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Literature Review of Research Trend of Ethnoscience-Infused Teaching Materials in Elementary IPAS Learning in 2020-2025

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Abstract

The rapid development of the times, including in the world of education, requires innovation in learning. One of the innovations that can be made is related to teaching materials and collaborating with ethnoscience. Ethnoscience is a learning that integrates culture into it as part of the learning process. The writing of this article aims to find out the research trends of ethnoscience-laden teaching materials in IPAS subjects in elementary schools. The research method used is a systematic literature review (SLR). The analysis was conducted on 15 articles indexed by Google Scholar from 2020 to 2025. The results showed that (1) The trend of research on ethnoscience-based teaching materials continues to increase every year, (2) The university that conducts the most research on ethnoscience-based teaching materials is Mataram University, (3) The learning model applied in the research is problem-based learning (PBL) and project-based learning (PjBL), (4) There are various cognitive abilities of students that can be developed with ethnoscience-loaded teaching materials, (4) IPAS material that dominates in research is human digestion material, heat transfer, and motion and force, (5) Making ethnoscience-loaded teaching materials is developed through various applications or software.

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INTRODUCTION

The rapid development of the times requires various aspects to develop. One of the developments that must be made is in the realm of education. Education is one of the multiple components and is very important in human life (Bararah, 2020; Prasadi et al., 2020). Education is an important aspect that must be instilled in individuals early on. According to (Annisa, 2022; Arifin, 2022; Kurniawan et al., 2022), education is an activity or individual experience to develop various innate physical and mental potentials to obtain results or achievements carried out throughout life. Education is a powerful weapon that every individual can own to help them solve problems through various knowledge and skills (Anjani et al., 2023; Machmud et al., 2021). This is in line with Undang-Undang No.20 tahun 2003 concerning the National Education System, namely "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state".

Based on the contents of the law, it can be said that forming quality human beings can be done through education. The implementation of education certainly has specific objectives. In order to achieve maximum educational goals, it is necessary to implement a good learning process as well (Muharnis & Fadriati, 2023). To achieve the expected goals, the learning process must be student-centered, not teacher-centered (Lufungulo et al., 2023; Noh & Karim, 2021; Uli et al., 2025). In addition, teachers must try to create learning that is interactive, creative, innovative, fun, and challenging. This is so that students, as the nation's next generation, can be encouraged to follow the learning as well as possible.

Many components can support the learning process at school. One is the existence of teaching materials, one of the learning resources. This component is one of the many important components needed to achieve learning objectives. Teaching materials are a set of tools or means used to support the learning process, which contains material, methods, or others that are packaged in an organized, complete, and attractive manner to achieve the expected learning objectives (Cahyadi, 2019; Magdalena et al., 2020). Teaching materials aim to facilitate the process of transferring knowledge from teachers as educators to their students (Lastri, 2023; Shakinah & Apriani, 2024).

Along with the rapid development of technology, it also indirectly requires adaptation of developments in the learning process in the classroom (Akbar & Noviani, 2019; Setyaningsih, 2023). To respond to this technological development, the development of teaching materials utilized in the learning process has been carried out. One of the new things discussed is the integration of ethnoscience in teaching materials or other components. Ethnoscience is a form of breakthrough or the latest innovation in the world of education that integrates environmental material (science) with local culture (Aza Nuralita, 2020; Oktaviana et al., 2024). Ethnoscience makes it easier for students to understand the subject matter because what they learn has been observed or done in everyday life (related to their culture) (Rahmawati et al., 2019).

The development of the times also requires changes in the education curriculum that must adapt to developments. This also happened in Indonesia, where the Merdeka Curriculum is currently implemented. In implementing this curriculum, there are several changes, one of which is in science and social studies subjects at the elementary school level. Currently, the science and social studies subjects taught in elementary schools are integrated into one unit, namely into Natural and Social Sciences (IPAS). The purpose of combining these two subjects is to build students' awareness of the surrounding environment, both natural and social environments, and as a form of strengthening the profile of Pancasila students (Karengga et al., 2025; Septiana, 2023; Wijayanti & Ekantini, 2023). The existence of this relatively new merger certainly presents various challenges for both

teachers and students. Therefore, an alternative is needed to overcome these challenges. One alternative solution that can be taken is to develop innovative teaching materials to help improve students' understanding of the material that has been or will be learned.

Researchers have often conducted Research on the development of ethnoscience-laden teaching materials in elementary school IPAS subjects. For example, research shows that ethnoscience-based teaching materials can support implementing the teaching and learning process on environmental pollution materials. This is in line with the research of Rahmi & Karma (2024b), suggesting that ethnoscience-based modules are said to be very feasible and practical to be implemented in IPAS learning. Another study by Ningsyih et al. found that ethnoscience-based IPAS teaching materials can encourage students to think creatively. This is also supported by research (Dewi et al., 2024a), which shows that the application of teaching materials integrated in the Project-Based Learning (PBL) model with ethnoscience content affects increasing students' ability to think creatively.

Several studies found that the teaching materials that teachers usually use tend to be less innovative and do not encourage students' interest in learning. In addition, it is not uncommon for teaching materials available in schools to be very limited or only rely on teaching materials from the Ministry of Education and Research. Then, often in schools, it is still found that science and social studies subjects are taught separately or unrelated. This will undoubtedly result in students not understanding the merger between science and social studies subjects. Therefore, a novelty is needed to help teachers and students integrate or link science and social studies subjects according to the mandate of the Merdeka Curriculum, which is packaged as interestingly as possible to help the learning problems experienced today.

This study aims to determine the research trend of ethnoscience-laden teaching materials for IPAS learning in elementary schools in the 2020-2025 range. Then, this research is expected to help provide information related to research trends in ethnoscience-loaded teaching materials in IPAS learning in elementary schools for readers.

METHOD

This article was prepared using the systematic literature review (SLR) method. Literature review is a method carried out through several stages, such as identifying, reviewing, interpreting, and evaluating research focusing on research topics (Valencia et al., 2022).

The identification stage was done by searching the Publish or Perish (PoP) software by writing the keywords "Ethnoscience Teaching Materials". The search was limited to 500 Indonesian and English articles published within the last five years, between 2020 and 2025. PoP search results obtained 500 articles indexed by Google Scholar. Furthermore, articles were eliminated based on relevant titles and abstracts, resulting in 72 articles. Then, 40 articles were found that entered the appropriate criteria for analysis. Of the 40 articles, it was found that 25 articles had a subject focus that was not IPAS, so only 15 articles remained that were by the research trend of ethnoscience-loaded teaching materials on IPAS learning in elementary school. The stages of searching for articles that match the research trend can be seen in Figure 1.

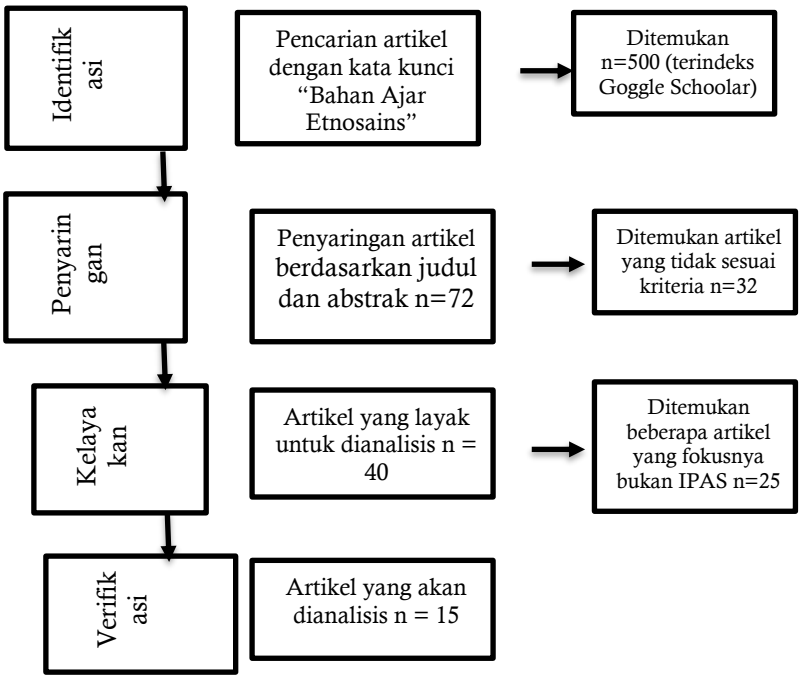

Figure 1. Article Search Stage

Based on the data of journal articles obtained, it can be seen that the period of research publications on ethnoscience-loaded teaching materials for IPAS learning in elementary schools from 2020 to 2025 is shown in Figure 2.

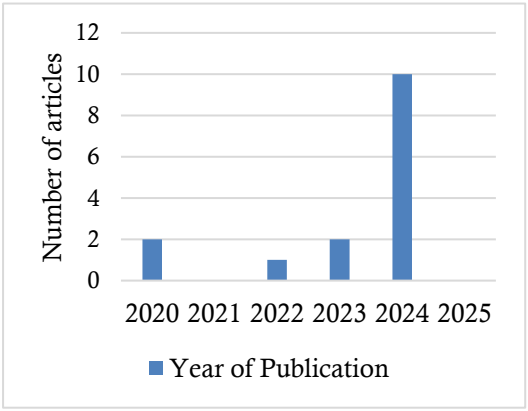

Figure 2. Graph of Research Publications on Ethnoscience-Laden Teaching Materials in Elementary IPAS Learning

Based on the articles analyzed, several universities/agencies in Indonesia contribute to conducting research related to ethnoscience-loaded teaching materials in elementary school IPAS learning. The university data is presented in Figure 3.

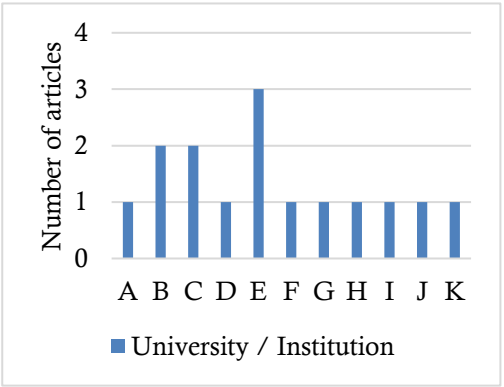

Figure 3. Graph of the University of Origin of Research Articles on Teaching Materials with Ethnoscience Content in IPAS Learning

The information related to the name of the university/institution of origin of the analyzed article is presented in Table 1.

Table 1. Description of the Graph of the University / Institution of Origin of the Article

University / Institution	Code
University Buana Perjuangan Karawang	A
Semarang State University	B
Surabaya State University	C
Padang State University	D
Mataram University	E
Pancasakti University Tegal	F
PGRI Madiun University	G
Sriwijaya University	H
STKIP Singkawang	I
STKIP Taman Siswa Bima	J
STKIP Citra Bakti	K

Four articles have the highest citations based on 15 research articles on ethnoscience-laden teaching materials for IPAS learning in elementary school. The data is presented in Table 2.

Table 2. Citation Chart of Research Articles on Ethnoscience-Laden Teaching Materials in Primary School IPAS Learning

No	Title	Citation
1	Development of Ethnoscience-Based Digital Pocketbooks in Elementary Schools in Singkawang City	44
2	Development of Ethnoscience-Based Learning Tools to Train Elementary School Learners' Science Literacy	14
3	Development of Ethnoscience-Based Teaching Materials on Integrated Thematic Learning in Grade V Elementary School	11
4	Development of Ethnoscience-Based Teaching Materials in Class V Elementary School	5
5	Ethnoscience-Based IPAS Learning for Understanding Science Concepts for Class IV Students of UPTD SDI Waruwaja	3

RESULTS AND DISCUSSION

Publication of Ethnoscience-Laden Teaching Materials Articles on Elementary IPAS Learning

Based on the search results for research articles on ethnoscience-laden teaching materials on elementary IPAS learning between 2020 and 2025, 15 journal articles were found. The articles found are articles published in journals that Google Scholar has indexed. As presented in Figure 2, the trend of research on ethnoscience-loaded teaching materials in primary school IPAS learning has increased, especially in 2024, which has increased very rapidly from previous years. However, in 2021 and 2025, article searches through the Publish or Perish (PoP) application did not find any articles indexed by Google Scholar related to research on ethnoscience-loaded teaching materials for IPAS learning in elementary schools.

The results of data analysis that have been carried out can be seen in Figure 3, which shows that Mataram University is a university that researches ethnoscience-loaded teaching materials in elementary school IPAS learning, namely, as many as three articles. Research on ethnoscience-laden teaching materials in

elementary IPAS learning is only spread in several provincial areas, including East Java, Central Java, West Sumatra, South Sumatra, West Nusa Tenggara, and East Nusa Tenggara. Therefore, through this literature review activity, it is hoped that it can provide an overview for readers to be interested in applying the research in their learning process.

Furthermore, Table 2 shows that the research conducted by Sulistri et al. (with the title "Development of Ethnoscience-Based Digital Pocketbooks in Elementary Schools in Singkawang City") has the highest citation, namely a total of 44 citations. This article discusses how developing ethnoscience-based digital pocketbooks in science subjects is interesting and feasible for grade V students in Singkawang City to utilize to make it easier to understand heat and its transfer material.

Development of Ethnoscience-Laden Teaching Materials in Elementary IPAS Learning Integrated Learning Model

Based on the 15 articles analyzed, one research article on ethnoscience teaching materials developed using the project-based learning (PjBL) learning model and 1 article developed with the problem-based learning (PBL) model were found. Implementing learning models can help increase interest, activity, creativity, motivation, and the effectiveness of the learning process. Below is presented Table 3, which illustrates the learning model implemented in the development of ethnoscience-laden teaching materials in elementary IPAS learning.

Table 3. Learning Model in Ethnoscience-Infused Teaching Materials in Elementary IPAS Learning

Learning Model	Author
PjBL	(Dewi *et al.*, 2024b)
PBL	(Amalina *et al.*, 2024)

Ethnoscience teaching materials developed using the Project-Based Learning (PBL) model have been proven effective in encouraging the improvement of students' creative thinking skills in the aspects of flexibility, elaboration, fluency, and originality (Dewi et al., 2024a; Rofikoh & Farisi, 2024). The involvement of students in the project will make it easier for them to understand the concept of material that has been previously learned. In PjBL learning, students will be involved in solving problems, constructing their knowledge, creating a product to solve problems, and being allowed to present it in front of their friends. Another benefit of integrating project-based learning models is developing students' analytical abilities, critical thinking, communication, cooperation, and 21st-century skills (Fitriyah & Ramadani, 2021; Musa'ad et al., 2024). Developing ethnoscience teaching materials based on the Problem-Based Learning (PBL) model is a learning approach that focuses on orienting students. This learning model encourages students to solve problems often experienced in real life (Amalina et al., 2024). This is because the PBL learning process will focus on presenting a problem in real or simulated form to students. Furthermore, students will be encouraged to find a solution to the problem through various research series connected to the theory or concepts of science that have been learned.

Analysis of the Development of Ethnoscience-Charged Teaching Materials in Elementary IPAS Learning

Based on 15 articles on research on ethnoscience-charged teaching materials in IPAS subjects in elementary schools, they are carried out to develop students' cognitive aspects. Students' various abilities in the cognitive aspects developed are presented through a pie chart in Figure 4.

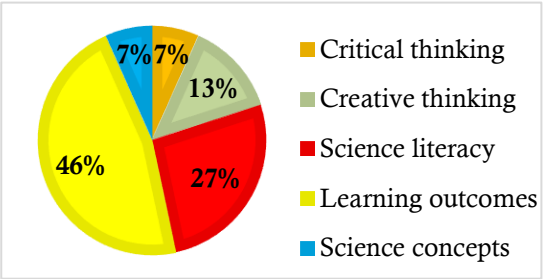

Figure 4. Learners' Ability in Cognitive Aspects

Research conducted by Amalina et al. (2024) shows that the results can encourage the improvement of students' ability to think critically. Research conducted by Dewi et al. (2024a) and Ningsyih et al. showed results that improved creative thinking skills. Research conducted by (Gudesma, 2024; Kriswanti et al., 2020; Yulianti et al., 2023; Zumaroh et al., 2024) showed results to improve science literacy skills. Research conducted by (DS et al., 2024; Liza Ayu Anggriani et al., 2024; Melawati & Istianah, 2022) shows data that can improve student learning outcomes. The research (Dhoka et al., 2024) showed results that improved understanding of science concepts.

Based on the diagram presented in Figure 4, students' abilities can be developed through ethnoscience-based teaching materials for IPAS subjects in elementary school. These results show that improving learners' learning outcomes and science literacy skills is the most done in research on ethnoscience-based teaching materials for IPAS subjects in elementary school. This is due to the low learning outcomes of students, which are below the established KKTP, and low science literacy due to the non-optimal utilization of teaching materials (Yunita, 2025). So, based on the research that has been done, the existence of ethnoscience-loaded teaching materials in this IPAS learning is one of the right solutions to improve students' learning outcomes and literacy skills.

IPAS Subject Matter Used in the Development of Ethnoscience-Infused Teaching Materials

Based on 15 research articles related to ethnoscience-fueled teaching materials that have been analyzed, it was found that the use of various subject matter in the subject of WWIAS in elementary schools. The distribution of various IPAS materials used as subject matter in the article is presented in Table 4.

Table 4. IPAS Materials in Ethnoscience-based Teaching Materials

Author	Material
(Kriswanti *et al.*, 2020)	Human digestion
(Lestari *et al.*, 2024)	
(Melawati & Istianah, 2022)	Ecosystem
(Liza Ayu Anggriani *et al.*, 2024)	Components of substances
(Yulianti *et al.*, 2023)	Local culture
(Ningsyih *et al.*, 2024)	Force
(DS *et al.*, 2024)	Natural Resources
(Dhoka *et al.*, 2024)	Functions and Benefits of Local Wisdom
(Dewi *et al.*, 2024a)	Heat Transfer
(Sulistri *et al.*, 2020)	
(Amalina *et al.*, 2024)	Biodiversity
(Gudesma, 2024) (Rahmi & Karma, 2024a)	Motion and Force
(Zumaroh *et al.*, 2024)	Forms of substances and their changes
(Fauzana Nelmi & Risda Amini, 2023)	Thematic

The existing subject matter in IPAS learning in elementary schools is quite a lot found in applying ethnoscience-charged teaching materials. This is because students will find it easier to find events they usually encounter in their environment, making it easier for students to understand the material they are learning. At least 15 journal articles were found that used IPAS subjects in elementary school in their research. The most common material found was material about human digestion, heat transfer, motion, and force.

Applications used in the Development of Ethnoscience-Infused Teaching Materials in Elementary IPAS Lessons

Based on the analysis of 15 research articles on ethnoscience-based teaching materials in elementary IPAS subjects, there are various variations in the applications used to develop them. The description of the data is presented in Table 5.

Table 5. Applications Used in the Development of IPAS Ethnoscience Teaching Materials

Author	Application
(Gudesma, 2024; Liza Ayu Anggriani *et al.*, 2024; Rahmi & Karma, 2024b; Yulianti *et al.*, 2023; Zumaroh *et al.*, 2024)	Canva
(DS *et al.*, 2024)	Book creator and Canva
(Lestari *et al.*, 2024)	CorelDRAW X7, FastCapture, Adobe Audition CS6, Adobe Media Encoder CS 6, Format Factory, Adobe Photoshop, Graph Editor, SublimeText 3
(Sulistri *et al.*, 2020)	Adobe Photoshop CS6, Adobe Acrobat Reader DC, and Microsoft Word 2010

A total of 15 research articles were analyzed, and there are at least six research articles on ethnoscience-based teaching materials in elementary IPAS subjects that do not detail the application or platform used in developing teaching materials.

Making ethnoscience-based teaching materials does not require using applications or software that is easy to use. In addition, making this teaching material also requires a long time and a long process. Nevertheless, using the application or software can produce quality teaching materials and attract attention. However, the resulting product in the form of ethnoscience-loaded teaching materials can provide convenience for its users, especially teachers and students. Some of these ethnoscience teaching materials are also designed to be accessed wherever and whenever we want. For example, teaching materials using digital media such as Canva can be accessed online or offline on mobile phones. This cellphone will undoubtedly make it easy for teachers and students to access teaching materials flexibly, anywhere, anytime, and at no cost.

Based on some of the research results that have been analyzed, the use of ethnoscience-loaded teaching materials can positively impact the learning process in the classroom. Teaching materials with ethnoscience content will provide new experiences for students because the content presented is exciting and has various illustrations or images. This attractive appearance also encourages students to play a more active role in learning to understand better the concepts being studied. Therefore, using ethnoscience teaching materials provides an opportunity to improve or develop various cognitive aspects in students.

CONCLUSION

Based on the trend of research related to ethnoscience-loaded teaching materials in IPAS subjects, it can be concluded that this research has increased yearly. The university that conducted the most research on ethnoscientifically charged teaching materials in IPAS learning was Mataram University. The learning model integrated in ethnoscience teaching materials is project-based learning (PBL) and problem-based learning (PBL). Some cognitive abilities, such as critical thinking, creative thinking, learning outcomes, science literacy, and science concepts, are the dominant themes in ethnoscience-loaded teaching materials. The dominant IPAS materials raised in the research of ethnoscience-loaded teaching materials are human digestion, heat transfer, and motion and force. Ethnoscience teaching materials are developed through various

applications or software, such as Canva, Adobe Photoshop, CorelDRAW, and others.

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