



Implementation of Teaching Materials Containing Majalengka Local Wisdom to Improve Ecoliteracy in Elementary Schools

Devi Afriyuni Yonanda*

*Elementary School Teacher Education Study Program, Faculty of Education and Teacher Training, Universitas Majalengka, Indonesia
E-mail: deviyonanda1990@gmail.com

Dudu Suhandi Saputra**

**Elementary School Teacher Education Study Program, Faculty of Education and Teacher Training, Universitas Majalengka, Indonesia
E-mail: d.suhandi.s@gmail.com

Irma Sofiasyari***

***Elementary School Teacher Education Study Program, Institut Pangeran Dharma Kusuma Indramayu, Indonesia
E-mail: irmasofiasyari14@gmail.com

Islahuddin****

****Department of Malay Language, Faculty of Liberal Arts and Social Sciences, Fatoni University, Thailand
E-mail: islahuddin@ftu.ac.th

Devita Cahyani Nugraheny*****

*****Elementary School Teacher Education Study Program, Sekolah Tinggi Keguruan dan Ilmu Pendidikan Kusuma Negara Jakarta, Indonesia
E-mail: devita_cahyani@stkipkusumanegara.ac.id

Received: May 07th, 2024. Accepted: October 20th, 2024. Published: October 30th, 2024.

Abstract

The environment is a precious resource that requires maintenance and preservation. Nonetheless, awareness regarding the significance of environmental conservation requires enhancement, particularly among elementary school students. This quasi-experimental research aimed to enhance the eco-literacy of elementary school students. This study's subjects were purposively selected elementary school students from Majalengka Regency. The research data consisted of both test and non-test instruments. Subsequent to data collection, it was analyzed utilizing a qualitative method with inductive techniques and a quantitative method employing statistical tests. The findings indicated a substantial enhancement in eco-literacy among the experimental group relative to the control group. The results demonstrate that utilizing teaching materials grounded in local wisdom can effectively enhance elementary students' comprehension and awareness of environmental issues. This study significantly contributes to the advancement of environmental education in Indonesia by highlighting the necessity of incorporating and integrating local values into eco-literacy instruction in elementary schools.

Keywords: *teaching materials, local wisdom, ecoliteracy.*

Abstrak

Lingkungan merupakan sumber daya yang sangat berharga yang perlu dipelihara dan dilestarikan. Meskipun demikian, kesadaran akan pentingnya pelestarian lingkungan perlu ditingkatkan, khususnya di kalangan siswa sekolah dasar. Penelitian kuasi-eksperimental ini bertujuan untuk meningkatkan literasi ekologi siswa sekolah dasar. Subjek penelitian ini adalah siswa sekolah dasar yang dipilih secara purposif di Kabupaten Majalengka. Data penelitian terdiri dari instrumen tes dan non-tes. Setelah data terkumpul, data dianalisis menggunakan metode kualitatif dengan teknik induktif dan metode kuantitatif dengan menggunakan uji statistik. Temuan penelitian menunjukkan peningkatan yang substansial dalam literasi ekologi di antara kelompok eksperimen dibandingkan dengan kelompok kontrol. Hasil penelitian menunjukkan bahwa penggunaan bahan ajar yang didasarkan pada kearifan lokal dapat secara efektif meningkatkan pemahaman dan kesadaran siswa sekolah dasar tentang isu-isu lingkungan. Penelitian ini memberikan kontribusi yang signifikan terhadap kemajuan pendidikan lingkungan di Indonesia dengan menyoroti perlunya menggabungkan dan mengintegrasikan nilai-nilai lokal ke dalam pengajaran literasi ekologi di sekolah dasar.

Kata kunci: *bahan ajar, kearifan lokal, literasi ekologi.*

INTRODUCTION

Environmental education plays a pivotal role in mitigating environmental degradation and serves as a crucial mechanism for preparing human resources capable of implementing sustainable development principles (Ambe et al., 2024; Arya et al., 2024; Nugroho, 2022). This form of education seeks to enhance public understanding and awareness, equipping individuals with the capacity to address and prevent environmental challenges (Hajj-Hassan, Chaker, & Cederqvist, 2024; Olsen et al., 2024; Syah et al., 2021). All living organisms inseparably link their lives to the environment, an integral component of human existence. Humans and their environment must coexist in harmony, as human survival is dependent on it, and the environment, in turn, is influenced by human activities.

The primary goal of education is to prepare students to integrate into society as social beings who can interact responsibly with the natural environment. This reflects the dual dependence of humans on the physical and social aspects of their environment (Fettes, Cole, & Blenkinsop, 2024; Sabila & Darmawan, 2024). Consequently, humans bear the responsibility to engage with their environment judiciously, ensuring its protection and preservation. Humans, being multidimensional beings, inherently share a relationship with nature. Educational processes are deeply connected to space and time. The same matter goes to people's relationships with their surroundings change over time (Juhriati, Rachman, & Yayoi, 2021; Kate, 2019; Matsekoleng, Mapotse, & Gumbo, 2024). Practically, this underscores the obligation to maintain ecological harmony, balance, and continuity.

Ecological awareness is a fundamental objective of education to raise people who have a deep connection to nature and are morally and ecologically responsible than to raise people with a pragmatic-materialist philosophy (Kaharu, 2021). Such a shift prevents the propagation of a paradigm that views nature mechanistically and as a mere object for exploitation (Wallace, 2019). Additionally, ecoliteracy is the level to which people understand environmental principles and apply them to their daily lives, thereby helping to build a sustainable society (Ozkan, Gurbuz, & Nasirov, 2020).

Elementary school teachers must facilitate students develop ecological competence, including knowledge, attitudes, actions, and participation, so that students can think critically and responsibly about how people and the environment are connected (Kuldoshev & Rahimova, 2024; Ramadhan, Gilang, Al Hadiq, Muhamad, & Chaerunnisa, 2022; Youpika et al., 2024). Schools represent strategic arenas for shaping and cultivating students' character through the instillation of moral and ecological values. Achieving these objectives requires employing diverse models, strategies, approaches, and educational media.

Research indicates that developing teaching materials aligned with local environmental contexts enhances educational outcomes. Integrating local wisdom into teaching materials not only promotes the preservation and appreciation of local cultural heritage but also facilitates teachers in contextualizing lessons for students (Arjaya et al., 2024; Harefa, 2024; Meilana & Aslam, 2022). Teaching resources based on environmental insights foster a sense of environmental responsibility and cultural awareness among students, thereby enhancing ecoliteracy and reinforcing the Pancasila student profile as outlined in the Merdeka curriculum (Boubaker et al., 2024; Pradita, Rachmawati, & Ulyan, 2023). A notable innovation in this research is the emphasis on developing teaching materials rooted in Majalengka's local wisdom, including cultural knowledge, traditional medicinal plants, and sustainable resource management practices. The researchers expect these resources to significantly enhance the ecoliteracy of elementary school students.

Addressing these challenges necessitates a reform in the learning process, particularly through the development of teaching materials that align with educational goals. The general objective of this study is to implement teaching materials infused with Majalengka's local wisdom to improve ecoliteracy among elementary school students. The specific aim is to enhance students' ecological awareness, which is increasingly critical in light of the ongoing environmental crisis. Developing ecoliteracy at the elementary level is expected to equip students with the knowledge, skills, and attitudes necessary for future stewardship of nature and the environment (Nuri et al., 2023). This study underscores the urgency of improving ecoliteracy as a means to enhance the quality of elementary education in Indonesia.

METHODS

The goal of this almost-experimental study was to find out how well the project-based learning (PBL) model helps elementary school students learn about the environment. The research employed a nonequivalent control group design. The study groups consisted of three experimental and three control groups, selected randomly from elementary schools. Both groups underwent a pretest to identify initial differences between the experimental and control groups.

The researchers conducted the research over a year in elementary schools located in Majalengka Regency. These schools included institutions from the Majalengka District, Jatiwangi District, and Talaga District. Each school exhibited distinct characteristics that contributed to the study.

The instruments for data collection included various tools to ensure comprehensive analysis. A semi-structured questionnaire was employed to gather data for the needs analysis, while semi-structured interviews captured feedback from students and teachers regarding teaching materials that incorporated Majalengka local wisdom. The researchers designed tests

to assess the effectiveness of these teaching materials. The researchers also developed an assessment framework to evaluate the process of creating and implementing the teaching materials. The researchers used field notes to document observational data and prepared a guide for assessing the overall learning process. Finally, documentation served to record the research implementation process comprehensively. These instruments collectively ensured a robust approach to data collection.

The researchers used inductive methods to examine the non-test data, such as teacher and student needs, language teaching patterns, and descriptions of the learning process, to find useful information. The researchers began the analysis by collecting, reading, and reviewing the data, during which the researchers identified and marked key ideas and keywords. Following this, the data were classified into thematic categories to organize information systematically. Identified patterns, or "models," were then documented to capture recurring trends or significant findings. Finally, the results were interpreted and synthesized to provide a comprehensive understanding of the data, ensuring that the analysis was both thorough and reflective of the research objectives.

RESULTS AND DISCUSSION

The use of teaching materials based on local wisdom has proven to be an effective strategy for enhancing elementary school students' understanding of and concern for environmental issues. The findings of the study yielded the following data:

Table 1. Pretest Post-test Control and Experiment Class

	Control Group		Experimental Group	
	Pretest	Posttest	Pretest	Posttest
Minimum	50	60	40	75
Maximum	80	80	80	90
Mean	71,54	72	74,94	84,24
Standard Deviation	7,37	3,87	7,81	6,42

The data in Table 1 indicate that both the control and experimental groups experienced an increase in scores. However, the post-test results revealed that the experimental group's mean score was significantly higher than that of the control group. Specifically, the experimental group showed a mean increase of 9.3 points, compared to a 0.46-point increase in the control group.

After that, the researchers descriptively analyzed the data to find the minimum, maximum, mean, and standard deviation values, which gave us a thorough statistical overview. The researchers then conducted normality tests on the data for both groups to confirm their suitability for further statistical analysis.

Table 2. Paired Samples T-Test

Measure 1	Measure 2	T	Df	p
Pretest Experiment - Posttest Experiment		-8.030	48	< .001
Pretest Control - Posttest Control		-0.377	49	0.708

The analysis revealed that each group test produced a sig (2-tailed) score lower than 0.05, indicating statistical significance. These results demonstrate a measurable mean difference in environmental literacy between the experimental group and the control group.

Table 3. Mean increase between pretest-posttest results

Descriptions	N	Mean	SD	SE	Coefficient of variation
Pretest Experiment	50	74.940	7.446	1.053	0.099
Posttest Experiment	50	84.240	3.910	0.553	0.046
Pretest control	50	71.540	7.898	1.117	0.110
Posttest control	50	72.000	6.493	0.918	0.090

The findings indicate that the experimental group's mean score increase between the pretest and posttest was significantly greater than that of the control group. Specifically, the experimental group exhibited an mean increase of 9.3 points, compared to a 0.46-point increase in the control group. This highlights the effectiveness of integrating teaching materials based on Majalengka Local Wisdom in enhancing eco-literacy among elementary school students.

The implementation of teaching materials incorporating Majalengka Local Wisdom represents a pivotal step in developing a curriculum that prioritizes environmental awareness. In a global context increasingly affected by issues such as climate change and ecosystem degradation, environmental education is critical in cultivating environmentally conscious and responsible future generations (Humaira, 2021; Mustofa & Hidayah, 2020). This discussion outlines key strategies for designing, implementing, and evaluating teaching materials rooted in Majalengka's local wisdom to achieve these objectives.

Eco-literacy encompasses not only knowledge of ecological and environmental concepts but also the development of skills, attitudes, and behaviors that support environmental sustainability (Amalia, 2024; Song et al., 2024; Suwandi et al., 2024). Elementary school represents a formative stage in shaping students' attitudes and values, making it a crucial period for embedding eco-literacy into the curriculum. By doing so, sustainable behaviors can be nurtured early, laying the foundation for long-term environmental stewardship.

Majalengka Local Wisdom has a lot of information that is good for the environment, like traditional knowledge of medicinal plants, long-term ways to take care of natural resources, and cultural practices that help protect the environment (Asteka, Suwandi, & Slamet, 2020). Integrating these values into teaching materials can help students understand the interdependence of local culture and the natural environment. For instance, local stories and traditional songs can effectively teach concepts such as biodiversity conservation, the natural cycle, and humanity's role within ecosystems.

The process of creating teaching materials integrating Majalengka Local Wisdom begins with identifying clear learning objectives and aligning them with relevant local

environmental values. Activities should be engaging and relatable to students, such as project-based learning tasks that involve direct observation of their environment (Farizka & Cahyono, 2021; Ninghardjanti, Huda, & Dirgatama, 2022; Sofiasyari & Yonanda, 2022). For example, students can participate in hands-on activities like mapping biodiversity around their schools or conducting field observations.

The successful implementation of these teaching materials requires collaboration among teachers, students, parents, and the local community. Teachers can facilitate engaging and meaningful lessons, while local communities can serve as valuable sources of traditional knowledge and practical insights (Matitaputty et al., 2023; Pratiwi et al., 2020; Wibowo, 2022). By involving all stakeholders, the learning process becomes more impactful and sustainable.

While implementing these materials, challenges such as limited resources or curriculum constraints may arise. Addressing these issues requires targeted teacher training on environmental and local wisdom-based teaching approaches (Kuldoshev & Rahimova, 2024). Furthermore, support from schools and local governments is essential for providing resources and promoting environmental education initiatives.

The researchers had to systematically evaluate the effectiveness of teaching materials to measure students' eco-literacy development and identify areas for improvement. Periodic assessments, including feedback from teachers, students, and parents, are crucial for refining the materials and ensuring alignment with learning objectives (Yonanda et al., 2023). Systematic evaluation enables continuous improvement and enhances the overall quality of the learning process.

CONCLUSION

Incorporating Majalengka local wisdom into teaching materials can significantly improve eco-literacy among elementary school students. Through a holistic and collaborative approach, students gain a deeper understanding of the connection between local culture and the natural environment. This understanding equips them to become proactive agents of change, committed to promoting environmental sustainability in the future.

REFERENCES

- Amalia, D. (2024). The Integration of Eco-Literacy in Teaching-Learning Activities as An Effort to Reduce Environmental Crisis. *Madinah: Jurnal Studi Islam*, 11(2), 257–274. doi: 10.58518/madinah.v11i2.2962.
- Ambe, B. A., Agbor, C. E., Amalu, M. N., Ngban, A. N., Bekomson, A. N., Etan, M. O., ... & Ogunjimi, J. O. (2024). Electronic media learning technologies and environmental education pedagogy in tertiary institutions in Nigeria. *Social Sciences & Humanities Open*, 9, 100760. doi: <https://doi.org/10.1016/j.ssaho.2023.100760>.
- Arjaya, I. B. A., Suastra, I. W., Redhana, I. W., & Sudiarmika, A. A. I. A. R. (2024). Global trends in local wisdom integration in education: A comprehensive bibliometric mapping analysis from 2020 to 2024. *International Journal of Learning, Teaching and Educational Research*, 23(7), 120-140. doi: 10.26803/ijlter.23.7.7.
- Arya, V., Gaurav, A., Gupta, B. B., & Chui, K. T. (2024). A bibliometric analysis of environmental education and sustainable entrepreneurship development in a global

- perspective. *Sustainable Technology and Entrepreneurship*, 3(3), 100080. doi: <https://doi.org/10.1016/j.stae.2024.100080>.
- Asteka, P., Suwandi, S., Andayani, A., & St Y, S. (2020, November). Kearifan Lokal Majalengka Sebagai Materi Ajar Mata Kuliah Sociolinguistik. In *Prosiding Seminar Nasional Pendidikan* (Vol. 2, pp. 870-894).
- Boubaker, S., Liu, P. Z., Ren, Y. S., & Ma, C. Q. (2024). Do anti-corruption campaigns affect corporate environmental responsibility? Evidence from China. *International Review of Financial Analysis*, 91, 102961. doi: <https://doi.org/10.1016/j.irfa.2023.102961>.
- Farizka, N. M., & Cahyono, B. Y. (2021). Faculty members' strategies to foster students' learning engagement in writing class. *Journal on English as a Foreign Language*, 11(1), 175-196. doi: 10.23971/jefl.v11i1.2478.
- Fettes, M., Cole, L., & Blenkinsop, S. (2024). Prompts for eco-social transformation: What environmental education can learn from transformative design. *The Journal of Environmental Education*, 55(2), 125-137. doi: 10.1080/00958964.2023.2259827.
- Hajj-Hassan, M., Chaker, R., & Cederqvist, A. M. (2024). Environmental Education: A Systematic Review on the Use of Digital Tools for Fostering Sustainability Awareness. *Sustainability*, 16(9), 3733.
- Harefa, D. (2024). Strengthening Mathematics and Natural Sciences Education based on The Local Wisdom of South Nias: Integration of Traditional Concepts in Modern Education. *HAGA: Jurnal Pengabdian Kepada Masyarakat*, 3(2), 63-79. doi: 10.57094/haga.v3i2.2347.
- Humaira, D. F. (2021). *Pendidikan Seks dalam Tafsir Tematik dan Tafsir Ilmi Kementerian Agama Republik Indonesia* (Doctoral dissertation, UIN Sunan Kalijaga Yogyakarta).
- Juhriati, I., Rachman, I., & Yayoi, K. (2021, June). The best practice of ecoliteracy based on social culture. In *IOP Conference Series: Earth and Environmental Science* (Vol. 802, No. 1, p. 012012). IOP Publishing. doi: 10.1088/1755-1315/802/1/012012.
- Kaharu, F. (2021). Penerapan Model Problem-Based Learning Pada Mata Pelajaran IPS Untuk Meningkatkan Minat Dan Hasil Belajar. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 3(2): 6. doi: <http://dx.doi.org/10.37905/aksara.7.2.507-522.2021>.
- Kate, A. (2019). *Eating for Ecoliteracy: The Social Praxis of Sustainability at a Residential Environmental Education Center. Nurturing Nature and the Environment with Young Children: Children, Elders, Earth,*.
- Kuldoshev, R., & Rahimova, M. (2024). RETRACTED: Region important directions for developing students' ecological education and thinking. In *E3S Web of Conferences* (Vol. 549, p. 09028). EDP Sciences. doi: 10.1051/e3sconf/202454909028.
- Matitaputty, J. K., Susanto, N., Fadli, M. R., Ramadhan, I., & Manuputty, C. J. (2023). The Effect of Team Games Tournament (TGT) in Social Science Learning to Improve Student Learning Outcomes. *Al Ibtida: Jurnal Pendidikan Guru MI*, 10(2), 374-388. doi: 10.24235/al.ibtida.snj.v10i2.15037.
- Matsekoleng, T. K., Mapotse, T. A., & Gumbo, M. T. (2024). The role of indigenous games in education: a technology and environmental education perspective. *Diaspora, Indigenous, and Minority Education*, 18(1), 68-82. doi: 10.1080/15595692.2022.2160436.

- Meilana, S. F., & Aslam, A. (2022). Pengembangan Bahan Ajar Tematik Berbasis Kearifan Lokal di Sekolah Dasar. *Jurnal Basicedu*, 6(4), 5605-5613. doi: 10.31004/basicedu.v6i4.2815.
- Mustofa, R. F., & Hidayah, Y. R. (2020). The Effect of Problem-Based Learning on Lateral Thinking Skills. *International Journal of Instruction*, 13(1), 463-474. doi: 10.29333/iji.2020.13130a.
- Ninghardjanti, P., Huda, C., & Dirgatama, A. (2022). The perception on mobile-based interactive learning media use in archiving course completion. *International Journal of Evaluation and Research in Education (IJERE)*, 11(2), 516-521. doi: 10.11591/ijere.v11i2.22131.
- Nugroho, M. A. (2022). Konsep Pendidikan Lingkungan Hidup Sebagai Upaya Penanaman Kesadaran Lingkungan. *Ibtidaiyyah: Jurnal Pendidikan Guru Madrasah Ibtidaiyyah*, 1(2):16–31. doi: 10.18860/ijpgmi.v1i2.1691.
- Nuri, N., Surya, A., Destari, U., Amanda, S. R., Sahendra, Y., & Fahrimal, Y. (2023). Peningkatan Literasi Lingkungan Peserta Didik MIN 3 Aceh Barat Menggunakan Metode Board Game Ular. *Wikrama Parahita: Jurnal Pengabdian Masyarakat*, 7(1), 61-68. doi: <https://doi.org/10.30656/jpmwp.v7i1.5466>.
- Olsen, E. K., Lawson, D. F., McClain, L. R., & Plummer, J. D. (2024). Heads, hearts, and hands: a systematic review of empirical studies about eco/climate anxiety and environmental education. *Environmental Education Research*, 1-28. doi: 10.1080/13504622.2024.2315572.
- Ozkan, G., Gürbüz, İ. S. M. A. İ. L., & Nasirov, E. (2020). A greener future: the addictive role of technology in enhancing ecoliteracy in rural community. *Fresenius Environmental Bulletin*, 29(6).
- Pradita, L. E., Rachmawati, U., & Ulyan, M. (2023). Buku Digital Berwawasan Lingkungan Sebagai Upaya Menumbuhkan Ekoliterasi Anak. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 7(6): 7262–7276. doi: 10.31004/obsesi.v7i6.5430.
- Pratiwi, L., Nurhayati, T., Patimah, & Atikoh, N. (2020). The Effect of Independence Education in Islamic Boarding School on the Development of Emotional Intelligence of Elementary School Students. *Al Ibtida: Jurnal Pendidikan Guru MI*, 7(1): 85. doi: 10.24235/al.ibtida.snj.v7i1.5147.
- Ramadhan, G. M., Al Hadiq, M. F., & Chaerunnisa, S. (2022). Analisis Kecerdasan Ekologis Siswa Dalam Program Adiwiyata Sekolah Dasar Negeri Manunggal Bhakti. *COLLASE (Creative of Learning Students Elementary Education)*, 5(3), 624-633. doi: <https://doi.org/10.22460/collase.v5i3.10936>.
- Sabila, D. Z. R., & Darmawan, M. D. P. (2024). Menelusuri Tujuan Pendidikan di Indonesia: Harapan dan Tantangan. *Sindoro: Cendikia Pendidikan*, 4(6), 22-32. doi: doi.org/10.9644/sindoro.v4i5.3317.
- Sofiasyari, I., & Yonanda, D. A. (2022). Nilai Kearifan Lokal Majalengka Sebagai Pembentuk Karakter Siswa Sekolah Dasar. *Jurnal Elementaria Edukasia*, 5(1), 90-100. doi: 10.31949/jee.v5i1.3776.
- Song, Y., Cui, H., Zong, Y., & Yin, S. (2024). Effect of ecoliteracy on farmers' participation in pesticide packaging waste governance behavior in rural North China. *Scientific Reports*, 14(1), 23103. doi: 10.1038/s41598-024-73858-y.

- Suwandi, S., Drajadi, N. A., Handayani, A., & Tyarakanita, A. (2024). The analysis of Ecoliteracy elements in language textbooks. *Cogent Education*, 11(1), 2300907. doi: 10.1080/2331186X.2023.2300907.
- Syah, N., Hidayat, H., Yuca, V., Ardi, Z., & Magistarina, E. (2021). Examining the Effects of Ecoliteracy on Knowledge, Attitudes, and Behavior through Adiwiyata Environmental Education for Indonesian Students. *Journal of Social Studies Education Research*, 12(4), 209-230. doi: <https://www.learntechlib.org/p/220445/>.
- Wallace, H. D. (2019). Transdisciplinary learning in a kitchen garden: connecting to nature and constructing a path to ecoliteracy?. *International Research in Geographical and Environmental Education*, 28(4), 309-323. doi: <https://doi.org/10.1080/10382046.2019.1646013>.
- Wibowo, A. M. (2022). Changing the Concept of Prospective Primary Education Teachers through Ethnoscience-Based Critical Thinking. *Al Ibtida: Jurnal Pendidikan Guru MI*, 9(2): 382. doi: 10.24235/al.ibtida.snj.v9i2.10273.
- Yonanda, D. A., Supriatna, N., Hakam, K. A., & Sopandi, W. (2023). The Effectiveness of Teaching Materials of Local-Wisdom Based Picture Storybooks on the Eco-Literacy of Elementary School Students. *Al Ibtida: Jurnal Pendidikan Guru MI*, 10(1), 143-152.
- Youpika, F., Permadi, T., Sunendar, D., & Yandryati, J. (2024). The Alignment of Folklore and Literature Learning in Schools Against Students' Eco-literacy Competencies. *Journal of English Education and Teaching*, 8(1), 88-105. doi: 10.33369/jeet.8.1.88-105.