



## The Potential for Integrating *Pencak Silat* Into Ethnophysics Education

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Received: February 2026; Revised: March 2026; Published: April 2026

### Abstract

This study aims to describe the trends, contributions, opportunities, and developments in ethnoscience research on *pencak silat*. The method used in this study is bibliometric analysis using Biblioshiny. Data was collected through the Scopus database by searching “TITLE-ABS-KEY (*Pencak Silat* OR Local Wisdom AND Physics Learning OR Ethnoscience),”. The data obtained used screening from 2015 to 2025 and English, resulting in 528 documents. The results show that ethnoscience research has increased since 2015. This indicates that ethnoscience research is trending. The contributors to ethnoscience research are Kuswanto H and Suprpto N, while the contributing affiliations are Universitas Negeri Yogyakarta and Universitas Negeri Surabaya. Opportunities for conducting ethnoscience research are greater, as evidenced by network visualization and average citations. Opportunities for international publication of ethnoscience can be through conferences, namely the Journal of Physics: Conference Series have 86 documents, and journals, namely the Jurnal Pendidikan IPA Indonesia have 36 documents. The development of ethnoscience research has reached the stage of learning media and the context of physics learning. The results obtained can be concluded that ethnoscience research is still relevant to be conducted. If future researchers wish to add *pencak silat* to the context, this can be done as an opportunity for research innovation. The addition of *pencak silat* to the context needs to be combined with physics learning and learning media so that it becomes an opportunity for innovation in future research. This study hopes to contribute to providing a context for physics learning and cultural preservation through learning.

**Keywords:** Bibliometrics; Ethnoscience; *Pencak silat*; Physics learning

**How to Cite:** Rusmila, P., Suprpto, N., Suliyanah, S., Hidaayatullaah, H. N., Damarsha, A. B., Zakaria, A., & Putri, M. A. (2026). The Potential for Integrating *Pencak Silat* Into Ethnophysics Education. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 14(2), 614–628. <https://doi.org/10.33394/j-ps.v14i2.19665>



<https://doi.org/10.33394/j-ps.v14i2.19665>

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## INTRODUCTION

The era of society has brought about changes in the sustainability of human life in achieving goals. The era of society is characterized by the relationship between technology and culture, commonly referred to as humanism (Tavarez et al., 2022; Girard, 2021). This era has had an impact on the world of education, with the hope that it can provide quality education. In their research, Suprpto et al. (2021) stated that the society curriculum is related to the integration of learning through local culture. In this context, it is hoped that the implementation of learning with the integration of local culture can increase students' knowledge and preserve culture.

In this context, culture in learning integration is used as a contextual problem. Furthermore, through learning that uses contextual problems, it is hoped that students' thinking skills in everyday life can be developed (Winarso & Haqq, 2020; Sarwari & Kakar, 2023). Through these learning activities, it is hoped that students can understand the application in daily life and the preservation of local culture. According to Akhyar et al. (2025), the preservation of local culture can be done through learning, which can have an impact through students getting to know the local culture.

Ontologically, the local culture possessed by local communities contains scientific concepts. This is proven through research Charles et al. (2020) that local culture exists in communities related to the surrounding environment, thus containing scientific concepts. Science is related to concepts of nature and the surrounding environment. In this context, knowledge related to culture is referred to as ethnoscience (Sari et al. 2023). According to Sudirman et al. (2025), ethnoscience is divided into several basic sciences related to nature and the environment. One of them is physics, which is also related to phenomena.

Physics is one of the sciences that is closely related to everyday life. Through physics, local culture can be integrated because it is connected to the concepts of natural phenomena (Damarsha et al., 2023; 2025). In this context, it is necessary to implement ethnophysics learning, which is a combination of physics learning and local culture. According to Avraamidou (2020), science or physics is related to culture, so that learning objectives in accordance with the curriculum can be achieved as targeted. This implementation requires a process to make it realistic in the learning process.

In fact, the implementation of ethnophysics learning is still difficult because many concepts need to be adjusted to real visuals. This fact is supported by research by Batlolona et al. (2022) that ethnophysics learning is still difficult to implement because many physics concepts are abstract and lack visuals. In addition, Mufit et al. (2020) stated that ethnophysics is difficult because many concepts are poorly understood and the visualization of the concepts provided is lacking. Based on these facts, a deep understanding of concepts related to local wisdom is needed to provide context for physics learning. In addition, learning practices are needed so that students have a clear visualization of the concepts.

One of the local wisdoms that is synonymous with Indonesia is *pencak silat*, which has clear visualizations and practices. *Pencak silat* has cultural values such as spirituality, art, martial arts, and sports, so it is inseparable from everyday life (Sar baitinil et al., 2023). According to Zakaria et al. (2025), *pencak silat* incorporates scientific concepts into each of its movements. This indicates that the local culture of *pencak silat* involves activities related to scientific concepts, particularly physics. Through activities to prove physics concepts, students will become interested in learning and understand the concepts well (Nugroho, 2020; Tolly & Kallery, 2021).

In this context, further research is needed on the application of physics concepts in the local culture of *pencak silat*. Research by Deta et al. (2024) shows that research on ethnoscience is trending. This is evidenced by data on the increase in research and the expansion of network visualization. In this case, further research is needed with a new focus on ethnoscience, especially in the field of physics (Yuliana et al., 2025; Hidaayatullaah et al., 2021). Previous studies have only shown topics that are trending in ethnoscience research, but have not yet shown the focus of ethnoscience that needs to be analyzed for further research. In this context, researchers will conduct a more in-depth analysis of the focus of ethnoscience research, especially on the local wisdom of *pencak silat*. The purpose of this study is to describe the trends and opportunities of ethnophysics in *pencak silat*, so that the research questions are as follows:

RQ1: How are the trends and contributions (Author & Affiliation) of ethnoscience research on *pencak silat*?

RQ2: What are the opportunities for ethnoscience research (Citation & Publication) on *pencak silat* on an international scale?

RQ3: How has ethnoscience research on *pencak silat* evolved on an international scale?

This study offers bibliometric analysis and a systematic literature review as a research map. Bibliometrics are used to analyze the research map in order to identify gaps in previous research (Wang et al., 2025; Pessin et al., 2022). In addition, this study also offers research mapping on local wisdom or *pencak silat* in ethnoscience and physics education. The purpose of this offering is to create a flow of information related to *pencak silat* in the context of ethnoscience so that integrated ethnoscience learning can be applied. Therefore, further

development and focus in conducting ethnoscience research, especially on *pencak silat*, is urgently needed.

The operational definitions in this study are based on the research questions formulated by the researchers. RQ1 uses the questions of trending and research contribution. Trending refers to indications that show an increase in the number of studies found (Massey et al., 2025; Ofer et al., 2024). Meanwhile, research contribution is an indication that shows the authors and affiliations that contributed the most documents to the research found (Chang et al., 2020). RQ2 uses questions about opportunities from the perspective of citations and journal publications, which refers to research that will be found by researchers to have a high chance of being useful as a source of information and publication (Majhi et al., 2023). RQ3 uses questions about the development of the research found, which refers to the opportunity for subsequent researchers to offer new scientific works (Soanes et al., 2020; Hubbers et al., 2022).

## METHOD

### Information Source

This study uses the Scopus database for information retrieval and bibliometric analysis. The reason for using the Scopus database is that it has a broad coverage of scientific literature in various disciplines, ideal for comprehensive literature reviews (Zhu et al., 2024). Furthermore, the Scopus database provides information that can be used to evaluate research according to the desired field of coverage (Asubiaro, 2023; Yeung, 2021). This is the basis for researchers to use the Scopus database, so that researchers can identify gaps and opportunities for further research.

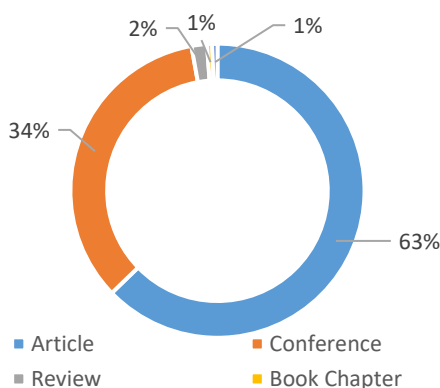
In this context, researchers did not use Google Scholar for their search because of the lack of abstract information, which is necessary for topic modeling analysis (Asl et al., 2023). The literature search focused on articles related to ethnoscience in the local wisdom of *pencak silat*. The database search was conducted using “TITLE-ABS-KEY (Pencak Silat OR Local Wisdom AND Physics Learning OR Ethnoscience),” which yielded 547 documents.

### Eligibility Criteria

Data collection and elaboration were conducted at the end of 2025 through the Scopus database. The criteria for document selection are as follows:

1. Time Frame: eligible data includes research data collected over the last 10 years, so the data included in the criteria is from 2015-2025.
2. Language: Eligible data includes research conducted in English; therefore, research conducted in languages other than English is not included in the data criteria.

Furthermore, data clustering is based on the type of document obtained from the Scopus database, as shown in Figure 1.



**Figure 1.** Document type

Based on Figure 1, there are five types of documents from Scopus (Articles, Conferences, Reviews, Book Chapters, and Others). Other types of documents include short surveys, editorials, and books. In terms of data acquisition, articles and conferences are the most common types of documents.

### Data Collection Process

The database search process was conducted through a broad search with identification. Then there was a data screening process that was carried out, such as by year (the last 10 years) and language (English). This systematic approach ensured that the search was comprehensive, covering many relevant studies. The selected document screening process covers 10 years because the researchers want to know the development of research trends over the last 10 years. English is used for language screening because it is an international language that is widely used. For more details, the database collection process can be interpreted in Figure 2 and Table 1.

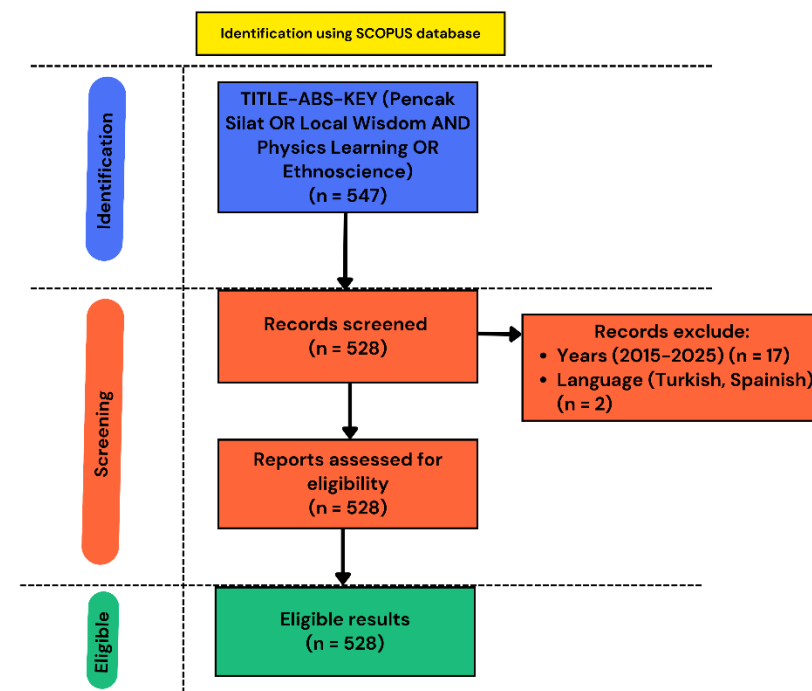


Figure 2. Screening process

Table 1. Scopus search strategy

Step 1	Searching for documents in Scopus with Query String “TITLE-ABS-KEY (Pencak Silat OR Local Wisdom AND Physics Learning OR Ethnoscience),”	Has a total of 547 documents
Step 2	Performing document search screening in Scopus with EXCLUDE PUB YEAR ≥ 2026	Has a total of 530 documents
Step 3	Performing document search screening in Scopus with EXCLUDE LANGUAGE (Turkish, Spanish)	Has a total of 528 documents
Step 4	Export eligible data in csv format	Has a total of 528 documents

### Data Analysis

The raw data was initially exported as a CSV file from Microsoft Excel, which systematically listed the author's name, affiliation, position, country, journal title, and keywords. The next step involved descriptive analysis tailored to answer our research questions. For data visualization, we used Bibliometrix in R Studio. These programs together provide various analytical functions that allow us to study indicators such as total number of publications, number of citations, author collaboration networks, and co-occurrence patterns among keywords (Srivastava & Srivastava, 2022; Wani & Ganaie, 2024). Through these programs, researchers can identify developments, trends, opportunities, and contributions of ethnoscience research on *pencak silat* on an international scale. In the data analysis process, Biblioshiny uses a thematic setting of three years, while for top minimum it uses a setting of ten.

The indicators in bibliometric analysis in R studio form the basis of the researchers' findings. Research trends will show that keywords that are searched for are highly trending if there is an increase in documents each year (Zafar & Masood, 2020). Opportunities in bibliometric analysis are analyzed through an increase in the average number of citations and journals that provide the most information sources (Kumar et al., 2023). This is because opportunities are reviewed based on the relevance of a study; relevant studies will have a large number of citations. Research developments use thematic map and thematic evolution analyses to determine the level of relevance in the coming years.

## RESULTS

### Trending and Research Contributions

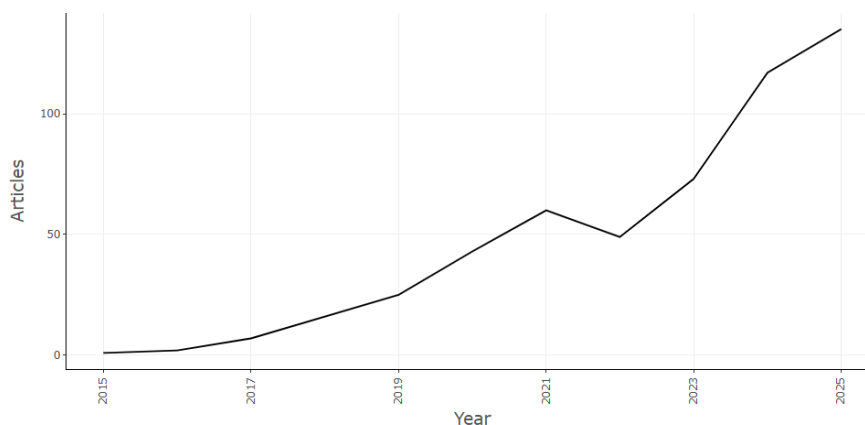


Figure 3. Annual productivity

Figure 3 shows that research on ethnoscience in *pencak silat* increased from 2015 to 2021. Research began in 2015 with 1 document and increased to 60 documents in 2021. That year marked a transition to a society-era curriculum, which required development and learning related to humanism. In 2022, research declined due to the pandemic, which reduced research activities. This is evidenced by research conducted by Kim (2024) that the research database in 2022 experienced a decline due to the impact of the pandemic. In 2022, there were 49 research documents, indicating a significant decline in ethnoscience research on *pencak silat*. From 2023 to 2025, there was an increase in research, resulting in 137 documents in 2025. These results show that ethnoscience research on *pencak silat* has increased, which means that this research is still relevant and trending. To further reinforce the trending research results, Figure 4 provides trending research data based on relevant keywords for each year.

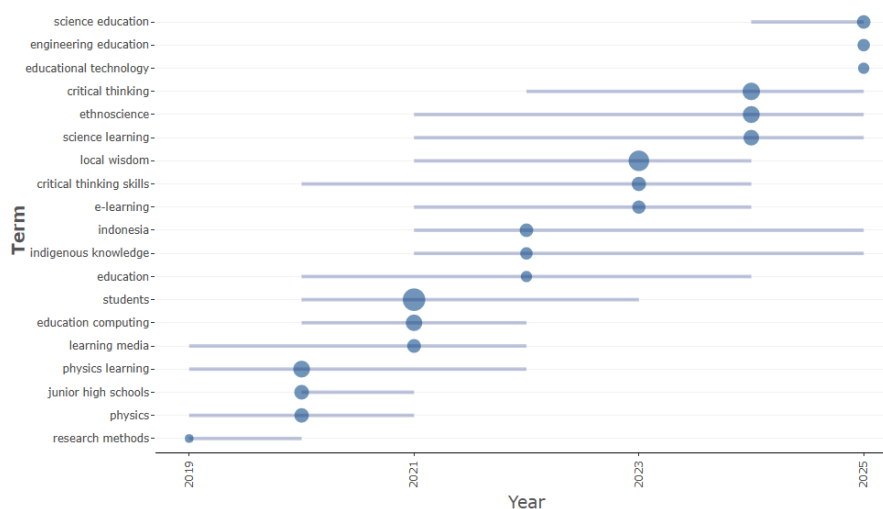


Figure 4. Annual research trends

Figure 4 shows research trends by keyword per year. The results show a research trend with the keyword “Local Wisdom” in 2023. In 2024, the keyword “ethnoscience” became a

trending research topic. This shows that research on local wisdom has developed into ethnosience research. The development of local wisdom research into ethnosience is based on the education curriculum that uses the era of society. This is evidenced by the research of Hikmawati et al. (2021) and Suprpto et al. (2021) that local wisdom can be developed in science learning to become ethnosience, and this becomes the basis for the application of the society curriculum. In these results, there is no keyword for *pencak silat* in ethnosience, so further research can be conducted as a basis for innovation. Furthermore, it is necessary for authors to evaluate their expertise in ethnosience and local wisdom research.

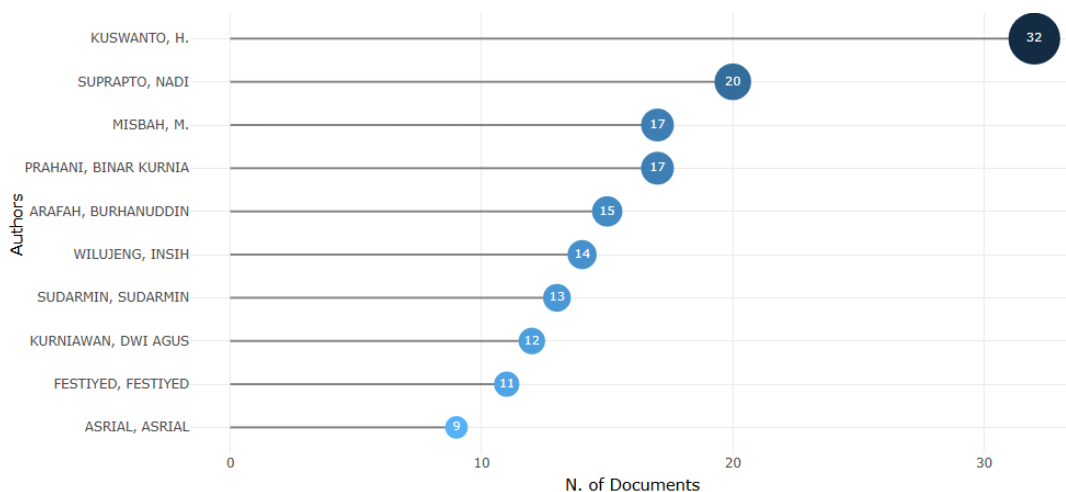


Figure 5. Top contributing authors

Based on Figure 5, the top three authors contributing to ethnosience research are Kuswanto H, Suprpto N, and Misbah M. Kuswanto H contributed 32 internationally published documents on ethnosience research. Furthermore, Suprpto N contributed 20 internationally published documents on ethnosience research. This shows that Kuswanto H and Suprpto N have expertise in ethnosience research. Through these statements, these authors can be trusted as reputable research reference sources.

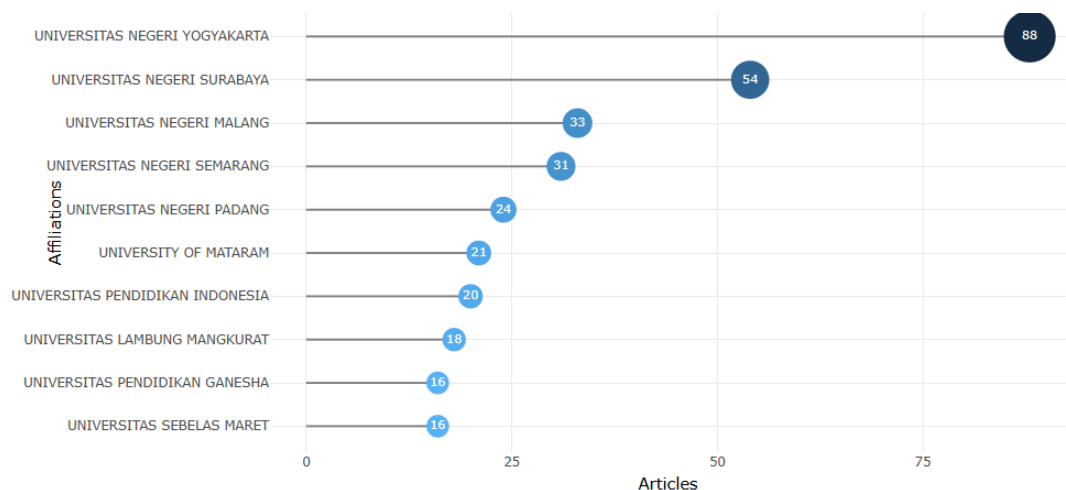


Figure 6. Top affiliate contributions

Figure 6 shows the top three affiliates conducting research on ethnosience, namely Universitas Negeri Yogyakarta, Universitas Negeri Surabaya, and Universitas Negeri Malang. Universitas Negeri Yogyakarta contributed 88 internationally published documents on ethnosience research. Universitas Negeri Surabaya contributed 54 internationally published documents on ethnosience research. This shows that these affiliations are productive in conducting research on ethnosience. Based on this statement, the affiliations that can collaborate in ethnosience research are Universitas Negeri Yogyakarta, Universitas Negeri Surabaya, and Universitas Negeri Malang.



**Table 2.** Average research citations

Year	Mean TCperArt	N	Mean TcperYear	Citable Years
2015	11.00	1	0.92	12
2016	8.50	2	0.77	11
2017	25.00	7	2.50	10
2018	14.56	16	1.62	9
2019	9.72	25	1.22	8
2020	6.53	43	0.93	7
2021	10.02	60	1.67	6
2022	10.82	49	2.16	5
2023	5.30	73	1.32	4
2024	2.85	117	0.95	3
2025	1.81	135	0.90	2

Description:

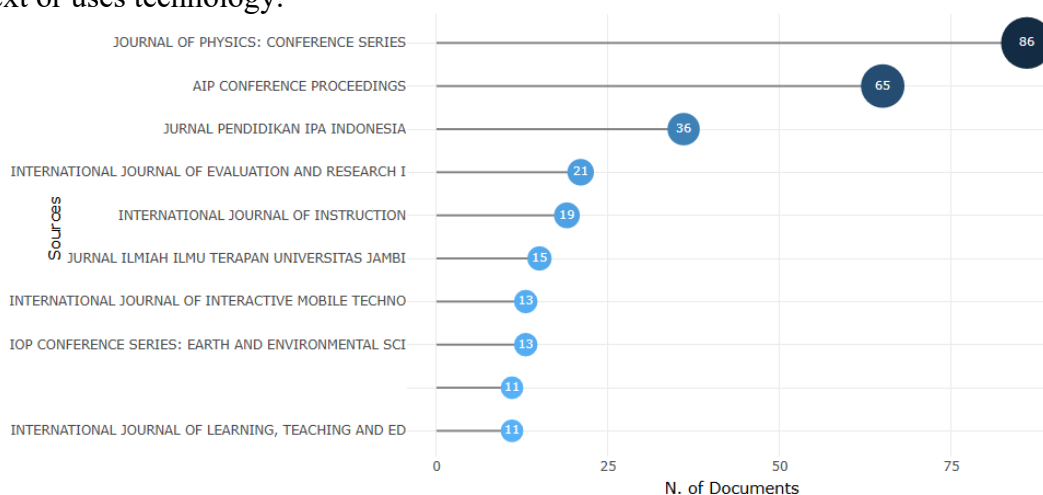
Mean TCperArt: Average citations per article

N: Number of documents

Mean TCperYear: Average citations per year

Citable Years: Number of years an article can be cited

Figure 8 and Table 2 show the citation opportunities for research on ethnoscience. Figure 8 shows that citations of ethnoscience research fluctuate. From 2017 to 2020, there was a decline in citations of ethnoscience research. In 2017, ethnoscience research had the highest number of citations compared to 2022. This was because in 2017, there was a need for innovation in learning that integrated culture. In 2025, the number of citations was low because the documents recorded were still new. This statement is evidenced by citable years, which means that in 2025 or the new year, there will only be a chance of 2 articles. Furthermore, in this context, ethnoscience research will have a great chance of getting citations if there is something new and unique. To get this opportunity, it is necessary to have something new that has a specific and unique field of focus, such as research that emphasizes a specific local context or uses technology.



**Figure 9.** Top productive journals

To further strengthen the results, data from reputable international journals is needed as a reference for research publications. Figure 9 shows that the Journal of Physics: Conference Series has 86 research documents on ethnoscience. Furthermore, for scientific publications in the form of articles/journals, the Jurnal Pendidikan IPA Indonesia has 36 documents. In this context, if you want to publish through a conference, then the Journal of Physics: Conference Series is the most likely option, while the scientific journal in the form of articles is the Jurnal Pendidikan IPA Indonesia. In this context, there is a 50:50 chance, because researchers who want to develop research on ethnoscience, especially in the context of local *pencak silat* wisdom, can do so through conferences or reputable journals. The greater the number of

documents owned by the article source, the greater the chance of publication in ethnoscience research article sources. In this context, it should be emphasized that researchers only provide information about opportunities. For the rest, in implementing a publication strategy, it is necessary to adjust the scope and focus of the target journal or conference.

### The Evolution of Research Development

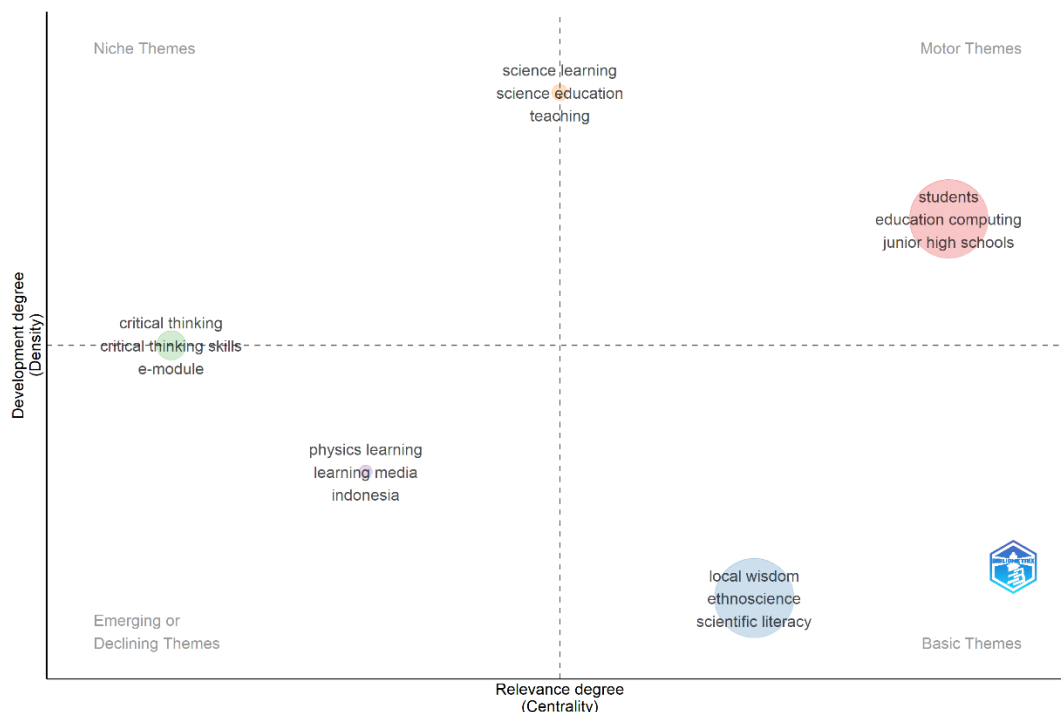


Figure 10. Thematic map

Figure 10 represents the thematic development of ethnoscience research. From Figure 10, there are several interesting points, namely that research on local wisdom and ethnoscience is highly relevant. Meanwhile, physics learning has seen significant development. The results show that there is a gap, as research on local wisdom and ethnoscience is relevant but there has been minimal development. Research on physics learning has seen significant development, but its relevance is small. In this context, there is a need to develop research that connects physics learning, local wisdom, and ethnoscience. These results prove that deeper innovation is needed in developing ethnoscience research. Furthermore, research on *pencak silat* does not appear in the thematic map, which means that there is still no relevance and development of such research. To combine these, future researchers can combine physics learning and ethnoscience in the context of *pencak silat*.

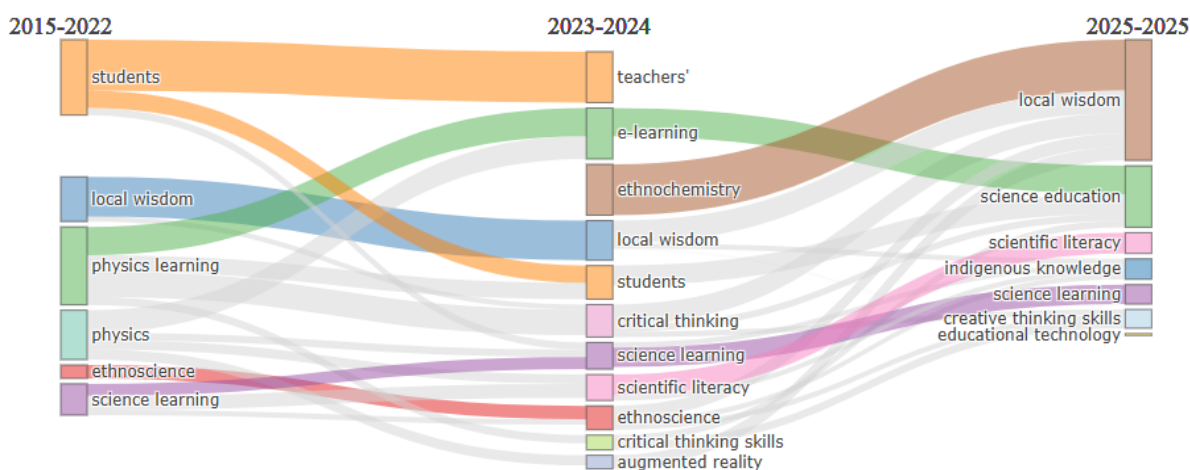


Figure 11. Thematic evolution

To deepen the research results, it is necessary to conduct thematic evolution research as represented in Figure 11. Figure 11 thematic evolution is divided into three years, namely 2015-2022, 2023-2024, and 2025. In 2015-2022, there were interesting findings, namely research with the keywords local wisdom, physics learning, and ethnosience. In 2023-2024, these three keywords developed into several branches. In 2023-2024, they developed into research on e-learning, ethnosience, and local wisdom. In 2025, it developed into local wisdom, science education, indigenous knowledge, and educational technology. For *pencak silat* research, through the results of thematic evolution, research and innovation can be developed by linking local wisdom, science education, indigenous knowledge, and educational technology. This is because these four keywords developed through the keyword ethnosience.

## DISCUSSION

The results obtained show that research on ethnosience from 2015 to 2025 is very trending. This is evidenced by Figure 3, which shows an increase in research documents each year. Ethnosience research is research that combines local culture with the concept of science in culture (Sari et al., 2023; Putra, 2021). Ethnosience research is related to the era of society, which emphasizes cultural integration learning (Cahyadi et al., 2025). Ethnosience is the basis for science learning that integrates local culture in accordance with curriculum guidelines. Furthermore, Figures 5 and 6 show the authors and affiliations that contributed to ethnosience research. Information about the contributions of authors and affiliations in research is used to identify relevant literature review sources (Snyder, 2024; Lim et al., 2022). Through information on relevant literature review sources, researchers can further develop research on ethnosience, especially on *pencak silat*, by evaluating previous research.

Ethnosience research, especially on the concept of *pencak silat* in physics education, has potential on an international scale. Figure 7 proves that research on *pencak silat* in ethnosience has never been conducted, thus providing a foundation for future researchers to conduct international-scale research. International-scale research prioritizes novelty in research that has not been previously conducted by earlier researchers (Ghosh & Wu, 2023). Furthermore, in the context of research citations, ethnosience still has great citation opportunities. Adding new elements to ethnosience research, such as *pencak silat* in ethnosience in physics education, will increase opportunities because it provides new information (Festiyed et al., 2024). Moreover, conducting ethnosience research, especially focusing on *pencak silat* in physics education, has the opportunity to be published in conferences and journals. This opportunity provides benefits for researchers who will conduct ethnosience development research on *pencak silat* in physics education in the future.

To further strengthen the results of future research opportunities, researchers need to be aware of developments and evolutions in ethnosience research, as shown in Figures 10 and 11. The findings show that ethnosience research is relevant, but has seen little development. The findings of ethnosience research are inversely proportional to those of physics learning research, where the development of physics learning is greater than its relevance. In this context, future researchers can conduct research on *pencak silat* in accordance with the ethnosience context in physics learning. New developments and innovations in research need to be adjusted to the relevance of current research trends, then combined with research that has already been developed (Antons et al., 2020). Furthermore, in 2025, ethnosience research evolved into the context of learning media. Therefore, future researchers can develop research related to *pencak silat* by developing learning media, especially in physics learning. This is supported by research by Fitria et al. (2025) and Damarsha et al. (2025) that the following year requires the development of learning technology that integrates ethnosience. This is evidenced by Figures 10 and 11, which show that the development of ethnosience has reached the stage of developing learning media. Therefore, it is important to add technological innovations, especially in ethnosience learning.

The limitations of this study lie in the year of bibliometric analysis and the fact that it does not fully prove that *pencak silat* is an opportunity. This is because the keyword *pencak*

silat used by researchers in the query string is related to the keyword ethnoscience. Furthermore, this study is limited to providing bibliometric analysis as a preliminary study for future research. There is a need for the development of technology that is integrated with local wisdom, as evidenced by Figures 10 and 11. This development is aimed at producing innovative learning that integrates local cultural values (Ramli et al., 2025; Barak & Yuan, 2021). In this context, the researcher is also limited in providing the research methods that need to be carried out for further research in the development of innovative research that is integrated with culture.

This study provides findings on trends, contributions, opportunities, and developments in ethnoscience research on *pencak silat* in the context of physics education. The findings indicate that ethnoscience research is still relevant, but further development is needed. In this context, if future researchers want to conduct new research by adding the context of *pencak silat*, especially in physics learning, they will have great opportunities. This is because there has been no international research that further discusses the concept of *pencak silat* in ethnoscience, especially in physics learning. This study hopes to have an impact on cultural preservation, especially through physics learning. This is relevant to the curriculum objectives, where current learning prioritizes local wisdom with the aim of preserving culture. Through this study, the researcher provides information on strategies and opportunities for developing further research in the context of ethnoscience, especially in physics learning.

## CONCLUSION

The results of this study can be concluded that research using the Scopus database search “TITLE-ABS-KEY (Pencak Silat OR Local Wisdom AND Physics Learning OR Ethnoscience)” has increased every year. This shows that ethnoscience is trending and relevant for further development. The results show that Kuswanto H and Suprpto N are authors who have contributed to ethnoscience research by contributing more than 20 research documents. The contributing affiliations are Universitas Negeri Yogyakarta and Universitas Negeri Surabaya, which have contributed more than 50 ethnoscience research documents. There are greater opportunities for conducting ethnoscience research because this research is still relevant and needs further development. There are still opportunities for publication in journals and conferences, so future researchers who wish to develop this further can publish their work in journals and conferences. If future researchers want to develop the context of local pencak silat wisdom, this can be done as an opportunity for research on physics learning content and the use of technology as a learning medium. This is because the development of the times requires advanced technology as a medium for ethnoscience learning. This study hopes to have an impact on cultural preservation, especially through physics education. This is relevant to the curriculum objectives, which prioritize local wisdom with the aim of preserving culture. Through this study, the researchers provide information on strategies and opportunities for developing further research in the context of ethnoscience, especially in physics learning.

## RECOMMENDATION

This study is limited to the results of bibliometric analysis using a database covering a period of 10 years. In addition, this study is limited to providing information on opportunities using the Scopus database, so it is necessary to compare other databases as a reference. Further research is recommended to observe the concept of *pencak silat* in ethnoscience as physics learning. This aims to provide a source of information that strengthens research and development of *pencak silat* in ethnoscience as physics learning.

## ACKNOWLEDGMENT

The authors would like to express their sincere gratitude to the Universitas Negeri Surabaya, for the academic support provided during the preparation of this manuscript. The authors also thank all parties who contributed valuable insights to the development of this study on ethnoscience, pencak silat, and physics education.

## FUNDING INFORMATION

This research received no external funding

**AUTHOR CONTRIBUTIONS STATEMENT**

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Putri Rusmila	✓					✓								
Nadi Suprpto	✓	✓												
Suliyannah		✓		✓										
Hasan Nuurul										✓				
Hidaayatullaah														
Adrian Bagus									✓					
Damarsha														
Azar Zakaria			✓								✓			
Meydiana Arnyan Putri					✓	✓								

**CONFLICT OF INTEREST STATEMENT**

Authors state no conflict of interest

**DATA AVAILABILITY**

Data availability is not applicable to this paper as no new data were created or analyzed in this study.

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