



The Relationship of Ecological Intelligence with Students' Environment Care Behavior on Mangrove Ecosystem Materials

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Abstract

This research was aimed to find the relationship between students' ecological intelligence and Pro-Environmental behavior on mangrove ecosystem material. The populations of this research were Salamahu Junior School students, and the sample was the fourth-grade classes which randomly chosen. The result was showed that $r_{\text{calculated}} = 0,761$ dan $r_{\text{table}} = 0,3338$. Therefore $0,761 > 0,3338$ so H_0 accepted which means there is a positive relationship between variable X and Y. Significant point correlation (2-tailed) was $0,000 < 0,05$ which means between ecological intelligence and pro-environmental behavior there is a significant's relationship.

Keywords: *Ecological Intelligent; Environmental Pro-Behavior; Mangrove Ecosystem*

Introduction

Ecological Intelligence

Intelligence according to Gardner (2003) in the multiple intelligences paradigm has three main components, namely (1) the ability to solve problems that become challenges in real life; (2) the ability to generate new problems, and the ability to try to solve related problems; (3) the ability to create something.

If the abilities possessed are associated with ecological problems, it can be assumed that it is possible to form humans who are responsible and have concern for an ecological problem (Suhartini, 2007).

Regarding ecology, (Putrawan, 2014) states that there are still mistakes in interpreting the term ecology with the environment because the term ecology is often equated with the environment. Environmental science combines several disciplines such as ecology, geology, economics, social and political science. Meanwhile, ecology itself is related to research in the field or laboratory, analyzing data mathematically and statistically, testing hypotheses, and formulating conclusions. This means that the study of environmental science has a wider scope in a study, while ecology itself is studied in environmental science and has a narrower scope. Ecology refers to an understanding of an ecosystem and the behavior of the organisms in it. While intelligence is defined as learning to appreciate, love, and use the environment fairly (Untari, 2020).

Ecological intelligence is a comprehensive understanding that aims to create awareness about how human activities affect ecosystems and to promote behaviors that lead to sustainable living (Goleman, 2009).

Ecological intelligence is also based on knowledge, awareness, and skills to live in harmony with nature. The knowledge that a person has becomes the initial capital for the formation of awareness and awareness is expressed in the form of skill for improving ecological problems to allow caring behavior towards the environment (Supriatna, 2016).

Table 1. Ecological Intelligence Competencies from the Center for Ecoliteracy

Core competencies of the Center for Ecoliteracy	Sub Competencies and core competencies of the Center for Ecoliteracy
Knowledge aspect	<ul style="list-style-type: none"> • Understanding environmental issues and problems from the perspective of ecological balance and sustainability • Think critically, solve problems creatively and apply knowledge to new situations • Understand the principles of ecology • Assess the impact or effect of human actions and apply technology to the environment • Taking into account the long-term consequences of making a decision and taking into account the long-term consequences of a decision
Attitude Aspect	<ul style="list-style-type: none"> • Give attention, empathy, and respect for others and other living beings • Appreciate differences in background, motivation, intention to interact under the perspective of mutual respect for the value of cooperation • Committed to equality, fairness, inclusivity, and respect for all people

In addition, (Sterling, 2009) states the importance of approaching ecological problems through the perspective of relational thinking (which is implied by ecological intelligence) by stating: "If we want the chance of a sustainable future, we need to think relationally".

The point of Sterling's statement above is about systems thinking. Ecological thinking is a form of applying systems thinking which is also a form of the scientific thinking process, namely synthetic thinking by logically connecting ecosystem components in an ecological order, as well as in solving these ecological problems (Kusniati, 2020).

Ecological intelligence is one of the intelligence that is closely related to naturalist intelligence. Naturalist intelligence is the ability to recognize and categorize species, both flora, and fauna, in the surrounding environment and their ability to process and utilize nature, and preserve it (Yaumi, 2012). Yaumi's opinion received support from (Armstrong, 2009) who said:

“expertise in the recognition and classification of the numerous species the flora and fauna of and individual’s environment”

That is, naturalist intelligence is an expert in recognizing and classifying various species including flora and fauna in an environment. Someone who has naturalist intelligence is more interested in activities that are directly related to ecological components so that they will have sensitivity to environmental problems and have a desire to overcome related problems (Wantika, 2017).

Based on the expert opinion above, it can be synthesized that ecological intelligence is the ability of a person to be sensitive to ecological changes so that his actions are beneficial for environmental safety.

Environmental Care Behavior

Talking about caring for the environment is associated with the behavior or actions that a person takes towards the environment itself, whether consciously or not. A person's awareness to perform certain behaviors that make changes to the environment does not just happen. Awareness of behavior has a relationship between the level of knowledge and attitudes. However, a person's knowledge of the environment indirectly affects his attitude and behavior (Yulianti et al., 2014).

A person's behavior related to the environment is not simple but complex, so that the tendency to display one's caring behavior to bring safety to the environment requires a combination of several aspects, both from within and from outside (Sulianto, 2008).

Aspects that come from within a person relate to knowledge, perceptions, interests, intentions or desires, and attitudes. While aspects that come from outside are related to environmental influences such as law, social and cultural values inherent in society (Mariana, 2016).

The behavioral model emphasizes the influence that comes from within a person such as knowledge (knowledge), awareness or attitude (awareness or attitude) and ends with action (action). This means that increasing one's knowledge about the environment will lead to a more positive attitude change so that decisions to take environmental management actions are also better (Hasiana, 2015).

In line with that, in its development, many experts feel that knowledge and attitudes (internal aspects) are not enough to determine someone to achieve better behavior for the environment. Not always a high level of knowledge will encourage someone to behave in environmental care (Meyer, 2015). While a good attitude also does not necessarily reflect good actions or behavior as well. This means that it is necessary to consider external aspects as predictors that can strengthen a person's behavior to have a concern for the environment (R.D, Iswari & S.W, Utomo., 2017).

Therefore, Ajzen (1991) developed a theory of planned behavior which consists of several variables to determine environmental behavior. The behavioral theory developed by Ajzen is based on the assumption that humans are rational beings and use the information that is possible for them systematically.

The theoretical model of behavior developed by Ajzen begins with intentions or intentions. Intentions or intentions are influenced by three variables, namely: (1) behavioral beliefs that are formed from attitudes toward beliefs (attitudes towards beliefs); (2) normative beliefs formed from subjective norms (subjective norms) and (3) Control beliefs formed from perceived behavioral control (perceived behavioral control).

Intentions or intentions are a function of beliefs, while beliefs are determined by three components consisting of (1) attitudes towards behavior; (2) subjective norms; and (3) internalized behavioral control. These three components will interact with each other and as an initial condition for the occurrence of intentions which will then determine a person to perform certain behaviors or not.

In the context of society, environmental care behavior is considered as a way to protect the environment from damage because society and the environment will interact continuously and functionally. Meanwhile, according to the view of environmental culture, behavior is referred to as the main element that appears as the embodiment of human ideas and feelings.

In this regard, Trasdiyanto (2011) divides environmental behavior patterns into four priority scale groups, namely (1) corrective behavior; is to provide added value to the environmental situation so that its quality increases. This behavior can be displayed through the habit of caring for the environment so that it can increase the sustainability of environmental functions to support human life and other living creatures. (2) nurturing behavior; is to maintain the stability of the quality and function of the environment (3)

Neglecting behavior; is a habit that does not want to know about the environment. Individual behavior like this will not care about increasing or decreasing the quality of the environment (4) Destructive behavior; lead to a decrease in the quality and function of the environment.

Concerning human behavior, Notoatmodjo (1993) says that four main things determine individual behavior, namely (1) thoughts and feelings; the form of thoughts and feelings is determined by the knowledge gained through education and experience (2) role models; A person tends to imitate the behavior of others who are considered important to him. For example teachers, tribal chiefs, etc. (3) Resources; this is related to the availability of facilities, time, materials, labor, skills, and services (4) Culture; habits, values of normal behavior are elements of culture that have a deep influence on behavior.

Soemarwoto (2003) defines environmental care as a conscious human behavior or change towards the environment based on an attitude of responsibility due to environmental damage by the human mind. Environmental care behavior can be instilled in students as school members from an early age by respecting and loving nature which is expressed through maintaining harmony with nature, responsible behavior towards the surrounding environment such as not littering, as well as ecological behavior such as avoiding fishing using tools that are not appropriate. environmentally friendly and save electricity.

Therefore, the right solution is needed to raise awareness and understanding of people who have caring behavior towards environmental problems starting from students at school through learning activities. From the description above, it can be synthesized that what is meant by environmental care behavior is a conscious human action based on an attitude of responsibility towards the environment so that the impact is beneficial and feels fair for others and the universe.

Based on the above, the problem can be formulated, namely, how is the relationship between students' ecological intelligence and environmental care behavior in the mangrove ecosystem?

Research Method

This research was conducted at the Salamahu State Elementary School. This research was conducted in May 2021.

Sampling Method and Data

This type of research is quasi-experimental research with a post-test-only design. Research data collection methods include the test method used to obtain data on students' ecological intelligence. Previously, this ecological intelligence data was tested for pre-requisites including a population normality test using the Lilliefors method and a homogeneity test. Furthermore, a regression correlation test was conducted to prove the hypothesis with a significance level of $= 0.05$.

The population of this study was all students of SD Negeri Salamahu. The sample of this research is fourth-grade students who are determined by a simple random sampling technique. The number of samples taken in this study was 35 people.

Result and Discussion

After doing the research, the data was obtained from the normality test of students' ecological intelligence and environmental care behavior.

Table 2. Normality Test Results

	Kolmogorov-Smirnov ^a		
	Statistic	Df	Sig.
Intelligence_Ecology	.125	35	.184
Behavior_Caring_Environment	.169	35	.013

a. Lilliefors Significance Correction

The results of the normality test above show that the ecological intelligence data is normally distributed because there is a significant value of < 0.05 in one group, namely 0.184, and environmental care behavior, which is 0.013.

Table 3. Normality Test Results

		Ecological Intelligence	Behavior_Caring_Environment
Intelligence_Ecology	Pearson Correlation	1	.761**
	Sig. (2-tailed)		.000
	N	35	35
Behavior_Caring_Environment	Pearson Correlation	.761**	1
	Sig. (2-tailed)	.000	
	N	35	35

** . Correlation is significant at the 0.01 level (2-tailed).

The average ecological intelligence of fourth-grade students of Salamahu State Elementary School as a research sample on the subject matter of Mangrove Ecosystem Science shows a score of 24.90. It is known that $r_{\text{count}} = 0.761$ and $r_{\text{table}} = 0.3338$. So that $0.761 > 0.3338$ then H_0 is accepted, meaning that there is a positive relationship between the X variable and the Y variable. It is known that the correlation significance value (2-tailed) is $0.000 < 0.05$, which means that between variables X (Ecological Intelligence) and Y (Environmental Care Behavior) there is a significant relationship.

Several research results and empirical experience show that the pressure on mangrove forest ecosystems mainly comes from the human desire to change the function of mangrove forest areas into residential areas, clearing and expanding pond areas, increasing demand for timber from felled mangrove forests, and other commercial activities. Deforestation of mangroves for the development of pond areas has eliminated the function of the mangrove ecosystem, caused damage to basic habitats and the loss of ecosystem functions, and in turn threatened seagrass ecosystems, coral reefs, and even human settlements (Cunningham, 2003). This shows that human desires which also come from their ecological intelligence are related to their concern for the environment, especially in this case the mangrove ecosystem.

Environmental care behavior of elementary school students towards ecological intelligence that students get when taught by their teachers in utilizing and preserving mangrove forests is obtained by using a questionnaire in the form of a formative test. Based on the average value of the students' ecological intelligence obtained, it can be classified into a good category with an average score of 24.90.

In carrying out the level of family education taught to their parents about the use and conservation of mangrove forests, the questionnaire showed different opinions about the use and conservation of mangrove forests (Nasution, et al., 2016).

The ecological crisis stems from two factors, namely; (a) the use of natural resources that exceeds the capacity to grow, and (b) the low quality of human resources involved in the management of natural

resources and the environment [5]. The low quality of human resources can include their ecological intelligence. This can be seen in the management of the mangrove ecosystem which affects the survival of the biotic and abiotic factors in it.

The pressure on the needs of human life is increasingly having an impact on the exploitation of the capacity of natural resources so that environmental problems also arise, but there are still humans who have ecological intelligence in the form of behavior or local knowledge in the management of ecosystems and coastal natural resources. Ecological intelligence is formed from traditions, attitudes, and behavior with ecological insight into the living order of local communities. Local values that apply to coastal communities are quite effective in managing natural resources and efforts to preserve their ecosystems (Utina, 2012). This behavior or local knowledge is maintained and used by certain ethnic communities because it has religious and sacred values, regardless of the ecological values contained in each of the intended local behaviors and knowledge.

The view of humans in seeing the reality of nature will shape their perceptions and behavior towards nature and their environment. The behavior that is formed can be in the form of harmony in human relations with their environment, or vice versa (Barbara, 2008). The quality of the environment can be changed by human intervention or due to natural influences, but natural changes can also occur due to human behavior. Overcoming the ecological crisis is not merely a technical matter, but it is necessary to explore the spiritual intricacies of humans, their outlook on life, their awareness of nature to ecological behavior that maintains the balance of nature (McCallum, I., & Lyall, W., 2008).

Ecological intelligence is in the form of understanding and translating human relationships with all elements of nature and other living things. Ecological intelligence is empathy and deep concern for the surrounding environment, as well as a critical way of thinking about what is happening in the surrounding environment as a result of our treatment.

Another meaning of ecological intelligence is people who think critically about environmental problems both individually and in groups in making political decisions (Goleman, 2009).

Ecological intelligence organizes human emotions, thoughts, and actions in responding to the universe so that humans realize as part of an ecosystem, for example, humans should not allow the planet's future to be threatened by global warming. Ecological intelligence is expressed in the form of real attitudes and behaviors that take into account the ecological capacity and gives birth to the loyal attitude of human friends with nature.

The form of human ecological intelligence in life, among others, appears when a policymaker decides to transfer the function of a mangrove forest to a fishpond area or other designation, the ecological impact must be carefully considered. As a result of his policy, some of the mangrove lands were lost and replaced by pond land. The existence of ponds does not have to eliminate the ecological function of mangroves in coastal areas. Ecological intelligence can also be seen in the real behavior of replanting mangrove plants in open land on the coast, this behavior is based on an awareness that if mangrove plants are not replanted, the land will be exposed and affected by erosion or abrasion. The Bajo ethnic has the values of ecological intelligence in the form of local wisdom, for example when the husband makes a living at sea for several days or weeks (called *mamia kadialo*), the family left at home is prohibited from throwing materials into the sea. as; sea cucumber washing water, wood charcoal, kitchen ashes, chili water, ginger, as well as a ban on washing cooking utensils (pans) in sea waters. Washing water and these materials should be collected and then thrown on land, if this is violated it can bring havoc, storm disasters, disturbance of evil spirits and even those who go to sea do not get results. There is also a prohibition against killing or eating turtle meat because these animals are believed to help humans who experience disasters when they go to sea (Harun, R., 2011).

But ecologically, this local wisdom contains the value of ecological intelligence which prohibits polluting marine waters with household waste, encourages people to try to preserve animals, and means the preservation of coastal water ecosystems.

The sustainability of human life in the future will depend on ecological intelligence. So that students have ecological intelligence, it is necessary to have a competency that is an indicator of the achievement of planting an understanding of ecological intelligence in students.

Conclusion

Based on the results of data analysis and discussion, it is concluded that there is a positive relationship between students' ecological intelligence on environmental care behavior, especially on the material of mangrove ecosystems. Ecological intelligence can be improved through teaching in schools and the family environment so that students' environmental care behavior will also be better.

Ecological intelligence has the principles and values of environmental conservation. For this reason, efforts are needed to improve students' ecological intelligence starting through the learning process at school so that students can implement it in the form of caring behavior towards the environment.

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