Intenational Conference on Emerging Trends on Science Education
30 September – 02 oktober 2024
Pekanbaru-Riau, Indonesia

Ethnoscience-Based Teaching Materials in Junior High School Science Learning: A Literature Review

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ABSTRACT. Ethnoscience basically focuses on the worldview of indigenous people through various social and natural phenomena that are perceived and classified. The purpose of this research is to identify and analyze studies relevant to Ethnoscience-Based Teaching Materials in Junior High School Science Learning. This research uses the systematic literature review method by following the PRISMA guidelines. The data analysis technique involved collecting, organizing and synthesizing the literature to identify the main themes in related research. The result of the study was that the dominant research method was Research and Development (R&D), followed by experimentation and descriptive qualitative. The class that was most often the subject of research was class VII, indicating the focus of learning development at that level. Science modules are the most commonly used form of ethnoscience-based teaching materials, implying a tendency to utilize print media in learning. So it can be concluded that the dominant research on ethnoscience-based teaching materials in junior high school science uses the R&D method, focusing on grade VII and science modules as the main media.

Keywords: *ethnoscience, natural science, junior high school.*

INTRODUCTION

Education is a journey towards maturity through teaching and learning to change attitudes and behaviors in order to develop potential holistically, including spiritual strength, intelligence, morals, personality, and skills in community life (Irawati & Susetyo, 2017). Education is a process to influence learners to adapt to their environment optimally, so that it can produce changes in themselves (Mardianti, 2020).

One strategy to improve the quality of learning is to utilize elements of local culture in the learning process (Subekti & Fibonacci, 2014). Ethnoscience essentially focuses on the worldview of indigenous people through various perceived and classified social and natural phenomena. Furthermore, ethnoscientific studies inclusively pivot on cultural aspects. Culture is understood as the classification of people in society (Roth, 2019; Sturtevant, 2019). Ethnoscientific knowledge is valid ecological knowledge that is "similar to knowledge gained through systematic scientific research" (Chandler, 1994).

Science learning becomes a means for students to understand themselves and the surrounding environment, so that they have the opportunity to apply this knowledge in everyday life more broadly (Panjaitan, 2017). The learning approach focuses on direct experience in various concepts of chemistry, physics, biology and earth-space to improve competence, so that students can scientifically explore and understand the surrounding environment (Aini, 2021; Ilhami et al., 2021).

Some research on Ethnoscience-Based Teaching Materials in Natural Science Learning to improve the understanding of junior high school students in learning Natural Science. This systematic literature review aims to develop a stronger concept, based on empirical research that has been conducted previously. In this study, researchers will identify and analyze studies relevant to Ethnoscience-Based Teaching Materials for Junior High School Science Learning.

METHODS

This study uses a systematic literature review method following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines. This method focuses on reviewing clearly formulated questions, using systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyze data from existing studies included in the review (Moher et al., 2010).

This review consists of several steps, namely: (a) Developing Background and Objectives; (b) Research Questions; (c) Literature search; (d) Selection Criteria; (e) Practical Screening; (f) Quality Checklists and Procedures; (g) Data Extraction Strategies; (h) Data Synthesis Strategy (Fitriyani, 2021).

In the context of this systematic review, the author obtained articles using Google Schoolar as a search source. The literature search is relevant to the topic of the research, namely "Ethnoscience-Based Teaching Materials for Junior High School Science Learning". After the search, the author listed these articles based on the research topic, so that the author found a total of 15 articles to be included in the meta-analysis.

In the first instance, the selection of articles to be included or analyzed in a literature review requires inclusion and exclusion criteria (Hidayat & Hayati, 2019). The results of the data search with the inclusion criteria are used by the writer to analyze the article. The inclusion and exclusion criteria in this paper are shown in Table 1.

Table 1. Inclusion and exclusion

Inclusion Criteria	1) Research articles published in 2014-2024. 2) Research topics include ethnoscience-based teaching materials and science learning. 3) The research subjects are generally junior high school students.
Exclusion Criteria	1) Research articles that cannot be accessed in full. 2) Literature from the scholarly web.

After identifying the inclusion and exclusion criteria, the next step is to select the articles to be reviewed(Hadi et al., 2020). This is a chart of the process of selecting an article as shown in Figure 1.

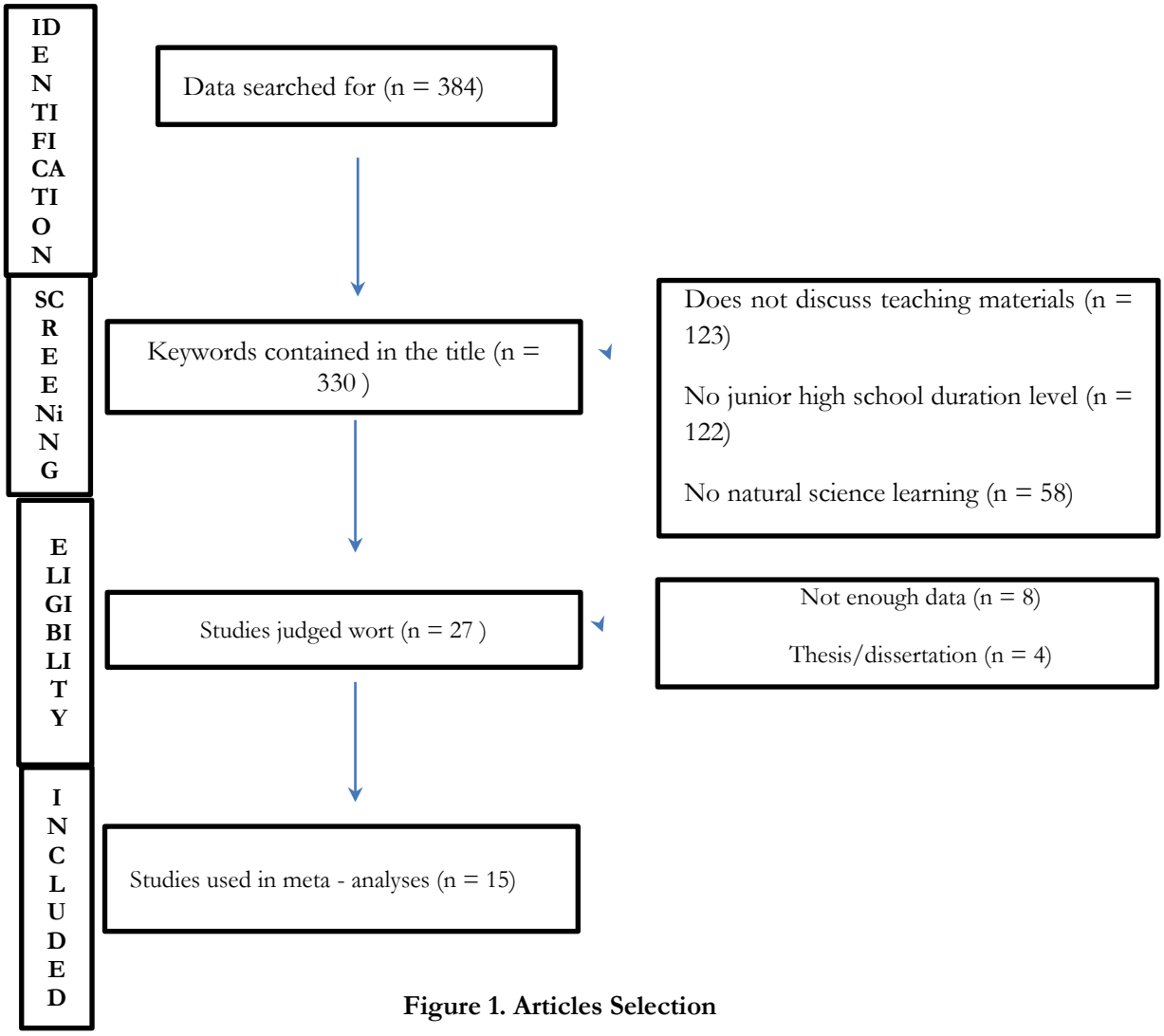

Figure 1. Articles Selection

RESULT AND DISCUSSION

The ethnoscience approach focuses more on achieving a holistic understanding rather than just a deep understanding (Yustiqvar, 2019). Students learn to relate the lessons they receive in the classroom to situations they experience on a daily basis, while understanding the relationship between science and technology. Ethnoscientific knowledge is derived from a heritage of beliefs passed on from one generation to the next (Sani, 2021).

Ethnoscience-based learning involves guiding learners in discovering and building their own knowledge by using the knowledge that is unique to a society (Fauzana Nelmi & Risda Amini, 2023). Therefore, the need for teaching materials in the ethnoscience approach is important because it aligns learning with the social and cultural context of students, encourages recognition of knowledge diversity, develops critical thinking skills, and allows for more authentic culture-based assessments.

After searching for articles through google scholar, 15 clinical articles published between 2016-2024 were found, which are analyzed in Table 2.

Table 2: Characteristics of the Analyzed Articles

No.	Authors & Years	Methods	Class	Shape of Teaching Materials
1.	(Lubis et al., 2021)	R & D	VII	Natural Science Module
2.	(Sari et al., 2021)	R & D	VII	Science Learner Worksheet
3.	(Febriati et al., 2021)	R & D	IX	Natural Science Module
4.	(Puspaningtyas, 2018)	R & D	VII	Natural Science Textbook
5.	(Dwipayana, 2024)	R & D	VII	Natural Science E-Module
6.	(Ahmadi et al.,2016)	R & D	VII	Natural Science Textbook
7.	(M. N. Putri et al., 2023)	R & D	VII	Natural Science E-book
8.	(Dinurrohmah et al., 2023)	Deskriptif kualitatif	VII	Natural Science Textbook
9.	(Nailiyah et al., 2016)	R & D	-	Natural Science Module
10.	(Siti Nur Ni'mah & ıkhdum Noor, 2023)	R & D	VII	Natural Science Module
11.	(Nabil et al., 2021)	R & D	VII	Natural Science Module
12.	(Handayani et al., 2022)	R & D	-	Science Learner Worksheet
13.	(Nihwan & Widodo, 2020)	Eksperimen	IX	Natural Science Module
14.	(M. R. Putri et al., 2023)	R & D	VIII	Natural Science E-Module
15.	(Aprila et al., 2021)	R & D	-	Natural Science E-Module

Based on the analysis results from Table 2. there are 15 articles that discuss ethnoscience-based teaching materials in junior high school science learning. The results of the analysis show that the research uses Research and Development, descriptive qualitative and experimental methods. The percentage of the use of research methods can be seen in Figure 2.

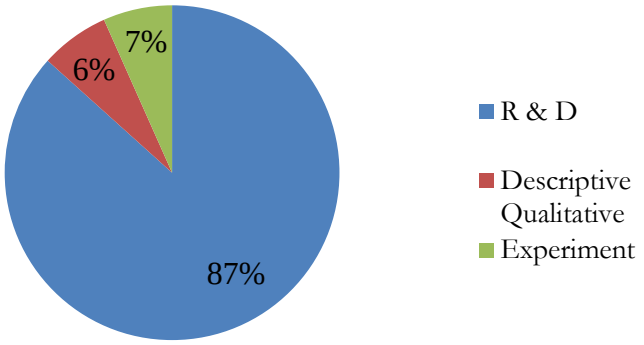

Figure 2. Research Methods

Based on Figure 2, it can be seen that the research method that is widely used is the Research and Development (R & D) method with a percentage of 84%. Then the experimental and descriptive qualitative research methods with a percentage of 7% and 6%, respectively.

Research and Development (R&D) is a research methodology that combines two approaches such as 1) research and 2) development to create innovative curriculum and learning. Meanwhile, experimentation according to Kerlinger (Setyanto, 2013) is a scientific study in which researchers set independent variables and observe their impact on the dependent variable to identify changes

that occur along with the setting of the independent variable. Based on Bogdan and Taylor (Waruwu, 2023), qualitative research is a research method that produces descriptive data in the form of written or oral narratives from participants and behavioral observations.

Research and development methods are often used in ethnoscience-based teaching materials in junior high school science learning because they enable the integration of local knowledge with scientific concepts, produce teaching materials that are more relevant to the students' context and encourage a deeper understanding of the relationship between science and local culture, which in turn can increase students' interest and engagement in science learning.

Furthermore, what can be analyzed from the findings of the article is the class that was used as the research target. The percentage of classes can be seen in Figure 3.

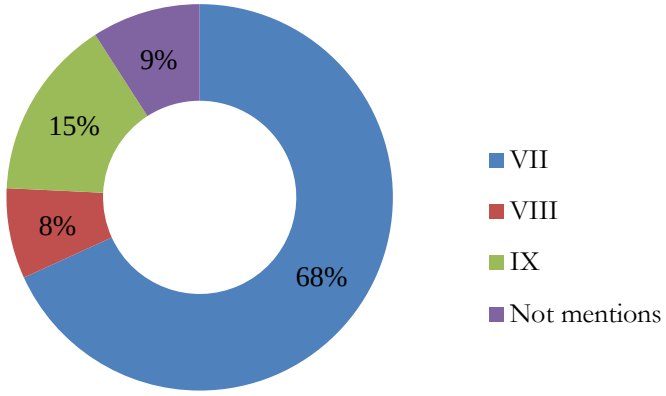

Figure 3. Class Data

Based on Figure 3. it can be seen that the class that is mostly used as a target in research is class VII with a percentage of 68%. Furthermore, class IX has a percentage of 15%. In the analysis there are also studies that do not have a target class with a percentage of 9%. Then the least class with a percentage of 8% is class VIII.

Ethnoscience-based teaching materials are often found in 7th grade junior high school science learning because at this level students begin to be introduced to basic scientific concepts related to everyday life and the surrounding environment. By integrating local and cultural knowledge in science learning, students can more easily understand the material, see the relevance between science concepts and their daily lives, and develop higher engagement and interest in learning. In addition, ethnoscience-based learning can also help strengthen students' cultural identity, increase awareness of local cultural heritage, and develop a sense of pride in their own culture.

Furthermore, there are several forms of ethnoscience-based teaching materials in the form of natural science modules, natural science e-modules, natural science textbooks, natural science e-books and science learner worksheets. The percentage of ethnoscience-based teaching materials can be seen in Figure 4.

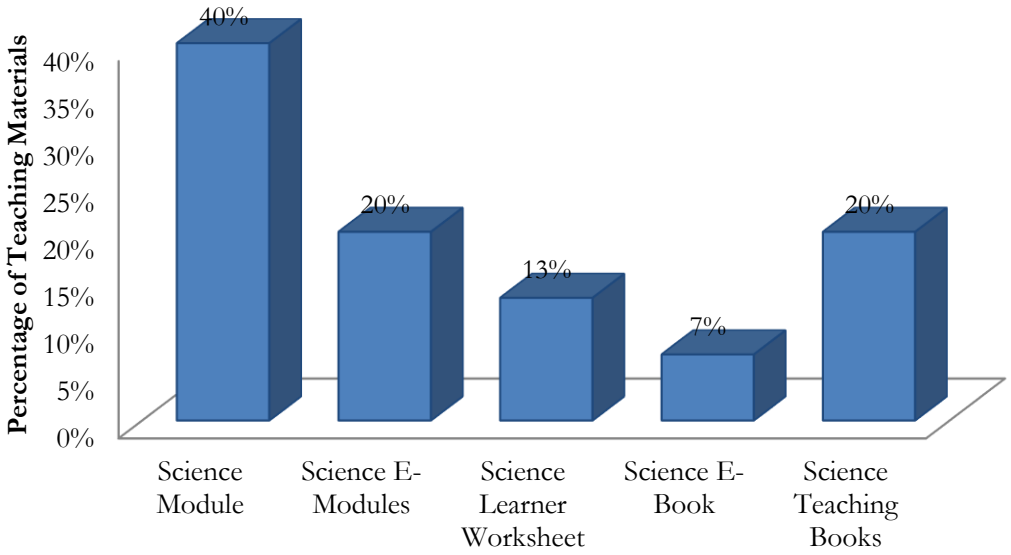

Figure 4. Shape of Ethnoscience-Based Teaching Materials

Based on Figure 4, it is known that the most widely used form of ethnoscience-based teaching materials is the science module with a percentage of 40%. Then Science E-Modules and Science textbooks have the same percentage of 20%. There are also Science Learner Worksheet and Science E-Books which have a percentage of 13% and 7% respectively.

Modules are tools or learning materials that are arranged systematically with the aim that students can learn independently or with teacher guidance. The module is designed in such a way that it is interesting and makes it easier for students to achieve the expected competencies in accordance with the learning objectives (Muldiyana et al., 2018). Learning modules, as learning aids, must be structured, interesting, and easy to understand. The advantage of modules lies in their ability to provide flexibility to students in learning independently. With the availability of modules, students can access learning materials anytime and anywhere according to student needs (Fatimah et al., 2017).

Meanwhile, E-modules according to (Wahidah et al., 2019) are learning materials based on information and communication technology (ICT). Learning materials based on information and communication technology (ICT) that have interactive nature due to ease of navigation, image display, video, and feedback through formative tests. feedback through formative tests. E-modules provide convenience in supporting students who need more time in understanding the material, because it can create a more effective and interesting learning environment for students. learning environment that is more effective and interesting for students (Inanna et al., 2021).

According to ((Halim, 2018) textbooks is a component of teaching materials that contains materials that are arranged systematically by experts to support the achievement of objectives. systematically by experts to support the achievement of learning objectives that have been designed. has been designed. One type of teaching material used in the learning process learning process is a textbook, which is included in the category of printed teaching materials (Halim, 2018). Utilization of utilization of textbooks can support teachers in delivering learning materials, so as to achieve the desired learning goals achieve the desired learning objectives (Suwarni, 2015).

Learner Worksheet is a tool that serves as a guide for facilitators in the learning process. as a guide for facilitators in the learning process. Learner Worksheet is developed by including material, instructions, and summaries that must be done by students, so as to help improve cognitive abilities. learners, thus helping to improve their cognitive abilities by providing the

necessary information providing the necessary information (Rahmawati, 2020). Learner Worksheet facilitate learners' understanding of the material and encourage active participation in active participation in learning through the tasks provided (Pawestri & Zulfiati, 2020).

Furthermore, there is an E-Book which is a digital document containing text, images, and other information presented in a computer or electronic file format (Ismail & Zainab, 2005). E-books are the result of modern technology that replaces traditional printed books. Its advantages include a smaller size and search features that facilitate access to information (Anwar Us & Mahdayeni, 2019).

The following is a trend based on the analysis of vosviewers shown in Figure 5.

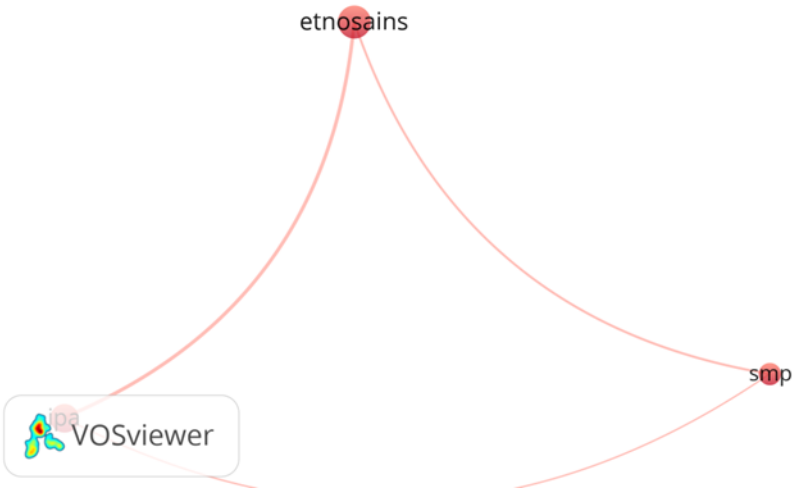

Figure 5. Problem Trend

The results of the VosViewer analysis confirm that there is a close relationship between the concepts of ethnoscience, Natural Science (IPA), and Junior High School (SMP). Emerging research indicates efforts to integrate aspects of local or ethnic culture in science learning at the junior high school level. This reflects a trend that aims to make science learning more relevant and engaging for students by utilizing their cultural context. In addition, the VosViewer results also reflect efforts in developing innovative teaching methods that integrate ethnoscience concepts with science learning in junior high school, as well as research on the effectiveness of ethnoscience-based learning approaches in improving the understanding of science concepts among junior high school students.

Based on the research results of the data analysis of 15 articles conducted by the systematic literature review method, several things can be concluded, namely: (1) Commonly used research methods are Research and Development (R&D), followed by experiments and descriptive qualitative; (2) Grade VII is the main target of research, followed by grade IX, while grade VIII is the least; (3) Ethnoscience-based teaching materials vary, including science modules, science e-modules, science textbooks, science e-books, and science LKPD; (4) Science modules are the most common form of teaching materials used in research; (5) The use of ethnoscience-based teaching materials shows considerable interest in the development of science learning at the junior high school level; (6) The results of the VosViewer analysis showed a significant relationship between the concepts of ethnoscience, natural science, and junior high school education level. This finding highlights the importance of integrating local culture in science learning in junior high school to create a more relevant learning experience for students.

CONCLUSION

Based on the analysis of 15 articles that discuss ethnoscience-based teaching materials in junior high school science learning, it can be concluded that the dominant research method is Research and Development (R&D), followed by experiments and qualitative descriptive. The class that is most often the subject of research is class VII, indicating the focus of learning development at that level. Science modules are the most commonly used form of ethnoscience-based teaching materials, implying a tendency to utilize print media in learning. The variation in the form of teaching materials indicates an effort to enrich students' learning experience through an ethnoscience-based approach. In conclusion, the use of ethnoscience-based teaching materials shows significant interest in the development of science learning at the junior high school level.

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