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Preschool Gardens as a Source of Child Development

Ogrody przedszkolne jako źródło rozwoju dziecka

KEYWORDS

education, outdoor
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embodied cognition,
preschool garden,
development, child
development, nature

ABSTRACT

The purpose of this article is to demonstrate that the preschool garden constitutes a space aligned with children's natural needs and highly supportive of their holistic development. The analysis of the garden's role as an educational environment is embedded within four complementary theoretical perspectives: constructivism, experiential learning, embodied cognition, and outdoor education. These theoretical frameworks create a coherent interpretative model in which the preschool garden is viewed as a constructivist setting (where the child acts as an active constructor of knowledge), a space for direct experience (learning through doing), a context for embodied cognition (emphasizing the role of the body and senses), and a medium of outdoor education (in which the relationship with nature forms the foundation of development). In this perspective, the garden is no longer seen merely as a recreational area, but rather as an integral component of the educational environment that fosters the child's multidimensional development. The article takes the form of a narrative literature review aimed at providing a synthetic presentation of the current state of knowledge on the role of preschool gardens in outdoor education. Literature was selected purposively and included publications from the fields of pedagogy, developmental psychology, and environmental education, with special attention given to studies published within the last 10 years. The qualitative analysis consisted of identifying key theoretical categories, comparing research results, and interpreting the role of the garden. The main limitation of this methodological approach is the lack of procedures characteristic of systematic reviews.

SŁOWA KLUCZE ABSTRAKT

edukacja, edukacja
outdoorowa,
ucieleśnione
poznanie, ogród
przedszkolny,
rozwój, rozwój
dziecka, natura

Celem niniejszego artykułu jest ukazanie ogrodu przedszkolnego jako przestrzeni bliskiej naturalnym potrzebom dziecka i sprzyjającej jego holistycznemu rozwojowi. Analiza roli ogrodu jako środowiska edukacyjnego została osadzona w czterech komplementarnych perspektywach teoretycznych: konstruktywistycznej, uczenia się przez doświadczenie, ucieleśnionego poznania oraz edukacji outdoorowej. Przyjęte ramy teoretyczne tworzą spójny model interpretacyjny, w którym ogród przedszkolny postrzegany jest jako środowisko konstruktywistyczne (dziecko jako aktywny twórca wiedzy), przestrzeń doświadczenia (uczenie się poprzez działanie), kontekst ucieleśnionego poznania (rola ciała i zmysłów) oraz medium edukacji outdoorowej (relacja z przyrodą jako fundament rozwoju). Tak rozumiany ogród przestaje być jedynie przestrzenią rekreacyjną, a staje się integralnym elementem środowiska edukacyjnego wspierającego wielowymiarowy rozwój dziecka. Artykuł ma charakter przeglądu narracyjnego literatury, którego celem jest syntetyczne ujęcie aktualnego stanu wiedzy dotyczącej roli ogrodu przedszkolnego w edukacji outdoorowej. Dobór literatury miał charakter celowy i obejmował publikacje z pedagogiki, psychologii rozwojowej oraz edukacji środowiskowej (ze szczególnym uwzględnieniem prac z ostatnich 10 lat). Analiza jakościowa polegała na identyfikacji kluczowych kategorii teoretycznych, porównaniu wyników badań oraz interpretacji roli ogrodu. Ograniczeniem przyjętej metodologii jest brak procedur typowych dla przeglądów systematycznych.

Introduction

Contemporary education operates in the context of dynamic changes within a highly urbanized, technologized, and stimulus-overloaded world. The increasing amount of time children spend in digital environments has become almost normative. This has significantly limited children's spontaneous outdoor physical activity and direct contact with nature (Stawarz, 2023; Nowakowski, 2023; Bałachowicz et al., 2023). Furthermore, the latest reports indicate that only about 16–20% of children meet the WHO recommendations for a minimum of 60 minutes of daily physical activity (Zembura et al., 2022).

In this context, outdoor education responds to current educational challenges, emerging as an innovative approach, even though it has always been practiced as a natural space for the child's comprehensive development. After all, getting to know nature constitutes the primary mechanism for acquiring experiences that are crucial for human survival and development as a species (Bergan et al., 2024). Thus, the return to nature and the renaissance of outdoor education can be perceived as a kind of homecoming.

In the context of the issues discussed, one of the most accessible yet still insufficiently utilized educational resources remains the preschool garden. In many institutions, it functions primarily as a recreational space or an aesthetic complement to the building's architecture (Klichowska, 2013). Meanwhile, the analysis of empirical research and practical experience shows that a well-designed and consciously used garden can become an integral pedagogical tool with interdisciplinary potential. It encompasses not only nature, health, and ecological education, but also therapeutic activities that are particularly important when working with children with special educational needs (Biernacka, 2023).

Methods and Research Tools

The article takes the form of a narrative literature review aimed at providing a synthetic account of the current state of knowledge regarding the role of the preschool garden as an environment supporting child development in the context of outdoor education.

The selection of literature was purposive and included scientific publications from the fields of pedagogy, developmental psychology, and environmental education. Particular attention was given to studies addressing outdoor education, experiential learning, constructivist approaches to learning, embodied cognition, and the role of children's contact with nature in cognitive, motor, and socio-emotional development.

The review was structured around four complementary theoretical perspectives: constructivism, experiential learning, embodied cognition, and outdoor education. These perspectives were selected due to their prominent and recurring presence in the literature on learning in natural environments, as well as their relevance for interpreting the educational potential of preschool gardens. Each perspective highlights a distinct yet interconnected dimension of the garden as an educational environment: the active construction of knowledge by the child, learning through direct experience, the role of bodily and sensory engagement in cognitive processes, and the developmental significance of interaction with nature. Taken together, these perspectives provide a coherent interpretative framework for a multidimensional analysis of children's learning and development. Although they do not encompass all possible theoretical approaches, they were considered the most appropriate for achieving the aims of the present study.

The analysis included scientific articles published in peer-reviewed journals, academic monographs, and research reports from educational and health institutions. Preference was given to recent publications (from the last 10 years), of an empirical or review nature, and referring to both national and international contexts.

The literature analysis was qualitative and involved:

- the identification of key theoretical categories, such as holistic development, experiential learning, contact with nature,
- the comparison of research findings on the impact of the natural environment on child development,
- the interpretation of the role of the preschool garden as an educational space in light of contemporary pedagogical concepts.

Due to the nature of the study, it did not aim at an exhaustive, systematic analysis of all available sources, but rather at a critical synthesis of selected theoretical and empirical approaches. A limitation of the adopted methodology is the absence of procedures characteristic of systematic reviews.

Contemporary Trends in Outdoor Education

Comparative analyses conducted by J. Stawarz (2023), with reference to solutions implemented in selected European countries, indicate that regular contact with the natural environment supports the development of gross motor skills, psychological resilience, and cognitive independence. As a result, “knowledge becomes personally acquired, experienced, and derived from direct engagement and one’s own exploratory activity” (Stawarz, 2023, p. 198).

A preschool garden can serve as a means of implementing the principles of outdoor education, even in urban settings (Stawarz, 2023). However, as the author points out, outdoor education in Poland remains undervalued. Specialists in outdoor education, based on their own research, indicate that currently “the strategy of outdoor education in Polish schools does not support the implementation of principles of sustainable coexistence between humans and nature” (Michalak & Parczewska, 2019, p. 172). They observed that the students studied exhibit a sense of disorientation, not knowing what they are allowed to do in natural spaces and expecting instructions for action. The causes of this situation may be attributed, among other factors, to the contemporary education system, which primarily focuses on the transmission of information without developing children’s ability to use it in practice (Gajdek et al., 2025).

The significance of the preschool garden, considered in relation to the concept of experiential learning and the constructivist model of knowledge construction (Michalak, 2020), indicates that a preschool-aged child learns about the world primarily through action, manipulation, observation, and direct contact with matter – as “an active participant in the process of acquiring knowledge.” Although legislation assumes, as noted by A. Klichowska (2013), that a child completing preschool education possesses basic knowledge about the natural world, it does not specify that

such knowledge should be acquired through exploration of natural environments. As a result, only about 9% of this knowledge is gained through activity in the garden (Klichowska, 2013, p. 318).

This situation invites reflection on the fact that nature is largely taught to children through expository methods; consequently, children do not have the opportunity to truly experience it, but only to hear about it and learn about its mechanisms in an abstract way. At this point, it is worth recalling the well-known statement by Baba Dioum:

“In The End We Will Conserve Only What We Love.
We Will Love Only What We Understand.
We Will Understand Only What We Are Taught”
(Baba Dioum, n.d.).

In the context under discussion, these words can be understood as highlighting the urgent need to educate future generations in the spirit of conscious and sustainable coexistence with nature attitude that can emerge only through direct, embodied experience. In this way, environmental protection, rather than remaining a slogan or a struggle, has the potential to once again become a natural human need.

Developmental Mechanisms Activated in the Preschool Garden

Cognitive Development

The garden offers cognitive situations characterized by a high degree of authenticity. In contrast to structured instructional settings typical of the classroom, contact with the garden enables the child to directly experience the natural world. Learning does not occur here through verbal or symbolic transmission, but through action, observation, and lived experience (Michalak, 2020).

The authenticity of this situation can be understood through the interaction of its two components. On the one hand, there is the child – an individual, unique being with their own history of experiences, sensitivity, and way of perceiving reality. The child engages with the world in an individual manner, interpreting encountered phenomena through the lens of prior experiences and current developmental needs. In this perspective, the learning process is deeply rooted in bodily experiences and in the relationships that the active organism builds with the surrounding natural environment. By acting within the garden space, the child not only observes natural phenomena but simultaneously constructs meanings from what they see, touch, and experience (Michalak & Parczewska, 2019, p. 34; Bergan et al., 2024).

On the other hand, there is the natural space of the garden which never remains static. It is characterized by dynamism, undergoing ever-changing elements and constant change resulting from the rhythms of nature, seasonal changes, weather conditions, and the life cycles of plants and living organisms.

The garden is a space whose defining feature is variability: plants germinate, grow, bloom, wither, and die; new organisms appear; the smell, color, and structure of the environment continuously change. The child's encounter with such a space is always individual and unique. Each experience in the garden is different, as both the child and the natural environment are in a constant state of change. It is precisely within this dynamic dialogue between the developing child and the living, changing garden space that authentic cognitive experience emerges. The garden thus becomes a place where the child not only acquires knowledge about the natural world but, above all, learns through direct participation in the natural processes occurring in the surrounding environment, while also deepening their understanding of themselves (Trina et al., 2024).

Moreover, as noted by K. Biernacka (2023), the experience of the process itself is more important than the final outcome, such as the harvest. Through planning activities, preparing garden beds, planting, and systematically caring for the garden, children engage in meaningful learning. This is particularly significant in work with children, as it allows them to understand where plant-based food comes from. Today, many young people, especially those raised in urban environments, perceive fruits and vegetables merely as products available in stores, lacking awareness of how complex and demanding the cultivation process is, and how much effort is required to produce food. Additionally, it is worth noting that products sold in large stores are often harvested before reaching full ripeness, which affects their taste and aroma. As a result, children do not always know the natural flavor and scent of fresh fruits, vegetables, or herbs. Preschool gardens therefore fulfill an important cognitive and educational function. It is there that children have the opportunity to taste freshly harvested produce for the first time, which, as research shows, may also support the development of healthy eating habits (Taniguchi et al., 2022). Thus, working in the garden is not only a component of environmental education but also enables practical understanding of the basics of food production (Biernacka, 2023, p. 97; Bjørgen et al., 2023).

Motor Development

The natural, uneven terrain of the garden, along with the need to overcome obstacles, bend, squat, dig, carry watering cans, or manipulate gardening tools-contrasted with the delicate touch required for plants-stimulates both gross and fine motor skills

and supports the development of sensory integration, which is crucial for a child's proper development. Unlike flat, synthetic playgrounds, the garden provides diverse proprioceptive and balance-related stimuli (Nanda et al., 2025; Falode et al., 2026).

K. Biernacka (2023) emphasizes the high degree of freedom children have in choosing the type of physical activity and experiencing its various forms in a natural environment. Running across uneven natural surfaces filled with stones, depressions, or branches effectively promotes the development of overall motor fitness. Learning in direct contact with nature engages all the senses due to the richness of diverse stimuli and experiences. This allows the child to build a sensory-based understanding of reality. Independently and creatively arranging play spaces stimulates imagination and ingenuity, while the wide range of movements helps children better understand and control their bodies (Stawarz, 2023, p. 199).

Moreover, research by A. Lundy and J. Trawick-Smith (2021) confirms that active outdoor play enhances children's engagement in tasks upon returning to the classroom. Children demonstrate greater attention span and more easily resume their work.

It is also worth noting that regular activity in the garden can help counteract the recent decline in children's physical fitness (Active Healthy Kids Poland – Zembura et al., 2022), postural defects, and metabolic disorders (AOTMiT, 2025). Alarming, nationwide screening studies indicate that in 2025, over 60% of preschool-aged children exhibit postural disorders (Stępień, 2025).

Emotional and Social Development

Gardening activities are inherently communal in nature. They require task division, coordination of actions, and shared responsibility for outcomes. Children learn planning, cooperation, and mutual support in their efforts, as well as experiencing both the disappointment of failure and the joy of success together. In terms of emotional and social development, contact with nature is associated with reduced stress levels and the development of emotional self-regulation skills. As specialists note, "Children's contact with nature also has extraordinary therapeutic and relaxing properties" (Michalak & Parczewska, 2019, p. 90), including lowering tension related to school-related stressors by providing opportunities to gain positive experiences in and with nature (Michalak & Parczewska, 2019, p. 90). Research further indicates that nature pedagogy can enhance critical thinking skills and communication competencies (Jabeen et al., 2025).

It is worth noting that, despite the clear need for teachers to thoughtfully guide children in work with, in, through, and for the garden, the individualization of the educational process often occurs spontaneously. Children independently adjust their

activities to their current needs and abilities. Therefore, it can be argued that it is even undesirable for a teacher to create overly detailed adaptations, which are currently considered milestones for educators and other specialists working with children. When a space conducive to the child's cognitive process is created, the child naturally follows their needs, unconsciously adjusting to their current psychophysical capacities. As a general principle, work in nature is not bound by rigid frameworks unless a teacher imposes them. Kochanowski and Carr (2014) stress the importance of allowing children to independently set and surpass their own boundaries, which significantly contributes to their holistic development and sense of self-determination.

Within this context, it is worth reflecting on the growing demand for activities that support emotional self-regulation among preschool children (Shanker, 2019). Such activities are clearly important in contemporary times, yet it is valuable to explore why children today specifically need them, given that research and expert opinion consistently highlight the beneficial effects of nature on mind and body. Specialists in pedagogy note a paradox: nature is free, and in today's world, it is sometimes perceived as having little value. This leads to the conclusion that, as a species, we have distanced ourselves too far from our natural surroundings in favor of immaterial products, whose value is often overestimated (Odrowąż-Coates et al., 2024).

Designing the Garden as an Educational Space

Conscious planning and landscaping of the garden should transform it from a recreational space into a multifunctional, integral educational environment. The key element of this process is the designation of diverse zones that support structured learning, therapeutic activities, as well as free, independent exploration and mental restoration (Urząd m.st. Warszawy, 2021).

Specialists in the field recommend establishing zones such as:

- Dramatic play – allowing children to create and assume roles, experience social situations, and practice empathy and storytelling;
- Adventure play – enabling spontaneous transformation of the space according to needs and imagination (building huts, tunnels, forts, or transforming the garden into a jungle, a ship, or a space base);
- Imaginative play – supporting the development of creative imagination through free construction of stories, scenarios, and personal worlds;
- Muscle-strengthening activities – providing opportunities to overcome physical and psychological challenges;
- Manipulative games – fostering psychomotor coordination, precision of movement, visuomotor perception, and planning skills (using natural manipulatives such as cones, sticks, stones, and ropes);

- Contact with nature – including a mini vegetable and herb garden, an insect and bird observation corner, a sensory zone with mud, water, sand, and leaves, an educational compost bin, plant cultivation, and observation of seasonal changes (Michalak & Parczewska, 2019, p. 162).

With such an organized natural space, the preschool garden becomes a site for the holistic development of the child, while teachers gain natural tools for observing and individualizing the educational process.

In the literature on children's garden planning, zones are also categorized according to four key needs of children:

- Quiet zone – for rest and seeking calm, e.g., in a hideaway, treehouse, tipi, hammock, or picnic area;
- Creation zone – for creative activities such as building, exploring terrain, and testing abilities in a sandbox, treehouse, or water play area;
- Contact with nature – fostering multisensory engagement and learning about the natural world;
- Movement zone – following the authors' recommendation to "above all, play, play, and play again!" (Erckenbrecht & Lutter, 2016, p. 15), using natural obstacles both on the ground (walkways, log structures) and in the air (swings, rope parks) (Erckenbrecht & Lutter, 2016, p. 15).

Analyzing these complementary zoning approaches in preschool gardens, one can conclude that designing natural spaces for children should involve the creation of a coherent and holistic system. Such a system balances creative freedom with physical, emotional, and cognitive development, while staying true to children's innate needs. A key aspect is maintaining an appropriate equilibrium between safety and reasonable developmental risk. Excessive adult control and limitations on children's autonomy reduce their sense of agency and undermine the educational potential of the space. By contrast, natural environments provide rich affordances that promote spontaneous exploration and genuine, unrestricted experiences of the world (Trina et al., 2024).

The Garden in the Formal Education System – Challenges and Opportunities

According to the literature review, the main challenges associated with implementing a preschool garden include:

- Financing and long-term maintenance of the space,
- Organizational time required for planning and management,
- Training and professional development of staff,
- Beliefs and attitudes of teachers, school leaders, and parents (Burt et al., 2018).

Clearly, the opportunities offered by a preschool garden are numerous and significant. Most importantly, it allows for full implementation of the preschool curriculum through embodied learning and authentic contact with nature, which fosters ecological and pro-environmental attitudes. Over time, the garden helps reduce stress for both children and teachers and saves time by naturally individualizing activities and reducing the labor-intensive preparation of educational materials. Furthermore, learning emotional self-regulation becomes a partially natural, self-practiced skill, as children, with careful adult support, independently notice that they can relax, rest, and discover new aspects of the surrounding world while outdoors (Michalak & Parczewska, 2019, pp. 28–36).

A significant challenge lies in the creation and long-term sustainability of preschool gardens, which necessitates active involvement of the local community. This circumstance, however, should not be perceived as a limitation. Rather, the joint efforts of teachers, parents, and children enable the development of a genuine, living space that the community will value and maintain for years to come. Consequently, the garden emerges as both a product of collective endeavour and a meaningful symbol that contributes substantially to the holistic development of each child (Burt et al., 2018).

Before this optimistic vision can be realized, initiators may face financial barriers and resistance stemming from the beliefs of staff or parents. While challenging, these obstacles can be overcome. A key element in this process is the conscious building of community partnerships from the planning stage. Research clearly shows that gardens supported by active committees—including parents, teachers, volunteers, and collaborations with local organizations are more sustainable and effective. Such partnerships not only address financial and staffing challenges but also transform the garden into a “shared garden,” ensuring authentic care and stewardship over time (Burt et al., 2018).

Equally important is investing in staff development. Studies indicate that most teachers, even when implementing elements of outdoor education, tend to follow behavioral, transmission-based approaches similar to classroom teaching when taking children outdoors (Michalak & Parczewska, 2019, p. 90). Therefore, practical training – such as workshops on integrating garden activities with the curriculum – can help reduce resistance among teachers and directors while enhancing their sense of efficacy as educators.

Results of the Scientific Analysis and Conclusions

The literature review and theoretical reflection clearly indicate that the preschool garden possesses significant, yet still underutilized, potential as an environment for

the holistic development of the child. Findings from the cited studies consistently emphasize the positive impact of contact with nature on children's cognitive, motor, and socio-emotional development, a pattern confirmed by both national and international literature.

Regarding cognitive development, the analyzed studies show that natural environments promote learning through experience and exploration, in line with the principles of constructivism and embodied cognition. In a garden setting, the child is not a passive recipient of information but an active participant in the cognitive process, constructing knowledge through action and direct interaction with a dynamic environment. In this sense, the preschool garden represents a space conducive to deep learning, offering a clear alternative to the transmissive model of education prevalent in many formal institutions. At the same time, practical activities such as planting and caring for plants, observing seasonal changes, and exploring natural phenomena create opportunities for inquiry, experimentation, and problem-solving, illustrating how knowledge is constructed through embodied interaction with the environment.

In terms of motor development, research highlights the clear advantage of natural environments over artificially designed spaces due to their varied terrain and rich sensory stimuli, which, in the context of increasing health challenges among children such as reduced physical fitness and postural defects, give the preschool garden particular importance as a setting for preventive health measures. This potential stems from features such as uneven ground, natural obstacles, loose natural materials, and opportunities for climbing, balancing, digging, or carrying objects, all of which provide varied movement experiences that encourage active engagement with the environment.

From a socio-emotional perspective, contact with nature has a regulatory effect that supports children's mental well-being, with the reviewed sources emphasizing its role in reducing tension, enhancing self-regulation, and fostering social relationships based on cooperation and shared responsibility, which gives the preschool garden not only an educational but also a therapeutic function, particularly through activities such as collaborative gardening projects, shared responsibility for living elements of the environment, and cooperative outdoor play, which contribute to the development of empathy, responsibility, self-regulation, and a sense of agency.

The analysis of the reviewed literature suggests that the educational value of the preschool garden extends beyond supporting discrete developmental domains. Rather, it provides a setting in which cognitive, motor, and socio-emotional development unfold simultaneously and in mutual interaction. Consequently, the preschool garden may be understood as an environment conducive to the implementation of a holistic approach to early childhood education, grounded in the principles of constructivism,

embodied cognition, and outdoor education, where learning emerges through children's active engagement with the natural environment.

However, despite abundant evidence of the effectiveness of outdoor education, the literature reveals a significant gap between theory and educational practice. In many cases, the preschool garden still functions primarily as a recreational or aesthetic space rather than as an integral educational environment. Several factors contribute to this situation:

1. Insufficient teacher preparation for working in outdoor settings. Studies indicate that even during outdoor lessons, teachers often replicate traditional, transmissive teaching methods, limiting the educational potential of the space.
2. Beliefs and attitudes of teachers and parents, which may promote excessive control and restrict children's free exploration. This creates tension between ensuring safety and allowing children to take developmental risks, an essential component of the learning process.
3. Systemic limitations, such as inadequate funding, infrastructure that is not adapted to outdoor learning, and the absence of clear curriculum guidelines regarding outdoor education, which marginalize the garden as an educational space.

In light of these findings, actions to redefine the role of the preschool garden within the education system are warranted.

The literature analysis indicates that the effective use of a preschool garden's potential requires not only a well-designed physical environment but also the development of a culture of shared responsibility for its functioning. For this reason, the co-creation of the garden by the entire local community including children, parents, teachers, parent councils, and other community stakeholders is recommended. Equally important are initiatives that actively engage the preschool community and strengthen participants sense of agency, responsibility, and identification with the shared space.

Particular attention should also be given to the development of teachers competencies in designing and facilitating learning experiences in natural environments, as well as to fostering pedagogical awareness of the value of experiential and embodied learning. Consequently, regular training opportunities and professional development activities should be provided to support the perception of the garden as an integral educational environment.

At the same time, activities conducted in the garden should be continuously adapted to children's needs, interests, and developmental capabilities. As an educational space grounded in exploration, the garden requires a child-centred approach and flexibility in planning learning experiences. It is equally important to ensure the inclusivity of this environment by adapting both the space and the activities to the diverse developmental needs of all children.

Furthermore, the long-term effectiveness of garden based educational practices depends on the systematic and ongoing evaluation of both their implementation and outcomes, as well as on openness to modifications informed by the experiences of teachers, children, and parents. Only under such conditions can the garden become a permanent component of the preschool educational environment rather than merely an occasionally used recreational space.

It should also be noted that, despite the growing number of studies confirming the positive impact of contact with nature on child development, there remains a shortage of empirical research conducted in the Polish context, particularly long-term studies. This highlights the need for further analysis to better understand the mechanisms through which natural environments influence development and to develop effective models for implementing outdoor education in preschool practice.

In conclusion, the preschool garden emerges as a space with high educational potential, the full utilization of which requires a paradigm shift in thinking about education – from a transmissive model toward a constructivist approach that recognizes the importance of embodied cognition, autonomy, and child agency in the learning process.

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