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INFLUENCE OF OUTDOOR ACTIVITIES ON THE COGNITIVE DEVELOPMENT OF 3 AND 4-YEAR-OLD STUDENTS AT THE SAFPI INITIAL LEVEL, ORELLANA

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ABSTRACT: The following study aimed to determine the effects of outdoor learning activities on the cognitive development of 3- and 4-year-old students at the initial level of the Servicio de Atención Familiar para la primera Infancia in Francisco de Orellana canton, Republic of Ecuador. It used a qualitative and quantitative approach; the research was exploratory, descriptive, and field-based. For data collection, observation techniques for children and interviews with experts were used. The results demonstrate the relevance of natural environments as pedagogical spaces that foster students' cognitive, creative, and emotional development. In addition, outdoor activities provide a direct, real experience; at the same time, they enrich children's understanding of their environment and make learning more lasting. The cognitive skill development of the children who participated in outdoor activities is "in process" and "acquired". It is concluded that natural environments are essential pedagogical spaces that provide authentic learning experiences, foster cognitive growth, and support children's creative and emotional development.

Keywords: cognitive development, playful activities, executive functions, initial education, multisensory learning.

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INTRODUCTION

Currently, early childhood education is undergoing a pedagogical transformation that prioritizes the holistic learning of young children. Despite theoretical and methodological advances, many educational institutions continue to rely on repetition and classroom work, neglecting learning experiences that involve direct contact with nature. Various studies show that outdoor learning fosters creativity, critical thinking, sensory exploration, and social interaction—elements that are fundamental to cognitive development in early childhood (Wells and Lekies, 2006). However, in urban school settings, outdoor activities are often limited to recess or free play, without pedagogical planning to guide them toward cognitive development goals.

In the specific case of 3- and 4-year-olds, this is a crucial stage in which cognitive processes such as memory, attention, classification, symbolic representation, and language are consolidated. The lack of innovative pedagogical strategies, such as outdoor activities, can limit opportunities for meaningful cognitive stimulation (Johnstone et al., 2022). Thus, there is a need to analyze and implement outdoor learning activities as a pedagogical strategy to strengthen the cognitive development of early childhood students, especially those aged 3 and 4.

This study is justified by the need to innovate pedagogical practices in early childhood education by promoting strategies that connect students with the natural environment as a learning space. Outdoor activities represent an opportunity to enhance cognitive, social, and emotional skills, in line with current demands for a comprehensive and meaningful education (Knight, 2009). From a social perspective, the research offers educational institutions alternatives for implementing accessible, sustainable resources that utilize outdoor spaces as learning environments. In the pedagogical realm, this study contributes to strengthening the early childhood curriculum through innovative strategies that foster creativity, critical thinking, and children's autonomy (Bento and Dias, 2017).

The purpose of the study was to determine the effects of outdoor learning activities on the cognitive development of 3- and 4-year-old preschool students. Recent research has shown that contact with nature and outdoor activities promotes the holistic development of

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preschool-aged children. These studies agree that learning in natural environments stimulates not only motor skills but also cognitive processes by allowing children to experiment, observe, and solve problems in real-life situations.

A systematic review conducted in Europe noted that nature-based early childhood education has a positive impact on self-regulation, working memory, and sustained attention—fundamental skills for early cognitive development (Johnstone et al., 2022). Unlike approaches focused solely on the classroom, outdoor experiences offer opportunities for active learning, which promotes greater autonomy and specific motivation in children.

In a more recent study, Zhu et al. (2024) analyzed how the amount of time spent on outdoor activities and the time of day they occur influence emotional regulation and early cognitive development. The results showed that outdoor play, especially at flexible times, is associated with significant improvements in working memory, highlighting the connection between physical, emotional, and cognitive experiences in childhood.

Complementarily, education research has highlighted the teacher's role as a mediator in these processes. When educators guide play in nature, they not only foster creativity and exploration but also structure meaningful experiences that enhance the acquisition of mathematical, linguistic, and scientific concepts at an early age (Smedsrud et al., 2024). Studies agree that outdoor learning is an effective pedagogical tool for stimulating the cognitive development of early childhood students. Contact with nature, sensory exploration, and teacher guidance form an essential triangle that strengthens memory, attention, and critical thinking from the earliest years of life.

DEVELOPMENT

The Educational Role of Natural Environments

Cognitive development in early childhood is a dynamic, nonlinear, and complex process that emerges from the two-way interaction between a child’s neurobiology and their experiential environment. Far from being an automatic unfolding of preprogrammed abilities, the brain’s architecture is actively constructed through exploration, play, and social interaction

(Shonkoff, 2017). Within this framework, contemporary theories of learning and neuroeducation agree that natural environments offer an optimal multisensory context rich in integrated stimuli, which is essential for the maturation of the neural networks that underpin higher cognitive functions.

Recent neuroscientific evidence indicates that experiences in open, green spaces have a direct and positive impact on children's brains. So-called "exposure to green spaces" has been correlated with greater gray matter volume in the prefrontal and frontal regions—areas directly linked to executive control, working memory, and attention regulation (Dopko et al., 2019). This environment acts as a "gym for the brain," where attention is exercised differently: rather than requiring a voluntary effort to sustain it on a single stimulus (as often occurs in the classroom), the outdoor environment promotes a state of fascination or involuntary attention, which allows cognitive resources to recover from mental fatigue—a phenomenon supported by Attention Restoration Theory (ART) in childhood contexts (Moll et al., 2022).

Processes such as memory are enhanced by the emotional and novel aspects of outdoor experiences, which facilitate deeper and more lasting encoding. Problem-solving and executive functions—planning, impulse control, and mental flexibility—come into play in authentic and meaningful ways when a child must figure out how to climb a tree, negotiate the rules of a cooperative game, or devise a strategy for carrying water with friends (Fyfe-Johnson et al., 2021).

In early childhood education, specifically for 3- and 4-year-olds who are experiencing a surge in language, symbolic thinking, and social-emotional skills, these activities go beyond mere recreation. They become a powerful pedagogical strategy with a solid scientific foundation, aligned with the principle of embodied cognition—that is, that the body and movement are central vehicles for the construction of knowledge (Macedonia, 2019).

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Outdoor Educational Activities in Early Childhood Education

Outdoor educational activities go beyond simply playing games. According to Chicaiza Sinch et al. (2023), this is a play-based educational method that uses a playful approach to transform the outdoors into an educational tool that stimulates all areas of development. At the core of this concept is deliberate instructional planning, designed with specific learning objectives, that uses the environment as an ally to foster independent exploration organically.

The strength of this perspective stems from its grounding in classical theoretical frameworks. By drawing on Piaget's theory of development and Gardner's theory of multiple intelligences, Chicaiza Sinch et al. (2023) confirm that movement and physical interaction with the environment are indispensable tools for early childhood learning. From Piaget's perspective, these activities contribute to the formation of mental schemas through experimentation with tangible elements such as water, plants, or sand, thereby overcoming the limitations of abstraction.

On the other hand, Gardner's theory posits that an open environment is an ideal space for developing intelligences such as naturalistic intelligence (classifying leaves and insects), kinesthetic intelligence (climbing trees and maintaining balance), and spatial intelligence (knowing one's own location on the playground), demonstrating that this methodology can accommodate a variety of possibilities.

These activities are characterized by their integrative nature, since a single experience—such as tending a garden—encompasses the following content areas: mathematics (measuring growth), science (the life cycle of a plant), language (expanding vocabulary), and values (responsibility and perseverance). Thus, the educator's role evolves into that of a facilitator, designing rich learning environments and observing children's interactions to guide and reinforce their discoveries, thereby strengthening the outdoor environment as an educational setting rich in stimulation and development opportunities.

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Types of Outdoor Activities Suitable for Early Childhood Education

Outdoor activities in early childhood education should be planned and systematic, making the most of the natural environment's potential as a multisensory learning space. Various studies on nature-based early childhood education indicate that these activities can be organized according to their pedagogical purposes and the skills they aim to strengthen. Notable among these are sensory exploration, gross motor experiences, and social interaction and symbolic play, all of which are related to children's holistic development (Johnstone et al., 2022; Smedsrud et al., 2024).

One of the most important activities is sensory exploration and discovery. These activities focus on children's direct contact with natural elements such as leaves, rocks, water, soil, and sand, which stimulate the senses and foster curiosity. The second key activity is gross motor skills and play in open spaces. Running, jumping, climbing, and playing on uneven terrain are activities that develop gross motor skills, balance, and body awareness in children. Finally, it is important to incorporate social interaction mediated by the environment and symbolic play. Natural environments offer an ideal setting for children to invent role-playing games such as "jungle explorer" or "shelter builder," which foster language skills, cooperation, negotiation, and creative thinking.

Outdoor Learning as a Pedagogical Strategy

Educational experiences in natural environments constitute systematic pedagogical approaches that go beyond the traditional classroom and use the natural environment as a setting that fosters holistic development. These consist of strategies implemented in open spaces designed to strengthen gross motor skills, support sensory exploration, and foster connection with the natural world. The essence of this initiative lies in its dual purpose: to optimize physical development while fostering positive connections with the environment (Achury and Torres, 2024).

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The effectiveness of these approaches is based on natural environments' ability to provide complex, unstructured, and multisensory stimuli that require constant adaptation and creative responses from students, unlike the predictable stimuli in artificial environments. This approach is consistent with contemporary educational trends that prioritize meaningful and situated learning, in which knowledge is constructed through direct interaction with the environment and the resolution of real-world problems. Furthermore, these experiences inherently develop important social-emotional skills, such as self-reliance, adaptation to unpredictable weather conditions and terrain, and collaboration to overcome outdoor challenges. Therefore, these activities must be carefully planned and sequenced not only to help participants learn to navigate their environment but also to gradually foster a sense of inquiry and responsibility, ultimately leading them to participate in environmental conservation actively. In this way, the natural environment emerges as an essential protagonist in the educational process—a space for inquiry that enriches the formal curriculum and contributes to the development of more aware, critical, and healthy individuals.

Cognitive Development

Cognitive development during the preschool years is the process of progressively constructing mental structures that enable children to learn about, understand, and interact with their environment (Barreto et al., 2024).

According to Leiva and Zuleta, in their research, they conceptualize it as an active process in which children, through social interaction and direct experimentation, develop essential cognitive functions such as sustained attention, working memory, classification, seriation, simple problem-solving, and symbolic thinking. These authors emphasize that, in early childhood, cognitive development is inseparable from concrete action and play, the latter being the natural vehicle par excellence for its stimulation and strengthening (Leiva and Zuleta, 2020).

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This developmental process is characterized by remarkable neuroplasticity, in which rich and diverse experiences actively shape synaptic connections and lay the foundation for all future learning. Therefore, the quality of these experiences is fundamental to enhancing cognitive development (Molina and Adrián, 2024). A stimulating environment that presents developmentally appropriate challenges fosters the development of new metacognitive skills, such as planning simple actions and evaluating their outcomes. From a Vygotskian perspective, mediation by adults or more competent peers is essential because, through language scaffolding and shared activities, children internalize cultural tools and thinking strategies that they would not have been able to develop on their own (Sarmiento et al., 2024).

Similarly, the symbolic and role-playing games characteristic of this stage are not mere entertainment but a complex cognitive exercise that requires mental representation, flexibility of thought to adopt roles other than one's own, and the ability to follow the implicit rules of a playful narrative; in other words, the ability to exercise executive functions. Cognitive development in preschool-aged children cannot be understood in isolation but rather as the result of a complex network of biological, social, and emotional factors that converge in play and in the exploration of the world (Rosero et al., 2025).

The Importance of Play in Cognitive Development

Play is a uniquely human activity and constitutes a primary mechanism for cognitive development, especially during early childhood (Ramos et al., 2025). In the early stages, play goes beyond its recreational qualities to become a vital vehicle for meaningful learning, integrating sensory, motor, and social experiences that promote the maturation of brain structures associated with complex thinking (Quinde de la Cuadra, 2025).

This study highlights that play directly influences cognitive development because:

1. It stimulates executive function: symbolic play (such as "playing house" or role-playing) requires skills important for future academic success, such as planning, mental flexibility, and inhibitory control.

2. It improves language and abstraction: By interacting with their peers in structured games, children expand their vocabulary, understand sequential rules, and practice abstract thinking. 3. It develops metacognition: Free play in open spaces allows children to self-assess their actions, correct mistakes, and adjust their strategies to achieve goals, which forms the foundation of autonomous learning (Bustamante et al., 2024).

METHODOLOGY

This study used a quantitative-qualitative approach to examine the impact of outdoor learning activities on the cognitive development of 3- and 4-year-old children. It allowed integrating the interpretation of behaviors and experiences with the analysis of qualities and emerging quantitative data in natural contexts. The research was descriptive, seeking to characterize and identify manifestations of cognitive development—such as reasoning, memory, and attention—in educational experiences linked to the environment. A non-experimental design was adopted, without manipulating variables, to observe phenomena as they occur in the educational process.

The research setting was the Early Childhood Family Care Service (SAFPI), located in the Francisco de Orellana canton. The population consisted of 25 3- and 4-year-old students, who also made up the sample, selected because they met the necessary conditions for observations in a natural setting. Data collection techniques included observation, the use of a form to record cognitive processes and behaviors in real time, and semi-structured interviews with experts in early childhood education. The study's limitations include the small sample size and the absence of a control group, which restricts the generalizability of the findings and the ability to establish causal relationships.

The instruments were validated through expert judgment and a pilot test to ensure clarity, relevance, and applicability. From an ethical standpoint, informed consent was obtained from the children's parents. Data collection from the children took place over 3 weeks, during 3-hour morning sessions at home, to observe their performance in outdoor activities. Meanwhile, the expert interviews were conducted both in person and virtually. Data

processing consisted of the organized analysis of the data, relating it to previously established categories, which enabled adequate interpretation, understanding, and comparison of the results.

RESULTS

Table 1

Observation of 3- and 4-year-old children

Skills	Assessment							
	Home		In Progress		Reached		Total	
	F	%	F	%	F	%	F	%
Presents new ideas related to what they have experienced, observed, and heard.	1	4%	14	56%	10	40%	25	100%
Connects what they observe in the natural environment with previous experiences.	2	8%	13	52%	10	40%	25	100%
Classifies natural objects (leaves, rocks, flowers) based on their characteristics.	0	0%	0	0%	25	100%	25	100%
Follows simple narrative sequences in a story told outdoors.	0	0%	5	20%	20	80 %	25	100%
Actively participates in conversations about what they have observed.	1	4%	11	44%	13	52%	25	100%

Note. Created by the author.

Table 1 evaluates the level of cognitive development among 3- and 4-year-old students in early childhood education regarding the skill of expressing new ideas based on their experiences, observations, and what they have heard. The results indicate that 56% of the children are in the developmental stage, meaning that the majority of students can express their own ideas. However, they require teacher guidance to expand their vocabulary and improve the coherence of their thoughts. The findings demonstrate significant progress in critical thinking and oral expression.

It is believed that children develop the ability to express and generate new ideas when they participate intentionally (Blewitt et al., 2021). The articulation and verbalization of ideas improve when children connect direct observation of their environment with actively

narrating what they have observed, which fosters their ability to construct their own knowledge and express it aloud (Moula et al., 2021).

This skill involves connecting what is observed in the natural environment with prior experiences. The findings confirm that 52% of children demonstrate intermediate or developing proficiency in outdoor learning experiences. This confirms the importance of pedagogical strategies that integrate environmental observation with reflective activity, thereby promoting lasting learning.

This finding indicates that most children can connect new outdoor experiences with their prior knowledge, fostering a meaningful understanding of learning. This is corroborated by the findings of Lindfors et al. (2021), who found that outdoor learning facilitates the creation of cognitive connections through direct interaction with multisensory environments. Similarly, Jukes et al. (2022) argue that active exploration linked to prior experiences enhances the transfer of learning and improves long-term memory. On the other hand, Dankiw et al. (2023) note that unstructured play in natural environments allows children to connect what they observe with everyday life, which promotes learning through personal reflection.

Regarding the skill of classifying natural objects such as leaves, stones, and flowers according to their characteristics, 100% of the children were successful; the effectiveness of this skill highlights the efficiency of hands-on and sensory activities, since direct manipulation of natural materials facilitates the understanding of concepts such as color, texture, and shape. Classification promotes cognitive development and the ability to analyze fundamental processes in the early stages of scientific learning.

According to González-Sanmartín and Yanacallo-Pilco (2020), hands-on experience with concrete materials fosters the development of logical-mathematical thinking from an early age. For his part, Ramos Vallecillo (2022) asserts that education is essential during early childhood; through physical contact with objects, it serves as a foundation for children to identify properties such as color, texture, and shape. In this way, various organized mental schemas are developed. Likewise, Narváez (2022) argues that classifying natural objects

contributes to cognitive development, allowing children to sort, group, and articulate all their selection criteria.

Regarding the ability to follow simple narrative sequences in a story told outdoors, 80% of the students were successful. These findings demonstrate a high level of listening comprehension and sequential memory, which are strengthened through storytelling in natural settings and through outdoor activities that stimulate imagination and support the ability to reconstruct stories—all of which are essential for language development.

The results align with the findings of Blewitt et al. (2021), who argue that meaningful educational experiences promote the development of communicative and socio-emotional skills from early childhood onward. Similarly, Johnstone et al. (2022) note that activities conducted in natural settings strengthen attention, exploration, and meaningful learning. Similarly, Poveda-Silva et al. (2025) indicate that multisensory strategies promote language development, comprehension, and verbal expression—fundamental aspects for the organization of children's thinking and communication.

Regarding the skill of actively participating in conversations about what was observed, 52% of the children were successful, indicating that improvements are needed to foster confidence and spontaneity when speaking in groups, teacher-guided dialogue, and group dynamics that encourage the expression of ideas, respect for turn-taking when asking to speak, and the development of collaborative learning—all of which underpin social and linguistic development in early childhood education.

According to Cuesta-Ormaza and Barrera-Andrade (2022), verbal interaction in group settings fosters cooperation and the construction of shared knowledge, which enhances communicative autonomy from an early age. Furthermore, Poveda-Silva et al. (2025) indicate that multisensory strategies and teacher-guided dialogue provide greater stimulation, promote verbal expression, and build confidence in communication, thereby fostering active learning. Similarly, Bejar et al. (2024) note that oral participation in group activities enhances language inquiry and social understanding, which are important tools for child development in early childhood education.

Results of Expert Interviews

The research also included an interview with three experts in early childhood education to identify outdoor learning activities that support the cognitive development of 3- and 4-year-olds.

In response to the question: "What is the pedagogical role of natural environments in developing children's thinking and creativity?"

Expert One: "I believe that natural environments act as educational spaces because they stimulate the senses, encourage exploration, and foster children's innate curiosity by allowing them to interact with each of the natural elements found in the environment—such as leaves, sticks, soil, or water. In this way, children construct their own learning, which is meaningful because it develops through the observation and experiences they gain while playing freely."

Expert two: "Natural environments have the great advantage of being unstructured. When children are allowed to connect with nature, they have a variety of options thanks to the range of elements available. This can be used to help students realize that nature offers a diversity of objects, shapes, colors, and sizes, which allows them to develop valuable sensory experiences for meaningful learning."

Expert Three: "Natural environments play an essential role. It is the setting where children are provided with direct experiences that stimulate observation, curiosity, and exploration. These spaces help them build their knowledge, logical thinking, and creativity; by manipulating, observing, and feeling, they internalize what they learn; even their emotions shift so they can focus constructively."

Question: Why do you believe that outdoor activities enhance children's cognitive development and learning?

Expert One: “I believe that outdoor activities foster a direct and real-world experience; at the same time, they enrich children’s ability to understand their environment and promote more lasting learning.”

Expert Two: “Outdoor activities require a space where children can move freely without risk of injury. This space should include grass, turf, sand, or dirt, allowing children to develop motor skills—such as running, jumping, crawling, and rolling. This process contributes to cognitive development as children experience different situations, resolve conflicts, and demonstrate mental flexibility.”

Expert Three: “In these contexts, children observe, experiment, create, imagine, find inspiration, and enjoy the entire reality around them—which is their reality, not something invented like screens; they feel—there are many emotions and sensations that foster language development, autonomy, and decision-making skills—because through play and participation, they interact with peers, encounter challenges, and begin making decisions, which are fundamental aspects of becoming autonomous, and this, in turn, promotes the development of children’s thinking.”

Question: Which outdoor activities, in particular, are most beneficial for 3- and 4-year-olds?

Expert One: “Any activities involving field trips or hikes, because they broaden children’s perception of their surroundings and also strengthen their creativity; exploring natural environments really helps them become more curious and inquisitive; when children observe insects, flowers, rocks, and animals and interact with them, it helps them develop various skills.”

Expert Two: “Activities in general include anything related to gross motor skills—running, jumping, walking on a balance beam, climbing up and down stairs if possible, hanging from bars, running at different paces and speeds, walking along lines, and walking barefoot on sand, dry ground, or wet ground. Allow them to experience a variety of sensations. Anything related to psychomotor skills, such as crawling, rolling, creeping, and riding a bicycle. All these activities are essential and should be practiced with children of this age because they develop their muscles and agility, both physical and mental. Similarly, having the autonomy

to decide "do I or don't I do this activity, do I or don't I walk?" helps foster emotional balance and decision-making skills; that is why it is so important to practice as many exercises as we can that develop gross psychomotor skills.

Expert 3: "I believe that children's gardens are the most beneficial, where you encourage a child to plant a seed, and they witness the entire process involved in planting that seed; they're even taught to water the plants, and later, they observe the growth of that little plant, which fosters a sense of responsibility and scientific thinking in children. Another activity could be outdoor symbolic play, where children use their surroundings and any objects or elements they find to spark their imagination—for example, building little houses with branches, paths with stones, or even using leaves and flowers to imagine and start playing cooking games. Another activity would be sensory play, in which children are allowed to touch different textures in their environment—such as sticks, sand, leaves, and water—smell flowers, and listen to the various sounds around them."

Analysis of the Interviews

Based on interviews with early childhood education experts, there is consensus on the importance of natural environments as pedagogical spaces that enhance students' cognitive, creative, and emotional development. The experts agree that nature provides an authentic learning context in which children can build knowledge through observation, direct experimentation, and interaction with the environment.

The researchers believe that outdoor activities are an important tool for children's holistic development. This type of experience fosters decision-making, flexibility, and autonomy, allowing children to learn actively, while also promoting logical thinking, conflict resolution, and creativity—all of which are crucial for cognitive development during early childhood.

It has been determined that natural environments and outdoor activities—such as school gardens and gross motor skills activities systematically incorporated into the early childhood education curriculum—foster meaningful experiences that contribute to a child's holistic development.

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DISCUSSION OF RESULTS

The results show that outdoor learning activities constitute a relevant pedagogical strategy for strengthening the cognitive development of 3- and 4-year-old children in early childhood education. Direct contact with natural elements, along with multisensory experiences and playful activities in open spaces, fostered the creation of more active and meaningful learning environments. In these contexts, progress was observed in essential cognitive processes, including attention, memory, oral communication, and the structuring of logical thinking. From a neuroeducational perspective, the findings demonstrate that natural environments foster more active and meaningful learning, allowing children to construct knowledge through exploration and direct experimentation. These results align with the findings of Shonkoff (2017) and Dopko et al. (2019), who argue that exposure to natural environments stimulates cognitive functions and activates neural networks through multisensory experiences.

It was found that skills related to verbal expression, idea construction, and the connection between prior experiences and new learning require ongoing pedagogical guidance. In this regard, the results suggest that while the natural environment is a conducive space for learning, it does not, by itself, guarantee meaningful processes of knowledge construction. In line with this, Dopko et al. (2019) and Smedsrud et al. (2024) argue that adult mediation is essential for enhancing learning, as teacher guidance transforms exploratory experiences into opportunities for meaningful knowledge construction.

Participation in discussions about the observed experiences revealed a positive progression in communication and social skills, reflecting a gradual development of these abilities. These findings support López's (2022) argument that free play and outdoor activities promote social interaction, autonomy, and problem-solving. In this context, free exploration of nature allowed for the integration of emotional, social, and cognitive dimensions into the learning process.

Interviews with experts complement these results and highlight that natural environments serve as educational spaces that foster creativity, curiosity, and logical thinking. Furthermore, specialists agree that outdoor activities promote direct observation, exploration, and the

manipulation of natural elements. These findings are consistent with the theory of embodied cognition proposed by Macedonia (2019), which posits that learning is constructed through movement and interaction with the environment, thereby strengthening the connection between thought and action. The experts highlighted specific practices such as school gardens, symbolic play, and sensory experiences, noting that these activities stimulate decision-making, psychomotor skills, and scientific observation.

These pedagogical practices align with the proposals of Chicaiza Sinch et al. (2023) and Achury and Torres (2024), who view the natural environment as a learning resource that fosters critical thinking, self-confidence, and autonomy from an early age.

Through qualitative triangulation, the interviewees reinforced the findings, noting that natural environments allow children to explore, question, and construct knowledge through direct experience, thereby highlighting the pedagogical value of these spaces. Likewise, another specialist noted that, without teacher guidance, many experiences remain merely playful and do not translate into meaningful learning—a point that aligns with the observational findings and offers a critical perspective on the need for educational intervention.

These observations align with the arguments put forth by Macedonia (2019) and Chicaiza Sinch et al. (2023), although the current study provides contextual evidence demonstrating that effectiveness depends not only on the natural environment but also on pedagogical planning and teacher mediation. Expert testimonies show that outdoor learning not only improves cognitive skills but also contributes significantly to children's holistic development.

Among the study's limitations are the small sample size and the absence of a control group, which limit the generalizability of the results and the ability to establish conclusive causal relationships. Furthermore, the study was conducted within a specific educational context; therefore, future research could expand the analysis through comparative and longitudinal designs in different sociocultural settings.

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CONCLUSIONS

The findings from the sample of 25 students analyzed indicate that outdoor learning activities have positive effects on the cognitive development of 3- and 4-year-old children in early childhood education; observation, hands-on manipulation of materials, and exploration strengthen skills such as attention, memory, and comprehension, enabling children to learn in a meaningful way, natural environments serve as educational spaces that stimulate the senses, foster curiosity, and allow children to construct their own learning.

Regarding the most effective activities, those based on sensory engagement, free play, and guided exploration can foster autonomy, relationship-building skills, and curiosity, providing both prior and new learning experiences. According to experts, activities such as walks or psychomotor games are important because they strengthen creativity and understanding in the natural environment.

When assessing cognitive development, it was determined that a large proportion of the children have achieved or are in the process of acquiring these skills. This demonstrates the comprehensive relevance of the natural environment as a constant pedagogical resource that stimulates communication, creativity, and collaborative work. Furthermore, direct experiences in the natural environment influence emotional regulation and logical thinking, thereby promoting dynamic and sustainable learning in early childhood education.

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