Chapter 12

Nature-based Learning in Early Childhood Education

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"The most beautiful gift of nature is that it gives one pleasure to look around and try to comprehend what we see."

Albert Einstein

Abstract

The nature-based learning approach involves the direct integration of nature into learning processes and the facilitation of firsthand nature experiences. Considering the benefits it provides across a wide range of areas, including social development, cognitive development, emotional development, motor skills, and health, it becomes evident that the integration of this approach into early childhood, a critical period for individual development, is significant. In this context, this study primarily examines the nature-based learning approach from a theoretical framework perspective. At this point, Bronfenbrenner's bioecological theory, experiential learning theory and place-based learning theory, which are noted in the literature as having an impact on the nature-based learning approach, are mentioned. Furthermore, the implementations of nature-based learning during early childhood and the underlying approaches supporting these implementations are examined in general terms. This study aims to highlight the diversity of educational models that provide nature-based learning experiences through nature-integrated learning environments offered by various approaches, including Kindergarten, Montessori, Waldorf, Reggio Emilia, and forest schools.

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https://doi.org/10.58830/ozgur.pub534.c2205

1. Introduction

Albert Einstein (2011)'s quote, "The most beautiful gift of nature is that it gives one pleasure to look around and try to comprehend what we see." refers to the feelings of wonder and awe that nature arouses in human beings. Indeed, while observing nature and its processes, individuals are not only influenced by its beauty but also seek to understand its functioning. This quest for meaning encourages individuals to observe and explore. Children, often described as little scientists (e.g., MacDonald, Huser, Sikder & Danaia, 2020; Cremin, Glauert, Craft, Compton, & Stylianidou, 2018; Stylianidou, Glauert, Rossis, Compton, Cremin, Craft & Havu-Nuutinen, 2018), possess a natural inclination to discover their environments (Temiz & Semiz, 2019). It can be stated that children's curious approaches to their surroundings effectively contribute to this natural tendency. Indeed, little scientists who seek to understand their environment and the world around them conduct inquiries by asking questions and learning. From this perspective, it can be stated that one of the environments in which effective learning occurs for children is nature itself. A review of the relevant literature indicates that the outcomes of nature-based learning experiences are emphasized regarding their benefits. In this context, nature-based experiences have been linked to various positive outcomes, including reduced attention deficits (Faber Taylor & Kuo, 2009; Faber Taylor, Kuo & Sullivan, 2001; Kuo & Faber Taylor, 2004; Mårtensson, Boldemann, Söderström, Blennow, Englund & Grahn, 2009; Taylor, Kuo & Sullivan, 2001; Ulset, Vitaro, Brendgen, Bekkhus & Borge, 2017); cognitive development (Coates & Pimlott-Wilson, 2019); creativity (Wojciehowski & Ernst, 2018); physical health (Chawla, 2015; Dennis Jr, Wells & Bishop, 2014; Gill, 2014; McCurdy, Winterbottom, Mehta & Roberts, 2010); physical skills (Fjortoft, 2001; Li et al., 2019; O'Brien & Murray, 2007); social development (Coates & Pimlott-Wilson, 2019; Li, Larsen, Yang, Wang, Zhai & Sullivan, 2019; O'Brien & Murray, 2007); learning (Ballantyne & Uzzell, 1994; Dennis Jr, Wells & Bishop, 2014; O'Brien & Murray, 2007); mental health (McCurdy, Winterbottom, Mehta & Roberts, 2010); behavior (Dennis Jr, Wells & Bishop, 2014); self-discipline (Faber Taylor, Kuo & Sullivan, 2002); self-confidence (O'Brien & Murray, 2007); positive attitudes toward the environment (Ballantyne & Uzzell, 1994; Collado, Rosa & Corraliza, 2020; Gill, 2014); nature connection (Barrable & Booth, 2020); willingness to protect nature (Dopko, Capaldi & Zelenski, 2019); and emotional well-being (Chawla, 2015; Dennis Jr, Wells & Bishop, 2014; Li et al., 2019). Considering these findings, it can be expressed that nature-based experiences and learning processes support not only the cognitive development of children but also

contribute to their emotional and social development. Progress in these areas is significant for children's future academic and social lives. Additionally, the gains achieved in the emotional domain can enhance life skills. Furthermore, the positive impact of nature interaction on reducing attention deficits inevitably contributes to the effectiveness of learning environments. In this context, it can be stated that nature-based learning represents an important model that contributes to children's holistic development. Establishing a connection with nature through nature-based learning experiences and developing positive attitudes towards nature, along with a growing desire to protect it, is particularly important. Indeed, individuals' perspectives on nature continue to cause harm to the environment today (Yusup, Istiqamah & Khairunnisa, 2021). For example, viewing nature as an inexhaustible resource (Frank, 1997) and activities such as urbanization, industrialization, and mining (Ukaogo, Ewuzie & Onwuka, 2020) are among the reasons for environmental degradation. Unfortunately, the damage inflicted on nature has led to an increase in ecological and environmental problems (Ye & Shih, 2020). In this context, increasing children's awareness of the environment can lay the groundwork for them to become individuals who exhibit environmentally conscious and responsible behaviors in the future. Indeed, Iozzi (1989) emphasizes that the development of attitudes and values toward the environment should begin during early childhood.

2. Theoretical Framework of Nature-based Learning

The nature-based learning approach encompasses the integration of natural elements, such as plants, animals, and water, into educational environments, facilitating the acquisition of knowledge and various attitudes, skills, values, and behaviors relevant to areas such as personal development, academic achievement and environmental responsibility (Jordan & Chawla, 2022). Although there has been a rapidly increasing interest in implementing education in nature, the notion of conducting education in natural settings has its roots in the philosophical approaches of Aristotle and Plato (Stonehouse, Allison & Carr, 2011; Yıldırım & Akamca, 2017). At this point, it is deemed important to address the theories influencing learning through nature experiences. Indeed, learning experiences in nature or outdoors are influenced by Bronfenbrenner's bioecological theory (Pope, Egan & Hilliard, 2021), experiential learning theory (Williams & Wainwright, 2016), and place-based learning theory (Rymanowicz, Hetherington & Larm, 2020).

Bronfenbrenner's bioecological theory emerged from the transformation of Bronfenbrenner's ecological systems theory across three stages over time

(Rosa & Tudge, 2013). This theory is one of the most well-known theoretical frameworks regarding human development in social sciences (Vélez-Agosto, Soto-Crespo, Vizcarrondo-Oppenheimer, Vega-Molina & García Coll, 2017). Bronfenbrenner and Morris (2006) state that the bioecological model composes of four defining properties termed as *process*, *person*, *context*, and *time*, as well as the dynamic interactions between these properties. They indicate that the *process*, which forms the core of the model, encompasses specific forms of interaction occurring between the organism and the environment. The ability of these proximal processes to influence human development varies depending on the other three defining properties. The second defining property, *person*, emphasizes the active role of individuals in influencing their developmental processes, particularly focusing on biological impacts (El Zaatari & Maalouf, 2022). Here, three types of person characteristics are identified that have the most significant impact on the progression of future development, indicating their potential to affect the direction and strength of proximal processes throughout life (Bronfenbrenner & Morris, 2006). These characteristics are described by Bronfenbrenner and Morris (2006) as follows: (1) dispositions can initiate proximal processes in a specific area of development and sustain their operation; (2) effective functioning requires bioecological resources related to experience, skills, abilities, and knowledge; (3) demand characteristics invite or hinder social environmental responses that can promote or disrupt this operation. The third defining property, *context*, refers to the multiple environments that modify proximal processes, including social, physical, and economic settings in which individuals are continuously interacting (Krishnan, 2010). The *time* property focuses on the large-scale changes created over time by developmental processes and outcomes in society, and the impact of these emerging changes on the future of society (Bronfenbrenner & Morris, 2006). When linking bioecological theory with children's learning processes through nature experiences, it is evident that this theory posits that children's development continues through various contexts and environments with which they interact continuously, associating these contexts with their biological predispositions (Krishnan, 2010).

Kolb (1984) associates the designation of experiential learning theory with two reasons. The first is the explicit connection to the intellectual roots found in the works of Piaget, Dewey, and Lewin. The second reason pertains to the central role of experience in learning processes. In this regard, experiential learning theory is presented as a holistic integrative perspective that combines the elements of experience, behavior, cognition, and perception related to learning. In other words, this theory emphasizes

that experiential learning occurs through real experiences, facilitating effective learning beyond the information presented in classroom settings or textbooks (Chan, 2012). In this context, experiential learning theory asserts that effective learning processes require four abilities: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Concrete experience ability refers to students' full, open, and unbiased participation in new experiences; reflective observation ability enables the reflection and observation of experiences from various perspectives; abstract conceptualization ability facilitates the creation of concepts by logically integrating observations into sound theories; and active experimentation ability highlights the application of these theories in decision-making and problem-solving processes (Kolb, 1984). Within this framework of the four identified abilities, experiential learning theory presents a four-stage learning cycle (Kolb, 2014). This theory serves as an important foundation for nature-based experiences as it emphasizes real-life experiences. Indeed, when outdoor environments such as botanical gardens and nature reserves are integrated into the learning processes, they provide valuable opportunities (Dunkley, 2016).

Sobel (2004) emphasizes the necessity for students to integrate with their communities and local resources within the framework of place-based learning theory, asserting that this will support the learning process with concrete and real experiences while highlighting the need for experience. Place-based learning theory aims to create a learning process in which students are directly engaged with their environments and collaborate with their communities. At this point, it promotes participation in local projects such as designing school garden layouts, recycling and composting programs, and water quality testing, thereby facilitating opportunities for students to explore nature and generate solutions to local problems. In this context, place-based learning theory, which focuses on the values, resources, and problems of the local community, aims to enhance socialization and academic success alongside improving the environmental quality of the community through the development of various collaborations between schools and the community (Powers, 2014).

3. Nature-based Early Childhood Education

Educational institutions with curricula focused on nature experiences are referred to by various names such as nature-based preschools, nature kindergartens, forest kindergartens, outdoor preschools, and Waldkindergartens; however, the common feature of all these programs is that their educational philosophies and methods are shaped through nature

(Cordiano et al., 2019). Finch and Bailie (2015) note that there is no single correct framework for defining the key characteristics of preschool institutions centered around outdoor habitats, and they explain these institutions' distinguishing features through three main criteria. These criteria are as follows (Finch & Bailie, 2015):

1. Nature themes and daily nature explorations form the core of the programs in nature kindergartens. In this regard, researchers state that nature is not merely a topic within various subjects or activity centers; rather, they describe nature as a binding element that intentionally integrates the philosophy, methodologies, classroom designs, outdoor spaces, and public identity of these schools.
2. The entire curriculum of nature kindergartens must be equally committed to developmentally appropriate high standards of early childhood education and best practices in environmental education. This situation necessitates that teachers working in nature kindergartens are experts in both areas. Thus, the teaching staff in these institutions is expected to be dual experts with skills and experience in both early childhood education and environmental education.
3. Nature kindergartens support a dual objective for children, focusing on meeting child development goals and instilling conservation values.

Although the educational institutions providing nature-based learning experiences in early childhood vary in their philosophies, each aims to establish intense interactions with nature and, in line with this goal, ensures that children are exposed to nature by participating in outdoor activities for varying durations (Sobel, 2014). At this point, as previously mentioned, the expectation for teachers to be dual-field expert is significant, as well as the roles they assume in organizing outdoor activities for children. The behaviors and attitudes of teachers during the activity process have a considerable impact on achieving the goals and outcomes of the activities. Indeed, Jacobi-Wessels (2013) states that teacher participation in outdoor activities supports learning and that a teacher's positive attitude and curious behaviors serve as an encouraging force in guiding children to explore.

The teacher's interaction with the children and their supervision during the process is also significant from a safety perspective. This is because nature-based learning activities in early childhood raise the issue of risk. Indeed, modern societies are risk-averse, and many children are protected from situations involving risk that were experienced by previous generations (Harper & Obee, 2021). In this context, it is suggested that the teacher

takes on a role that facilitates the process rather than simply ensuring safety (McClintic & Petty, 2015). For example, the teacher is expected to take necessary precautions by being knowledgeable about local vegetation and animals, as well as identifying needs arising from seasonal changes (such as clothing choices or sunscreen) and addressing them appropriately (Jacobi-Wessels, 2013).

Due to the diversity of nature-based educational institutions mentioned in this section, the following section introduces various approaches and examples of schools that incorporate the philosophy of nature experiences into their programs during early childhood.

4. Development of Nature-based Early Childhood Education

The nature-based education initiative that emerged in Scandinavia and Germany is widely implemented in the United Kingdom and Wales and has recently begun to gain increasing interest in the United States (Cordiano, Lee, Wilt, Elszasz, Damour, & Russ, 2019). However, the idea of organizing or supporting learning environments through nature in early childhood education is not a new strategy. Pestalozzi, Froebel, Montessori, and Dewey expressed that children's learning and development are significantly supported through direct interactions with nature and natural materials, as well as high-quality early childhood programs (Davis, 1998).

Friedrich Froebel, known for establishing the first kindergarten in Germany in 1837, believed that nature-based experiences led by children form the foundation of early childhood education and continues to influence the curriculum content of many countries today (Ashmann, 2018). As the founder of the kindergarten, Froebel (1903) advocated for the necessity of children experiencing nature in gardens, forests, or around their homes, proposing activities such as garden care (e.g., growing plants from seeds, tending to fruits and crops), caring for animals like pigeons, chickens, and ducks, and collecting natural objects.

The first Montessori school, Casa dei Bambini, opened in Rome in 1907 (Whitescarver & Cossentino, 2008). The Montessori method, developed by Maria Montessori, involves a stimulating and collaborative learning environment where the child can freely explore their imagination and the teacher assumes a guiding role, encompassing a holistic approach that includes emotional, ethical, and spiritual development, rather than focusing solely on academic achievement (Duckworth, 2006). In Montessori classrooms, children aged 3-6 are encouraged to choose their own activities, which supports the individualization of the learning process by providing

comprehensive tools and self-directed learning materials (Miezitis, 1971). In this context, the emphasis of the Montessori method on fostering children's independence and freedom to act is particularly notable (Montessori, 1912). Montessori (2013) states that children are natural observers of the environment, leading to various activities such as plant cultivation and animal care within her school (Montessori, 2013). Today, a wide range of nature activities continues to be conducted in Montessori schools.

In 1919, the first Waldorf school, Freie Waldorfschule Uhlandshöhe, was opened in Germany by Emil Molt, with Rudolf Steiner serving as the pedagogical leader (Paull & Hennig, 2020). In Waldorf schools, which are based on the philosophy of Anthroposophy, art is a central element of education, and the approach is built on experiential learning through arts such as painting, music, and movement, with Eurythmy, a form of artistic expression that visualizes music through bodily movements, being particularly noteworthy (Uhrmacher, 1995). According to the Waldorf approach, teaching environments are not limited to enclosed spaces; learning processes are also supported through open areas, as Steiner's theoretical framework posits that children should be viewed as part of nature, allowing them to explore themselves through activities that promote interaction with the natural environment (Demirci & Arslan, 2019).

Following the end of World War II in 1945, the first Reggio Emilia school was established in the Reggio Emilia region of Italy under the leadership of Loris Malaguzzi (Smith, 2014). This school was built by parents using funds raised from the sale of a tank, several trucks, and a horse, with Loris Malaguzzi guiding parents and educators from that inception (Gandini, 1993). The Reggio Emilia approach fosters an interaction based on the exchange of ideas between parents and teachers within a community context that offers a rich culture (Gilman, 2007). Malaguzzi (1993) stated that they aimed to create a school that provides an environment for learning, reflection, and reassessment. In structuring the school organization, they designed a system that brings together the child, parent, and teacher as three main subjects, strengthening interactions among these subjects. Furthermore, the Reggio Emilia program includes various activities aimed at enhancing children's interactions with nature, ensuring exposure to the natural environment (Omidvar, Wright, Beazley & Seguin, 2019; Osgood & Odegard, 2022).

Established in Scandinavia during the 1950s, forest schools (Murray & O'Brien, 2005) involve educational outdoor experiences conducted in forested areas or open environments with trees (Tiplady & Menter, 2021).

Dean (2019) notes that studying the global history of forest schools is a complex topic, as these schools have evolved into new versions influenced by the cultures of the countries in which they were established. Researchers have indicated that the forest school approach developed in Scandinavian countries has spread to countries like the United Kingdom and the United States. Additionally, Knight (2018) mentions that countries such as Canada, South Korea, China, Australia, and New Zealand have adapted the forest school approach according to their geographical and cultural structures. Furthermore, the Waldkindergarten, first established by Ursula Suben in Germany in 1968, has continued to be developed and sustained by Petra Jäger and Kerstin Jebsen in Flensburg during the 1990s, expanding upon Suben's ideas (Ordon, 2019). This adaptation of the forest school approach in different countries can be seen as an indicator of these institutions' educational significance worldwide. In this context, the global proliferation of forest schools indicates that this approach, which integrates children's educational processes with nature, occupies a prominent place among contemporary educational approaches. The Forest School Association (FSA), established in the United Kingdom, defines forest schools as follows (FSA, 2024):

Forest School is a child-centred inspirational learning process, that offers opportunities for holistic growth through regular sessions. It is a long-term program that supports play, exploration and supported risk taking. It develops confidence and self-esteem through learner inspired, hands-on experiences in a natural setting.

Additionally, The Natural Start Alliance, a project of the North American Association for Environmental Education (NAAEE), states that nature preschools can have both outdoor and indoor facilities, and that these schools can conduct all their instructional processes in outdoor environments, categorizing them as forest preschools, forest kindergartens, or outdoor preschools (NAAEE, 2020). In this context, The Natural Start Alliance defines forest preschools through the concept of nature preschools as follows (NAAEE, 2017):

Nature preschools as schools that use nature as the organizing principle for their programs… A nature preschool program uses the natural world to support goals that address both child development (in all domains, including cognitive, physical, social, emotional, aesthetic, and spiritual) and the development of an ecological identity or environmental ethic. Nature preschools often allow the children's interests and curiosity to guide the day's activities and inform the curriculum. A significant portion of the school

day in nature preschools is spent outside. Forest kindergartens are a type of nature preschool that takes place entirely outdoors.

Nature-based learning approaches organize learning environments by integrating nature into the development processes of children. These approaches, which have spread to many countries worldwide through various practical examples, encourage children to interact with their natural environments. The approaches and views of educators such as Froebel, Montessori, Steiner, and Malaguzzi emphasize the important role of nature in learning processes. Indeed, the diversity of benefits provided by nature-based learning experiences is striking. For instance, a two-phase evaluation project conducted by O'Brien and Murray (2007) between 2002 and 2005 examined the effects of forest schools on children in Wales and England. This research scrutinized the changes in 24 children over an eight-month period. According to the findings, the forest school had positive effects on six themes: confidence, social skills, communication and language, motivation and concentration, physical skills, and knowledge and understanding. From this perspective, the contributions of nature-based learning experiences to cognitive, social, and emotional development, as well as the development of connections to nature and positive attitudes toward the environment, can be regarded as critical learning process outcomes. Indeed, these outcomes can be seen as indicators that the nature-based learning approach is a model contributing to a sustainable future.

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