



Publication Trends and Hot Topics in Ethnoscience Research: A Bibliometric Study

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Abstract

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Ethnoscience, which integrates traditional knowledge with scientific approaches, is increasingly attracting attention in the academic community as a culture-based solution to various global challenges. This study aims to analyze publication trends and research topics in ethnoscience over the past decade (2014-2024) using a bibliometric approach. A total of 84 articles indexed in Scopus were analyzed to evaluate trends in the number of publications, geographical distribution, as well as hot topics based on keyword co-occurrence analysis. The results showed a significant increase in the number of publications and citations, with the largest spike in the 2019-2024 period. Indonesia became the country with the largest contribution (more than 50% of publications), followed by Brazil and the United States, which focused on exploring local traditions and interdisciplinary approaches, respectively. The topic analysis identified two main themes: critical thinking and problem-solving as the most recent focus and scientific literacy and context-based learning as the most cited themes. These findings suggest that ethnoscience is increasingly relevant in global research, especially in supporting culture-based education, sustainability and local innovation to face global challenges. This study recommends strengthening international collaborations and further exploration of the integration of ethnoscience with technology and environmental sustainability.

Keywords: *Ethnoscience, Bibliometrics, Publication Trends, Scopus*

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INTRODUCTION

The development of science and technology in education continues to encourage the emergence of new approaches that can bridge global needs and local wisdom (Fadillah et al., 2024). One approach that has gained widespread attention in recent decades is ethnoscience, which integrates local or traditional knowledge with modern science concepts in learning (Irfandi et al., 2023). Ethnoscience not only serves to increase the relevance of science learning to everyday life but also enriches students' learning experience by introducing local cultural values (Suprpto et al., 2021). This approach is considered to make a significant contribution to building 21st-century skills, such as critical thinking, science literacy, creativity, and environmental awareness (Asrizal et al., 2023; Desnita et al., 2022; Festiyed et al., 2019; Hikmawati et al., 2020; Nurhasnah et al., 2022). In addition, ethnoscience-based learning has the potential to strengthen students' cultural identity while preparing them to face global challenges with a deeper understanding of the local context (Zidny et al., 2020).

As an interdisciplinary approach, ethnoscience has become an increasingly popular research subject in science education, especially in Indonesia. Various studies have shown how local wisdom can be integrated into the science curriculum to improve student engagement and understanding. Efendi and Muliadi (2023), for example, elaborated on how Sasak culture, such as songket motifs and poteng jaje tujak, are relevant to basic science competencies, such as biotechnology and plant reproductive systems. Fahrudin et al. (2023) showed that ethnoscience-based learning models, such as inquiry, contribute to the development of students' critical thinking skills and science literacy.

The bibliometric approach has become an important tool in understanding the development and trends of ethnoscience research globally. Supriyadi et al. (2023) showed that ethnoscience research has experienced significant growth since 2000, with Indonesia being one of the main contributors to publications in this field. Meanwhile, Sunarti et al. (2024) found that research on ethnoscience in physics learning mostly focused on developing innovative learning models but less on exploring global aspects, such as the application of modern technology in ethnoscience.

Although the literature shows that ethnoscience has a positive impact on science education, some research gaps still need to be addressed. Fahrudin et al. (2023) limited their focus to the implementation of ethnoscience at the primary and secondary school levels, thus not providing a broader picture of the global trends and contributions of this discipline in the context of higher education. Rahmawan and Rahayu (2023) highlighted the lack of ethnoscience-based science literacy modules, particularly in chemistry learning, although such modules are considered relevant for improving students' science literacy. In addition, the studies of Supriyadi et al. (2023) and Sunarti et al. (2024) show that ethnoscience research is dominated by specific geographical areas, such as Indonesia, so it does not yet reflect broader global developments. This gap suggests the need for more comprehensive research, both in geographical and thematic coverage, to identify current publication trends and emerging themes in ethnoscience research. A more in-depth bibliometric approach could provide new insights into emerging topics and potential future research directions.

This research aims to answer two main questions in ethnoscience studies using a bibliometric approach, namely: (1) What are the publication trends of ethnoscience research over the past decade, and (2) What are the hot topics that are the focus of ethnoscience research today? By utilizing analytical tools such as VOSviewer and Biblioshiny, this research will map the development of ethnoscience research, identify key themes, and reveal the relationships between emerging research topics. Through detailed analysis, this research is expected to make a significant contribution to understanding the dynamics of ethnoscience research while providing a more targeted roadmap for future research development. Thus, the results of this study will not only enrich the literature in the field of ethnoscience but also provide practical guidance for educators and researchers who want to integrate local wisdom into science education more effectively.

METHODS

This study uses a bibliometric approach, which is a quantitative analysis of scientific literature that aims to evaluate publication patterns, author relationships, and key topics in a field of research. This approach provides tools to analyze historical trends, understand the distribution of research, and predict the focus of future studies. In addition, this approach can be visualized in the scientific literature in the form of a network that illustrates relationships between authors, institutions, or key terms, which is useful for understanding the research map comprehensively (Donthu et al., 2021; McAllister et al., 2022).

Data Source

The Scopus database was chosen as the main data source in this study because it covers a wide range of high-quality scientific literature. Scopus includes various types of documents, such as journal articles, conference proceedings, and systematic reviews. In addition, Scopus's advantage lies in its ability to provide data that supports citation analysis and bibliometric relationships. Data from Scopus is also compatible with analysis software such as VOSViewer, which enables efficient and accurate network visualization (Festiyed et al., 2024).

Search Strategy

The search strategy focused on the keyword "Ethnoscience", which was applied to the title, abstract, and keywords of the documents (TITLE-ABS-KEY). The search was limited to documents published between 2014 and November 2024 to reflect research developments in the last decade. The initial search process yielded 182 documents, covering a wide range of publication types. Further screening was then conducted based on inclusion and exclusion criteria. The inclusion criteria included documents that were scientific articles without language restrictions, relevant to the research topic, and related to science education or ethnoscience. The exclusion criteria included documents that were reviews, editorials, or other types of non-research documents. After the screening process, 84 articles were selected for analysis.

Data Processing and Analysis

Data obtained from Scopus were exported in comma-separated values (CSV) format for further analysis. An initial descriptive analysis was conducted using Microsoft Excel, which included the distribution of publications by year, author's country of origin, institution, and subject area. This descriptive analysis aimed to provide an overview of the development of ethnoscience research publications in the last decade. For visualization and analysis of bibliometric relationships, data were imported into VOSViewer software. This software was used to map the network of relationships between terms that frequently co-occur in document titles and abstracts. Term co-occurrence analysis was conducted to identify key terms that were frequently used together, thus illustrating the main themes in ethnoscience research. The terms were grouped into clusters using the clustering algorithm in VOSViewer, resulting in an easy-to-understand visualization.

Validation and Interpretation

The network visualization results from VOSViewer were interpreted to answer two main research questions, namely trends in ethnoscience research publications over the past decade and hot topics that are the focus of ethnoscience research today. Interpretation was done by identifying dominant trends, emerging

keywords, and the relationship between emerging terms. An evaluation of country contributions to the development of ethnoscience research also complements the results of this analysis.

RESULTS & DISCUSSION

Trend Analysis of Article Publication on Ethnoscience

Trends in the Number of Publications and Citations

The publication trend of articles on ethnoscience over the last decade shows a significant increase both in terms of the number of documents published and the citations generated. Based on Figure 1, the number of publications on ethnoscience started from a very small number in 2014, with only 1 document without citations. The same thing happened in 2015 with 2 documents, also without citations. This data shows that in the early period, ethnoscience was not yet a major concern of the global scientific community.

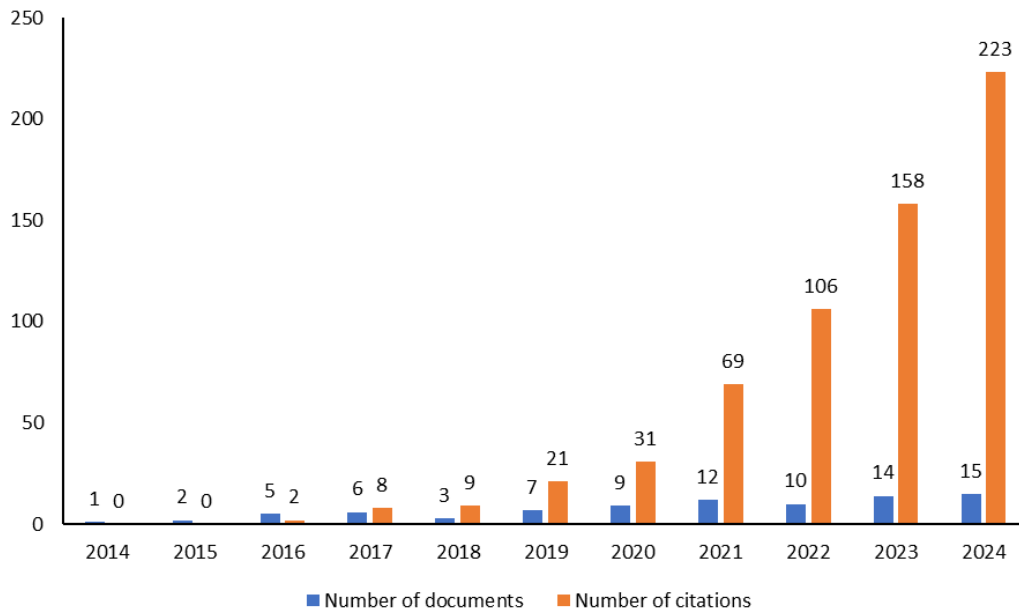


Figure 1. Trends in Ethnoscience Research Publications and Citations

An increase began to be seen in 2016, when there were 5 documents with 2 citations, marking the beginning of scientific recognition of this local wisdom-based research. In 2017, the number of publications increased to 6 documents with 8 citations, while 2018 saw a slight decrease in the number of documents (3 documents) but an increase in the number of citations (9 citations). Significant progress occurred from 2019 to 2024 when the number of publications increased consistently. In 2019, 7 documents with 21 citations were recorded, while in 2020, the number rose to 9 documents with 31 citations. This trend strengthened further in 2021, with 12 documents generating 69 citations, reflecting the growing impact of research in this area on other scientific literature.

Publication peaks were seen in 2023 and 2024, recording 14 and 15 documents, respectively, with the number of citations jumping sharply to 158 and

223. The spike in citations during this period confirms that ethnoscience articles are gaining widespread attention and are considered relevant in the context of interdisciplinary research. This trend also suggests that the topic of ethnoscience has made its way into the global research mainstream, along with the increasing attention to the preservation of local wisdom as a source of innovative solutions to global problems, such as cultural context-based education, environmental sustainability, and public health.

Geographical Distribution of Publications

Analysis of the geographical distribution of ethnoscience publications shows the dominance of developing countries (Figure 2), especially Indonesia, which recorded 43 documents or more than 50% of the total publications. This dominance reflects the richness of Indonesian culture and local traditions that form the basis of ethnoscience research. Research from Indonesia tends to focus on the integration of local wisdom in education, environmental conservation, and the exploration of culture as a source of innovation.

Apart from Indonesia, significant contributions also came from Brazil and the United States, with 8 documents each. Brazil is most likely to utilize the local traditions of indigenous Amazonian communities, which are rich in traditional knowledge related to the environment and health. On the other hand, the United States showed interest in the application of ethnoscience in the context of education and technological research, reflecting the cross-disciplinary approach typical of developed countries. Other countries, such as Malaysia and the Russian Federation, contributed 5 documents each, while Taiwan recorded 4 documents. The presence of these countries indicates that ethnoscience research is not only limited to tropical regions or countries with high cultural diversity but also attracts attention from countries that focus on technology integration and local wisdom-based education. Other publication distributions include European countries such as Germany (3 documents) and France (2 documents), as well as African countries such as Nigeria (2 documents) and Mozambique (1 document). This wide distribution reflects the potential of ethnoscience to become a globally relevant research topic.

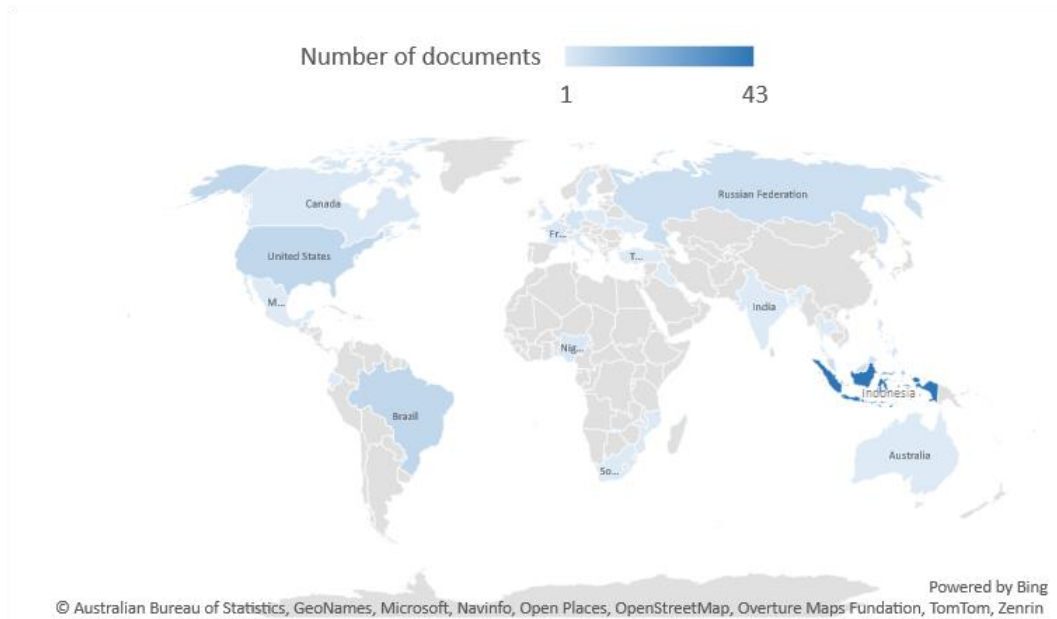


Figure 2. Geographic Distribution of Ethnoscience Research Publications

Research Focus by Subject Area

Based on Figure 3, the analysis of subject areas shows the dominance of Social Sciences with 63 documents, making it the main discipline in ethnoscience research. This dominance is not surprising, as ethnoscience is fundamentally rooted in the interaction between culture, traditional knowledge, and society. Research in this field often explores how local wisdom can influence education, social life, and community development.

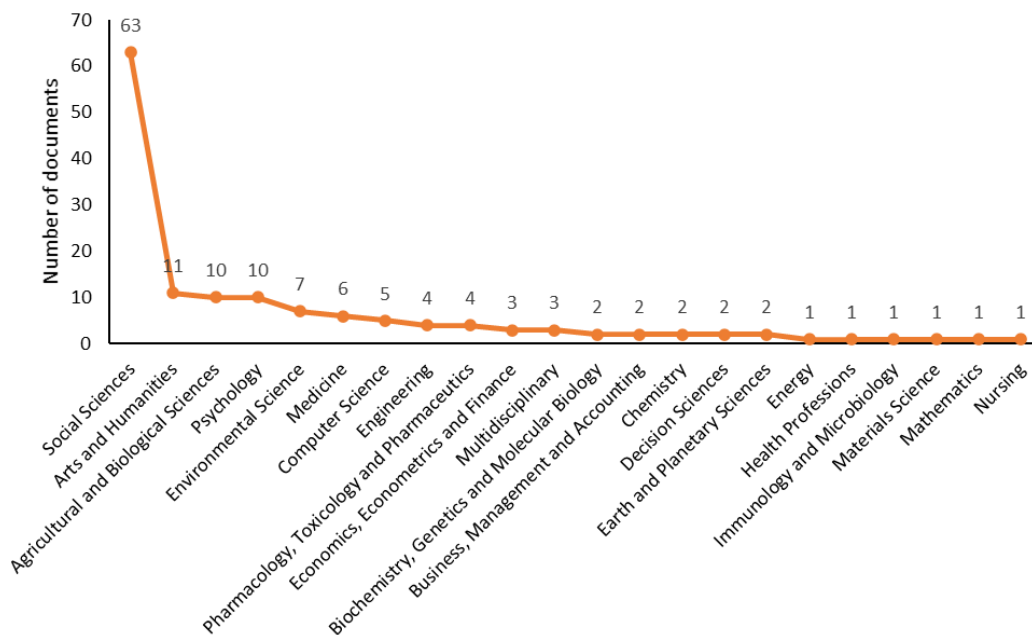


Figure 3. Ethnoscience Research Publication Subject Area

Arts and Humanities came in second with 11 documents demonstrating the important role of cultural traditions and the arts in conserving local knowledge. It was followed by Agricultural and Biological Sciences (10 documents), which highlighted the relevance of ethnosience in natural resource management and sustainability. The field of Psychology also recorded a similar number (10 documents), indicating that ethnosience research is beginning to explore its impact on individual mindsets, learning motivation, and educational methods. It is in line with the trend of integrating ethnosience in formal and informal education systems. Contributions from technical fields, such as Environmental Science (7 documents), Medicine (6 documents), and Computer Science (5 documents), reflect the great potential of ethnosience in creating innovative solutions to global challenges. In the context of technology, research in Computer Science and Engineering (4 documents) demonstrates efforts to integrate modern technology with local wisdom to create culturally relevant products and services.

Analysis of Current Ethnosience Research Hot Topics

The bibliometric analysis conducted on keywords in the scientific literature on ethnosience provides a clear picture of the development of emerging topics in this field. By using VOSviewer software for co-occurrence analysis and overlay visualization, this study was able to identify the keywords that appear most in ethnosience-related publications, as well as illustrate how the development of this topic changes over time. In this analysis, the most frequently occurring keywords provide clues as to the up-and-coming themes in ethnosience research. The results of this analysis show that there are two main categories of topics that can be identified based on two variables: average publication year and number of citations.

Topics by Year of Publication

Based on the overlay visualization measuring average years of publication (Figure 4), the two main topics that stand out are "critical thinking" and "problem-solving". These topics are yellow in the visualization, indicating that they are relatively new themes in ethnosience research. It suggests that the focus of research in recent years has been increasingly oriented toward developing critical thinking and problem-solving skills in the context of culture-based science learning.

Critical thinking skills are increasingly becoming a major concern in the integration of ethnosience in education, especially since this approach invites students to analyze, evaluate, and understand various natural phenomena related to local wisdom. In ethnosience research, the development of these skills is done by connecting scientific knowledge with local cultural values so that students not only acquire theoretical knowledge. However, it can also be applied in the context of their daily lives. This culture-based approach can trigger students to think more critically about their environment, as well as help them understand the relationship between traditional knowledge and scientific knowledge. In addition, problem-solving is also one of the rapidly growing topics in this field. The focus on problem-solving skills reflects an effort to teach students how to apply scientific concepts to solve problems relevant to their lives. In the context of ethnosience, this approach involves not only scientific theories but also applying solutions based on local traditions or knowledge to address existing problems, such as environmental or

health issues. For example, the use of traditional medicinal plants to address health issues or tradition-based farming techniques to increase agricultural yields demonstrate the relevance of local knowledge in solving global challenges.

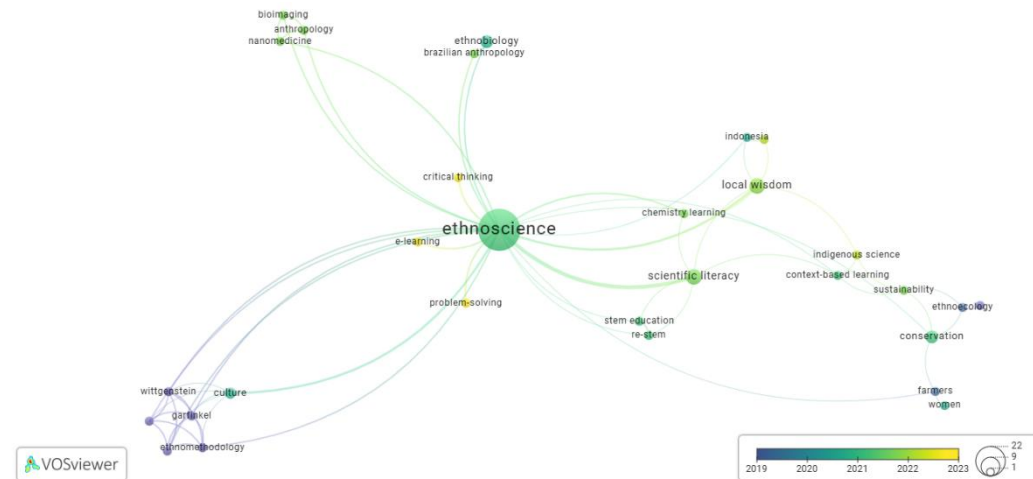


Figure 4. Visualization of Ethnoscience Research Overlay Based on Average Year of Publication

Topics by Number of Citations

Visualization analysis based on the number of citations revealed two main topics that received greater attention in publications and citations (Figure 5), namely "scientific literacy" and "context-based learning". These topics, highlighted in red in the visualization, indicate that they are themes that receive much attention from researchers and the academic community, so they are cited more frequently in the scientific literature.

Scientific literacy is a particularly relevant topic in ethnoscience research as it focuses on developing scientific understanding that not only includes basic science concepts but also how scientific knowledge can be applied in social and cultural contexts. Ethnoscience-based science literacy emphasizes the importance of linking scientific knowledge to local cultural experiences, such as in studies on the use of local wisdom in natural resource management or in solving environmental problems. This science literacy provides students with a better understanding of the scientific world and encourages them to be more critical in analyzing problems encountered in everyday life.

On the other hand, context-based learning is also a topic of much interest in ethnoscience research. This learning approach emphasizes the importance of linking subject matter to students' real-life experiences, which often involve local cultural and environmental knowledge. In the context of ethnoscience, context-based learning helps students to see the relevance of science in their lives by linking scientific theories to issues in society. For example, learning about traditional environmentally friendly farming systems can help students understand the concepts of biology, ecology, and sustainability in a more concrete and applicable context.

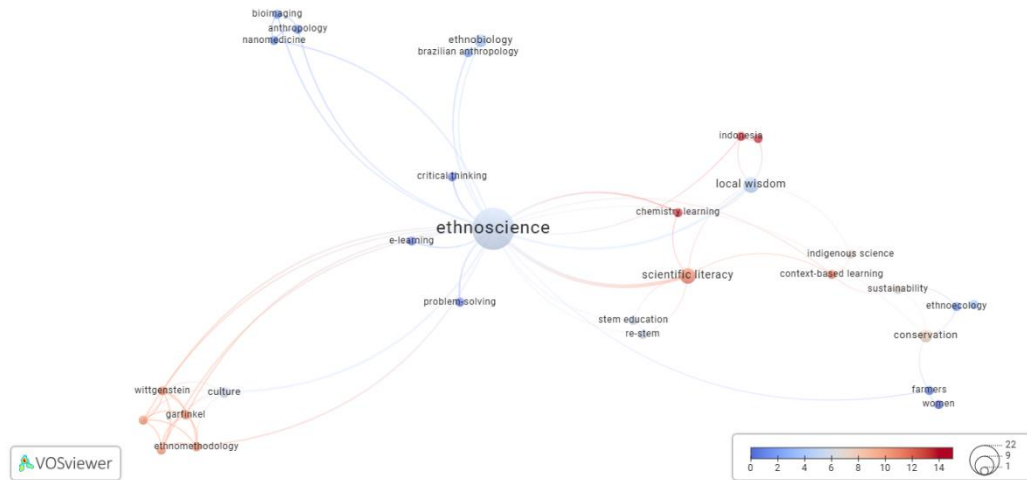


Figure 5. Visualization of Ethnoscience Research Overlay Based on Average Citations

Discussion

The results show that ethnoscience has experienced significant growth in terms of number of publications, citations, and disciplinary coverage. The surge in citations in recent years shows that research in this field is increasingly relevant in the global scientific community. Indonesia's dominance in publications also confirms that developing countries play an important role in developing this concept. However, it is important to note that ethnoscience research still has room for further exploration, especially in an interdisciplinary context. With increasing attention to sustainability, future research could focus on the integration of ethnoscience with green technologies, local context-based education, as well as public health innovations (Suprpto et al., 2021; Yuliarti et al., 2023). Increased international collaboration is also needed to expand the geographical scope of this research and identify similarities and differences in ethnoscience approaches across cultures. Thus, ethnoscience will become not only a valuable research subject but also a practical tool for creating relevant, sustainable, and inclusive solutions.

The results also show that ethnoscience research is now focusing on developing critical thinking and problem-solving skills through culture-based approaches. Topics such as critical thinking and problem-solving are becoming increasingly important as they relate to the need to prepare students for real-world challenges with relevant and applicable skills (Fadillah & Sahyar, 2023; Husin et al., 2024). The focus on scientific literacy and context-based learning suggests that ethnoscience research is increasingly moving towards integrating science with social and cultural contexts, providing a deeper understanding of how scientific knowledge can be used to solve problems that exist in everyday life (Bahtiar et al., 2022; Lestari et al., 2024; Mayasari & Usmeldi, 2023; Mulyono et al., 2024). Future research in ethnoscience could further explore how these skills can be effectively taught through culturally-based approaches that take into account local wisdom. In addition, research can also further develop an understanding of how science can be understood and applied in various local contexts, both in developing and developed countries. Thus, ethnoscience not only enriches insights into science but also opens up opportunities to create innovative local solutions yet have a global impact.

CONCLUSION

Ethnoscience research over the past decade has shown a significant upward trend in the number of publications and citations, with a sharp spike in 2019-2024, signaling the growing relevance of the field in the global scientific community. The dominance of contributions from developing countries, particularly Indonesia, reflects the richness of local cultures that are the main source of this research. In contrast, other countries such as Brazil, the United States, and Malaysia also play a role in cross-disciplinary exploration. Analysis of hot topics identified a focus on developing critical thinking and problem-solving skills, as well as a strong focus on scientific literacy and context-based learning, indicating the orientation of ethnoscience research towards integrating science with cultural values to address global challenges. With great potential to support sustainability, health innovation, and locally-based education, ethnoscience is projected to continue to grow as a global solution based on local wisdom.

CONFLICT OF INTEREST

Concerning the research, authorship, and publication of this paper, the author(s) reported no potential conflicts of interest.

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