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Presentation

My school, my laboratory: developing scientific vocations

Mi escuela, mi laboratorio: desarrollando vocaciones científicas

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This dossier brings together classroom projects that highlight their impact on educational innovation and the promotion of scientific thinking in early childhood. Through these projects, children, guided by their teachers, become protagonists in the generation and construction of knowledge. This document includes 11 articles that share experiences collected throughout Colombia within the project called "Strategy for the Generation of New Knowledge and the Promotion of Educational Innovation in Early Childhood and Preschool Education—*Ondas Primera Infancia*."

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The *Programa Ondas* of MinCiencias in Colombia was created as a national strategy to promote education research, fostering the development of scientific thinking in children and young people. Its methodology is based on Research as a Pedagogical Strategy (RPS), which allows students to explore research questions in their environment. Thanks to this approach, the program has promoted projects in elementary and secondary education, enabling students and their teachers to develop a critical perspective on their reality through research.

However, one critical aspect had been overlooked: the youngest children. This oversight brought a fundamental question: How can we introduce children to the world of science and technology from an early age? Based on the challenges facing preschool education, such as reliance on traditional methodologies, insufficient encouragement of critical and scientific thinking, and the need to modernize pedagogical practices, *Ondas Primera Infancia* was established as an initiative aimed at transforming this reality.

This strategy provides teachers with innovative teaching tools through mentoring and training processes, aimed at strengthening their knowledge and teaching practices, thereby enabling children to better harness their curiosity, ask questions, and actively participate in their learning process.

The objective is for children to formulate hypotheses, explore, and seek answers when questioning about the world. This approach positions them as active participants in investigative experiences, where the guidance of teachers plays a crucial role. More than just an educational strategy, *Ondas Primera Infancia* represents a national commitment to fostering

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scientific vocations. These include the skills, attitudes, and abilities that enable children from an early age to cultivate a passion for science, technology, and innovation. This, in turn, contributes to the development of creativity, curiosity, an appreciation for the environment, and cultural awareness, promoting holistic learning.

The articles adopt an approach aimed at improving guidelines and methodologies in preschool education. Through the transformation of tools and activities, we aimed to encourage and enhance scientific thinking in children, drawing on their innate curiosity, the formulation of authentic questions, and their creativity. In this sense, Paulo Freire (2010) proposes that educators should maintain a curious, creative, and open attitude toward the world as a perspective that aligns with the integration of these skills into guiding activities such as play, environmental exploration, literature, and art.

These activities, promoted by the Colombian Ministry of National Education, are a pathway to holistic learning. They integrate various elements that promote conscious decision-making, develop interpersonal skills, strengthen values, and improve of emotional, motor, and empathic abilities. This set of activities constitutes a central development in the relationships and interactions in everyday life and adapted to each child's reality (Colombia, 2014).

As previously mentioned, these activities are designed to guide, situate, support, and provide pedagogical practices with meaning. For example, play constitutes a manifestation of the culture and social dynamics of a community where children express their experiences, learning, and representations of the world around them. Literature, as the art of words transmitted orally or in writing forms, is part of the cultural heritage that families and their surroundings share with children, fostering children's imagination and language development. Environmental exploration invites children to discover and understand life in all its dimensions, fostering curiosity about the social, cultural, physical, and natural worlds. Finally, art opens the way to a diversity of expressive languages that go beyond the verbal, allowing children to communicate their ideas and emotions through visual, musical, corporal expression, and dramatic play.

Activating scientific thinking from early childhood is essential for developing knowledge and addressing contextual problems. This process begins with inquiry-oriented questions that stimulate children's scientific skills. Bargiela, Blanco Anaya and Puig (2022) emphasize that these questions spark scientific thinking, a vital skill for educational growth. To achieve this, it is essential to listen to children's questions and generate meaningful experiences in the classroom that are age-appropriate, within a learning environment where dialogue and understanding of the environment play a fundamental role.

Faced with the current challenges of early childhood education, it is essential to foster in children the ability to imagine, discover, reflect, and analyze their environment to allow to express what they think and construct from their own perceptions, as well as allowing them to make mistakes, seek the truth, confront answers, and understand them. This is a crucial step for their comprehensive development.

This compilation brings together articles that detail experiences resulting from classroom projects under the *Ondas Primera Infancia*. The topics explore children's cognitive, emotional, social, and physical development, philosophy, the STEAM approach, scientific experimentation, art, play, and contact with nature, among others. Through reflective insight, these experiences contribute to meaningful and environmentally conscious learning based on the curiosity of these children. The experiences have been classified as follows:

MY ENVIRONMENT, THE NATURE IS MY LABORATORY

It emerges from the wonder that everyday life inspires when observed through the curious eyes of children. Whether it is the school garden, an iguana crossing your path, a moving line of ants, or the sprouting of a seed, each moment becomes a unique opportunity to learn, explore, and understand the world. These experiences go beyond our own limits and take

risks safely, while developing an appreciation for nature and understanding the importance of its conservation as an act of belonging: protecting what we love.

The article "STEAM as a strategy to strengthen scientific thinking in early childhood education" by Moreno, Meza, Arcos, and Osorio develops a project that implements the STEAM approach in the creation of school gardens, integrating the project-based learning methodology. This initiative promotes conceptual understanding and strengthens collaborative work, environmental responsibility, and healthy living habits.

The article "From Curiosity to Science. Fostering Scientific Thinking in Preschool" by Muñoz and Osorio emphasizes how children's scientific thinking is engaged through classroom experiments, such as the transformation of matter, linking science to everyday situations, and awakening curiosity about physical phenomena.

The article "The Iguanas: A Project to Strengthen Social Skills in Children in Transition B, *Instituto Técnico Empresarial el Yopal*" by Chaparro, Velásquez, Fonseca, and Acuña, allows children to understand the importance of environmental conservation through exploration of the natural environment and observation of iguanas, a species that resides at the educational institution. They also promote a transformation in teaching practices, promoting both knowledge acquisition and emotional development. The direct connection with local wildlife strengthens a sense of belonging, respect for living beings, and ecological responsibility.

The article "Exploration strategy to strengthen motor skills in transition grade children at the *Centro Educativo Rural El Paulón de Bucaramanga-Colombia: Lupita la hormiguita*" by Lasso and Aldana argues that, through processes of observation, discovery, experimentation, and development, children can integrally strengthen their motor skills by observing ants, recognizing them as friends, and becoming aware of their care.

The article "Promoting Planting in Preschool Through Artistic Poetry Composition" by González, Aristizábal, Ávila, and Nanclares describes a preschool classroom project that combines planting and poetry writing to strengthen children's language, emotions, and environmental awareness. Using a qualitative approach, the project fosters a connection with nature and creativity, improving language skills and fostering a reflective and caring attitude toward the environment.

I LEARN WITH MUSIC, GAMES AND CULTURE

Learning in childhood is an adventure experienced with keen senses and an open heart. Through songs, games, and traditions, children discover the world, ask profound questions, and take their first steps toward knowledge. Some of these activities are innate, others develop over time, but all act as facilitators and motivators of learning. Through them, emotions are released, communication and memory are strengthened, and creativity is expanded.

The article "Epistemological Perspectives on Human Origins: A Strategy to Strengthen Scientific Skills in Primary Schools" by Portilla, Realpe, and Osorio highlights using philosophy as a tool for investigating the origins of humanity. Through dialogue, critical reflection, and constant questioning, they foster an investigative and curious attitude in students regarding major existential questions.

The article "Strategy to Promote Knowledge and Care of Marine Animals with Children in Transition" by Castaño and Acuña shows an educational experience that combines music therapy with the study of marine life, allowing students to acquire knowledge about marine animals, the importance of recycling, and, most importantly, awareness of the importance of caring for the planet and its wildlife.

The article "Recovering the Traditional Games and Routines of My Ancestors: An Early Childhood Educational Experience in Chocó, Colombia" by Ramírez, Padilla, and Aristizábal focuses on preserving cultural expressions through traditional games and routines, promoting recognition and appreciation of cultural heritage. This approach rescues ancestral knowledge

and community practices, strengthening identity, a sense of belonging, and respect for cultural diversity. At the same time, it allows for the development of motor, social, and linguistic skills in a playful way.

The article "Lectomusic 2.0: How can we learn to read?" by Porras and Aldana highlights how the interrelation between musical intelligence and the development of reading skills strengthens communication processes in childhood, utilizing digital tools based on universal design for learning.

EMOTIONS AND FEELINGS ARE ALSO PRESENT AT SCHOOL

In school, children engage with more than just letters and numbers. They also develop an awareness of heartbeats, lumps in their throats, and spontaneous smiles. Emotions and feelings are integral to every classroom experience. When these elements are acknowledged, the learning process becomes deeper and more meaningful. This approach enhances self-esteem, fosters autonomy, and cultivates the ability to coexist, grow, and learn with others.

The article "Strengthening Emotions Through the Senses of Transition-Grade Students" by Hernández, Bermúdez, Utima, and Palacios advocates for the exploration of emotions through sensory experiences, thereby enhancing cognitive, affective, and social learning. This project introduces sensory activities designed to help students recognize, articulate, and regulate their emotions from an early age.

The article "Developing Meaningful Learning Through Emotional Intelligence in Transition-Grade Students" by Joleanes, Aguas, and Bautista identifies that promoting emotional intelligence in the classroom is essential for fostering meaningful learning, especially in strengthening students' self-confidence, autonomy, and creativity. It seeks comprehensive development that enhances self-esteem, decision-making, and emotional expression.

This dossier is an invitation to rethink educational practices in preschool education, to share knowledge and to continue develop approaches that promote more meaningful teaching. The active participation of children is fundamental in the entire process of scientific thinking, from observation and hypothesis formulation to problem-solving. As Benjamin Franklin (1980) said, "Tell me and I forget, teach me and I remember, involve me and I learn"

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This program represents a significant advance for education in Colombia and a valuable contribution to strengthening pedagogical practices in Ibero-America by influencing educational policies to be an example for nurturing the educational processes of children in other countries in the region.

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