International Journal of Contextual Science Education
e-ISSN. 3046-8876
Vol. 4, No. 3, September 2026
pp. 117-123
https://jurnalpasca.unram.ac.id/index.php/ijcse/index

Science Education Management in Integrating Ethnoscience Values in School: Systematic Literature Review

Riska Dia Sapitri[1*]

[1]Master's Program of Science Education, University of Mataram, Mataram, Indonesia

*Corresponding author e-mail: riskasapitri18@gmail.com

Accepted: September 2th 2026, Approved: September 20th 2026, Published: September 30th 2026

Abstract— *This study aims to analyze the science education management model in integrating ethnoscience values in schools through a Systematic Literature Review approach based on the PRISMA 2020 framework. A total of 63 articles were identified from Google Scholar and Publish or Perish, then selected through the stages of identification, screening, and feasibility to produce 10 articles that were analyzed in depth using the PICOT framework. The results of the study indicate that integrating ethnoscience into science learning can improve students' scientific literacy, critical thinking skills, learning relevance, and ecological awareness. Local context-based learning strategies, especially the PBL and PjBL models, have proven effective in connecting scientific concepts with community cultural practices. However, the success of integration is greatly influenced by educational management that includes adaptive curriculum planning, strengthening teacher competencies through continuous professional development, and active collaboration between schools and local communities. In addition, the ethical principles of the 4Rs Respect, Relevance, Reciprocity, and Responsibility and the use of digital technologies such as AR/VR are important aspects in supporting the sustainable integration of local knowledge. Overall, this study confirms that effective, collaborative, and reflective science education management is key to the successful integration of ethnoscience into culturally relevant and sustainability-oriented science learning in the global and digital era.*

Keywords— Science Education, Management, Integrating Ethnoscience.
How to Cite— Sapitri, R.D. (2026). Science Education Management in Integrating Ethnoscience Values in School: Systematic Literature Review. *International Journal of Contextual Science Education*, *4*(3), 117-123. https://doi.org/10.29303/ijcse.v4i3.1870

1. Introduction

Science education is a crucial foundation for developing students' scientific literacy, enabling them to think critically, creatively, and engage in scientific behavior to face the challenges of the 21st century. In recent decades, science education in various developing countries, including Indonesia, has focused on the transfer of scientific concepts, isolated from the social and cultural contexts of students [1]. This condition causes the learning process to tend to be oriented solely toward memorization and cognitive achievement, thus providing little space for students to construct the meaning of science through real-world experiences. As a result, science is often viewed as "foreign" knowledge, far removed from their daily lives, and not reflecting the cultural realities and local practices with which they are familiar.[2] Therefore, a learning approach is needed that can bridge modern scientific concepts with the cultural realities of students, making science learning more contextual and meaningful.

The ethnoscience approach then emerged as an alternative strategy that places science within the context of a community's local culture, practices, and wisdom [3]. By using ethnoscience, students not only understand natural phenomena scientifically, but also through the values, traditions, and cultural practices that have been passed down from one generation to the next.[4], [5]. The integration of ethnoscience values in science learning has been proven to improve scientific literacy, critical thinking skills, and build students' awareness of the environment and their own cultural identity.[6].

The results of the study indicate that the integration of ethnoscience has not been effectively managed at both the institutional and class levels.[7]. Many science teachers still lack pedagogical competence in linking modern science with local knowledge [8]. School policies and curricula do not yet provide clear guidance on how to carry out this integration [9]. There are also limitations in the management of teacher training, context-based curriculum planning, and mechanisms for ongoing collaboration between schools and communities [10].

© 2026 The Author(s).
This article is published by International Journal of Contextual Science Education (IJCSE) and licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

From an institutional perspective, science education management plays a crucial role in overseeing the overall process of integrating ethnoscience. The planning, organizing, implementing, and evaluating functions of learning must be directed toward ensuring local community involvement and the sustainability of cultural values in science learning [11]. The curriculum design and community-based learning models implemented in Nigeria, South Africa, and the Philippines show that successful integration can only be achieved through participatory, adaptive, and collaborative ethics-based educational management [12].

The development of technology and the Society 5.0 paradigm also presents new opportunities for innovation in science learning, drawing on local wisdom [13]. The use of digital technologies, such as augmented reality (AR), mind mapping, and virtual laboratories, can enhance the scientific representation of local knowledge. Therefore, science education management must design learning strategies that focus not only on conceptual mastery but also on building epistemological bridges between modern science and local culture.[14], [15].

From these various research findings, it is clear that studies on the integration of ethnoscience into science learning and systematic assessments of the role and function of educational management in this process are still very limited. Yet, management is a key factor in the successful implementation of curriculum innovation and culture-based learning.[16], [17]. Through this systematic review, the research aims to map management models, implementation strategies, and policies that can strengthen local wisdom-based science learning practices sustainably in the global and digital era.

2. Method

This research method uses a systematic literature review approach based on the PRISMA 20 framework to collect, identify, and analyze articles related to science education management in integrating ethnoscience values in schools. The results of this study aim to map management models, strategies, and policy implications that support the integration of local wisdom in learning.

The literature search process was carried out through several main databases, namely Google Scholar and Publish or Perish, with keywords such as:

1. Science Education Management
2. Integration of ethnoscience
3. Local wisdom in science learning
4. School management based on ethnoscience
5. Management of science curriculum based on local culture

The selected articles ensure relevance and novelty, with a publication timeframe spanning a decade from 2015 to 2025.

The initial search yielded 63 articles related to the research title. The selection process consisted of three main stages. First, the identification stage screened titles and keywords to ensure their relevance to the research topic. Second, the screening stage reviewed abstracts to assess relevance to science education management and ethnoscience integration. Finally, the feasibility stage examined the full text to verify suitability. Finally, 10 articles were selected for in-depth analysis and synthesis.

Data synthesis was conducted using the PICOT (Population, Intervention, Comparison, Outcome, Timeframe) framework. Information collected included author names, year, country, research methods, management focus, integration strategy, and main results. A synthesis table was then created to identify emerging themes, including:

1. Management and leadership in science education.
2. Teacher competence and community involvement.
3. Collaboration-based curriculum design and policy.
4. Utilization of digital technology in the application of ethnoscience.

The following PICOT results are presented in Table 1. At the analysis stage regarding science education management and ethnoscience integration:

Table 1. Inclusion criteria based on PICOT elements

Elements	Information
P (Population)	Students (elementary–junior high school level), science teachers, and school management involved in ethnoscience integration.
I (Intervention)	Integration of ethnoscience values in science learning through educational management (planning, organizing, implementing, evaluating).
C (Comparison)	Conventional science learning models (without ethnoscience integration) and/or educational management without a local wisdom approach.
O (Outcome)	Improving scientific literacy, critical thinking skills, and the relevance of science learning to local culture.
T (Timeframe)	Studies published between 2015–2025.

The data in this systematic review were first searched and sorted using the PRISMA 2020 guidelines, starting from identification, screening, and determining eligibility, to determining which studies were ultimately analyzed. After relevant studies were obtained through the PRISMA process, the data were then analyzed using the PICOT framework, allowing each finding to be categorized based on population, intervention, comparator, outcome, and time span. Thus, PRISMA ensures a systematic and transparent study search and selection process, while PICOT ensures structured data analysis according to the focus of the research question

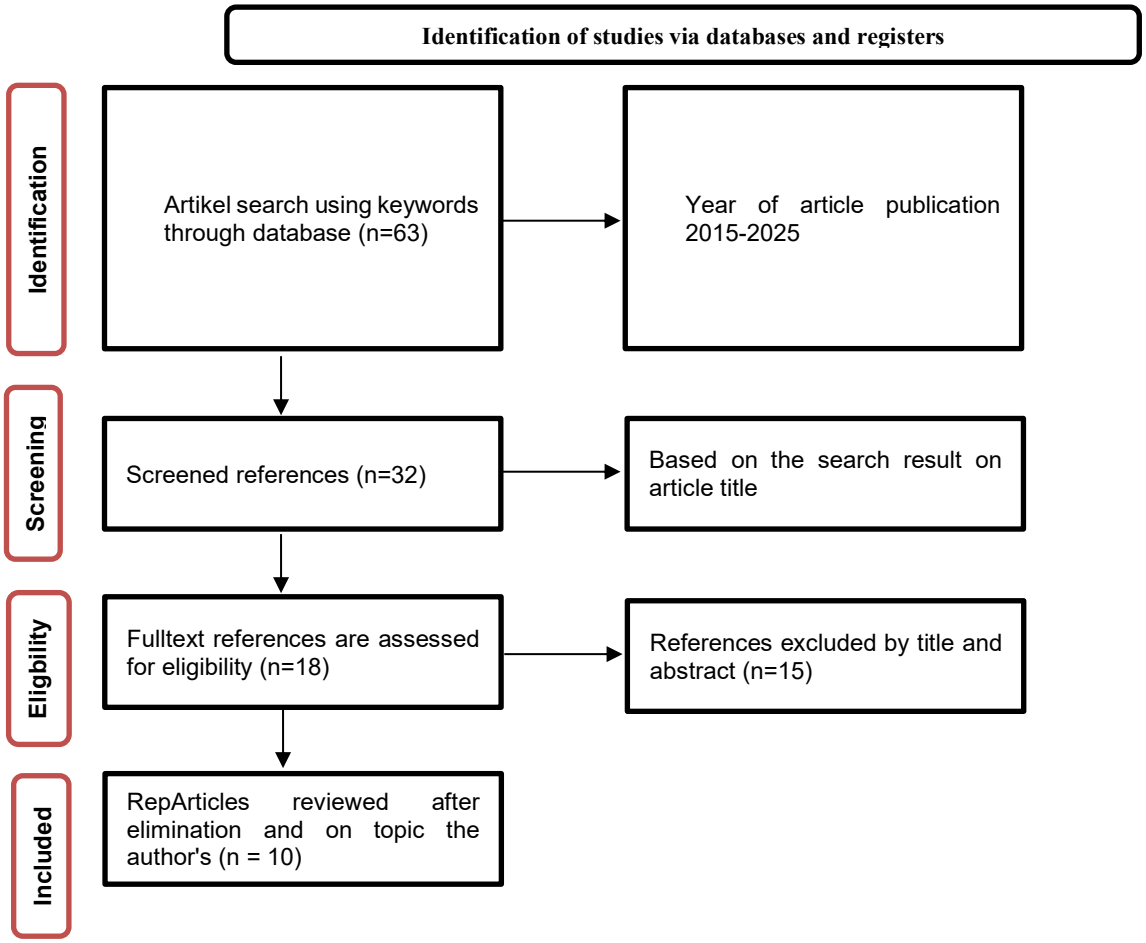


Figure 1. PRISMA Diagram

3. Result and Discussion

The analysis of the ten identified articles yields a comprehensive mapping of the forms, strategies, and effectiveness of integrating local wisdom into science learning. These studies encompass a variety of country contexts, research designs, and implementation focuses, ranging from systematic literature reviews and policy studies to surveys, interviews, and classroom experiments. This table analysis opens up opportunities to examine in more depth how science education management can be designed to effectively integrate ethnoscience into learning, whether through strengthening policies, improving teacher competency, managing culture-based learning resources, or school-community collaboration. The following table presents the analysis results of the ten articles.

Table 2. Results Of The Analysis Of Ten Articles Related To Science Management In Integrating Ethnoscience

No	Author (Year)	Country	Method	Focus/Sample	Integration Strategy & Management Aspects	Key Findings
1	[18], JPPIPA	Indonesia	Systematic Literature Review	20 articles (2018–2023)	Integration of ethnoscience into science via contextual, PBL, collaborative, PjBL	Ethnoscience strengthens critical thinking and scientific literacy; aligned with the Independent Curriculum
2	[19], Environmental Science & Policy	Global	Systematic Review	30+ studies	Integration of Indigenous Knowledge (IK)–Scientific Knowledge (SK); governance & ethics	There is a need for an ethics of collaboration, protection of traditional knowledge, and a policy framework.
3	[20], IJCI	Philippines	Policy review	Elementary School Curriculum	Integration of IK based on local cultural & language context; curriculum support	Local wisdom strengthens the relevance & literacy of contextual science
4	[21], Teaching and Teacher	Australia–Kanada–AS	Qualitative (16 Indigenous experts)	Teacher education & PD	Integration ethics (4Rs: Respect, Relevance, Reciprocity, Responsibility);	Need teacher training & ethical policies to avoid tokenism

	Education				professional development	
5	[22], EURASIA J. Math Sci Tech Ed	South Africa	Science teacher interview	5 guru Life Sciences	Implementation of IKS in the CAPS curriculum; PCK needs	Barriers: minimal PCK/training; recommendations for competency strengthening & school support
6	[23] Millennium Dev. Studies	Nigeria	Descriptive survey	111 respondents	Community-based & local language curriculum co-design; community-based management	Integration of IK increases inclusion and SDGs achievement; the importance of school-community partnerships
7	[24], JPPIPA	Indonesia	Literature review	—	Ethnopedagogy × Society 5.0; utilization of ICT (AR/VR)	Technology strengthens culture-based science learning & learning resource management
8	[25] Int. J. of Ethnoscience and Technology in Education	Nigeria	Eksperimen nonequivalent control group	66 high school students	PBL based on ethnoscience; learning management	PBL-ethnoscience effectively improves critical thinking and contextuality
9	[26]), Science & Education	Indonesia–Europe	Conceptual overview	Multi-perspective	Eco-reflexive Bildung approach; worldview transformation	Integration of ethnoscience in sustainability education through critical reflection
10	[27]. Turkish Science Education	Indonesia & global	SLR (52 items)	—	Integration of Local & Indigenous Knowledge (LIK) in Science; implementation framework	LIK strengthens environmental literacy; needs cross-cultural teacher training & policy support

The integration of ethnoscience into science education is increasingly receiving attention in various international and national studies due to its ability to strengthen the relevance of education, increase scientific literacy, and instill sustainable values in students.[28]. Various studies show that the application of ethnoscience not only makes learning more contextual but also encourages students to understand the relationship between scientific knowledge and cultural practices that exist in society. Furthermore, this approach is considered capable of addressing the gap between school science and local realities, thus making science learning more meaningful, inclusive, and appropriate to the needs of students' socio-cultural environments. Thus, the integration of ethnoscience has great potential in supporting the transformation of science education towards a humanistic, participatory learning oriented toward strengthening cultural identity. The following discussion summarizes key findings from various literature reviews and analyzes their implications for science education management, particularly in the aspects of curriculum planning, teaching materials development, learning strategies, and strengthening teacher competencies.

The study results show that incorporating ethnoscience values into science education is crucial for increasing the relevance of learning and strengthening students' scientific literacy.[29]. Research that employs a local context-based approach through PBL and PjBL models enables students to connect scientific concepts with cultural practices in their environment.[30]This learning, rooted in local experience, not only enriches understanding of science, but also fosters ecological and social awareness.[31]In education policy, these findings also suggest that a curriculum that integrates local culture and language can strengthen students' identities and create more meaningful science learning.[32]. Thus, ethnoscience has a dual function, as a pedagogical approach and as a cultural instrument in realizing context-based science education..

From a managerial perspective, the integration of ethnoscience demands ethical and collaborative governance. The principles of Respect, Relevance, Reciprocity, and Responsibility (4Rs) are considered essential foundations for integrating indigenous knowledge into science education. Without clear protection policies, the integration of Indigenous Knowledge risks creating epistemic injustice.[33]. Thus, the success of ethnoscience integration depends not only on classroom learning strategies, but also on school and government policies that ensure equitable cultural representation and protect the rights of indigenous communities.[34].

Additionally, the success of ethnoscience integration is significantly influenced by the teacher's pedagogical capacity. Teacher competence in managing Pedagogical Content Knowledge (PCK) is a determining factor in connecting scientific concepts with cultural practices.[35]Although ethnoscience-based PBL has been shown to improve students' critical thinking skills and conceptual understanding, its implementation is still hampered by limited teacher training and a lack of locally based learning resources. This situation emphasizes the importance of school management providing ongoing teacher professional development programs, strengthening academic supervision, and cross-subject collaboration.[36].

The development of digital technology opens up significant opportunities to strengthen the integration of ethnoscience in science learning. Combining ethnopedagogy with the concept of Society 5.0 through the use of AR and VR technology helps visualize local cultural processes scientifically.[37]In educational management, technology is not only a learning medium, but also

a knowledge management tool that enables more efficient documentation and preservation of local culture. Schools with leadership responsive to digital innovation can expand educational access, enrich learning experiences, and increase student participation in understanding scientific concepts from a cultural perspective.[38].

From a philosophical perspective, the integration of ethnoscience also encourages transformation. *worldview* students. Studies on the integration of ethnoscience emphasize that the approach*eco-reflective education*Able to connect science, culture, and sustainability values, thus encouraging students to understand science not merely as a collection of concepts, but as a reflective tool that guides them in seeing the relationship between humans, nature, and technology. This paradigm aligns with the spirit of the Independent Curriculum, which emphasizes reflective, humanistic, and contextual learning.[39]. Thus, educational management needs to direct science learning towards a sustainability orientation, not just knowledge transfer.

Collaborating with local communities is also crucial in strengthening ethnoscience practices. Research confirms that co-design between schools, traditional leaders, and local communities is a key element in maintaining the authenticity of cultural values in science learning.[23]With this community-based management model, schools can foster a sense of shared ownership of the educational process and ensure that the integration of ethnoscience is not merely symbolic, but truly reflects the cultural practices that live in the community.[27].

Overall, this study demonstrates that the integration of ethnoscience into science education is a multidimensional process, encompassing pedagogical, management, technological, ethical, and cultural aspects. Successful implementation requires competent teachers, flexible policies regarding cultural diversity, appropriate technological innovation, and sustained community collaboration.[25]Therefore, effective science education management is adaptive, collaborative, and reflective, capable of connecting modern science with local values, thus producing a generation that is culturally rooted, critical, and has a global perspective.

4. Conclusion

Based on a systematic review of ten relevant studies, it can be concluded that incorporating ethnoscience values into science education is a crucial strategy for enhancing the relevance of learning, promoting scientific literacy, and increasing students' awareness of sustainability. Learning that links scientific concepts to local cultural practices through contextual models, PBL, and PjBL has been shown to strengthen students' conceptual understanding and critical thinking skills. However, the success of this integration is highly dependent on the quality of science education management, particularly in context-based curriculum planning, teacher competency development through ongoing training, and the provision of authentic learning resources. Furthermore, ethnoscience integration requires ethical and collaborative governance that upholds the principles of Respect, Relevance, Reciprocity, and Responsibility to prevent the exploitation of local knowledge. The use of digital technologies such as AR and VR opens up significant opportunities to enrich the representation of local culture in science learning. Overall, the integration of ethnoscience into science education is a multifaceted process that necessitates synergy among teachers, schools, communities, and government policies. Adaptive, collaborative, and sustainability-oriented science education management is key to realizing science learning that is rooted in local culture, meaningful, and relevant in the global and digital era.

Acknowledgment

The author would like to thank Prof. Dr Joni Rokhmat, M.Si., the lecturer in charge of the Science Education Management and Supervision course, for his valuable guidance and scientific discussions in the preparation of this article. Thanks are also extended to all researchers and parties whose work is used as references, as well as to the institutions that provided access to various literature sources used in this study. The author hopes that the results of this study can provide a positive contribution to the development of science education management that integrates ethnoscience values in a sustainable manner.

References

[1] N. Amaliyah, N. Hayati, and R. Kasanova, "Implementasi Pendekatan Pembelajaran Berbasis Kearifan Lokal Dalam Meningkatkan Minat Belajar Siswa Di Mts Miftahus Sudur Campor Proppo," *Dewantara: Jurnal Pendidikan Sosial Humaniora*, vol. 2, no. 3, pp. 129–147, 2023.

[2] M. Stuckey, A. Hofstein, R. Mamlok-Naaman, and I. Eilks, "The meaning of 'relevance' in science education and its implications for the science curriculum," *Stud Sci Educ*, vol. 49, no. 1, pp. 1–34, 2013, doi: 10.1080/03057267.2013.802463.

[3] F. Abd-El-Khalick *et al.*, "Inquiry in science education: International perspectives," *Sci Educ*, vol. 88, no. 3, pp. 397–419, 2004, doi: 10.1002/sce.10118.

[4] M. Bang and D. Medin, "Cultural processes in science education: Supporting the navigation of multiple epistemologies," *Sci Educ*, vol. 94, no. 6, pp. 1008–1026, 2010, doi: 10.1002/sce.20392.

[5] C. da Silva, F. Pereira, and J. P. Amorim, "The integration of indigenous knowledge in school: a systematic review," *Compare*, vol. 54, no. 7, pp. 1210–1228, 2024, doi: 10.1080/03057925.2023.2184200.

[6] S. R. Syafani, "Penerapan E-Book Interaktif Berbasis Kearifan Lokal dalam," *Journal of Education and Humanities*, vol. 1, no. 2, pp. 16–22, 2023.

[7] N. Idhayani, N. Nurlina, R. Risnajayanti, S. Salma, H. Halima, and B. Bahera, "Inovasi Pembelajaran Anak Usia Dini : Pendekatan Kearifan Lokal Dalam Praktik Manajemen," *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, vol. 7, no. 6, pp. 7453–7463, 2023, doi: 10.31004/obsesi.v7i6.5624.

[8] B. Madlela, "Techniques and a Model for the Incorporation of Indigenous Knowledge Systems Into the Natural Science Curriculum in Schools," *Studies in Learning and Teaching*, vol. 5, no. 1, pp. 42–58, 2024, doi: 10.46627/silet.v5i1.310.

[9] F. F. Polii and A. Ahmadi, "Integrasi Kearifan Lokal untuk Pendidikan yang Memerdekakan dalam Pembelajaran Bahasa dan Sastra di Sekolah Dasar," *Deiksis*, vol. 16, no. 2, p. 234, 2024, doi: 10.30998/deiksis.v16i2.23021.

[10] M. K. Ulfah, S. Utaminingsih, and I. Fathurrohman, "Keefektifan Media Treasure of Science Berbasis Kearifan Lokal dalam Pembelajaran Tema 8 Kelas V Sekolah Dasar," *Jurnal Imiah Pendidikan dan Pembelajaran*, vol. 5, no. 3, p. 493, 2021, doi: 10.23887/jipp.v5i3.38790.
[11] A. J. Foa, N. M. Dinatha, K. E. Itu, and M. A. Moza, "Nilai Kearifan Lokal Dalam Pembelajaran Ipa Smp," *Jurnal Citra Pendidikan*, vol. 4, no. 2, pp. 1735–1745, 2024, doi: 10.38048/jcp.v4i2.3484.
[12] E. Journal and D. Setiyadi, "Volume 6 Nomor 1 (2025) Pages 101-115 Edubase : Journal of Basic Education Ethnoscience-Based Instructional Materials for Natural and Social Sciences in Elementary Schools : A Bibliometric Analysis," vol. 6, pp. 101–115, 2025.
[13] A. B. PRASANTY and L. NURLINA, "Pemanfaatan Media Pembelajaran Berbasis Kearifan Lokal Dalam Pengajaran Bipa: Tinjauan Literatur," *EDUCATOR : Jurnal Inovasi Tenaga Pendidik dan Kependidikan*, vol. 4, no. 1, pp. 57–67, 2024, doi: 10.51878/educator.v4i1.3350.
[14] P. Jedaman, K. Buaraphan, J. Pimvichai, C. Yuenyong, and S. Jeerasombat, "Educational management in transition of science: Policies and strategic leaders for sustainable education 4.0 in the 21st century science classroom," *AIP Conf Proc*, vol. 2081, pp. 0–11, 2019, doi: 10.1063/1.5094020.
[15] A. Mungchu, S. Teemueangsa, and P. Jedaman, "Science educational management of 'sIAOE model' for sustainability the quality improving a Thai's Basic education, Thailand," *J Phys Conf Ser*, vol. 1835, no. 1, 2021, doi: 10.1088/1742-6596/1835/1/012096.
[16] J. Trna and E. Trnova, "The Current Paradigms of Science Education and Their Expected Impact on Curriculum," *Procedia Soc Behav Sci*, vol. 197, no. February, pp. 271–277, 2015, doi: 10.1016/j.sbspro.2015.07.135.
[17] N. T. R. Tressyalina, Ena Noveria, Ermawati Arief, Ella Wulandari, "Analysis of the Interactive E-Worksheets Needs Based on Local Wisdom in Expository Text Learning," *Journal of Education and Humanities*, vol. 1, no. 1, pp. 23–31, 2023, [Online]. Available: https://doi.org/10.59687/educaniora.v1i1.1
[18] F. P. Sari, M. Maryati, and I. Wilujeng, "Ethnoscience Studies Analysis and Their Integration in Science Learning: Literature Review," *Jurnal Penelitian Pendidikan IPA*, vol. 9, no. 3, pp. 1135–1142, 2023, doi: 10.29303/jppipa.v9i3.2044.
[19] E. J. Ijatuyi, A. Lamm, K. Yessoufou, T. Suinyuy, and H. O. Patrick, "Integration of indigenous knowledge with scientific knowledge: A systematic review," *Environ Sci Policy*, vol. 170, no. April, p. 104119, 2025, doi: 10.1016/j.envsci.2025.104119.
[20] G. T. Pawilen, "Integrating indigenous knowledge in the Philippine elementary science curriculum," *International Journal of Curriculum and Instruction*, vol. 13, no. 2, pp. 1148–1160, 2021.
[21] T. Riley *et al.*, "Weaving stories of strength: Ethically integrating Indigenous content in Teacher education and professional development programmes," *Teach Teach Educ*, vol. 142, no. January, p. 104513, 2024, doi: 10.1016/j.tate.2024.104513.
[22] L. N. Mkhwebane, "Life sciences teachers' integration of indigenous knowledge: A vision for making science classrooms culturally responsive," *Eurasia Journal of Mathematics, Science and Technology Education*, vol. 20, no. 8, 2024, doi: 10.29333/ejmste/14859.
[23] O. T. Ebele, "Strategies for Integrating Indigenous Knowledge in Primary Education and its Impacts on Sustainable Development and Inclusive Growth," *Journal of Gender and Millennium Development Studies*, vol. 1, no. 2, pp. 93–105, 2024, doi: 10.64420/jgmds.v1i2.159.
[24] S. Hidayat, S. M. Leksono, U. Jamaludin, and S. Shintawati, "Ethno Pedagogy Approach in Preparing Science Learning in The Society 5.0 Era," *Jurnal Penelitian Pendidikan IPA*, vol. 9, no. 7, pp. 309–314, 2023, doi: 10.29303/jppipa.v9i7.4154.
[25] Y. Sarkingobir and A. Bello, "Enhancing Critical Thinking through Ethnoscience-Integrated Problem-Based Learning: A Comparative Study in Secondary Education," *International Journal of Ethnoscience and Technology in Education*, vol. 1, no. 1, p. 1, 2024, doi: 10.33394/ijete.v1i1.10878.
[26] R. Zidny, J. Sjöström, and I. Eilks, "A Multi-Perspective Reflection on How Indigenous Knowledge and Related Ideas Can Improve Science Education for Sustainability," *Sci Educ (Dordr)*, vol. 29, no. 1, pp. 145–185, 2020, doi: 10.1007/s11191-019-00100-x.
[27] A. Latip, Hernani, and A. Kadarohman, "Local and indigenous knowledge (LIK) in science learning: A systematic literature review," *Journal of Turkish Science Education*, vol. 21, no. 4, pp. 651–667, 2024, doi: 10.36681/tused.2024.035.
[28] J. M. Rogan and D. J. Grayson, "Towards a theory of curriculum implementation with particular reference to science education in developing countries," *Int J Sci Educ*, vol. 25, no. 10, pp. 1171–1204, 2003, doi: 10.1080/09500690210145819.
[29] A. M. Naah and V. Osei-Himah, "Perspectives of Pre-services Teachers on Indigenous Knowledge Practices and Their Integration into the Teaching and Learning of Science," *European Journal of Education and Pedagogy*, vol. 5, no. 4, pp. 1–10, 2024, doi: 10.24018/ejedu.2024.5.4.834.
[30] T. Riley *et al.*, "Weaving stories of strength: Ethically integrating Indigenous content in Teacher education and professional development programmes," *Teach Teach Educ*, vol. 142, no. January, p. 104513, 2024, doi: 10.1016/j.tate.2024.104513.
[31] M. Gondwe and N. Longnecker, "Scientific and Cultural Knowledge in Intercultural Science Education: Student Perceptions of Common Ground," *Res Sci Educ*, vol. 45, no. 1, pp. 117–147, 2015, doi: 10.1007/s11165-014-9416-z.
[32] W. P. A. Rayis, L. Herayanti, S. Prayogi, and N. Kurnia, "Integration of Ethnoscience in Science Learning: An Ethnoscience Study on the Palm Sugar Production Process," *Lensa: Jurnal Kependidikan Fisika*, vol. 11, no. 2, p. 97, 2023, doi: 10.33394/j-lkf.v11i2.14455.
[33] S. Sudirman, S. Sutikno, D. R. Indriyanti, W. Sumarni, and M. Rahayuningsi, "Integration of Ethnoscience in Natural Science learning: Literacy Study," *Jurnal Penelitian Pendidikan IPA*, vol. 11, no. 6, pp. 68–77, 2025, doi:

10.29303/jppipa.v11i6.9980.
[34] R. Naratiba, S. Suroyo, and R. Fatmasari, "Lokal Dalam Pembelajaran Budaya Melayu Riau Di Sd," *Sosioedukasi*, vol. 10, no. 2, pp. 208–216, 2021.
[35] S. Ridha, M. A. Akbar, M. Fadillah, P. Pebriyandi, S. Basuki, and S. Arifin, "Implementation of management science in physical education subjects: A systematic literature review," *Jurnal Patriot*, vol. 6, no. 3, pp. 109–118, 2024, doi: 10.24036/patriot.v6i3.1082.
[36] R. D. Oktyabrovna and K. Engineering, "TYPES AND FORMS OF ORGANIZING MANAGEMENT SCIENCE," vol. 10, no. 2, pp. 47–51, 2022.
[37] A. I. Asmarany, Djunaedi, A. A. Hakim, A. Saefudin, and L. Judijanto, "Effective Laboratory Management: Efforts to Improve Science Education Management in Islamic Boarding Schools," *Jurnal Penelitian Pendidikan IPA*, vol. 10, no. 8, pp. 5673–5680, 2024, doi: 10.29303/jppipa.v10i8.8250.
[38] T. Sastra Atmaja, "Internalisasi Nilai-Nilai Kearifan Lokal Dalam Pembelajaran Pendidikan Kewarganegaraan," *Jurnal Pendidikan Kewarganegaraan*, vol. 8, no. 1, pp. 171–179, 2024, doi: 10.31571/jpkn.v8i1.7380.
[39] H. Hikmawati, I. W. Suastra, and N. M. Pujani, "Ethnoscience-Based Science Learning Model to Develop Critical Thinking Ability and Local Cultural Concern for Junior High School Students in Lombok," *Jurnal Penelitian Pendidikan IPA*, vol. 7, no. 1, pp. 60–66, 2020, doi: 10.29303/jppipa.v7i1.530.