

The Influence of Eco-Literacy Learning Based on the *Tri Hita Karana* Concept in Enhancing Elementary Students' Cognitive Towards the Environment

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Abstract: The purpose of this research is to analyze the influence of innovative eco-literacy learning media on third-grade elementary students (Phase B) in the Science subject, Chapter 3: "Living with Nature," specifically on the ecosystem material based on *Tri Hita Karana*, in improving students' cognitive towards the environment. This research employs a qualitative method and descriptive approach to describe in depth the phenomena or conditions that occur in a particular context, and from credible literature studies without manipulating or intervening in the variables studied. This study aims to identify and describe the impact of eco-literacy learning, explore the learning of *Tri Hita Karana* concept, assess the students' cognitive development enhancement and students' cognitive towards the environment. The results of this study indicate a significant influence of the use of eco-literacy media based on the THK concept on students' environmental cognitive awareness.

Keywords: eco-literacy, *Tri Hita Karana*, cognitive, environment

INTRODUCTION

Due to the declining condition and quality of the natural environment in today's era, education that is oriented towards sustainable development is highly needed, in order to improve and create generations that are conscious of environmental preservation. The practice of ecoliteracy learning, which is oriented towards education for sustainable development, places a great responsibility on teachers to provide students with an understanding of the importance of environmental awareness. Teachers are also tasked with educating students on how to protect the environment in their daily lives (Setyaningrum & Gunansyah, 2020). Teachers must be able to manage learning effectively, considering the learning conditions, teaching methods, and learning outcomes to make the learning experience more meaningful and directed.

The environmental problems we face today are a clear manifestation of a lack of understanding about the environment. Eco-literacy competencies need to be cultivated in students from an early age,

starting with head, heart, and hands aspects. However, eco-literacy learning needs to be supported by the use of learning media so that it can have an impact on children (Hardiansyah, et al., 2023). Children should not only understand the basic concepts but also how to apply them. Of course, the learning media should be adapted to technological developments and at the same time strengthen the character of Pancasila student profiles in accordance with the content of the Merdeka Learning curriculum (Adrian, et al., 2022). Efforts to cultivate eco-literacy through the use of environment-based learning media have been implemented in Elementary Schools throughout the city of Magelang.

Eco-literacy materials were chosen because they contain Pancasila values that can be integrated into learning and cultivated in students. This aligns with the Merdeka Learning curriculum, which includes the Pancasila student profile, so it can be truly implemented. In line with the research (Dini, 2023), the Pancasila student profile provides students with the opportunity to become integral parts of the process of strengthening students' character, as well as an opportunity to inspire students to contribute to learning from their surroundings.

Tri Hita Karana is a concept or teaching that emphasizes how people can live side by side, greet each other, have no hatred, be tolerant and full of peace. *Tri Hita Karana* can be lexically interpreted as meaning three causes of well-being. This term is derived from the word “*tri*” which means three, “*hita*” which means balance or well-being, and “*karana*” which means cause.

METHODS

This research uses a qualitative method with a descriptive approach. The descriptive qualitative approach is a research method with observation and interview that aims to occur in a particular context, and from credible literature studies without manipulating or intervening in the variables studied. This study aims to identify and describe the impact of eco-literacy learning, explore the learning of *Tri Hita Karana* concept, assess the students' cognitive development enhancement and students' cognitive towards the environment centered on implementing *Palemahan* principles in environmental practices. The participants of this study totalled twenty five students with three teachers with the necessary criteria. Data were collected through observation and in-depth interviews.

RESULT AND DISCUSSION

Eco-Literacy Learning in Elementary School

Ecoliteracy refers to the ability of individuals to understand, appreciate, and act responsibly towards the environment. It signifies a deep-seated awareness of the interconnectedness between humans and the natural world. As Maulana (2023) noted, ecoliterate individuals recognize the intrinsic value of the environment. Furthermore, Dini (2023) highlighted that ecoliteracy extends beyond ecological concepts, encompassing the specific ecosystems where people live. To foster broader environmental sustainability, cultivating ecoliteracy must begin locally. Essentially, ecoliteracy empowers individuals to understand the vital importance of environmental conservation. Given their

cognitive development, elementary school students at the concrete operational stage, as described by Piaget, are particularly receptive to developing ecoliteracy (Yonanda, et al., 2023).

The foundation for environmental stewardship is laid in early childhood. By introducing eco-literacy concepts to elementary students, we can cultivate a generation of environmentally conscious citizens. Early exposure to nature, hands-on experiences, and age-appropriate learning activities can spark curiosity, inspire empathy for the environment, and foster a sense of responsibility towards the planet (Tyas, et al., 2022). Eco-literacy education not only equips students with knowledge and skills but also fosters a sense of connection to the natural world. By understanding the intricate balance of ecosystems and the impact of human activities, students can develop critical thinking skills, empathy, and a strong sense of civic responsibility. Ultimately, eco-literacy empowers young people to become active agents of change and contribute to a sustainable future.

Eco-literacy education, particularly in the 3rd grade of elementary school, is a crucial first step in fostering awareness of the importance of environmental conservation. At this age, children have a high curiosity and open minds to new things. By using engaging and experiential learning methods, such as simple experiments, outdoor play, and field trips to interesting places, students can actively participate in the learning process. For example, students can learn about the water cycle through a simple experiment using glass and soil. Or, they can observe various types of insects around the school and discuss the role of insects in the ecosystem. Additionally, activities like gardening or composting can help students understand the importance of maintaining soil fertility and reducing waste (Hui, et al., 2023). Through eco-literacy education, students not only gain knowledge about the environment but also develop a caring, responsible, and proactive attitude towards preserving nature.

Intaniasari & Utami (2022) describe that by integrating eco-literacy into the elementary curriculum, we are not only equipping students with knowledge about environmental issues but also fostering a deep sense of connection to the natural world. This connection can lead to a lifelong commitment to sustainability and environmental stewardship. Moreover, eco-literacy education promotes critical thinking skills as students learn to analyze environmental problems and evaluate potential solutions. By empowering young learners to become active participants in creating a more sustainable future, we are investing in a healthier planet for generations to come.

Explore the Eco-literacy Learning Based on *Tri Hita Karana* Concept

The Balinese philosophy of *Tri Hita Karana*, with its emphasis on harmony between humans, nature, and the divine, provides a rich framework for integrating eco-literacy into education. By emphasizing the interconnectedness of all beings, *Tri Hita Karana* encourages a deep respect for the environment. For instance, students can be taught about the importance of conserving water, reducing waste, and practicing sustainable agriculture, all of which are integral to maintaining a healthy ecosystem. Additionally, by exploring the spiritual significance of nature, students can develop a sense of reverence for the natural world and a commitment to protecting it (Tyas, et al., 2022). By integrating

Tri Hita Karana into eco-literacy education, we can cultivate a generation of environmentally conscious and compassionate citizens.

The application of *Tri Hita Karana* in the lives has been as follows: the relationship between humans and their God, the relationship between humans and their natural environment is realized through Bhuta yadnya, while the relationship of people. However, this relationship is far more than that (Mandra, 2020). Implementing *Tri Hita Karana* in the Merdeka Curriculum by Project-Based Learning like: 1) Environmental Projects: Students are encouraged to undertake projects related to the environment, such as planting trees, managing waste, or creating compost. This fosters a sense of responsibility towards nature (*Palemahan*); 2) Social Projects: Students can participate in social activities like visiting orphanages or helping those in need. This strengthens interpersonal relationships (*Pawongan*). 3) Spiritual Projects: Through religious activities or self-reflection, students can cultivate faith and spiritual values (*Parahyangan*). Other example in Thematic Learning are likes: 1) Environmental Theme: Discussing the importance of environmental conservation, the life cycle, and the impact of human activities on nature; 2) Social Theme: Learning about cultural diversity, tolerance, and the importance of living in a community; 3) Spiritual Theme: Discussing moral values, ethics, and spirituality.

Character Development within by *Tri Hita Karana's* value in learning are likes: 1) *Tri Hita Karana* Values: Instilling values such as cooperation, tolerance, compassion, and gratitude and 2) Role Modeling: Teachers serve as examples by applying *Tri Hita Karana* values in their daily lives. Authentic Assessment: 1) Portfolio: Students collect their work, reflections, and documentation of activities that demonstrate the application of *Tri Hita Karana* values and 2) Presentation: Students present their project results or assignments in front of the class or community. In essence, these examples show how the *Tri Hita Karana* philosophy can be integrated into the Merdeka Curriculum through various learning activities and assessments. By doing so, students can develop a deep understanding of their relationship with God, others, and the environment, fostering a more holistic and balanced education (Sawitri, et al., 2023).

Ecosystem has a complex system where living things (biotic factors) and non-living things (abiotic factors) work together to create a balanced environment. Biotic factors include all living organisms in an ecosystem, such as plants, animals, and microorganisms. They interact with others. Abiotics are the nonliving components of an ecosystem, including things like sunlight, water, temperature, soil, and minerals. These factors influence the distribution and abundance of living organisms.

The *Tri Hita Karana* philosophy offers a unique lens through which to approach ecosystem learning. By emphasizing the interconnectedness between humans, nature, and the divine, this Balinese concept provides a holistic framework for understanding ecological systems. Through *Tri Hita Karana*, students can explore the intricate balance between human activities and the natural world. They can learn about the importance of sustainable practices, such as conserving resources, reducing waste, and

protecting biodiversity. Additionally, *Tri Hita Karana* can inspire students to develop a sense of reverence for nature and a commitment to environmental stewardship. By incorporating *Tri Hita Karana* into ecosystem education, we can foster a deeper appreciation for the natural world and empower students to become responsible environmental stewards (Redana, 2023).

The "*Palemahan*" aspect of *Tri Hita Karana*, emphasizing harmony with nature, finds a powerful application in ecosystem learning through eco-literacy. By integrating this Balinese philosophy into education, students can develop a deep understanding of their ecological surroundings and the interconnectedness of all living things. Through hands-on experiences, such as nature walks, community gardening, and waste reduction initiatives, learners can actively engage with their environment, fostering a sense of stewardship and responsibility. This holistic approach not only cultivates environmental awareness but also instills a profound respect for the natural world, aligning with the core principles of *Tri Hita Karana* and promoting sustainable practices for future generations. Table 1 shows the steps of progress in developing cognitive understanding of eco-literacy through the application of *Palemahan* and the *Tri Hita Karana* concept.

Table 1. Understanding the Interconnectedness of All Beings

Level	Progressive Indicators	Progressive Breakdown	Practical by Level
Level 1	Awareness of Local Ecosystem	<ul style="list-style-type: none"> Recognizes basic components of the local ecosystem (plants, animals, water, soil). Understands the importance of biodiversity in the local environment 	<ul style="list-style-type: none"> Recognizes basic components of the local ecosystem (plants, animals, water, soil). Observes natural phenomena and records observations (e.g., weather patterns, plant growth). Participates in nature walks and outdoor activities.
Level 2	Appreciation of Cultural and Ecological Values	<ul style="list-style-type: none"> Values traditional knowledge and practices related to nature. Appreciates the aesthetic beauty of the natural world. 	<ul style="list-style-type: none"> Understands the importance of biodiversity in the local environment. Appreciates the aesthetic beauty of the natural world. Engages in traditional knowledge and practices related to nature.
Level 3	Critical Thinking and Problem-Solving	<ul style="list-style-type: none"> Identifies environmental issues in the local community. Proposes solutions to environmental problems, considering cultural and ecological factors. 	<ul style="list-style-type: none"> Identifies environmental issues in the local community. Proposes solutions to environmental problems, considering cultural and ecological factors. Participates in community-based environmental projects (e.g., clean-ups, tree planting).
Level 4	Ethical and Responsible Behavior	<ul style="list-style-type: none"> Practices sustainable behaviors (e.g., reducing waste, conserving water). Participates in community-based environmental initiatives. 	<ul style="list-style-type: none"> Practices sustainable behaviors (e.g., reducing waste, conserving water). Participates in environmental advocacy and activism. Demonstrates leadership in promoting environmental sustainability.
Level 5	Systems Thinking	<ul style="list-style-type: none"> Understands the interconnectedness of ecological systems. 	<ul style="list-style-type: none"> Organize field trips to local natural areas to observe biodiversity and ecological processes.

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- Recognizes the impact of human actions on the environment.
 - Participate in community gardening projects to learn about sustainable agriculture and food systems.
 - Implement waste reduction initiatives in schools and communities.
 - Design and implement water conservation projects, such as rainwater harvesting systems.
 - Conduct workshops to educate peers and community members about environmental issues.
 - Participate in citizen science projects to collect data on environmental conditions.
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Asses the Students' Cognitive Development Enhancement

Understanding cognitive development theories of cognitive development vary among experts. Prominent theories include those of Vygotsky, Bruner, and Piaget. According to Vygotsky, a child's cognitive abilities develop through social interactions and experiences. Bruner, on the other hand, emphasizes that every individual undergoes a process of receiving and processing information from every event (Juwantara, 2019). Based on these definitions, cognitive ability can be summarized as the intellectual capacity that enables the brain to guide the body's complex command system in processing information from the environment. Cognitive development is the process of growth that occurs through social and group interactions in various environments. Cognitive development in children is particularly rapid due to their high curiosity. This research and development focuses on Jean Piaget's theory of cognitive development. Piaget's theory centers on child development, from birth to adulthood, and explains stages of development in areas such as morality, language, memory, and thought.

Piaget's Stages of Cognitive Development According to Piaget's stages of cognitive development, the concrete operational stage, typically between 6 and 12 years old, marks a significant developmental milestone (Ariyani & Tego, 2021). At this stage, children begin to measure information and use simple logical reasoning about concrete or physical objects. Their cognitive development becomes more attuned to their environment, and egocentric thinking decreases.

Grade 3rd Elementary Students can be classifying at cognitive development. In the cognitive domain of Bloom's Taxonomy, third-grade students are at the Analysis and Synthesis stages. At the Analysis stage, students can connect causes and effects of events around them. Additionally, they are beginning to develop the ability to break down components into more detailed elements. Operational verbs in the Revised Bloom's Taxonomy suitable for developing cognitive abilities and problem-solving skills at this age include: analyze, audit, solve, confirm, detect, diagnose, select, detail, nominate, diagram, correlate, rationalize, test, clarify, explore, categorize, conclude, discover, examine, maximize, command, edit, link, choose, measure, train, and transfer. At the Synthesis stage, fourth-graders can express theories from their own perspective and use them to foster curiosity about knowledge. They also have a basic ability to test theories or hypotheses to prove answers to their

curiosity at this synthesis stage (Marinda, 2020). Supporting this need is the fourth-grade students' ability to produce abstract and unique communication language. Suitable operational verbs in the Revised Bloom's Taxonomy include: compare, evaluate, direct, measure, summarize, support, choose, project, criticize, guide, decide, separate, weigh.

The cognitive development of fourth-grade elementary students has reached the Concrete Operational Stage (7-12 years), where children are enough for using konkret things with operational thinking (Febrianti, 2024). At this stage, children have lost their tendency towards animism and artificialism. Their egocentrism decreases, and their ability in conservation tasks improves.

Students' Cognitive Towards The Environment

Developing a strong understanding of environmental issues is crucial for future generations. Through effective eco-literacy education, students can cultivate a deep appreciation for nature and a sense of responsibility for its preservation. By engaging in hands-on activities, such as nature walks, experiments, and community service projects. As they learn about the interconnectedness of all living things, they can develop a holistic perspective on environmental issues and the role they play in addressing them. Ultimately, eco-literacy education empowers students to become informed and engaged citizens who can contribute to a more sustainable future.

Based on the results of a field study analysis, several achievements in students' cognitive awareness of the environment were obtained after eco-literacy learning based on the *Tri Hita Karana* concept, as follows.

1. Deep Understanding of Ecosystems

Tri Hita Karana provides a robust framework for students to develop a profound understanding of ecosystems. By emphasizing the interconnectedness of all living things and their environment, students can grasp the intricate balance of nature. They learn about ecological processes such as the food chain, nutrient cycles, and the impact of human activities on these cycles. This knowledge empowers students to appreciate the delicate nature of ecosystems and the importance of preserving biodiversity.

2. Environmentally Friendly Behavior

The principles of *Tri Hita Karana* foster environmentally friendly behaviors among students. By cultivating a sense of harmony with nature, students are motivated to reduce their ecological footprint. They are more likely to adopt sustainable practices such as conserving water and energy, reducing waste, and choosing environmentally friendly products. This mindset empowers students to make informed choices that contribute to a healthier planet.

3. Active Involvement in Environmental Conservation

Tri Hita Karana inspires students to become active participants in environmental conservation efforts. They are encouraged to engage in activities such as planting trees,

cleaning up their communities, and participating in recycling programs. By taking action to protect the environment, students develop a sense of ownership and responsibility for the natural world.

4. Character Development

Through the lens of *Tri Hita Karana*, students develop essential character traits such as empathy, respect, and responsibility. They learn to appreciate the interconnectedness of all living beings and to treat the environment with care.

5. Innovation and Creativity

Tri Hita Karana stimulates students' creativity and problem-solving skills. By exploring the concept of balance between humans and nature, students are encouraged to think critically about environmental challenges and develop innovative solutions. They are inspired to create projects that promote sustainability and address local environmental issues.

Numerous studies have demonstrated the positive impact of eco-literacy education on students' cognitive development. Through engaging in hands-on activities, such as nature walks, experiments, and community service projects about environmental issues. As they explore the natural world, students learn to analyze complex ecological relationships, evaluate human impact on the environment, and propose sustainable solutions. By fostering a sense of wonder and curiosity, eco-literacy education empowers students to become informed and responsible citizens who are committed to protecting the planet for future generations.

The implementation of the *Tri Hita Karana* concept in teaching about biotic and abiotic ecosystems not only teaches students about the reciprocal relationships between biotic and abiotic components but also fosters an awareness of the relationship between humans and nature. Through a deep understanding of *Palemahan* (human relationship with nature), students are encouraged to appreciate the importance of maintaining ecosystem balance and to play an active role in environmental conservation.

Integrating *Tri Hita Karana* into eco-literacy encourages students to apply *Tri Hita Karana* values in their daily lives. For example, after learning about the water cycle, students can be encouraged to engage in simple activities such as planting trees around their homes to maintain groundwater availability. Thus, learning about ecosystems does not stop at conceptual understanding, but also impacts students' behavioral changes. The *Tri Hita Karana* concept, which emphasizes human relationships with other humans (*Parhyangan*) and humans with God (*Pawongan*), can also be integrated into ecosystem learning. For example, students can be invited to discuss the importance of cooperation in maintaining environmental cleanliness or to participate in social activities such as cleaning rivers together with the community. Thus, learning about ecosystems does not only focus on scientific aspects but also strengthens social and cultural values.

Schools, as the first learning environment for students, can become models for implementing *Tri Hita Karana*. By creating green, clean, and beautiful school environments, students can directly

experience the benefits of environmental conservation efforts. Additionally, schools can become centers for environmental activities such as composting, utilizing renewable energy, and waste management. Through these activities, students can develop a stronger environmental consciousness.

CONCLUSION

In conclusion, this research aimed to investigate the influence of innovative eco-literacy learning media on the cognitive development of third-grade elementary students, particularly in understanding ecosystem concepts rooted in the *Tri Hita Karana* philosophy. By employing a qualitative research approach, the study sought to gain a deeper understanding of how students engaged with the learning materials and how their cognitive abilities were enhanced. Through a thorough analysis of data, this research contributes to the growing body of knowledge on effective eco-literacy education and provides valuable insights for educators seeking to foster environmental awareness and critical thinking skills among young learners.

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