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Review Article

An Integrative and Interdisciplinary Assessment of Environmental, Ecological and Eco-Literacy

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Abstract

This study, aiming to address environmental, ecological, and eco-literacy within the paradigms of multiple intelligences or multiple literacies on a relational-contextual level and with a comprehensive interdisciplinary approach, reveals a problematic situation concerning the insufficient adoption of these literacies in educational environments. The aim of this research is to contribute to the development of the above mentioned literacies, create social awareness for their widespread implementation in educational environments, and facilitate sustainable development and pedagogical well being. The study deals with a critical discourse analysis concerning the historical background of these concepts in the literature, relying on a plethora of data obtained from the literature. The methodology of the study conducted in line with this purpose includes a combination of mixed, theoretical, conceptual, documentary, phenomenological, and qualitative methods based on complementary and interdisciplinary assessments. These methodological postulates envision an integrated approach to addressing the concepts of environmental literacy, ecological literacy, and eco-literacy.

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Introduction

The concept of environmental literacy was first coined by Roth (1968) and was expressed as a fundamental awareness towards environmental issues. Subsequently, Roth (1992) provided new meanings to the concept and expanded its scope. According to this updated definition, environmental literacy is defined as the capacity to perceive, interpret, protect, and enhance environmental systems through appropriate action. Roth (1992) emphasized the behavioral dimension when defining environmental literacy, stating that this skill can only be determined through observable behaviors.

The concept of environmental literacy has been defined from various perspectives from its initial use up to the present day. Environmental literacy entails awareness about the environment and related issues, making efforts towards solutions with concern for existing environmental problems, and possessing the knowledge, skills, and motivation to prevent potential issues (North American Association for Environmental Education, 2004). According to the definition provided by Ay and Yavuz (2016), environmental literacy involves understanding how environmental systems function and being conscious of the interaction between human-created systems and environmental systems. Environmental literacy can be defined as the process of learning how to establish a healthy, sustainable relationship between humans and the environment, increasing sensitivity towards the environment, and developing a positive attitude.

The concept of ecological literacy was first coined by Paul Gillan Risser in 1986. Risser (1986) introduced the term in a public speech at the Ecological Society of America, urging ecologists to engage in thinking, discussing, exchanging ideas, reaching consensus, taking a firm stance, and assuming responsibility as advocates for ecological literacy in the public, after contemplating what the concept encompasses. The various conceptualizations of the term in the field of ecology have continued to exist since then, together with a multidimensional focus on developing ecological knowledge necessary for conscious decision-making through scientific inquiry and systemic thinking (McBride, 2011).

Ecological literacy, a concept of increasing importance in recent years, is grounded in the integration of physical, emotional, social, geographical, and ecological intelligences or modes of thinking adapted to educational processes and environments. Social and emotional intelligence, fosters a perspective on establishing and understanding healthy dialectics in various societal or individual contexts, encompassing emotional and epistemic skills to a more advanced level, while ecological intelligence emphasizes the development of such skills or capacities by grounding them on a healthier ontological foundation of natural environments or systems, shaping cognitive abilities through emotional, environmental, and physical literacy, and adopting a dialectic accompanied by empathy. Through the combination of various literacy or intelligence forms mentioned above, ecological literacy focuses on various educational objectives, ranging from solving different pedagogical problems encountered in educational contexts and processes that aim to promote social and emotional learning to enhancing academic achievement. Thus, by adapting a more

sustainable vital ontology to educational environments, the establishment of an appropriate pedagogical environment for the development of necessary knowledge or skills, as well as empathy and activism capacities, will be facilitated. Acknowledging that individuals in educational environments characterized by plants, and animals can develop empathy and concern with an altruistic mindset towards other entities and living beings within the Earth, it would be much more tempting and worthwhile to emphasize the importance of curricula that highlight the significant roles played by individuals, and their aesthetical and moral dialectics to be established with each and every entity of the natural environments in sustaining life cycles and in order to reach a higher level of natural wellbeing. It is beneficial to emphasize that such educational curricula and designs can be adapted to various pedagogical processes; for instance, the widespread use of landscape architecture examples reflecting greenery in urban and metropolitan areas as a natural pedagogical example design could be adopted; similarly, the presence of various live plant and animal species reflecting the natural environment in pedagogical environments, and the organization of field trips to natural areas, botanical gardens, and animal rescue centers, as well as engaging students in field projects such as habitat restoration, can significantly contribute to the development of various skills, particularly ecological literacy.

The concept of eco-literacy, which can be considered relatively new compared to environmental literacy and ecological literacy, is said to be built upon the foundational skills of the two mentioned literacies. Growing concerns about the impact of escalating ecological problems, especially the rapid depletion of natural resources on the economy and social development have compelled people to contemplate and seek solutions for ensuring a more livable future. The concept of ecological literacy, conceptualized by Orr (1992), highlights the imperative of sustainable development, defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs (Imperatives, 1987). This notion has been envisioned as an ideology capable of addressing the concerns and anxieties that have emerged in individuals, and it has become a dominant perspective with its integration into education. Building on Orr's work, Capra (1996) has introduced the concept of eco-literacy into the literature, primarily centered around the idea of efficient use of resources, i.e., the concept of sustainability (McBride, 2011). Capra defines eco-literacy as understanding the organizational principles of ecological communities (ecosystems) and using these principles to create sustainable societies.

Inspired by the recognition of the challenges posed by the problematic lifestyle generated by the hyper-industrial context of the 21st century, structured with an interdisciplinary perspective, this study emphasizes the crucial importance of individuals within the educational environment acquiring significant skills based on ecological literacy. The pressure exerted by the problematic lifestyle, born out of the hyper-industrial conjuncture of the 21st century, on the ecosystems on Earth and the ontological sustainability of humanity, leaves individuals facing various difficulties and challenges. This underscores the vital necessity for individuals within the educational setting to develop skills grounded in ecological literacy at a noteworthy level.

This study aims to highlight a problem situation where environmental literacy, ecological literacy, and eco-literacy are not sufficiently adopted and emphasized in educational environments. There is an increasing awareness in the global academic community and various scientific circles, especially in global pedagogies and national education systems, that the importance of the above mentioned literacies is not adequately emphasized and that there is a lack of awareness in how to impart these literacies to students. This situation can lead individuals in educational environments to lack sufficient knowledge and skills in the neurocognitive and neuropedagogical foundations of the environment. Additionally, it may result in a cultural paradigm characterized by individuals being insensitive to environmental issues and making uninformed and problematic decisions related to environmental sustainability.

Can natural environment pedagogies, in comparison to traditional educational paradigms, approaches, or methods, demonstrate positive reflections in the learning processes, cognitive, and epistemic construction processes? What kind of benefits can these natural environment pedagogies provide concerning the enhancement of neurobiological processes and mechanisms? This question aims to address the curiosity or concern in pedagogical authorities regarding whether natural environment pedagogies can contribute to stronger and sustainable educational well-being or pedagogical improvement in learning processes and whether they can contribute to societal welfare.

Method

In this study, after initially adopting a documentary evaluation based on a literature review, postulates outlined within a theoretical framework that emphasizes the increasing

importance of multidisciplinary approaches or methods in interdisciplinary research, particularly in recent years, were grounded on a scientific basis. Following this, a variety of tools, materials, methods, and approaches were brought together within the context of the research design, and several topics, concepts, or themes were examined and presented with a multifaceted methodological approach, drawing conceptual insights.

After initiating the necessary research process for reviewing the literature proposed to address the problem outlined in the structure of this study, various studies directly related to the issues and concepts identified in the literature were analyzed. Additionally, after examining different studies and research projects that indirectly reflect a correlation with the topics, a hermeneutic perspective, along with an interdisciplinary approach, was interwoven into the fabric of the study.

Initially, a comprehensive literature review was conducted on the definitions and significance of environmental literacy, ecological literacy, and eco-literacy within the scope of the research. Subsequently, explanations regarding how these literacies can be acquired in educational environments, how they can be integrated, and how they can be adapted to educational settings were presented within the context of the methods or approaches mentioned above. The aim was to foster an awareness in pedagogies related to the problem and the statement of the problem in the research. In this context, various results and recommendations, information, and findings that can be utilized from the literature on what kind of experiences and practices can be implemented in curriculum development and other learning processes for the use of these literacies in pedagogies were presented in alignment with the scientific and academic integrity of the conducted research.

Developed within a predominantly conceptual and intricate methodological framework, this study can be considered within the framework of the arguments that can be evaluated on the plane of multidisciplinary fields of sciences. Therefore, it would be much more tempting to say that the aim in conducting this study would also be to establish a sustainable pedagogical development by considering pedagogy within the context of the nature or ontology of human beings, thereby establishing a quintessential synchronization aesthetically. Similarly, the study seeks to formulate pedagogical postulates and formulations around the concept of eco-pedagogy, which aims to design and construct natural environments that can enhance the physiological and neurobiological well-being of human beings. Based on various observational experiences and empirical findings, the study

is grounded in theoretical and conceptual assumptions, presenting novel postulates and perspectives contributing to sustainable development and biological diversity.

As part of the research methodology, it is considered that, unlike the complex, differentiating, and erroneous conceptualizations in the literature, an integrated approach or methodology that does not impose artificial and distinct distinctions between the concepts of environmental literacy, ecological literacy and eco-literacy, in other words, evaluating these concepts within a common context without placing them in separate frameworks, could be adapted to various situations throughout the course of the study. Additionally, considering the compatibility of bibliographic and documentary research as part of the adopted mixed methodology in the study, it is believed that an assessment leading to paradigm shifts towards partially inductive and partially critical discourse analysis could contribute to the literature. Therefore, a critical discourse analysis methodology has been adopted, taking into account the potential for paradigm shifts toward both inductive and critical discourse analysis, in line with the conceptual evaluations of bibliographic and documentary research as part of the mixed methodology embraced in the study.

The Ecological Crisis Arising from the Human-Nature Relationship

The interrelationship and interdialectics between humanbeings and nature extend back to and encompass a historical process that began with human existence and continue to the present day. Throughout this historical process, humans, like other living beings, have lived in and benefited from nature. However, unlike other living beings, humans have not limited themselves to benefiting from nature during this process; they have altered and transformed nature, beginning to use it according to their own interests. The advent of the Industrial Revolution, characterized by the replacement of manual production with mass production through the substitution of human labor with machines, marked a significant milestone that opened the way for the exploitation of nature due to the increased demand for raw materials. Concurrently, the process of urbanization, considered as a byproduct of the Industrial Revolution, has been both a significant part of the human-nature relationship and a contributor to the exploitation of nature, leading to the opening of new wounds and the deepening of existing ones. In addition to these developments throughout history, the recent phenomenon of technologically characterized lifestyles, the culture of digitalization, driven by technological advancements, and the resulting cultural and industrial transformation

have also played crucial roles as factors contributing to the degradation and disenchantment of the natural environment as well as any appropriate equilibrium in the natural environment.

As a result of all these developments, ecological problems have emerged, causing harm to humans, the environment, and other living beings inhabiting the environment, with destructive consequences in many aspects. Ecological issues, which negatively impact the mental and physical health, lead to various diseases and, at times, even fatalities. Furthermore, these ecological problems contribute to the damage of ecosystems, leading to the extinction of certain species in nature.

Before delving into the process of destruction of nature termed as ecological crisis or environmental degradation, understanding the primary factors that create this process and addressing the problems along with their causes will provide a comprehensible perspective on the issue. The ecological crisis, which is one of the most important and urgent problems of the contemporary world, has emerged as a result of societal activities. The free-market economy, viewing nature as a gift to humanity or as a freely available resource, is considered a major cause of the ecological crisis. The capitalist system, based on the ideology of 'Laissez faire, laissez passer!' (Aydin, 2003), instrumentalizes nature to increase capital accumulation and utilizes it in line with its own goals. Nature, turned into a commodity by capitalists, is sacrificed for further growth (Altiok, 2014). Nature mobilized in accordance with the desires of a very small minority in society is, metaphorically speaking, plundered, and the resulting ecological crisis affects the entire community.

Murray Bookchin, who laid the foundations of social ecology, also attributes the cause of ecological problems to the capitalist system and approaches the process with its historical dimension. According to Bookchin (2017), the domination of nature by humans stems from human domination over other humans. The exploitation of nature by humans is seen as a reflection of the hierarchical social order that emerged in historical processes. In other words, it is noted that the hierarchies arising from societal domination are extended to the human-nature relationship, leading to the ruthless plunder of nature and its perception as an object or raw material. Bookchin, emphasizing that he always sees ecology as social ecology, expresses his views by stating, "I believe that the concept of domination over nature arises from the domination of one human being over another, indeed, from the domination of man over woman, old over young, one ethnic group over another, the state over society,

bureaucracy over the individual, one class over other classes, and colonial powers over colonized peoples" (Bookchin, 2014, p.105).

These factors, attempted to be explained as the primary causes of ecological degradation, have brought about distorted urbanization resulting from industrialization, the indiscriminate use of natural resources, changes in consumption habits with the advancement of technology, and the emergence of irregular migration and rapid population growth. As a consequence, the destructive process of nature has gained momentum and continues (Karagozluoglu, 2020).

The environmental pollution problem created by these mentioned factors has been categorized and examined under four headings as water, soil, noise, and air pollution:

Water pollution is the disruption of the natural composition of waters, either by exceeding the normal concentrations of substances in natural water sources due to human activities or by the detection of previously unidentified substances in water sources (Uzun et al., 2014). As a result of the contamination of natural water sources such as rivers and lakes, people experience hygiene problems, become ill, and struggle to find clean drinking water. The use of chemical fertilizers to increase agricultural productivity and the toxic chemicals used to combat weeds, insects, and fungi contribute to the pollution of underground water through infiltration with rainfall, as well as endangering marine life by reaching the seas through runoff (Guler & Cobanoglu, 1994).

Soil pollution can be described as the disruption of the physical and geological structure of the soil due to the use of incorrect methods in agriculture, the introduction of toxic substances into the soil, and the disposal of waste onto the soil (Karaca & Turgay, 2012). Soil contamination leads to the pollution of plants, and contaminated plants endanger the lives of humans and animals that consume them (Mentese, 2017). As can be understood from this situation, nature operates within a system, and any disturbance in this system in one place adversely affects the lives of other living organisms in nature.

Noise pollution can be briefly defined as the pollution created by disturbing and unpleasant sounds that have a negative impact on human physical and psychological health (Soylu & Gokkus, 2016). Noise pollution is an environmental pollution that reduces human work performance, distracts attention, and prevents concentration by destroying the tranquil calmness of nature (Kaypak, 2019).

Air pollution can be defined as the presence of gases and particles in the atmosphere that alter the natural composition of the air, caused by both natural events and human activities, and can harm living organisms depending on their concentrations and the duration they stay in the atmosphere (Morcali & Akan, 2017). The resulting air pollution leads to an increase in respiratory diseases such as asthma and bronchitis in humans, as well as skin and lung cancer, nausea, watery eyes, and vomiting. Simultaneously, it causes various environmental consequences, including the greenhouse effect, the formation of acid rain, and the depletion of the ozone layer (Bayazit, 2006).

The consequences of pollution, especially those originating from industrial sources, on human health are sometimes immediately observable and sometimes emerge over time through research studies. A study conducted in the United States in 2022 investigated the impact of lead exposure during childhood on IQ. Previous studies have demonstrated the adverse effects of lead, used primarily to enhance motor performance in cars (Edelmann, 2016), leading to diseases such as paralysis, blindness, and infertility (Dundar & Aslan, 2005). Due to these harmful effects, the use of lead in gasoline was significantly reduced, especially after the 1990s. McFarland et al. (2022) collected and analyzed blood lead level data of American children aged 1-5 between 1976-1980 and 2015-2016. Population and leaded gasoline consumption data from 1940-1976 were also used in the study to estimate blood lead levels. The researchers found that children born during years when lead was used had an average lead-related cognitive ability loss of 2.6 IQ points per person. This illustrates that the damage caused by human activities to the environment can only be revealed through studies conducted many years later.

One of the ecological issues is the depletion of the ozone layer. The ozone layer, located in the upper part of the stratosphere, one of the layers of the atmosphere, acts as a shield by preventing harmful ultraviolet radiation from the sun from reaching the Earth. Ozone in the stratosphere exists in a natural balance, and when this balance between ozone production and depletion is disrupted, a problem called ozone depletion occurs. Chlorofluorocarbons emitted from sprays, refrigerators, air conditioners, and vehicle exhausts, as well as irregularly launched rockets, disrupt this balance and lead to ozone depletion. Ozone depletion allows harmful ultraviolet rays from the sun to reach the Earth, causing negative effects on both human health and the environment. These harmful rays can result in diseases such as skin cancer, cataracts, and corneal inflammations in humans, while

affecting aquatic life, natural cycles, and air quality in the environment, contributing to increased global warming (Anonymous, 2021-2022).

The thinning of the ozone layer is causally linked to global warming, creating a mutually reinforcing relationship where ozone layer depletion both results from and contributes to global warming. Alongside this interrelation, various factors leading to broad ecological issues, such as global warming, are known to exist. One of these factors is the phenomenon known as the greenhouse effect. The atmosphere, responsible for maintaining the Earth's average temperature, allows a portion of the sun's energy to be reflected back into space while directing another portion to reach the Earth. The Earth warms with this received energy, releasing energy back into the atmosphere, thereby maintaining the Earth's temperature equilibrium. However, due to the excessive use of fossil fuels during the industrialization process, deforestation, production and transportation of natural gas, the increase in large-scale livestock farming, and the use of synthetic fertilizers in agriculture, gases that disrupt this temperature balance have begun to accumulate in the atmosphere. Greenhouse gases, which contribute to the trapping of heat in the atmosphere, enhance the Earth's warming by capturing the energy emitted from the heated surface, causing the Earth's surface to warm even further. Because this effect is similar to the way a greenhouse functions, it is termed the greenhouse effect (Ozturk, 2002). These mentioned causes give rise to a significant ecological problem, namely global warming, and as a consequence of global warming, the issue of climate change arises.

The Multifaceted Positive Outcomes of Natural Environment Ontologies

Nature, which is often seen as a commodity by humans, is thought to have many positive effects. The positive effects of nature, making people feel good, can also be inferred from the lifestyle of urban dwellers. Even the act of city dwellers allocating space for plants in their home rooms or on balconies where they can breathe exemplifies this situation. Studies conducted on the subject have also revealed that nature not only makes people feel good but also has many other positive effects.

People sometimes come into contact with nature directly, through activities such as gardening, and sometimes indirectly, through passive experiences such as watching from a window. Both forms of contact have been shown to have positive effects on both physiological and psychological well-being. Exposure to environments with vegetation has

been indicated to support stress relief, reduce the number of negative emotions such as fear, anger, and sadness, and simultaneously increase positive emotions (Ulrich & Parsons, 1992). A study conducted between 1972 and 1981 in a hospital in Pennsylvania investigated whether assigning patients who had undergone gallbladder surgery to a room with a natural view had a therapeutic effect on their illnesses. In this research conducted by Ulrich (1984), patients randomly assigned to rooms with either a natural view or a brick wall in two wings of the hospital had their recovery records examined. Patients in rooms with a natural view had shorter postoperative hospital stays, used fewer strong pain relievers, and had fewer negative evaluations in nurse notes compared to patients in rooms with a brick wall view. This suggests that even passive contact with nature has a healing effect on health. In a study conducted in the state of Tennessee in the United States, individuals engaged in gardening activities and having direct interaction with nature were given a two-page written survey developed by researchers and asked to fill it out. Catanzaro and Ekanem (2004) found in their study that interacting with nature reduces the sense of stress in humans and has many positive effects, including mental health. In a study conducted by Moran and Turner (2019) in two different prisons, it was concluded that contact with nature has a calming effect, and inmates who had contact with nature experienced less stress.

It is possible to express, based on findings from some studies, that engaging in physical activities and various other activities in natural settings will provide more beneficial results compared to those conducted in artificial environments lacking vegetation in urban areas. For instance, in a study investigating the impact of nature experience on affect and cognition, participants were randomly assigned to nature and urban environments and asked to take a 50-minute walk. The study found that walking in nature provided cognitive benefits (particularly enhancing verbal working memory performance) compared to urban walking, and it also reduced anxiety and rumination (Bratman et al., 2015). Similarly, in a study conducted by Gidlow et al. (2016), it was stated that walking in a natural environment provides greater restorative benefits compared to walking in an urban environment and that the restorative benefits continued for an additional 30 minutes after departing from the natural environment. Additionally, a study conducted by Choe et al. (2020) investigated whether the effectiveness of Mindfulness-Based Stress Reduction (MBSR), a widely used well-being intervention, would increase when combined with the benefits of exposure to a natural environment. In the study, participants were randomly assigned to three different

environments: a natural outdoor setting (a large park with public greenery), a built outdoor setting (a greenery-lacking courtyard on a university campus), and an indoor setting (a windowless room in the basement). Participants practiced the MBSR program for one hour per week for six weeks. The study demonstrated that participating in the MBSR program in a natural environment resulted in better mental health and well-being outcomes compared to results in built outdoor or indoor environments.

The positive effects of natural environments is not limited to the physical spheres; it is also believed that natural settings, thought to have positive effects in various fields, have a restorative effect on some negatives arising from urbanization. In a study conducted by Kaplan (1995), it was stated that the abundance of stimuli in cities, such as light and noise, leads to attentional fatigue and mental exhaustion. In contrast, natural environments, which are quieter and have fewer stimuli compared to cities, were emphasized to prevent attentional fatigue and have a restorative effect on mental exhaustion. Supported and expanded by the research conducted by Plambech and Bosch (2015), which focused on the cognitive benefits provided by the restorative effect of natural environments, this study revealed that nature not only recharges our directed attention needed for generating new ideas and analyzing thoughts but also makes us more curious, flexes our thinking, and awakens a creative thinking style. All these studies highlighting the cognitive benefits provided by nature suggest that natural environments could also have positive effects on the educational process. Similarly, a study conducted by Dadvand et al. (2015) demonstrated the beneficial impact of exposure to natural vegetation, or greenery, in outdoor settings on the cognitive development of school children, supporting the idea that natural environments could positively influence educational processes. Another study conducted in Canada, examining the potential benefits of nature experience on children's mood, socialization, and attitudes toward nature, took 80 elementary school students to both a nature school and an aviation/space museum. The results indicated that children were more social and developed a closer connection with nature during their time at the nature school. The study also suggested that allowing time for unstructured activities in nature was beneficial for children's socialization and that children engaged with nature appeared more willing to protect the environment. This implies that children spending time in nature develop an awareness of environmental conservation and may adopt a protective attitude towards nature in the future (Dopko et al., 2019).

Towards Natural Environment Pedagogies

Several interdisciplinary explorations and research efforts, conducted through a thorough examination of the educational context defined by various problems and challenges arising from the global pedagogical paradigms of the 21st century, have demonstrated that ecological literacy's pedagogical outcomes, in other words, the establishment of an eco-pedagogical paradigm characterized by an interdisciplinary dialectic that can be established with the natural environment or surroundings, can contribute to the improvement of educational processes and the establishment of an eco-pedagogical paradigm (Magntorn, 2007).

Therefore, as expressed above, there has emerged a trend desiring the conduct of research that can reveal whether natural environment pedagogies, which can serve as antitheses to certain problematic educational paradigms, can effectively respond to individuals' physiological and psychological needs as these pedagogies gain popularity. This trend has facilitated the emergence of various empirical results and assessments from increasingly interdisciplinary studies. In other words, in recent years, education systems and curricula, predominantly departing from traditional classroom settings, where students spend more time indoors and engage in learning processes facilitated by digital technologies, have increasingly focused on building knowledge and experiences that can be gained through physical activity and an ontology of the natural environment. They have shifted their emphasis towards a pedagogical understanding that integrates educational processes more with the natural environment, concentrating on the development of various skills in individuals (Richardson, 1994).

Therefore, in contrast to the emerging trends favoring the adoption of natural environment pedagogies mentioned above, traditional closed-space pedagogies, especially when individuals within educational environments, encompassing various student portfolios, are engaged in educational processes connected to both formal education settings and distance learning modules, have kept students physically and bodily away from any dynamic or movement paradigms that may trigger various health problems. Instead, these pedagogies have positioned students, who have spent extended periods sitting in closed environments, namely in formal educational settings or in front of two-dimensional screens related to virtual technologies, away from any physical activity. As a result, their cognitive processes have been diminished and distorted by the information conveyed to them.

For centuries, in global pedagogies where the focus has been on the adverse effects of industrial civilization, a trend towards embracing natural environments has gradually gained acceptance. This trend has played a significant role in establishing an educational well-being situation and has become increasingly widespread and important. One important reason and justification for the widespread adoption of natural environment pedagogies is the growing global demand and need for interdisciplinary perspectives on learning and teaching processes and activities, methodologies that focus on the development of intellectual, pedagogical, and cognitive well-being (Barton, 2016).

Since natural environment pedagogies are considered an educational approach that allows all types of student portfolios to learn more effectively in their natural environments, this approach aims to facilitate children's exploration and experience of natural environments, enabling them to undergo a healthier cognitive and intellectual construction process. This, in turn, promotes more enthusiastic participation in learning processes and makes all kinds of pedagogical processes or activities more enjoyable.

In the study conducted by us, it was determined through documentary screening analysis that there are numerous documentaries that can be used in the teaching-learning environments for the processing of environmental literacy, ecological literacy, and eco-literacy. These documentaries provide students with the opportunity to understand environmental issues, raise awareness about the sustainable use of natural resources, and comprehend their responsibilities related to the environment. Moreover, considering the presentation and content of conferences or symposiums, it is believed that the use of documentaries in educational environments can increase students' interest in environmental issues by benefiting from visual and auditory stimuli. It is also thought that the use of documentaries can encourage more in-depth learning processes among students in these subjects. The use of documentaries also facilitates discussion and knowledge sharing among students, contributing to increased awareness of environmental issues.

Natural environment pedagogies have been closely associated, especially in recent years, with the development of environmental education and literacy related to environmental consciousness, and the establishment of a consciousness for the conservation of natural resources or reserves through the construction of a healthy foundation for sustainability education. Environmental education emphasizes the more functional implementation of pedagogical processes in natural environments, increasing individuals'

desire to learn and assisting in the exploration of various epistemic and ontological situations characterized by natural environments, leading to a more accurate understanding of the external world. Sustainability education, which emerges as an indispensable quest in these educational paradigms, enables the establishment of ecological literacy and environmental consciousness towards the natural environment, motivating individuals to take action for building a sustainable future. Therefore, it is acknowledged that natural environment pedagogies play a significant role in the construction of essential knowledge, experiences, or insights for environmental and sustainability education.

Natural environment pedagogies are also considered within the framework of learning theories grounded in the postulates of constructivism. According to this theory, environmental-social-cultural environments or contexts in which learning processes are adapted to life facilitate and encourage the mental, intellectual, and cognitive structuring of individuals (Norton, 2022). In other words, within various pedagogical processes, individuals engage in cognitive-intellectual activities, entering into a phenomenological dialectic with existing epistemic codes, experiences, or phenomena. Therefore, as expressed above, within a healthy eco-dialectic established with the external world or in a natural environment, natural environment pedagogies are associated with the construction of a shared cognitive, intellectual reservoir that can be molded by the experiences of individuals involved in educational processes.

The educational approach characterized by these pedagogical postulates is also influenced by social constructivism theory. This theory posits that individuals' learning is derived from their experiences organized within social interactions and their responses, reflexes, or reactions to various situations or factors encountered while conducting educational activities in a natural or environmental setting. Pedagogies defined by the methods or approaches with which such an educational program or curriculum is shaped can be considered as an educational approach that aligns with the predictions of social constructivism theory. These pedagogies focus and concentrate not only on the social interactions children establish but also on their experiences in natural environments, aligning with some of the predictions set forth by social constructivism theory (Smith & Sobel, 2014).

Conclusion and Recommendations

Conclusions to be drawn from all of the aforementioned interpretations and conceptualisations related with various research phenomenologies interspersed into our study have been obtained and inspired by the fact that natural environment pedagogies are becoming increasingly important in 21st-century pedagogies, focusing on interdisciplinary studies conducted in literature and based on various pedagogical postulates that are continuously being explored and evaluated in the literature on a multidimensional level. This was the reason why this study has been grounded in phenomenological, conceptual, mixed and qualitative methodologies. It has been suggested that educational activities, limited to closed environments within school walls, may be inadequate and problematic, leading to various neurocognitive and neuro-pedagogical issues. In light of this, various application areas where natural environment pedagogies can be adapted and educational programs or curricula that can be developed in these areas are discussed. It is proposed that these programs may have positive effects on various cognitive and physical well-being parameters or components of individuals.

Recently, there has been an increasing emphasis, particularly in selected pilot regions, on promoting the design and implementation of natural environment-based pedagogical programs in various primary and secondary education institutions and partially in higher education institutions. This initiative aims to enable students to have a more effective and healthier dialectic or interaction with their natural environments. It could contribute to providing a more realistic pedagogical experience, allowing students to go through cognitive-intellectual well-being conditions evaluated on the basis of multiple intelligence theories. Furthermore, it may facilitate a better understanding of nature, the establishment and development of ecological literacy, and the cultivation of environmental consciousness. By engaging students in pedagogical activities in natural environments, it can also encourage and support their ethical, social, and emotional development. In natural settings, students not only mature and develop pedagogically but also acquire collaborative learning skills, emotional literacy, empathy-building skills, a sense of duty and responsibility, as well as moral and spiritual literacy skills. Overall, such environments can foster students' development in ethical, social, and emotional dimensions, leading to a holistic growth and enhancing their overall well-being.

Furthermore, individuals who mature and develop within the aforementioned pedagogical postulates will not only grow in the areas mentioned above but also in various fields such as natural sciences, mathematics, fine arts, language, and literature. For example, in a natural environment, students can enhance their arithmetic skills, develop geometric literacy skills, and work with various spatial shapes and units of measurement. In addition to these, they will have the opportunity to conduct research and investigations on plants and animals in the natural environment.

Natural environment pedagogies are associated with many common concepts and phenomena that can be evaluated in the constructivist context. Considering the theoretical framework of such pedagogical approaches, student-centered approaches are emphasized more, facilitating students to take an active role in the learning process, enhance critical thinking skills, and personalize their learning experiences.

This approach can also assist students in solving various real-life problems rather than focusing solely on textbooks. Furthermore, one of the prerequisites for implementing learning-teaching activities in interaction with the natural environment, which is considered as an important element that allows students to interact with their natural surroundings, is the construction of school gardens, natural habitats, and parks, which can be evaluated as significant elements that can align with this approach. The arrangement and use of these areas will also contribute to the implementation of the postulates envisaged by natural environment pedagogies into practice.

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Author Contribution Statement

Dündar KERÇİN: *Conceptualization, literature review, methodology, data analysis, language editing, and writing.*

Mehmet Şirin DEMİR: *Conceptualization, methodology, data analysis, language editing, and writing.*

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