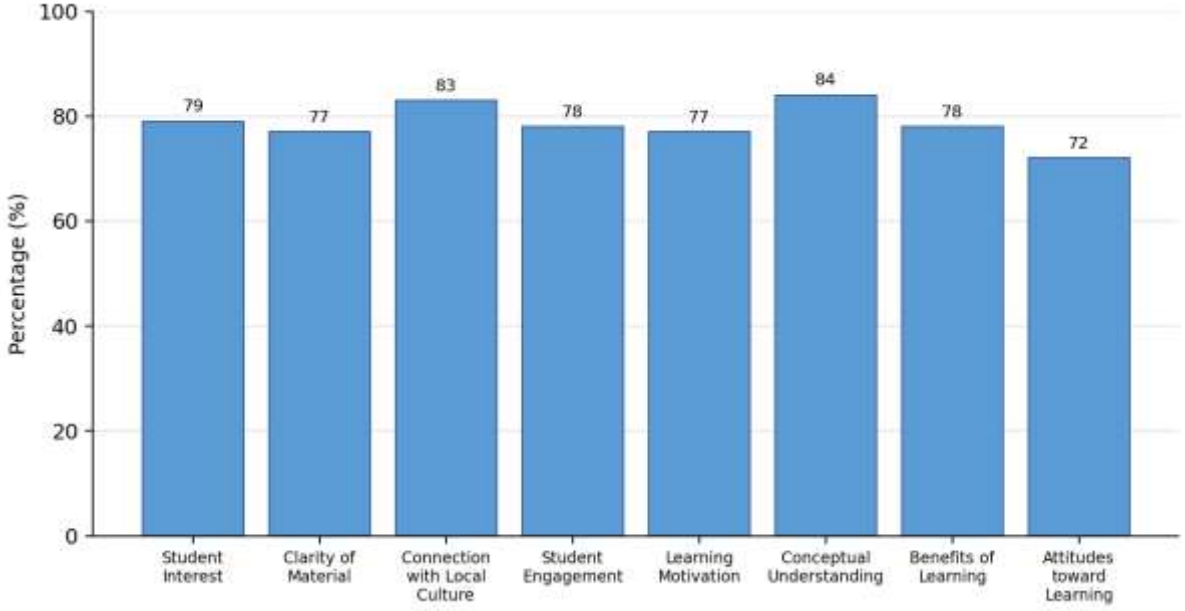

Figure 1. Percentage of Students' Responses by Indicator

As shown in Figure 1, all indicators achieved percentages in the good category. The interest-in-learning indicator showed that students found learning through the ethnoscience approach more engaging than the instruction they usually received. This was because the subject matter was connected to local culture and everyday life, making students more enthusiastic about participating

in learning. For the ease-of-understanding indicator, most students stated that the ethnoscience approach helped them understand environmentally friendly technology more easily. Examples drawn from their surroundings made the concepts more concrete and helped students connect theory with everyday practice. The student-engagement indicator also received positive responses. During learning, students participated actively in discussions, observed phenomena related to local culture, and expressed their views on the relationship between scientific concepts and community life. This engagement indicates that the ethnoscience approach can create more interactive and student-centered learning. Moreover, the benefits-of-ethnoscience indicator showed that students considered ethnoscience-based learning to provide a more meaningful learning experience. Integrating local culture into instruction helped students understand the importance of environmental conservation while fostering awareness that local knowledge can be connected to scientific concepts in science learning.

4. DISCUSSION

The mean response of 78.5% indicates that students generally viewed the ethnoscience-based science lessons favorably. In particular, the high ratings for conceptual understanding and connection with local culture suggest that students perceived value in relating environmentally friendly technology to cultural knowledge and practices familiar to them. This interpretation is consistent with literature describing ethnoscience as a means of connecting scientific concepts with local knowledge and contextual learning resources (Habibullah & Rizal, 2024; Pratama & Jumadi, 2023; Sari & Ernawati, 2025; Zulirfan et al., 2023).

Students also reported favorable interest and motivation. A plausible explanation is that familiar examples made the subject matter more accessible and relevant. Research in another national context found that ethnoscience instruction was related to learners' attitudes toward science, while Indonesian studies have reported favorable outcomes when ethnoscience was combined with contextual, collaborative, or problem-based learning (Dewi et al., 2021; Fasasi, 2017; Hidayanti & Wulandari, 2023). Nevertheless, differences in design, participants, and measured outcomes prevent those findings from being directly equated with the post-intervention perceptions reported here.

The student-engagement indicator was categorized as good. This result suggests that students perceived themselves as participating in learning activities that connected scientific and cultural perspectives. Such an interpretation aligns with descriptions of ethnoscience as an interdisciplinary and contextual approach (Saminan et al., 2024) and with reviews documenting its use in science learning across topics and educational levels (Fahrudin et al., 2023; Jannah et al., 2022). However, claims about actual behavioral engagement would require observational or process data in addition to questionnaire responses.

The very good rating for perceived conceptual understanding is also broadly compatible with research on ethnoscience-oriented project-based learning and course-review learning (Ardianti & Raida, 2022; Mudana, 2023). It is also consistent with review-level evidence describing positive results across scientific literacy, learning outcomes, science-process skills, and conceptual understanding (Nurhasnah et al., 2022; Wirama et al., 2023). In the present study, however, this indicator measures students' perceptions rather than an independently tested gain in conceptual mastery.

The lowest rating was recorded for attitudes toward learning. Although this indicator remained in the good category, its comparatively lower percentage suggests that positive perceptions were not equally strong across all dimensions. Future implementation should examine which questionnaire items contributed to this result and whether revisions to learning activities, duration, or instructional support are needed. Further work may also consider how local-wisdom integration can contribute to sustainability-oriented science education without simplifying either local knowledge or scientific explanations (Febrian et al., 2024). The Aceh-based model developed by Aswita et al. (2026) further suggests that environmental responsibility and community conservation can be strengthened when customary institutions are treated as part of the educational framework; nevertheless, its tourism-practitioner context differs from the junior-secondary classroom examined in the present study.

Taken together, the findings show that students perceived the ethnoscience approach as contextual, culturally relevant, and useful for learning science. The results support its continued exploration as an instructional approach. However, the single-group design, small sample, reliance on post-intervention self-report data, and unavailable instrument coefficients limit causal interpretation and generalization.

5. CONCLUSION

Students responded favorably to the application of the ethnoscience approach in science learning on environmentally friendly technology, with an unweighted mean response of 78.5% in the good category. The highest ratings were recorded for conceptual understanding and connection with local culture, whereas attitudes toward learning received the lowest rating but remained in the good category. These findings indicate positive student perceptions; they do not, on their own, establish that the approach increased conceptual understanding, motivation, engagement, or attitudes. Further research with complete pretest-posttest reporting, comparison groups, validated instrument reporting, and additional data sources is needed to assess learning effects.

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