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21st Century Environmental Education: A Strategy for Transforming Community Behavior in Facing the Environmental Crisis

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Abstract: The background of this investigation refers to the unwise human behavior towards the environment that has a significant impact on environmental crises and disasters. This behavior has made the condition of the ecosystem order worse and no longer able to meet the needs of all its components. Therefore, a strategy is needed in transforming human knowledge, attitudes and behavior so that the environment remains sustainable and sustainable. 21st century environmental education comes as a resolution in solving environmental problems. The purpose of this investigation is to provide information to the public about the urgency of 21st century environmental education in achieving SDGs. The method of investigation is Literature Review (LR). Articles used in the review of this paper were obtained from online databases. The results of the investigation obtained are that the implementation of 21st century environmental education responds to challenges and adapts to the needs of society, especially in dealing with environmental crises that occur due to anthropogenic activities. Strategies, approaches, and models of 21st century environmental education are adapted to the needs of society and the development of technology and information. The movement of the environmental education paradigm towards ESD is expected to transform the way of thinking and working towards a green future. The resulting conclusion is that empowering people's knowledge, attitudes and behaviors through 21st century environmental education must be done immediately in order to achieve a balance of environmental quality and the quality of human life.

Keywords: 21st Century Environmental Education, Environmental Crisis, Environmental Quality, Human Quality of Life

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1. Introduction

We are currently in an unprecedented environmental crisis. Environmental problems such as deforestation, climate change, pollution, waste disposal, biodiversity crisis and resource scarcity are major challenges that we face in the era of the industrial revolution 4.0. Given the scale and impact of these environmental problems, we need people who are motivated to help find solutions to these extreme environmental problems. Environmental education serves as a means to achieve this goal in constructing knowledge as well as pro-environmental behavior (Georgiou et al., 2021). The destruction of the environment, nature, earth, and the universe is the result of human actions. Human behavior is governed by the value system that a person believes in and adheres to (Fatria, 2023; Maghfur, 2010; Sriwulantari et al., 2024).

Although various research and investigations on environmental problems continue to be carried out, the solutions offered have not been fully able to overcome environmental problems (Fatria et al., 2019; Priadi et al., 2018, 2020). One way to transfer of knowledge In order to overcome environmental problems, it is through education. Education is a way to spread knowledge and experience. Education can be achieved through teaching, training, independent learning or research that can be used as knowledge to define something. Attitudes and behaviors are inseparable from the surrounding environment, this is closely related to public education that is accepted both formally, informally and informally (Hamid, 2020; Urban et al., 2023). Human beings are an integral part of education, if the education system and function are damaged, it will certainly cause chaos in our educational paradigm that leads to a moral and character crisis (Fatria, Rahmat Suwandi SN, et al., 2023).

Many countries such as Finland, India, the People's Republic of China, Brazil, Kenya, and Japan have officially incorporated environmental education into their education systems to solve problems and prevent future environmental disasters (Vieira et al., 2022). Environmental education is considered a type of continuing education that must start from an early age to create environmental behavior in daily life towards global sustainable development (Kautish & Sharma, 2020; Monte & Reis, 2021).

Conceptually, the definition of environmental education is a process that aims to form behaviors, values, and habits that respect the environment. With the above understanding, we can conclude that environmental education must be given to our children from an early age, and most importantly, environmental education must be based on direct experience with the environment in the hope that such direct experience can form wiser behaviors, values and habits towards the environment (Freije et al., 2017; Surakusumah, 2009). Environmental education is a process of systematically providing knowledge, using educational technology, and transferring environmental knowledge to individuals at every level in order to change behavior through the use of natural resources and the environment reasonably and wisely, as well as being more moral towards the environment (Sangsongfa & Rawang, 2016). Human behavior is vital to be developed and empowered through education by

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increasing human knowledge which is expected to change human attitudes. Human attitudes towards the environment should be directed in a positive direction that can be used as capital in changing human behavior to be more positive in treating ecosystems (Barrow, 2006; Nguyen et al., 2016; Sulphey et al., 2023).

Citizens who have environmental awareness and knowledge tend not only to change their behavior and attitude to preserve the environment, but also to actively participate in contributing to the achievement of sustainable development (Monte & Reis, 2021). Environmental education is a process that aims to make everyone in the world aware and concerned about the environment and all problems related to it. These problems are inseparable from parties who have knowledge, skills, attitudes and behaviors, motivation and commitment to work together to be able to solve various existing environmental problems and prevent the emergence of new problems. Environmental education also includes the emotional aspects of behavior, values and commitments needed to build a sustainable society (Fatria et al., 2019; Marliani, 2014).

In line with the above, environmental education will be more meaningful if students are close to the actual environmental conditions, namely the environment that needs to be preserved to be sustainable. In achieving this goal, it is very urgent and urgent to directly introduce environmental education and invite students to play an active role in protecting the environment from an early age (Hamidah et al., 2023; Jufri et al., 2019; Lim et al., 2022). Environmental education has a specific purpose to build society (Community Development) who are more aware of environmental sustainability, including environmental problems and crisis environmental conditions that lead to disasters. The community has general knowledge to describe its environment and the community has an important role in its environment, because people who live in their environment every day and know many things from the place where they are. Therefore, there is a need to integrate public knowledge about the environment into the education system that has been studied by researchers in the world (Fatria, Priadi, Artanti, et al., 2024; Hamid, 2020).

Several studies from various disciplines have found that there is a linear relationship indicating environmental education as a key factor in transforming knowledge, attitudes, and environmentally conscious behaviors demonstrated in daily life. However, to observe the differences in objectives and orientations of 21st-century environmental education based on research results, refer to Table 1 above.

Table 1. Relevant Studies on 21st Century Environmental Education

No	Authors	Title	Journal	Method	Findings
1.	Shutaleva et al., (2020)	Environmental Education for Sustainable Development in Russia	Sustainability, Vol. 12 (8), 2020	A literature review was conducted to examine international theories and practices in implementing sustainable development principles and	Environmental education in Russia aims to establish and develop environmental perspectives among students of all ages, based on scientific

No	Authors	Title	Journal	Method	Findings
				environmental education for sustainable development in Russia.	knowledge, environmental culture, and ethics.
2.	Marouli (2021)	Sustainability Education for the Future? Challenges and Implications for Education and Pedagogy in the 21st Century	Sustainability, Vol. 13 (5), 2021	This article adopts a multidisciplinary approach, reviewing various cultural worldviews and integrating the old and new. It explores objectives and pedagogies using diverse knowledge, critical pedagogical theories, and critical issues addressing Education for Sustainable Development (ESD).	Education for Sustainable Development needs enhancement by considering socio-economic and cultural contexts. Transforming environmental education to ESD contributes to shaping environmentally friendly societal behaviors in line with 21st-century challenges.
3.	Rahmayanti et al., (2020)	DIFMOL: Indonesian Students' Hots and Environmental Education Model During Covid-19	Journal of Sustainability Science and Management, Vol. 15 (7), 2020	The study was adapted from Gall and Borg's (2003) model, with 504 students participating, selected randomly using simple random sampling across several cities in Indonesia.	DIFMOL is an innovative 21st-century technology-based learning model applicable to environmental education. Its implementation enhances Higher Order Thinking Skills (HOTS) in solving environmental issues.

Source : Article Review 2023

From the review of articles in Table 1 above, it appears that the goals and orientations of 21st-century environmental education share similarities in forming environmental awareness, attitudes, consciousness, and behaviors to create sustainability for future generations in line with sustainable development goals. Differences may lie more specifically in the strategies used, such as employing innovative learning models aligned with advancements in educational technology. The apparent gap in implementing environmental education involves providing technology and media to support the learning process. Some educational institutions may face challenges in transferring environmental knowledge due to insufficient access to appropriate educational technology (intensive government and community support is needed to reduce these gaps). The originality of the study raised about the urgency of environmental education is actually not new. However, the investigation carried out aims to provide information on the analysis of environmental education needs for the transformation of community behavior to

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be wiser towards the environment. This article is written based on previous research sources reviewed in several journals related to environmental education in the context of developing knowledge, attitudes, and behaviors, with the aim of better understanding the importance of environmental education that must be given to the community from an early age so that sustainable development goals can be achieved. The framework of the investigation regarding environmental education in the 21st century, can be described as follows:

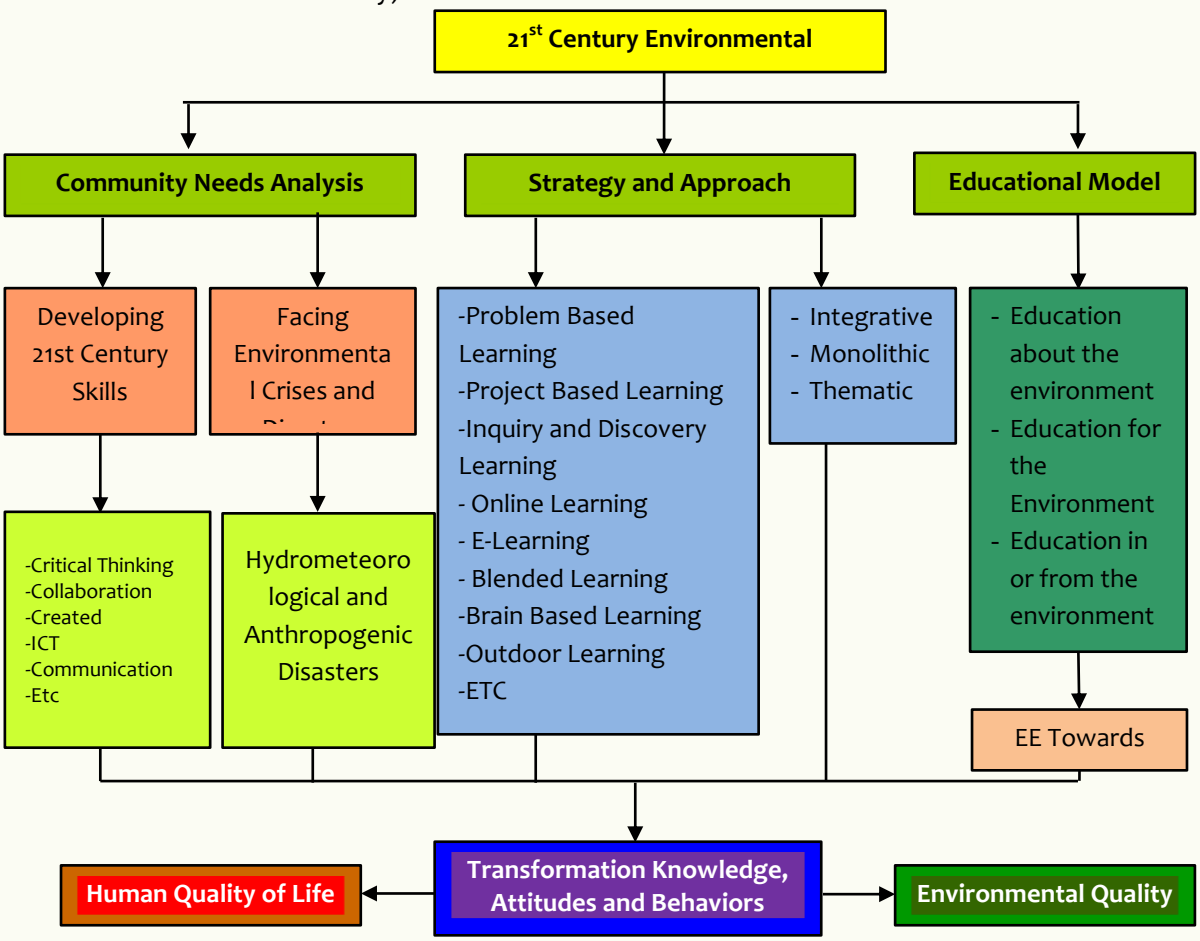

Figure 1. Adaptation of the 21st Century Environmental Education Investigation Framework
Source : (Fatria, Priadi, & Fransiska, 2024)

2. Method

The review in this article is presented in the form of a literature review is an investigative effort carried out by reading, observing, identifying, and describing and analyzing reading materials in the form of library books and related literature as a source of reference (Creswell W., 2013; Devi Artanti et al., 2022; Priadi & Fatria, 2024). The design of this research is a document analysis research, in the form of Literature Review (LR). The article used in the review of this manuscript is obtained from Online Database. The source of the articles to be analyzed comes from the

scientific works of students, academics, teachers, and lecturers published in accredited national journals, seminar proceedings, and reputable international journals. The author limits this investigation to 2014-2024 only. Environmental education or education for sustainable development is one of the lessons that is known and widely used around the world in order to save the increasingly critical environment. Searches were conducted on the online databases Google Scholar, Elsevier-ScienceDirect, Springer, and Taylor & Francis Online as well as web pages that contained scientific content according to the theme of the investigation. The next sub-stage is to determine the criteria for selecting articles to be used. The specific criteria set are: (1) Documents are selected in Indonesian or English; (2) The document used discusses the environmental education model in an effort to transform behavior; (3) The document uses the keyword "environmental education or education for sustainable development" and "environmental behavior" contained in the title of the article; (4) Articles published from 2014 to 2024 during the process of writing this manuscript. The data analysis technique used in this investigation is the content analysis technique or Content Analysis, namely by conducting an in-depth analysis of literature related to environmental education and environmental behavior. The steps can be seen in the image below:

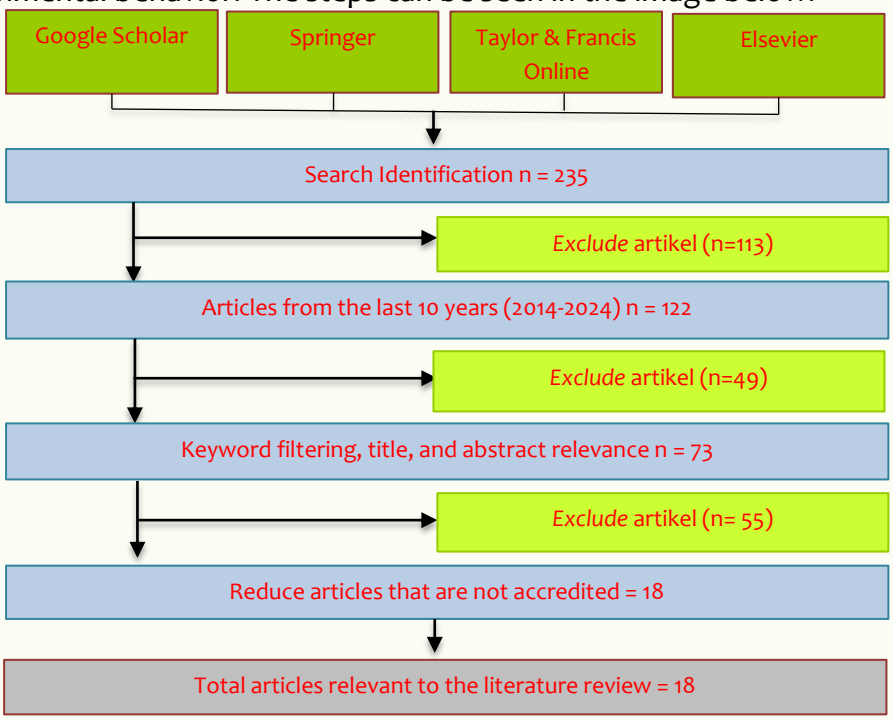

Figure 2. Literature review steps
Source: Illustration of the investigation team

3. Result and Discussion

1. Environmental Education Needs Analysis

Population growth, changes in consumption patterns and life style the community has caused an increase in the amount of waste, its types and diversity.

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Increasing people's purchasing power for various staple foods and technological products as well as increasing business activities or activities that support the economic growth of a region are also the main drivers of contribution to the quantity or volume of waste produced (Georgiou et al., 2021; Hadjichambis et al., 2015). The increasing volume of waste requires management in its management. Waste and waste management that does not use environmentally friendly management methods and techniques will not only have a negative impact on health, but will also seriously interfere with the sustainability of environmental functions in the layers of life (Marliani, 2014). Indeed, in reality, the environmental damage that occurs on earth is caused by the establishment of a paradigm that humans are the rulers of this planet (anthropocentrism) so that the behavior caused is solely for their own interests and ignores other aspects such as the environment (Ji et al., 2023; Nurdiansyah & Komalasari, 2023; Xu et al., 2023). As a result of environmental damage, it causes damage on land or land, in water, and in the air in the form of pollution and damage to human behavior (Fatria, Priadi, SN, et al., 2024; Herman et al., 2023). For trends in natural disasters related to hydrometeorology and anthropogenics in 2023, you can see the figure below:

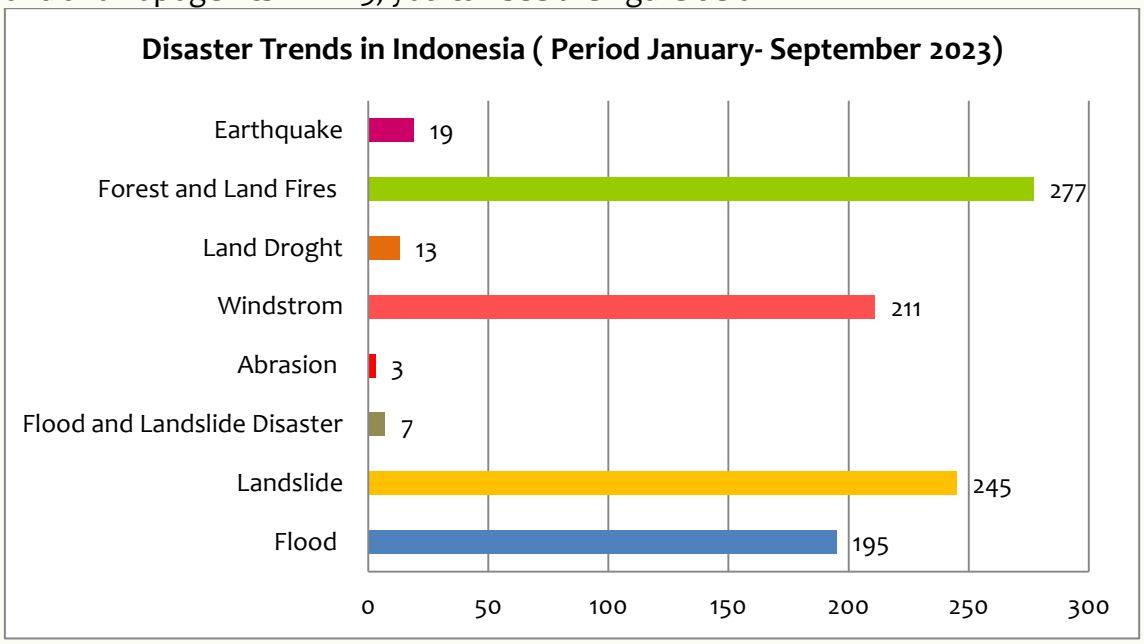

Figure 3. Natural Disaster Trends in Indonesia in 2023
Source: (BNPB, 2023)

Based on the image above, environmental disasters related to hydrometeorology and anthropogenics such as floods (with 195 incidents), landslides (245 incidents), forest and land fires (277 incidents) are becoming disaster trends in Indonesia in 2023. The role of humans as environmental destroyers has a big contribution to this incident such as littering, cutting down forests, burning forests deliberately to clear land for plantation activities and settlement development. Environmental disasters describe natural problems, namely phenomena that occur as part of natural processes. This natural process occurs

without causing a significant impact on the environment itself and can recover later naturally (homeostatic). However, environmental disasters can no longer be said to be a purely natural problem, because humans provide a very significant variable causative factor for environmental disasters (Nina Herlina, 2017; Sara & Nurit, 2014; Walter et al., 2024). To overcome environmental damage caused by people's irresponsible, selfish, and negligent behavior towards their environment, environmental education is necessary (S. Aithal et al., 2016; Widiawati, 2022). The need for environmental education, in order to produce a society that has a high sense of society, is more concerned with common interests than personal interests (Fatria, Rahmat Suwandi SN, et al., 2023; Fatria, Priadi, & Fransiska, 2024; Fatria, Priadi, Artanti, et al., 2024).

Environmental education is very important for people in the era of disruption, in order to manage resources wisely and foster a sense of responsibility for the benefit of future generations. In addition, the need for knowledge, behaviors and skills is to support our resources so that they can be used sustainably. This requires synergy between generations to continue to support a green future towards a sustainable generation (Hidayah & Baedowi, 2020; Jakhanwal & Mishra, 2020). Environmental Education focuses on authentic investigation and action as well as community involvement and more appropriate participation for environmental development and protection (Hadjichambis & Paraskeva-Hadjichambi, 2020). Environmental knowledge and environmental behavior transformation can be obtained through environmental education. While the acquisition of knowledge and attitude change are often necessary conditions for the adoption of behavior, so before having environmental behavior one must have knowledge and attitude towards a good environment (Dias et al., 2020; Fatria, Priadi, Artanti, et al., 2024; Priadi et al., 2020; Sriwulantari et al., 2024). Those factors remain important, but we now know other factors that can be facilitators or obstacles in this process, such as social norms, the desire to act, and the opportunity to do so. This can be seen in the image below.

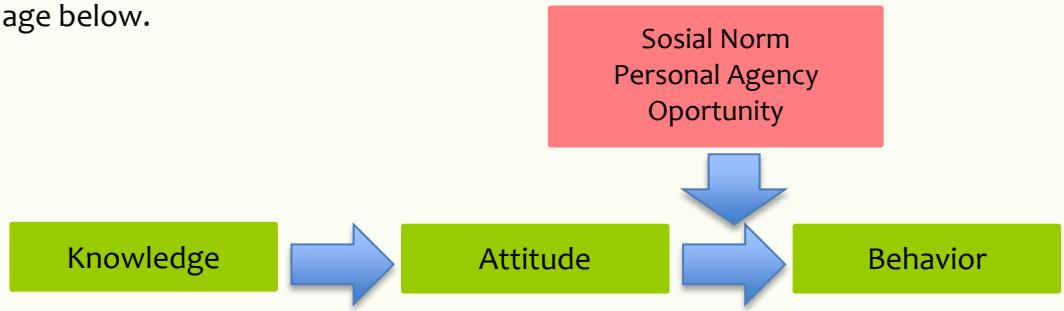

Figure 4. Classic psychological model of attitude lifting behavior as a central component in determining behavior
Source: (Effendi et al., 2020)

The Indonesian government has implemented various policies on environmental education. At the primary and secondary education levels, population and environment lessons were integratively outlined in the 1984 curriculum by incorporating population and environment materials into almost all

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subjects. On May 21, 1996, a Joint Memorandum was issued between the Ministry of Education and Culture and the Office of the State Minister of Environment No. 0142/U/1996 and No. Kep. 89/MENLH/5/1996 concerning the Development and Development of Environmental Education. In line with the issuance of this memorandum, the Directorate General of Elementary and Secondary Education of the Ministry of Education and Culture seeks to develop and strengthen the implementation of environmental education in schools, among others, through teacher training, preparing a guidebook for the implementation of population and environmental education for teachers at the elementary, junior high, high school, vocational level, and environmentally friendly school programs. Furthermore, on July 5, 2005, the Minister of Environment and the Minister of National Education issued a joint decree No. Kep.07/MenLH/06/2005 and No. 05/VI/KB/2005 for the guidance and development of environmental education. In this joint decision, it is strongly emphasized that environmental education is carried out in an integrated manner with existing subjects (Amini & Munandar, 2014).

However, at the time of almost 40 years of the implementation of environmental education in Indonesia. Environmental education seems to be marginalized and has become a hidden curriculum. Consolidation as a stand-alone subject (monolithic) cannot be implemented, even though knowledge and attitudes towards the environment can be constructed and environmental behavior transformation can be carried out through the implementation strategy of environmental education. This is in accordance with the objectives of environmental education by UNESCO (1977):

Table 2. UNESCO Environmental Education Goals (1977)

No	Dimension	Description
1.	Awareness	To help social groups and individuals acquire awareness and sensitivity to the environment as a whole and the problems associated with it
2.	Knowledge	To help social groups and individuals gain a wide range of experiences and gain a basic understanding of the environment and the problems associated with it
3.	Attitude	To help social groups and individuals acquire a set of values and feelings of concern for the environment and motivation to actively participate in the improvement and protection of the environment
4.	Skill	To help social groups and individuals acquire skills to identify and solve environmental problems
5.	Participation	To provide opportunities for social groups and individuals to be actively involved in efforts to solve environmental problems

Source: (Fang et al., 2022)

In line with the above, Hungerford (1980) in (Fang et al., 2022) also describes the 4 levels of environmental education objectives as follows: (1) Level I objectives, namely the treasury of ecological knowledge to equip students or the community with adequate knowledge in the field of ecology, which will enable the community

to make environmentally friendly decisions in relation to environmental issues; (2) Level II objectives, namely conceptual awareness of issues and values to guide the development of individual and group actions that can affect the relationship between quality of life and environmental quality and how these actions result in environmental problems that must be solved through investigation, evaluation, clarification of values, and decision-making; (3) Level III objectives, namely the investigation and evaluation of knowledge and skill development problems needed so that students or the community can investigate environmental problems and evaluate alternative solutions to overcome these problems; and (4) Level IV objectives, namely environmental action skills and participation, to develop the skills necessary for learners to take positive environmental action for the purpose of achieving or maintaining a dynamic balance between quality of life and environmental quality. For more details, it can be described through the following image:

Figure 5. The Purpose of Environmental Education by Hungerford (1980) revised by Fang (2022)
Source: (Fang et al., 2022)

Environmental education strategies that can be used are similar to science education, interdisciplinary and offer a variety of learning strategies, which are determined by learning resources, learning time, learning spaces, learning curriculum, and student attributes. In the society of the era of disruption and meeting the challenges of 21st century learning, in the independent curriculum learning strategies that can be used include problem based learning, project based learning, inquiry and discovery learning, blended learning, brain based learning and others (Fatria, Priadi, & Fransiska, 2024). The author also recommends learning environmental education that is carried out outdoors (Outdoor Learning), nature-centered education and education for sustainable development. For the wider community, environmental education can be provided with strategies of counseling, socialization, training, spiritual activities, seminars (in the

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implementation of environmental education in the 21st century, it may be in the form of webinars and teleconferences), and also outbound (Bascopé et al., 2019; Monte & Reis, 2021).

The environmental education approach can be implemented with a monolithic and integrative approach. The monolithic approach is that learning takes place through one field of study, meaning that in this approach environmental education becomes a separate subject. While the integrative approach is an approach that integrates environmental education into a specific field of study, for example with biology or geography subjects. The integration of environmental education can be done by observing the environment directly, studying the habitat and distribution of organisms, and creating recycled products (Anazifa & Hadi, 2016; Jener et al., 2019; Lim et al., 2022; Sriwulantari et al., 2024). Integrative environmental education in intracurricular activities refers to the applicable curriculum such as the independent learning curriculum. Educators insert topics or environmental issues in certain subjects so that they do not interfere with the learning goals to be achieved. An example of its implementation in science subject grade 2, environmental education is integrated into the material of changes that occur in the growth of animals and plants, with indicators of caring for plants grown by themselves (Expósito & Sánchez, 2020; Perera et al., 2022; Perwitasari et al., 2023). Likewise, in grade 4, environmental education is integrated into the material that causes environmental change (wind, rain, sunlight and sea waves), with indicators of caring for plants and participating in making biopores in the school environment. Meanwhile, other subjects that are also integrated are Indonesian, Social Studies, and Mathematics. Environmental education can also be carried out through extracurricular activities such as Scouting, English Club, and the Youth Red Cross. Meanwhile, activities that are integrated with the school program are through waste sorting, sanitation management, the use of electricity, water, healthy canteen services, family medicine gardens (toga), catfish and fish farming in schools, vegetable gardens, classroom gardens, composting, infiltration wells, recycling skills of used goods, environmentally friendly technology projects and energy saving (Fatria, Priadi, et al., 2023; Priadi & Fatria, 2024; Rezkita & Wardani, 2018).

2. Environmental Education Model

The environmental education model from UNESCO is based on the Palmer model (1998) and can be applied through several strategies. The environmental education model according to UNESCO can be carried out in both indoor and outdoor learning. In its implementation, it is necessary to consider several factors such as the curriculum used, the purpose and objectives, infrastructure, student characteristics, educator preparation, and effectiveness and efficiency. The implementation of environmental education from UNESCO based on the Palmer model (1998) can be seen in the figure below:

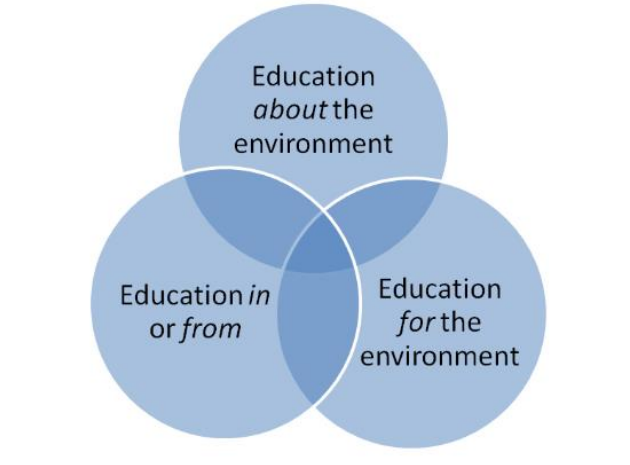

Figure 6. Environmental Education Model based on the Palmer Model (1998)
Source: (Fűz-Kószó & Szabó, 2023)

Based on the Palmer (1998) environmental education model, in general, environmental education can be classified into 3 models, namely: (1) Environmental education which is the basic knowledge and understanding of the environment and our relationship with the environment; (2) Education for the environment, which is to use the environment as a resource with an emphasis on planned investigation and investigation and also provide opportunities for students to engage in hands-on personal experiences; (3) Education in or from the environment, which is related to values, attitudes and positive actions (Fűz-Kószó & Szabó, 2023). The implementation of the model can be seen in table 3 below:

Table 3. Implementation of the Palmer Environmental Education Model

No.	Type	Implementation
1.	Education about the environment	✓ Provide reading resources about an adequate environment for students. ✓ Implementing student-centered learning strategies in explaining materials related to the environment such as *problem-based learning* and *project-based learning*. ✓ Holding counseling or training activities about the environment by presenting competent resource persons in the field of the environment. ✓ Provide leaflets or posters containing climate change issues and the current environmental crisis.
2.	Education for the environment	✓ Cultivating waste disposal by identifying it first ✓ Getting used to clean and healthy living behaviors (PHBS). ✓ Inviting students to actively participate in *go green activities*. ✓ Providing guidance to students who do not care about the environment. ✓ Holding competitions related to a clean and healthy environment at a certain time, for example, school or classroom cleanliness competitions.
3.	Education in or from environment	✓ Invite students to learn outside the classroom (*outdoor learning*), for example in the school garden if presenting materials related to

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	the environment or to the forest near the school if the material presented is related. ✓ Invite students to see firsthand examples of environmental damage due to pollution and provide solutions to these problems.

Source: (Supadmini et al., 2020)

Each model of environmental education has 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 aims to teach them to understand environmental concepts, and allows them to criticize issues in a logical and constructive way; (2) education for the environment have aim to understand the causes of environmental pollution and be encouraged to integrate responsibility and attitudes towards the environment into their behavior; (3) education in or from the environment aims to integrate research data and personal experiences 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). For an illustration of the focus and learning process of each environmental education model, you can see in the image below:

Figure 7. Focus and Learning Process of the Environmental Education Model
Source: (Fang et al., 2022)

Based on figure 7 above, it can be seen that each model has a different focus: (1) education about the environment on improving the quality of thinking that is significant to the context of environmental education; (2) education for the environment focuses on improving the quality of life that is significant to human welfare; (3) education in or from the environment focuses on improving the quality of experience that is significant to the surrounding environmental situation (Jener et al., 2019; Karmanto et al., 2015; Liao, 2017; Spinola, 2015).

3. 21st Century Environmental Education

The 21st century is marked as the century of globalization, meaning that human life will undergo a fundamental transformation that is different from the life paradigm of the previous century (Wijaya et al., 2016). In the teaching and learning process of the 21st century, it is very important to be able to equip students to have

quality and competitiveness in the global world (Khasanah & Herina, 2019). In addition, the rapid development and advancement of science and technology in the 21st century, both in the fields of education, communication science, information and communication technology (ICT), it is not impossible that in the future environmental education will continue to develop and strengthen itself into a discipline, study program, and profession that can play a role in solving environmental problems. In addition, there have been changes in the field of learning technology development, where every subject must be based on ICT (P. S. Aithal & Aithal, 2016; Pérez-Escoda et al., 2016; Warsita, 2017). Learning strategies in 21st century environmental education are not only carried out face-to-face (offline) but also done online and can also be implemented by combining the two (blended learning) (Nusraningrum et al., 2024; Rahayu et al., 2022; Syahrin & Sa'adah, 2021).

The explanation of adaptation Framework 21st Century Environmental Learning According to BNSP in Wijaya et al., (2016) are as follows: (a) critical thinking and problem-solving skills, namely being able to think critically, laterally, and systemically, especially in the context of environmental problem solving; (b) the ability to communicate and cooperate, namely being able to communicate and collaborate effectively with various parties involved in providing solutions to environmental problems; (d) the ability to create and renew, namely being able to develop their creativity to produce various innovative and environmentally friendly technologies; (e) information and communication technology literacy, which is able to utilize information and communication technology to improve performance and daily activities; (f) contextual learning ability, namely being able to undergo environmental education activities independently and contextually as part of personal development, and (g) information and media literacy skills, being able to understand and use various communication media to convey various ideas and carry out activities, especially in the field of informatics and Big Data related to the environment. So the 21st century wants an environmental education system that is given to students, able to equip all competencies and skills in accordance with the shift in the learning paradigm of the 21st century.

The principles of implementing environmental education in the 21st century need to develop the following aspects: (1) intructional should be student-centered namely student-centered environmental learning; (2) educational should collaborative namely environmental education that must be able to make students collaborate to hold a series of scientific activities in solving environmental problems; (3) learning should have contest namely environmental education has a performance of the findings obtained, to be discussed together; (4) school sould be integrated with society that is, schools can be integrated with the community around the school environment in the implementation of environmental education (Angga et al., 2022; Fatria, Priadi, & Fransiska, 2024; Khasanah & Herina, 2019; Priadi & Fatria, 2024; Yusliza et al., 2020).

The long journey of the implementation of environmental education until the 21st century, starting from the implementation of nature studies in the 1900s, conservation education in 1920, until the term environmental education was

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introduced in 1948. In facing different environmental crisis issues every year, the theme of environmental education is always adjusted to the needs of the community and environmental conditions at that time, especially in tackling environmental pollution and climate change issues (Broomell et al., 2015; Linh Tran et al., 2023; Wyss et al., 2022). In the 21st century in its implementation, the direction of environmental education is adjusted to the 17 Sustainable Development Goals (SDGs) which began in 2015. Until 2030, environmental education will begin to adapt and transform into education for sustainable development or Education For Sustainable Development (ESD). The declaration of the ESD concept is in order to maximize each item of the SDGs related to environmental, social, economic, and legal development (Expósito & Sánchez, 2020; Gantini & Hamdu, 2021; Kamis et al., 2017; Marouli, 2021). For the history of the journey of environmental education in the 21st century towards ESD, you can see in figure 8 below:

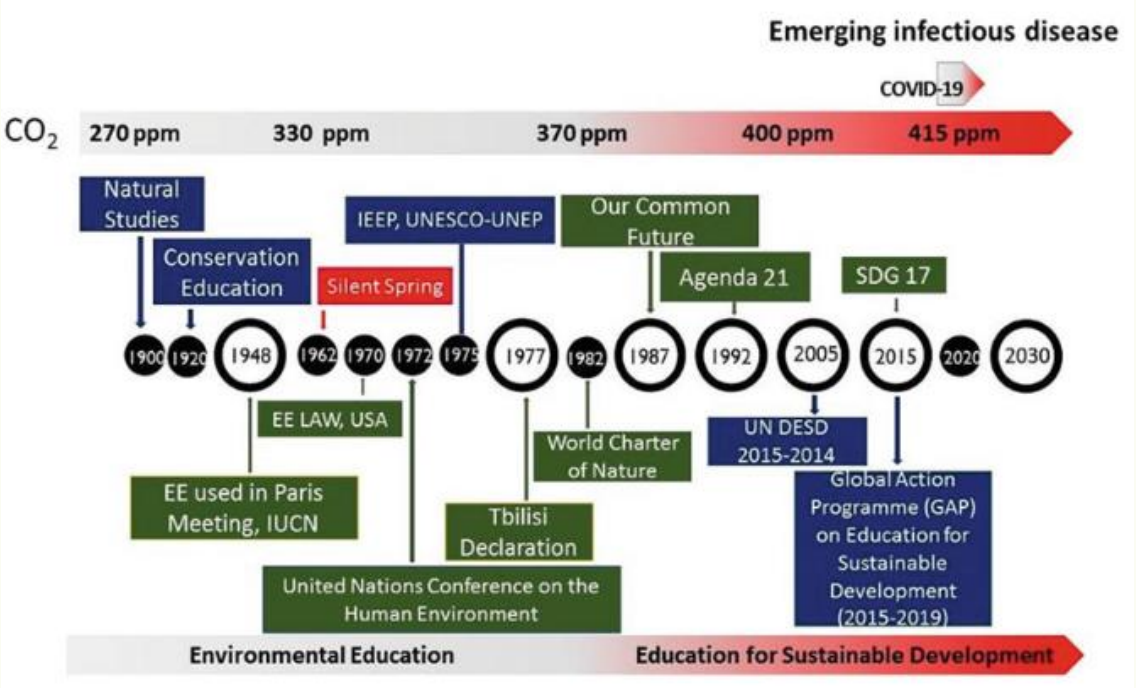

Figure 8. Environmental Education Time Chain Towards ESD
Source: (Fang et al., 2022)

Based on the image above, it can also be described, that the journey of environmental education transforming towards ESD is also based on the urgency of real changes from 21st century society regarding their knowledge, attitudes, and behaviors towards the environment. Worsening environmental conditions are indicated by an increase in carbon dioxide (CO_2) in the atmosphere, which has a direct impact on the increase in temperature on Earth and the occurrence of global warming and climate change (Fatria, Priadi, SN, et al., 2024; Reyer et al., 2017; Rothermich et al., 2021). ESD is present as one of the solutions offered to overcome the root of this disaster problem, namely the behavior, attitude, and knowledge of the 21st century society. The public should begin to be aware of the urgency of the presence of environmental education in the national and global education system,

because the issue of environmental crisis is not only a local and national problem but has become a global problem. Environmental sustainability so that it can be inherited to future generations should always be a commitment and responsibility global citizen cross-generation (Fatria et al., 2019; Fatria, Priadi, & Fransiska, 2024).

ESD presents forms of educational contribution to global goals that have been agreed upon and ratified internationally (Gantini & Hamdu, 2021; Jasmi & Kamis, 2019). ESD also empowers 21st century society to transform the way they think and work towards a green future by incorporating environmental issues, such as climate change and biodiversity into the learning process. Individuals are encouraged to be responsible societies and are able to solve challenges, respect cultural diversity and contribute to creating a sustainable world (Langenbach et al., 2020; Rahmawati et al., 2021). UNESCO proposes to strengthen ESD's contribution to all SDGs, with the main focus being to help achieve goal 4. UNESCO also emphasized that the future education agenda must place emphasis on the contribution of learning content to the survival and well-being of humanity. For an illustration of the ESD focus can be seen in the image below:

Figure 9. ESD's Basic Philosophy to Achieve SDGs Education Quality
Source: (Shaw et al., 2021)

Based on the image above, it can be described that, the basic philosophy of ESD aims to transform knowledge, values, behaviors, and others. ESD is organized by combining the concepts of environmental, social, and economic development. ESD study areas are environmental education content such as climate change, biodiversity, disaster prevention, alternative energy, sustainable environment, international agreements, world heritage sites and local cultural riches and other related disciplines. The context of the implementation of ESD, in addition to realizing a sustainable environmental, economic, social, and legal rule, ESD is

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basically present in realizing the goal of the 4th point of the SDGs, which is related to creating the quality of world education (Shaw et al., 2021).

Pedagogical reorientation efforts are needed to support the implementation of ESD in the education system in Indonesia. Educational reorientation can be carried out through curriculum reorientation by identifying several aspects, namely knowledge, attitudes, perspectives, skills and values related to sustainable development, by integrating four main pillars: environmental, economic, social, and legal governance. Ideally, educational reorientation efforts should be based on local and national sustainability goals. To reorient education to be more in line with local and national conditions (Bascopé et al., 2019; Indrati & Hariadi, 2016). ESD is a lifelong learning process that aims to inform and engage people to have creativity and skills in solving problems, be scientific, have social literacy, then commit to individual and collective responsibility. This action will ensure that the environment remains sustainable with a prosperous economy in the future (Sadh, 2019). Therefore, the implementation of ESD will be successful if the resulting output provides a real transformation to the change in knowledge, attitudes, and behaviors of 21st century people who are more pro-environment, especially in dealing with the issue of environmental crisis.

4. Conclusion

Based on the explanation of environmental education in the 21st century above, it can be concluded that environmental education is present as an urgency due to the environmental crisis and fulfilling 21st century skills. Learning strategies that can be used are innovative strategies that can be adapted to the development of technology and information, such as problem-based learning, project-based learning, inquiry and discovery learning, blended learning, online learning, e-learning, outdoor learning that provide contextual learning experiences and independent learning skills to students (especially in the context of implementing the independent learning curriculum). The learning approaches that can be used are: (1) integrative that combines environmental education with other learning such as biology and geography; (2) monolithic where environmental education stands alone as a subject; and (3) thematic where environmental education is found in certain themes or certain sub-materials. The 21st century environmental education model adopts environmental education from Palmer and UNESCO, including (1) Education about the environment (which is the basic knowledge and understanding of the environment and our relationship with the environment; (2) Education for the environment, which is to use the environment as a resource with an emphasis on planned investigation and investigation and also provide opportunities for students to engage in hands-on personal experiences; (3) Education in or from the environment, which is related to values, attitudes and positive actions. In its development, the environmental education model began to shift to education for sustainable development (ESD) which notabene adapted to 17 sustainable development goals (SDGs) with 4 development pillars: (1) environmental pillar; (2)

economic pillar; (3) social pillar; and (4) pillars of legal governance. All forms of transformation in environmental education in the 2nd century, the main goal of their implementation is the transformation of people's knowledge, attitudes, and behaviors in facing environmental crises.

The community is expected to be wiser in the use of natural resources and not damage nature in meeting their living needs. Empowering knowledge, attitudes, and behaviors to be more pro-environment is the responsibility of the global community across regions and generations. The hope to be achieved is the sustainability of a beautiful environment that improves the quality of human life. And based on the conclusions of the investigation carried out, it can be suggested that the government can affirm the existence of environmental education in the current independent curriculum, no longer as a hidden curriculum but as a monolithic independent subject. The community must better understand the increasingly degraded environmental conditions, the occurrence of energy and resource crises, the biodiversity crisis, and the phenomenon of climate change and can learn environmental education as a strategy in dealing with environmental disasters. For other researchers and students, in order to consider the results of this investigation, to follow up or conduct more in-depth research on 21st century environmental education.

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