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## The Development of Early Childhood Naturalist Intelligence through Environmental Education

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**ABSTRACT:** Environmental education exists as a solution to improving the intelligence of early childhood naturalists, but its implementation is often forgotten or only as a hidden curriculum. The purpose of this study is to provide information related to the implementation of environmental education for early childhood to improve the intelligence of early childhood naturalists. The research method used in this study is a qualitative method presented in the form of an in-depth literature review. Literature study efforts are carried out by reading, observing, recognizing, and describing to analyze reading material in the form of related literature as a reference source. The result of this study is that the use of instructional strategies for gardening activities and creative game-based environmental learning can be considered to improve the intelligence of early childhood naturalists. In addition, it was also found that the material often used by educators to improve naturalist intelligence is the introduction of animals and plants. The trend of measuring the intelligence of early childhood naturalists uses many observation sheets, but it is also recommended to use research instruments that have been standardized or published in reputable scientific articles to obtain valid and reliable data.

**Keywords:** environmental education, early childhood, naturalist intelligence

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## 1 INTRODUCTION

A great nation is not only measured by the abundance of natural resources in a country but also by the potential of the humans who inhabit it. Learners are the generation that will maintain environmental sustainability. By involving students in this matter is hoped that environmental problems can be prevented and resolved. Habituation in the school environment will have a positive influence on the habitual lifestyle of students. Thus, it is necessary to instill the value of environmentally caring character in students of the next generation of the nation who love the surrounding nature (Fajrin, 2020). As a developing country, Indonesia is not spared from the problem of character education that continues to have an impact on human life (Fatria et al., 2023). People's awareness to love the environment must start from an early age and start from the child's home or early school, namely in ECCE institutions (Chandrawati, 2021). The formation of an environmentally conscious character can be done through environmentally sound learning. With the learning of environmental care attitudes, it is hoped that it can make students aware to have concern for nature and the surrounding environment (Ismail, 2021).

In line with the above, other opinions emphasize efforts to increase awareness and improve the community in an environmentally responsible direction can be done through environmental education. Environmental education is an educational program that aims to nurture students to have understanding, awareness, rational attitudes, and behaviors, and be responsible for the mutual influence between humans and the environment in various aspects of life (Martuti et al., 2022). One of the objectives of environmental education is to form a character of environmental love. This character-building is ideally done from an early age. So environmental education is very appropriate if integrated into the early childhood education curriculum because early age is the right time to instill children's love for the environment (Pelima, 2014). Another reason that explains the importance of implementing environmental education is introduced early, because basically during the golden age this is a time when children form their character through the stimulation provided (Safira & Wati, 2020).

Education should put children as subjects because every child has special and unique needs while the child's world is playing to develop his creativity. The surrounding natural environment is a vast exploration area as well as the right learning media to educate children to love the environment (Pelima, 2014). Instilling an attitude of concern for the environment is a challenge, there needs to be the participation of coaches and mentors, namely educators. A teacher must set an example for students in the educational environment of the school. Teachers are authorized and responsible for guiding and addressing environmental issues. Teachers must take concrete action by instilling environmental care values for students, especially for the early education level so that they have an initial foundation of environmental love. Students can be nurtured, guided, and educated to carry out tasks that demand commitment and responsibility (Fajrin, 2020). But the problem is that environmental education is one thing that is often ignored in our education system (Adawiyah & Dewinggih, 2021). Even the introduction of

environmental education or environmental hygiene in early childhood is very necessary for the formation of a personality in the future, to create a society that cares about the environment because, at an early age, children are good imitators (Widhiani & Imam, 2018).

Given the importance of environmental education for early childhood in forming the foundation of environmental sensitivities, interests, and behaviors later in life, early childhood environmental education is envisioned to be a unique environmental education, that influences the emergence of several philosophical approaches and orientations. We can exemplify this in nature-based early childhood programs, which will provide direct experience of information about nature and a high appreciation of nature (Ardoin & Bowers, 2020). A person who has a high sensitivity and appreciation for nature means having a high naturalist intelligence towards nature and the environment. Naturalist intelligence should be instilled from an early age. This is because at that age the child is in the golden mass so that the development of children's intelligence is at an optimal level (Wijaya & Dewi, 2021). But what is the problem currently is that there are still many early childhood children who have not received good environmental education, so children's concern for the environment and the environment is still low. The most obvious example that exists in the environment around us is the frequent littering of early childhood, on tables, under benches and even scattered inside and outside the classroom. In addition, children never learn outside the classroom to just observe the trees around the school, so when children are invited to learn outside the classroom, children cannot say the names of plants they encounter every day. The things mentioned above are part of the child's naturalist intelligence that is still low and needs a strategy to develop it (Saripudin, 2017).

The purpose of this study is to determine the importance of environmental education in early childhood with the use of pedagogical models or strategies to strengthen the intelligence of early childhood naturalists. Originality in this study is related to contemporary issues of environmental education for early childhood, especially those applied in the current era of the Industrial Revolution 4.0, where the development of technology and information plays an important role in learning activities and the use of instructional strategies that are considered capable of responding to global challenges and fostering the development of early childhood naturalist intelligence. The implementation of this study is expected to be able to answer 3 pedagogical questions related to environmental education for early childhood: (1) What trends in instructional strategies have been reported and become findings in environmental education research to strengthen the intelligence of early childhood naturalists that have been published in scientific journals?; (2) How is naturalist intelligence measured in early childhood?; (3) What is the diversity of 21st-century environmental education materials for early childhood to improve naturalist intelligence that has been published in scientific journals?

## 2 THEORETICAL STUDY

### 2.1 *Environmental Education for Early Childhood*

Environmental education is education that emphasizes the environment as the main axis in its discussion. One of the goals of environmental education for early childhood is to form an attitude of caring and respecting the environment. If the formation of attitudes and character begins early, then as they grow older they will get used to caring and respecting the environment (Safira & Wati, 2020). Environmental education from an early age is a holistic idea related to increasing knowledge about nature, strengthening admiration for the beauty of nature, creating conditions that make children come into direct contact with nature, and fostering children's skills to care for nature. Therefore, early childhood environmental education requires attention and responsibility from family and school (Mulyatno, 2022). Environmental education is very important for people in the era of disruption, to manage resources wisely and foster a sense of responsibility for the benefit of future generations. In addition, the need for this knowledge, behavior and skills are to support our resources so that they can be utilized sustainably. This requires synergy between generations to continue supporting a green future towards sustainable generation (Hidayah & Baedowi, 2020). Environmental Education focuses on authentic inquiry and action as well as community involvement and participation more appropriately for environmental development and protection (Hadjichambis & Paraskeva-Hadjichambi, 2020).

Environmental education for early childhood can be started with various activities based on environmental love. Habituation of environment-loving behavior helps shape the character of students. Environmental loving behavior is an application in the form of actions to maintain, care for, and preserve flora and fauna including the act of managing all natural resources (land, water, and air) for the survival and welfare of human life (Pelima, 2014). Environmental education is a process activity that aims to create a world community (including early childhood) that has concern and is willing to work to provide solutions to the environment and related problems in it, and has the knowledge, motivation, commitment of skills to avoid the emergence of new environmental problems. The purpose of environmental education is to change individual behavior into environmentally friendly behavior (Chandrawati, 2021).

Environmental education in early childhood is a holistic concept that includes nature which is considered as important as learning about emotions, and skills that also include the development of curiosity, appreciation of natural beauty, the opportunity to feel joy through closeness to nature; and respect the living beings that are in it (Priyatna et al., 2017). Therefore, environmental learning activities in early childhood require maximum use of the senses. This is because at that age the child is in a period of motor development (A. S. R. Adawiyah & Dewinggih, 2021). Although regulations regarding the implementation of environmental education have been born, at the implementation level there are still no guidelines that can be a reference for teachers in implementing environmental education at the early childhood education level. On the other hand, early

childhood education is seen as a great place to start learning about the environment (Djoehaeni, 2014). Environmental education must be based on direct experience of the natural environment so that it is hoped that direct experience can shape behaviors, values, and habits directed at respecting the environment. Therefore, educators and learners must be able to live and interact directly with the environment, maintain, and participate in environmental protection. In achieving this goal, it is urgent and urgent to introduce environmental education directly and invite students to play an active role in protecting the environment from an early age (Jufri et al., 2019).

Environmental education models have different directions and goals, but both can start from an early age and become lifelong learning. The differences for each focus are: (1) environmental education has the goal of teaching early childhood about the environment, making them understand environmental concepts, and enabling them to critique issues in a logical and constructive way; (2) education for the environment aims to encourage early childhood to learn the relationship between individuals and the environment, early childhood also begins to understand the causes of environmental pollution and is encouraged to integrate environmental responsibility and attitudes into their behavior; (3) Education in or from the environment aims to integrate research data and personal experience to develop environmental awareness and solve environmental problems. Using this model, awareness is built on our knowledge and experience of the environment (Fang et al., 2022). Based on the definitions above, it can be constructed that environmental education for early childhood is a field of science that equips early childhood about the importance of the environment, values, and morals of the environment so that it can transform early childhood knowledge, attitudes, and behaviors into more pro-environment to support sustainable development.

## 2.2 *Early Childhood Naturalist Intelligence*

Intelligence has a very important role in human life. Through intelligence possessed by humans are able to solve various problems they face (Yunisari et al., 2016). Early childhood is an age group that is in a unique developmental process. Currently children experience extraordinary growth and development in all aspects of intelligence and development, both in terms of social, emotional, language, physical motor, cognitive and art. All aspects of intelligence and development can develop optimally if children are given good stimulus (Rocmah, 2016). One of them is naturalist intelligence, which is needed by early childhood to prepare the next generation of the nation who love the environment. Recognition and understanding of the surrounding environment, and preserving the environment, must be developed from early childhood. From an early age children are taught to recognize and understand natural conditions, both flora and fauna (Firdausyi et al., 2022). Another opinion explains that naturalist intelligence is equated with the ability to recognize, distinguish and group everything related to nature, be it flora, fauna, and abiotic components as important life support components strengthened to each individual from an early age, so that later they grow into people who have an environmentally caring character (Wijaya & Dewi, 2021).

The concept of naturalist intelligence describes a person who can recognize flora and fauna and other things that exist in nature and use his abilities productively, which is also expressed as the ability to observe natural patterns and understand natural or man-made systems (Saripudin, 2017). Naturalist intelligence relates to sensitivity to the surrounding natural environment. When children aged 4-5 years can be seen the manifestation of the intelligence of children who have this naturalist intelligence as follows: (1) children like activities related to the surrounding environment for example liking animals by maintaining, liking plants; (2) show a desire to preserve the surrounding environment; (3) be sensitive to natural events; (4) likes exploration or exploring by observing how the surrounding environment is, so that learning for early childhood not only aims to stimulate children's development but also includes their naturalist intelligence (Gumitri & Suryana, 2022). In line with this concept, naturalist intelligence is defined as children's knowledge in recognizing and maintaining nature, namely plants and other aspects of the surrounding environment (Dwikayani, 2015). Naturalist intelligence needs to be stimulated as early as possible, so that children have a character that is more friendly to the natural environment and have awareness to preserve biodiversity. If as early as possible children have been introduced to how to love the universe and its contents, then environmental damage as it occurs today in various parts of the world can be minimized (Rahmatunnisa & Halimah, 2018).

The ability of children to interact with nature is often referred to as naturalist intelligence. Naturalist intelligence also includes a child's sensitivity to natural phenomena, such as weather, cloud shapes and natural disasters. Usually children who have naturalist intelligence are very fond of the outdoors such as mountains, clouds, plants, and allow them to raise animals such as rabbits, cats, hamsters and so on (Anggraini, 2017; Sumitra & Panjaitan, 2019). One of the traits present in children who are strong in naturalist intelligence is their enjoyment of nature, animals, and plants. This fun may lead the child to activities that seem dirty and dangerous. Children who are interested in animals, for example, will dare to approach, hold, pet, even have the instinct to maintain. Problems arise if educators are afraid, disgusted, or dislike the animal (A. Ismail, 2018). There are children who have high naturalist intelligence, and some are low, and some even do not have naturalist intelligence, therefore in developing a child's naturalist intelligence, the right strategy is needed so that learning objectives can be achieved properly. Naturalist learning emphasizes providing direct experience to develop competencies so that children can see and understand the environment they have. Children who have good naturalist intelligence will be able to love and have a high interest in plants, animals, and the environment. Environmental education is directed to find out and make the right decisions so that it can help children to gain a deeper understanding of themselves and the environment around them, so that children can later develop and apply this understanding in everyday life (Destarani & Sari, 2021).

Early childhood can apply through environmental education activities by doing games, through these activities the learning experienced by children will be more fun because children learn while playing so that they can explore the potential that exists in them such

as gardening, raising fish, planting flowers, and so on (Sari et al., 2023). The core components of naturalist intelligence are distinguishing species, recognizing the existence of other species, and mapping relationships between multiple species. The competence possessed is the ability to examine natural phenomena, classify and identify. One of the reasons for the importance of developing this naturalist intelligence from an early age is because many humans do not care at all about their environment and the preservation of nature, so it will damage the existing ecosystem. Therefore, by developing naturalist intelligence in early childhood, it is expected to be able to produce a generation that cares and loves the environment and the environment (Sari et al., 2023). Based on the above definitions, early childhood naturalist intelligence can be constructed into a conceptual definition, namely the ability of early childhood to recognize biotic and abiotic environments so that it can stimulate sensitivity and commitment to maintain and preserve the surrounding environment.

### 3 METHOD

The research method used in this study is a qualitative method presented in the form of an in-depth literature review. Literature study efforts are carried out by reading, observing, recognizing, and describing to analyze reading materials in the form of related literature as reference sources (Creswell W., 2013). The design of this research is a document analysis research, in the form of Literature Review (LR).

#### 3.1 *Data Source*

The articles used in the literature study of this manuscript, were obtained from an online database. The source of the articles to be analyzed comes from the scientific work of students, academics, teachers, and lecturers published in accredited national journals, seminar proceedings, and international journals. The authors limit this investigation to 2014-2024. Environmental education for early childhood is one of the learning that is well known but rarely carried out widely throughout the world, even though the principle and purpose of this education is in constructing knowledge and strengthening the naturalist intelligence of children from an early age as future life leaders to save an increasingly degraded environment both in quality and quantity (Fatria et al., 2019). The search was conducted on the online databases Google Scholar, Rama, Elsevier-ScienceDirect, Springer, Wiley, and Taylor & Francis Online and web pages containing scientific content such as the Raden Intan Lampung UIN repository, Panca Budi Development University, UNY, UNNES, Bengkulu University in accordance with the theme of the investigation.

#### 3.2 *Procedure*

The next sub-stage is to determine the criteria for selecting articles to be used. The inclusion criteria set out are: (1) Documents selected in Indonesian or English; (2) The document used discusses environmental education in strengthening the intelligence of early childhood naturalists; (3) The document uses the keywords "early childhood

environmental education" and "naturalistic intelligence" contained in the title of the article; (4) Articles published in 2014 to 2024 (last 10 years) during the writing process of this manuscript. The exclusion criteria used are: (1) The articles obtained are presented incompletely; (2) The author excludes articles published before the last 10 years, to prevent contemporary issues or environmental learning trends for early childhood in accordance with the themes and developments of the 21st century; (3) The article does not have a reputation and level of trust in the results obtained.

### 3.3 Data Analysis

The data analysis technique used in this investigation is a content analysis technique, namely by conducting an in-depth analysis of literature related to environmental education and early childhood naturalistic intelligence. For more details, the systematic steps used in this investigation adopt research steps from Artanti et al.(2022), which can be described at Figure 1.

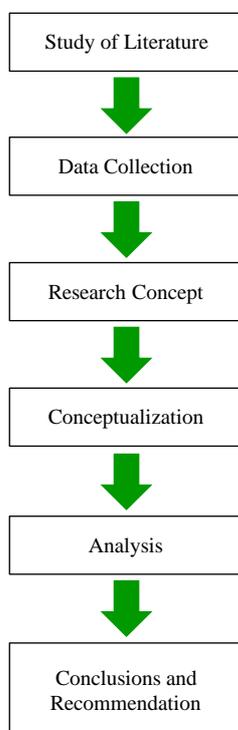


Figure 1. The Stages of The Study Literature

## 4 RESULT AND DISCUSSION

### 4.1 Result

The number of references traced in environmental education investigations for early childhood to strengthen naturalist intelligence was 35. The references used have been collected regarding the validity, reputation, and accuracy of scientific writing research data, so that it is worthy of being used as a reference in systematic literature studies. Scientific papers that are used as references have been indexed internationally, national indexes, but some are not indexed. Before these articles are continued for review, for

scientific journal publications, the writing team first checks the articles obtained are included in predatory journals or not. For the first part we will discuss instructional strategies used in environmental education for early childhood to strengthen naturalist intelligence. Data on instructional strategies used in environmental education for early childhood to improve naturalist intelligence are presented in table 1 which has been grouped based on several stages according to the description of the research method.

#### 4.1.1 *Environmental Education Learning Strategies for Early Childhood*

Table 1. Environmental Education Learning Strategies for Early Childhood to Strengthen Naturalist Intelligence

Instructional Strategies	Sum
Farming or Gardening Activities	6
Learning at the Natural Material Center	3
Traditional Game-Based Learning	2
Scientifically Based Learning / PjBL	3
Direct Observation-Based Learning	4
Science Learning with Creative Game Media	6
Plant Exploration	4
Field trips	4
Outdoor Learning	2
Inquiry Learning	1

Source: Results of article review, 2024

##### 4.1.1.1 Farming and Gardening Activities

Based on the articles that have been reviewed, environmental education with farming or gardening activities is a strategy that is quite widely chosen by educators to be applied during the implementation of environmental education in developing early childhood naturalist intelligence (there are 6 articles in total). Developing naturalist intelligence in early childhood can be done through gardening activities, especially by planting vegetable plants (Agustiana, 2021; Dwikayani, 2015). Farming activities are not only limited to planting activities but also in the context of plant maintenance (Sukanti, 2021) and it can also be done at the initial stage, namely planting vegetable seedlings (Nurwati, 2020). In other studies it is stated that gardening is a fun activity for children, providing new things to children, doing physical activity activities, and gardening can provide opportunities for children to explore and observe the surrounding environment and increase naturalist intelligence (Indrayani, 2021). Through gardening activities, early childhood can mention the characteristics of vegetables, can classify various types of vegetables, know the benefits of vegetables for themselves, children the ability to preserve and cultivate plants and increase love for the environment (Hasanah et al., 2019).

##### 4.1.1.2 Learning at the Natural Material Center

The center as a place for children to play and learn is very necessary, so that children can explore and do all learning activities.

#### 4.1.1.3 Traditional Game-Based Learning

To develop the naturalist intelligence of the child can be done through traditional games. Traditional games have a huge influence on the mental, physical, and mental development of children.

#### 4.1.1.4 Scientific Based Learning / Project Based Learning

Learning using a scientific approach can improve the naturalist intelligence of early childhood. The success factor is because scientific-based learning is carried out gradually starting from children observing, questioning, trying, reasoning and communicating (Aprilianti & Septiani, 2021).

#### 4.1.1.5 Direct Observation-Based Learning

Learning by direct observation is a learning process where students are invited to deal directly with the surrounding environment which will provide facts or natural symptoms that occur. This approach is a learning approach that seeks to increase student involvement through the utilization of the surrounding environment as a learning resource (Hendriani et al., 2023). In general, these activities include providing a conducive environment for children's development and learning, shaping children's behavior with educational and teaching activities, and helping to solve problems faced by children by providing appropriate direction. Its application can be through the observation of life science that discusses facts, concepts, theories, principles, and rules related to animals, plants, the relationship between plants and animals, and elements of life with their environment (Gumitri & Suryana, 2022). The implementation of direct observation-based learning in children is carried out not only in the classroom, but also outside the classroom so that the learning carried out is more effective, and can attract children to interact directly with the environment (Ulfa, 2014). Forming naturalist intelligence in children is more fun if preschoolers can observe directly what is around them, for example observations about school cleanliness which is simple material and can raise the spirit of early childhood if supported by simple, environmentally friendly, recyclable learning media such as plastic cups and used cans (Ekayanti, 2014).

#### 4.1.1.6 Science Learning with Creative Game Media

Play is a fun activity that gives joy. Through play, children learn to control themselves and can be imaginative. So play is a mirror of child development (Rahmatunnisa & Halimah, 2018). The main purpose of creative play is to maintain optimal development or growth in early childhood through a creative, interactive, and integrated play approach with the child's play environment, and the emphasis of creative play is the development of creativity from early childhood (Cinantya & Maimunah, 2022; Susmini & Sumiyati, 2019). Increasing naturalist intelligence through creative games such as messy play for children aged 5-6 years has been successfully proven by Rocmah (2016). In addition, investigations regarding the use of creative game media such as horta dolls have taught children love and sense of responsibility for the surrounding environment through play activities, as well as training the spirit of patience, discipline and responsibility from an

early age to children (Rossa, 2014). In addition, creative media can also be in the form of educational game media that have also been researched by Latifah & Prasetyo (2019) With their findings that there are very significant differences in naturalistic intelligence using educational games rather than monotonous demonstration methods. This means that the use of creative learning media can stimulate and increase the intelligence, love, and sensitivity of early childhood to the environment (naturalistic).

#### 4.1.1.7 Plant Exploration

Exploration is a game activity carried out by observation to obtain deeper knowledge about the object of observation which serves to improve the ability to think creatively, develop the ability to observe, concentration, accuracy, independent learning and curiosity of children (Anggraini, 2017). Evaluation of the intelligence of early childhood naturalists can use plant recognition learning which aims to classify dry and green leafy plants, classify them based on the shape of the leaves of surrounding plants, classify plants that produce fruits and flowers, twigs, and by size (Fajrin & Alwiyah, 2023). Children's responses in learning through the use of plants to increase naturalist intelligence, among others, children can already name the types of plants in accordance with the information obtained (Milin et al., 2014). An example of other exploration activities is taking early childhood around the house or school to get to know various types of plants, such as vegetables, ornamental plants, medicinal plants, fruit plants, and others. In this activity, teachers or parents should act as guides as well as facilitators for children (Khan, 2022).

#### 4.1.1.8 Field trips

Field trips are a learning activity carried out in the field where every child can directly observe animals, plants, and can observe directly. Through this method, the benefits can be taken for children, namely getting the opportunity to foster interest in something, for example to develop an interest in the animal world, children are taken to the zoo. They had the opportunity to observe the behavior of the animals there (Sumitra & Panjaitan, 2019).

#### 4.1.1.9 Outdoor Learning

Some of the concepts underlying outdoor learning for environmental education are: 1) Education so far does not place children as subjects; 2) Every child has special and unique needs, they have advantages and disadvantages, so that the process of uniformity and leveling will kill the uniqueness of the child; 3) The child's world is a world of play, but more lessons are delivered not through play; 4) The age of children is the most creative age in human life, but the world of education does not provide opportunities for the development of creativity (Sari et al., 2023). Outdoor play is very fun and important for a child's growth and development. Various types of areas can enrich the outdoor environment as a learning tool that can be utilized by children. Outdoor play areas can be implemented on open grass, on the ground, and on the sand where children can use to play groups, run toys, or run freely. Research on outdoor learning can improve the intelligence of early childhood naturalists by Rahmawati (2018), resulting in research

findings there are significant differences and improvements in the naturalist intelligence of children aged 4-5 years after applying outdoor learning and children become more sensitive to the surrounding environment.

#### 4.1.1.10 Inquiry Learning

The use of inquiry learning strategies in order to improve early childhood naturalistic intelligence has been reported by Ulfah & Khoerunnisa (2018), it was also explained that the inquiry learning strategy is a series of learning activities that involve the maximum ability of students in finding, investigating and solving a problem.

#### 4.1.2 Early Childhood Naturalist Intelligence Measurement Tool

Based on Table 2, the instruments that are widely used in research are observation sheets. Observation sheets are used so that researchers are more directed in making observations so that the data obtained is easy to process. The observation sheet is used to determine the extent of improvement in children's naturalist intelligence through instructional treatment provided by educators (Fuaida et al., 2023).

Table 2. Naturalist Intelligence Measurement Tool for Early Childhood

Measuring Instruments	Sum
Behavioral Observation Sheet	11
Open Observation Sheet + Systematic Observation	1
Life Science or Problem-Solving Tests	1
Observation Sheet + Interview + Simple Test	3
Observation Sheet + Interview + Documentation	15
Open Questions	2
Interview + Questionnaire	1
Interview + Test Using Media	1

Source: Results of article review, 2024

The form of instruments developed by several researchers on early childhood naturalist intelligence is classified into 2 forms, namely test and non-test instruments (observation sheets, interviews, questionnaires). For the instruments used, you can use instruments made by the researcher himself, which are constructed based on conceptual definitions, operational definitions, and instrument grain grids. You can also use standardized instruments published in scientific journals or scientific papers of a researcher. Standardized instruments are instruments that are considered good, because they have gone through detailed calibration and validity tests to ensure the accuracy of research data collection.

While instruments that are developed by themselves and have not been standardized can cause gaps in research carried out with research that has been published in reputable journals (Primahesa et al., 2023). One form of standardization of early childhood naturalist intelligence instruments published in reputable journals, has constructed early childhood naturalist intelligence consisting of 7 dimensions and 24 indicators. These dimensions are: (1) Sensitivity to nature; (2) The ability to recognize, classify and distinguish the life of species in large numbers, including flora, fauna, and the environment; (3) Food chain; (4) Love of nature, animals and plants; (5) The ability to

distinguish living things from inanimate objects; (6) Interested in the animal or plant world; and (7) Care for the environment, pay attention to nature and easily adapt to nature (Ismail, 2018).

#### 4.1.3 Environmental Education Learning Materials for Early Childhood

Based on table 3, it can be explained that the material often given by educators to early childhood is animal and plant taxonomy material. The large selection of this material is based on an interest in nature shown in early childhood by observing and investigating various lives of small creatures such as worms, ants, caterpillars, and so on. Children who have naturalist intelligence tend to like the outdoors, get along with pets, and often spend time near animals or plants they like (Ultimate, 2015).

Table 3. Environmental Education Learning Materials for Early Childhood to Strengthen Naturalist Intelligence

Early Childhood Environmental Education Materials	Sum
Taxonomy of Animals and Plants	14
The Existence of Humans, Animals, Plants and Other Things	3
Recreation	1
Gardening and Caring for Plants	9
Concern for the environment + Pollution	2
Flora and Fauna Cycle + Weather Dynamics	2
Waste Management	1
Properties of Water, Fire, and Air	1
Wet Material Environment	1
Recognizing Natural Objects	1

Source: Results of article review, 2024

The learning steps for children can be done by inviting children to identify plants such as children are invited to study outdoors and observe plants around and guess animal sounds, where children can listen to animal sounds or watch movies with animal themes (Firdausyi et al., 2022). Instilling naturalist values in children from an early age is expected to make children increase their love for animals and plants around them (Yunisari et al., 2016). Other materials that are also often used to improve the intelligence of early childhood naturalists are gardening and caring for plants. Gardening materials are fun for children as they plan, plant and care for their plants, learn valuable concepts and skills that will help them live later in life (Dwikayani, 2015).

#### 4.2 Discussion

The fact explains that environmental damage that occurs on earth is caused by the awakening of the paradigm that humans are the rulers of this planet (anthropocentrism) so that the behavior caused is solely for its own interests and ignores other aspects such as the environment (Nurdiansyah & Komalasari, 2023). Therefore, planting the foundation of environmental education from an early age is the main solution that must be done, so that the younger generation understands the environment. Environmental education is expected to be able to educate early childhood to behave in caring for the environment. Childhood is a critical journey, as future generations of the nation come. Thus, it is very strategic to equip students with knowledge about the environment from an early age, so that they behave in a caring way for their environment (Amini &

Munandar, 2014). Environmental education is an educational program to nurture children or students to have rational and responsible understanding, awareness, attitudes, and behaviors about the mutual influence between residents and the environment in various aspects of human life. With the application of the environment, it is expected to realize environmental awareness by implementing a comfortable and ideal learning environment so that the learning process runs as it should. Along with the development of the times, the current natural environment is increasingly changing for the worse. There are many natural disasters caused by humans. To overcome environmental damage, it is necessary to have environmental education (Widiawati, 2022).

The challenges of the current 21st century in educating children to be more sensitive to environmental problems include the lack of environmental education from parents, the community is still not aware of environmental problems so environmental education must be carried out more intensively through schools and other educational institutions. Therefore, in educating a community, especially early childhood, schools must cooperate with parents and the surrounding community (Chandrawati, 2021). Environmental education is instrumental in the survival of early childhood in the future. Environmental education is important in relation to being able to manage resources wisely and the emergence of a sense of responsibility for the interests of future generations, namely the need for understanding, behavior, and skills as a support for our resources can still be used sustainably or can be used sustainably. This requires intergenerational sustainability to keep nature sustainable for the future (Hidayah & Baedowi, 2020).

Early childhood intelligence plays an important role for survival in the future because early childhood is an asset in adulthood. Intelligence is a measure of the performance of each individual, but intelligence is not a place to judge whether someone is smart or not, but based on the potential of that person because we know that everyone has different potential, that is intelligence (Fajrin & Alwiyah, 2023). One of the intelligences possessed by humans that is closely related to the environment is naturalistic intelligence. Naturalist intelligence is important to be instilled in everyone so that later they will grow into people who have a character that cares about the environment. Naturalist intelligence should be instilled from an early age. This is because at that age the child is in the golden mass so that the development of children's intelligence is at an optimal level. In addition, at that age children have a curiosity instinct and a high interest in exploration of the surrounding nature. Thus, developing naturalist intelligence in early childhood is appropriate (Wijaya & Dewi, 2021).

#### 4.2.1 *Farming and gardening activities*

Based on searches conducted on several articles and scientific papers, the writing team can report that strategies that are widely applied to stimulate the intelligence of early childhood naturalists are farming and gardening activities and creative game-based environmental learning. Gardening is a fun activity for children, where children are given the opportunity to learn concepts and skills, explore life around such as grains, insect vegetables, water and other nutrients and play in dirty places, observe and participate in

important cycles of plant life such as planting, caring for, and harvesting garden products (Agustiana, 2021; Dwikayani, 2015; Hasanah et al., 2019; Indrayani, 2021; Nurwati, 2020; Sukanti, 2021).

#### 4.2.2 *Learning at the Natural Material Center*

Naturalist intelligence can be improved through learning strategies of natural material centers by applying aspects of the development of naturalist intelligence into activities in natural material centers, such as pouring water into bottles, filling patterns from dried banana leaves, planting green beans, painting on leaves with watercolors, putting grains into bottles, stamps or stamping banana and star fruit fronds, Experiments float, float, sink, and shape with matchsticks (Asih & Susanto, 2017). The selection of games in natural material centers brings early childhood closer to the surrounding nature, because centers can develop and stimulate various potentials, development and intelligence of children naturally and can facilitate children's needs. So that children choose games according to their needs and interests that stimulate their naturalist intelligence by agreeing on the rules of play (Yunisari et al., 2016). The introduction of various types of animals, plants, fruits of the surrounding nature, gives an understanding of waste that waste causes various consequences such as disease or flood or increased intelligence naturalists can apply the center model. Its use can add to the experience of educators to develop skills in developing early childhood naturalist intelligence (Firdausyi et al., 2022).

#### 4.2.3 *Traditional Game-Based Learning*

Through traditional games make children more creative in creating game tools using items, objects, or plants in the surrounding environment so that they can get closer and unite children with nature. One of the traditional games that can develop naturalist intelligence is the traditional game *Market* Many use game tools made or used from plants, soil, tiles, rocks, or sand, these activities bring children closer to the surrounding nature (Ultimate, 2015). Another example of the application of traditional game-based learning is corn seed mashing learning which has been shown to efficiently improve the intelligence of early childhood naturalists. Naturalistic intelligence is obtained as the ability to cultivate and utilize nature, and preserve it (Syarofi et al., 2023).

#### 4.2.4 *Scientific Based Learning*

One of the models applied to scientific learning is project-based learning. Examples of the application of the project model in environmental education for children are project activities to make flower vases from waste that can be reused (reuse), and make flowers from waste that must be reduced (reduce) and teach the concept of recycling (recycle) by making compost (Walidaini, 2021). Research revealing the significant influence of project-based learning with naturalist intelligence has been elaborated by Adawiyah et al., (2019), explained that the project method is something fundamental to the teaching and learning process that teachers and students have, it is based on a strong belief that learning by doing is very important to be the subject of discussion in groups and also

reviewing ideas and experiences is the main way to gain better understanding and learning.

#### 4.2.5 *Direct Observation Based Learning*

In improving the intelligence of early childhood naturalists, instructional strategies are needed that can be used by educators in the transfer of knowledge, values, environmental morals to early childhood. Innovative learning strategies are learning strategies that can improve students' creative thinking. Innovative learning strategies are inseparable from constructivism in learning. This understanding of constructivism familiarizes students with finding things independently and struggling with ideas (Fatria, 2023).

#### 4.2.6 *Science Learning with Creative Game*

Creative game-based learning in environmental education can also be considered, where based on the results of research that has been reviewed, the use of this strategy is based on the needs that are inherent in each child. In play there are elements of trying, exploring, discovering, experimenting, restructuring, speaking, and listening. Children can reap various benefits for the development of physical-motor, intelligence, and social-emotional aspects of play. Various studies have reportedly confirmed that creative use of games can enhance the intelligence of early childhood naturalists (Rahmatunnisa & Halimah, 2018; Rocmah, 2016; Rossa, 2014; Susmini & Sumiyati, 2019).

#### 4.2.7 *Plant Exploration*

Planting is a joyful and entertaining activity for children, where children are provided the opportunity to skillful equipped by concepts and skills, explore life around such as grains, vegetables, water, and other nutrients. Looking after the cycles of plant life such as planting, caring for, and harvesting garden products (Agustiana, 2021; Dwikayani, 2015; Hasanah et al., 2019; Indrayani, 2021; Nurwati, 2020; Sukanti, 2021).

#### 4.2.8 *Field Trips*

Field trips carried out by teachers and students to directly see the objects to be visited so that children feel the real experience. Findings related to field trip activities can improve the intelligence of early childhood naturalists group B, has also presented a learning atmosphere that is different from before where children are able to get to know directly the objects to be visited (Destarani & Sari, 2021; Juniarti, 2015). The benchmark for improving early childhood naturalist intelligence through the field trip method is the achievement obtained when children can distinguish each characteristic of natural objects and can classify natural objects according to their characteristics. In observing nature will encourage children to explore nature freely as they wish, but this activity is still under the supervision of the teacher. By observing nature, teachers will be able to measure the extent of children's interest in nature (Marlyana, 2023).

#### 4.2.9 *Outdoor Learning*

Several studies published in reputable scientific journals have confirmed that environmental education materials that are often given by educators to early childhood in order to improve naturalist intelligence are animal and plant taxonomy materials (Anggraini, 2017; Ekayanti, 2014; Gunitri & Suryana, 2022; Hendriani et al., 2023; Ulfa, 2014; Yunisari et al., 2016). Studies that are more specific to living things in science for early childhood are often called life science. The science of life is the study of living things i.e. plants and animals (Winangun, 2020). This material is mostly taught by ECCE teachers because the objects are most easily found around the school such as plants in the school yard, and pets in the school such as ornamental fish and rabbits. The way the teacher introduces plants is for example various kinds of fruit plants, vegetable plants, ornamental plants, plant colors, how to care, how to plant plants and how to process plants. For animals, the teacher explained it by introducing various animals, land animals, aquatic animals, air animals, pets, wild animals, how to care for animals, how to give food to animals (Prezylia et al., 2021). Introduction to animals and plants is a form of learning activity designed by teachers that is loaded with children's fun. In the introduction of this animal, children are required to be able to remember the names of animals or plants and their types. It is also the responsibility of teachers to be able to guide and direct students in animal and plant recognition activities (Suhartini & Laela, 2018).

#### 4.2.10 *Inquiry Learning*

The process of finding answers is very important in inquiry strategies because students will gain valuable experience as an effort to develop mentally through the thinking process. The task of the teacher in inquiry learning strategies is to stimulate children to do something (experiment) and ask questions that can trigger children's curiosity. Inquiry learning strategies given in early childhood can be given in the theme of water, fire, and air. The application of inquiry learning strategies consists of the stages of presenting questions or problems, making hypotheses, designing experiments, conducting experiments to obtain information, collecting and analyzing data, and making conclusions (Ulfah & Khoerunnisa, 2018).

Instruments are tools used by researchers when carrying out research, because instruments can be used as tools to monitor various children's development that must be recorded authentically. Based on the results of a systematic review, the authors found that the early childhood naturalist intelligence instrument widely used in research is a behavioral observation sheet (Asih & Susanto, 2017; Firdausyi et al., 2022; Khan, 2022; Ulfah & Khoerunnisa, 2018). The advantages of observation include: (1) Many symptoms in human life or in the social field can only be investigated by observation; (2) Many research objects that provide data are only willing to be observed; (3) Can observe a large number, in unison conditions and in different places; (4) Observation is not influenced and does not depend on the object's willingness to provide information about itself; (5) Observation can avoid differences in interpretation of the data collected between the observer and the object (Fuaida et al., 2023).

However, in the use of these instruments, it must meet the requirements of a good instrument, namely a valid and reliable instrument. By meeting this requirement, the research results are expected to be valid and reliable as well. In relation to the instruments made and developed by researchers, these two conditions must be met to produce standard and quality instruments. Whether or not the research instrument determines whether the data is true or not. A good instrument must meet important requirements, valid and reliable (Ismail, 2018).

## 5 CONCLUSION

Based on the results and discussions in this literature study, it can be concluded that several things became the findings of the investigation, including: In carrying out the improvement of naturalist intelligence for early childhood, the recommended instructional strategies are gardening and farming activities as early childhood contextual efforts in understanding and finding resolutions to environmental problems, as well as creative game-based learning strategies that are believed to improve appreciation and sensitivity of early childhood to the environment. For the collection of data on early childhood naturalist intelligence on various instructional treatments provided by educators, the use of observation sheets on popular behavior or performance was used by researchers. The use of test instruments is not so often used, because the conceptual of naturalist intelligence is not limited solely to early childhood knowledge. Observation sheets are used so that researchers are more focused in making observations so that the data obtained is easy to process. The observation sheet is used to determine the extent of the increase in children's naturalist intelligence through the treatment given. The trend of environmental education material provided based on the results of this study is related to taxonomy or introduction of animals and plants. The reason educators often provide this material, associated with objects of observation is generally simple and easy to find around the school. Therefore, the authors suggest that readers, especially academics, can consider the findings of this research in developing innovative curricula and strategies for environmental education for early childhood, especially in improving naturalist intelligence. In addition, it is also recommended that there be further research on naturalist intelligence using different research techniques and learning media.

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