

CHAPTER I

INTRODUCTION

1.1 Background

Humans and nature are two inseparable things that depends on each other. Conserving nature is actually conserving our own future. Unfortunately, human activities are significant contributors to environmental problems. This impact manifests in various forms, including atmospheric pollution, water pollution, and soil degradation, ultimately leading to biodiversity loss (Díaz et al., 2019; Manisalidis et al., 2020; Rillig et al., 2021). Human activities contributes 81.3% of environmental threats (Cardinale et al., 2012; Goudie & Viles, 2013). This significant human impact underscores the urgent need for sustainable practices and responsible environmental stewardship. Atmospheric pollution is enhancing because of emitted greenhouse gasses and air pollution produced from industrial activities. It contributes global warming, acid rain and climate change. Water pollution is also enhancing due to improper disposal of sewage and waste into rivers and oceans leads to toxic environments for marine life. Soil degradation happened due to activities such as deforestation, desertification, and urbanization. These interconnected environmental challenges pose significant threats to well-being and the long-term sustainability of earth.

These environmental challenges are due to limited environmental awareness and education (Dinansyah Wiradimadja et al., 2023). Studies have shown that Indonesian students exhibit low levels of environmental knowledge and medium levels of environmental awareness. Students in Indonesia have low levels of environmental knowledge and medium level of environmental awareness (Anggraini & Karyanto, 2018). Most of Indonesian high school students were classified as inadequate in environmental knowledge (Wardani et al., 2018). On the other hand, Indonesian high school students have only 39% awareness level of human behavior causing environmental problems, lower than Malaysian students that gain 68% awareness (Halim et al., 2014). This lack of awareness and knowledge can lead to unsustainable behaviors and a lack of engagement in environmental conservation efforts. These problems are caused by lack of

environmental competencies and poor teaching-learning processes. This lack of environmental awareness and knowledge among students has significant implications for the future, as it may lead to unsustainable behaviors and a lack of engagement in environmental conservation efforts. Addressing these issues requires a multi-pronged approach, including the integration of environmental education into the formal curriculum, the development of innovative teaching methods, and the promotion of environmental awareness campaigns within schools and communities.

To address this critical issue, initial research investigated students' environmental awareness across cognitive, emotional, and behavioral dimensions. Initial research conducted by researchers showed that students' environmental awareness in cognitive, emotional and behavior aspect are in moderate level. However, several key concerns emerged. For instance, many learners disagreed that the use of chemicals in agricultural activities damages the ecosystem. This shows a lack of understanding of the dangers of using artificial fertilizers and pesticides. It also shows that the use of chemicals such as artificial fertilizers and pesticides is normal for them. This indicates a limited understanding of the environmental impacts of agricultural practices and the need for more comprehensive education on sustainable agriculture. Still in the cognitive aspect, some learners agreed that environmental education is only important for children. In fact, in order to achieve sustainable environment, education regarding environment is needed for all people. Regardless young or old, high or low educated, female or male. This highlights the need for lifelong learning and a societal shift towards greater environmental consciousness across all segments of the population.

Moving beyond cognitive aspects, challenges were also observed in the emotional and behavioral dimensions. In the emotional domain, students demonstrated a relatively weak emotional connection with nature. From eight statement items regarding emotional aspect, five of them gained slightly low average. Showing that in some aspects, students' emotional connection with nature are just quite weak. Subset of students expressed that they do not disappointed by individual who does not put interest in environmental problem. This lack of

empathy towards individuals who disregard environmental concerns suggests a limited understanding of the collective responsibility we share in protecting the environment. There is no anger and frustration when they are thinking of individuals and industries that cause environmental pollution. Furthermore, they also expressed that they do not angry thinking of pollution that harm plants and animals. It shows that students still lack of sympathy and empathy toward nature. This lack of emotional response indicates a potential disconnect between the students' cognitive understanding of environmental issues and their emotional engagement with the natural world. It shows that students still lack sympathy and empathy towards nature. Cultivating a deeper emotional connection with nature, such as fostering a sense of wonder and awe, is crucial for developing a genuine concern for environmental protection.

While students demonstrated some positive behaviors, such as wise use of natural resources and a preference for eco-friendly products, challenges remain in their purchasing decisions. However, there are areas where their behavior falls short. For example, they do not consistently avoid using products from companies known for their negative environmental impacts. This indicates a gap between their knowledge of environmental issues and their actual purchasing decisions. Furthermore, they do not always buy recyclable packaged products or choose products with less negative environmental impact. This could be attributed to several factors such as limited product knowledge, limited availability and lack of consumer power. Students may lack the information or awareness to make informed choices about the environmental impact of different products. Recyclable products and products with lower environmental impact may not always be readily available or affordable. Students may feel powerless to influence corporate behavior through their purchasing decisions. Addressing these challenges requires a multi-pronged approach, including improving consumer education, increasing the availability of eco-friendly products, and empowering consumers to make informed and sustainable purchasing choices. Recognizing the interconnectedness of these aspects, it's crucial to understand that pro-environmental behavior is influenced by both cognitive and emotional factors.

Taking a broader perspective, these cognitive, emotional, and behavioral aspects are interconnected and influence one another. Behavioral aspects, such as pro-environmental actions, are often the culmination of both cognitive and emotional factors. Knowledge and empathy predict pro-environmental behavior, knowledge tends to be a stronger predictor. However, empathy still plays a significant role, particularly in fostering emotional connections to nature (Ienna et al., 2022). For instance, understanding the ecological consequences of pollution (cognitive) may motivate individuals to reduce their carbon footprint, but empathy for the suffering of animals due to habitat loss will likely further strengthen their commitment to environmental action. Through education, nature can be presented in a humanized way so it can improve students' empathy and give positive impact toward students' attitude toward environment, leading to stronger pro-environmental intentions (Flannery et al., 2024). By fostering a deeper emotional connection with nature, education can inspire a sense of responsibility and stewardship, ultimately driving more meaningful and sustained pro-environmental behaviors.

To effectively address these challenges, it is crucial to focus on developing critical thinking and problem-solving skills, particularly through the enhancement of research skills. As a predictor of someone's pro-environmental behavior, expected knowledge transcends mere memorization of facts. It necessitates a deeper understanding that goes beyond simple recall. True environmental knowledge involves the ability to critically analyze information, evaluate evidence, and apply that knowledge to understand and solve real-world environmental problems. True environmental knowledge involves the ability to critically analyze information, evaluate evidence, and apply that knowledge to understand and solve real-world environmental problems. Activities that involve analyzing, evaluating, and applying new knowledge in real-world contexts, such as conducting independent research projects, participating in citizen science initiatives, and engaging in community-based environmental action, are crucial for developing these essential skills (Arifin, 2021). Furthermore, these experiences not only enhance critical thinking and problem-solving skills but also foster a deeper sense of agency and

empower students to become active agents of change in addressing environmental challenges.

Research skills are foundational for developing these critical thinking and problem-solving abilities. Research skills are considered as a set of skill needed to enhance critical thinking and problem solving. Enhancing students' research skill is developing students' communication, collaboration, critical thinking and creativity. It allows them to apply academic knowledge to real-world problems, thereby enhancing students' problem-solving capabilities (Kembara et al., 2019). Developing research skills is often mistakenly considered solely a responsibility of university institutions. However, the foundations for these crucial skills must be laid much earlier, ideally starting in elementary school. The development of basic science process skills, such as observation, experimentation, and data analysis, is crucial for fostering a lifelong love of learning and equipping students with the tools they need to navigate an increasingly complex world.

The development of basic science process skills, such as observation, experimentation, and data analysis, is crucial for fostering a lifelong love of learning and equipping students with the tools they need to navigate an increasingly complex world. Research skills are seen as essential for learning information, fostering curiosity, and solving problems. It helps students actively participate, question and improve their understanding (Aktepe & Ulu, 2023). By engaging in research-like activities, such as conducting simple experiments, asking questions, and seeking answers, students develop essential cognitive skills such as critical thinking, problem-solving, and creativity. The development of research skills in young students is related to the improvement of their cognitive abilities. It includes organizing activities, working with information and conducting educational research, which are essential for intellectual development (Bapanova et al., 2023). By cultivating a culture of inquiry and fostering a love of learning from an early age, we can empower students to become independent thinkers, lifelong learners, and active contributors to society.

However, current research indicates that students in Indonesia have significant deficiencies in research skills. Students' research skill in Indonesia are still lacking.

Descriptive study of students' research skill done by Yani et al. (2023) showed that students' average research skills score were in low category. The lowest average was found on students' planning skill. Most students have low research skill in questioning, analyzing and communicating. The highest score was on observing skills, indicating some proficiency in this area. These findings highlight the need for significant improvement in the development of research skills among Indonesian students. Therefore, learning activity that facilitates improvement of students' research skill is highly needed, especially in environmental topic such as ecology to produce pro-environmental behavior. By integrating research skills into environmental education, students can develop the critical thinking, problem-solving, and investigative skills necessary to address environmental challenges and become active agents of change.

To address these shortcomings, a shift towards more student-centered and inquiry-based learning approaches is necessary. Teachers report that primary school students have underdeveloped research skills that are often not adequately supported by current teaching practices (Aktepe & Ulu, 2023; Bapanova et al., 2023). Almost all student activities in the learning process, are activities that are carried out because of orders from the teacher. Science learning in the classroom still uses many conventional and teacher-centered methods such as lectures so that it is less able to train these skills. To better support the development of research skills, traditional and modern educational techniques must be integrated. Learning environments should shift away from passive learning and towards more active and student-centered approaches.

Learning does not provide opportunities for students to learn according to their interests and curiosity, students are less able to develop their creativity. Students cannot observe, hypothesize, plan, interpret, and communicate something related to the material presented. Students can only know facts that must be memorized and the teacher as the only source of information, the main source of knowledge. Instead of simply transmitting information, teachers must act as facilitators, guiding students through the process of inquiry and encouraging them to ask questions, explore their own curiosities, and develop their own understanding. Teachers must

act as role models and create engaging and supportive environments. This includes utilizing interesting activities and ensuring that both the home and school environments support research. Creating a culture of inquiry and exploration within the classroom, where students are encouraged to ask questions, conduct experiments, and share their findings, is crucial for developing their research skills and fostering a lifelong love of learning.

Nature-based learning offers a promising approach to enhance both environmental awareness and research skills. Enhancement of students' environmental awareness (Parra et al., 2020; Si et al., 2022; Zeng et al., 2023) and environmental knowledge (Geiger et al., 2019; Křepelková et al., 2020; Otto & Pensini, 2017) can lead to more sustainable behaviors and practices. Environmental education is seen as a key tool in developing these factors, with a focus on understanding the impact of human activities on the environment (A. K. Badoni, 2017; Praimee et al., 2023). The variables influencing natural mindfulness incorporate the esteem of common assets and the environment, information of natural preservation, mindfulness of natural preservation news, natural assurance demonstrate, and cooperation in natural preservation exercises (Praimee et al., 2023). Nature-based learning promotes learning processes and health on different levels (Mann et al., 2021). It improves academic learning success, social competencies, self-competencies, physical and mental health, real-world learning, twenty-first century skills and familiarity to nature. Moreover, Experience (Braun & Dierkes, 2017; Kleespies et al., 2020; Talebpour et al., 2020), activity (Otto & Pensini, 2017; Whitburn et al., 2019) and time spent (Barrable & Booth, 2020; Larson et al., 2019) in nature during nature-based learning allows students to be connected with nature.

Nature exposure in nature-based learning could be in any activity such as free play in nature, nature walks and more. This activity help learner to be engaged in learning and also build comfortable atmosphere of learning. This integrated condition resulting learning outcomes that classified into three main nature-based learning can occur with varying degrees of guidance or structure, across the age span, alone or with others, and in urban, suburban, rural, and wilderness settings

(Jordan & Chawla, 2019). With respect to children's nature-based learning, it includes informal learning during children's free play or discovery in nature in their yards, near their homes, in green schoolyards, on the naturalized grounds of child care centers, or in any other natural area. It includes non-formal learning in nature during out-of-school programs, camps or family visits to parks or nature centers. And it includes formal learning when children have contact with nature during structured activities in schools, preschools, and child care centers, or during outdoor field trips (Ameli, 2022). There are seven areas of knowledge that suits nature-based learning. They are climate, soils rocks and mineral (Genc et al., 2018; Kleespies et al., 2020; Talebpour et al., 2020), water, materials and resources, plants and animals (Collado et al., 2020a; Genc et al., 2018), people and their communities, and industrialization and work.

Nature-based learning provides a valuable context for students to engage with environmental concepts and develop critical thinking skills. Nature-based learning emerged as response to this limitation. It uses outdoor settings as a context for delivery of curricular lessons (Edlund, 2001). Therefore, it emphasizes direct engagement through hands-on activities and exploration. Experience (Braun & Dierkes, 2017; Kleespies et al., 2020; Talebpour et al., 2020), activity (Otto & Pensini, 2017; Whitburn et al., 2019) and time spent (Barrable & Booth, 2020; Larson et al., 2019) in nature allows students to be more connected with nature.

Hands on activities, exploration, and connection with nature provided by nature-based learning offers several benefits including increasing students' research skill and environmental awareness. Developing these two aspects are incredibly important for students. It offers benefits for their personal live and of course nature. Evidence suggests that engaging with nature can promote learning and development in children (Jordan & Chawla, 2019). Exposure to the natural world, whether through wilderness trips, schoolyard gardens, or simply observing local flora and fauna, has been linked to positive academic, personal, and environmental outcomes. This is a significant finding, as it indicates that connecting students with nature may provide a cost-effective means of addressing pressing societal challenges, such as improving academic achievement and

mitigating the rise in mental and physical health disorders (Kuo et al., 2019; Kuo & Jordan, 2019).

Worksheets play a valuable role in guiding nature-based learning activities, offering several advantages. It guides students to achieve learning objectives while doing nature-based learning. It promotes students' scientific process skill including problem-defining, hypotheses formulation, and result interpretation (Mutlu, 2020; Suryawati et al., 2020). Guided activities in contact with nature during outdoor environmental education programs have positive effects on students' wellbeing, connectedness to nature, and pro-social behavior (Pirchio et al., 2021). Overall, worksheets serve as effective tools for guiding nature-based learning activities, enhancing student engagement, and promoting the development of various skills and environmental awareness.

The relationship between nature and learning appears to be causal, with nature-based experiences directly contributing to improved academic performance, personal growth, and environmental stewardship. Hundreds of studies have now demonstrated this effect, converging on the conclusion that nature should be considered a valuable resource for learning and development. (Kuo et al., 2019; Kuo & Jordan, 2019). Evidence suggests that engaging with nature can promote learning and development in children (Jordan & Chawla, 2019). Exposure to the natural world, whether through wilderness trips, schoolyard gardens, or simply observing local flora and fauna, has been linked to positive academic, personal, and environmental outcomes.

In Indonesia, topic about ecosystem is taught in phase D Kurikulum Merdeka. This topic could be a basic knowledge for students in gaining knowledge about ecosystem and how it would be if there is unbalanced ecosystem. Nature-based learning is particularly effective in helping students understand ecosystems. By directly observing the interactions between plants, animals, and their environment, students gain a holistic perspective on ecological processes and the delicate balance of nature.

1.2 Research Problem

Balgis Az Zahra, 2025

THE EFFECTS OF NATURE-BASED LEARNING TO STUDENTS' RESEARCH SKILL AND ENVIRONMENTAL AWARENESS IN LEARNING ECOSYSTEM

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Based on the background above, the research problem of this study is “How is The Impact of Nature-Based Learning to Students’ Research Skill and Environmental Awareness in Learning Ecosystem?”

Elaborating the research problem, the research is attempted to answer the following questions:

- 1) How is the impact of nature-based learning to Students’ research skill in learning ecosystem?
- 2) How is the impact of nature-based learning to Students’ environmental awareness in learning ecosystem?
- 3) How is students’ impression towards nature-based learning?

1.3 Research Objective

Referring to the background and research problem explained, the aim of this research is to produce an overview and knowledge of the relevance Impact of Nature-based Learning to students’ research skill and environmental awareness in learning ecosystem.

1.4 Research Benefit

This research is expected to give benefits for:

- 1) Teacher
Teacher gains a new sight of learning activity guided by worksheet that facilitates students to explore their knowledge and experience through Nature-based learning approach.
- 2) Student
Students gain improvement in environmental awareness and developed research skill.
- 3) Another Researcher
Result of research can be used as the reference to develop another study regarding nature-based learning approach especially in Indonesia.

1.5 Research Paper Structure

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An overview of the content of this thesis can be seen in the thesis organizational structure. The writing system used in writing this thesis refers to the guidelines for scientific papers of Universitas Pendidikan Indonesia (UPI) in 2024. This research report is written in the form of a thesis with the following systematics. Overall, this research paper consists of five chapters and several appendices. Each chapter consists of sub-chapters. The systematic of this research paper is as follows:

1) Chapter I: Introduction

This chapter describes the background of the research which includes the importance of environmental awareness and research skills for students, some previous findings related to research skills and environmental awareness, and how nature-based learning is expected to be a solution to improve research skills and environmental awareness of junior high school students. This chapter also states research problem, research questions, research objectives, limitation of problem, research benefit and research paper structure. All discussion was based on the research problem and questions stated in this chapter.

2) Chapter II: Literature Review

This chapter describes the theoretical foundations related to each concept related to this research. The concepts are nature-based learning, students' research skill, students' environmental awareness and ecology. There is also relevant research presented in this chapter.

3) Chapter III: Research Methodology

This chapter describes about methodology used during the research. It consists of research method and design, population and sample of research, research instruments, instrument analysis result, data processing technique and research procedure.

4) Chapter IV: Result

This chapter concerns with the data gathered in this research. The data are presented in forms of tables and graphs to make it easier to be understood. The author analyzes and interpreted it based on the needs of answering research questions determined in chapter one.

5) Chapter V: Discussion

The findings and discussion include impact of nature-based learning to students' research skill, and students' environmental awareness. There is also findings and discussion related students' impression toward nature-based learning. This discussion is complemented by a review of relevant literature that has been described in the previous chapter.

6) Chapter VI : Conclusion and Recommendation

This chapter contains conclusions drawn from all stages of the research. Then this chapter also contains implications and recommendations made by the author for similar research in the future. The implications presented are based on important things that can be utilized for others from the research results, while the recommendations are based on the shortcomings found in the research that has been done.