

Research Reports

Strategy to promote knowledge and care of marine animals marine animals with Transition children

Estrategia para promover conocimiento y cuidado de animales marinos con niños de Transición

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Abstract

This paper is the result of a collaboration between the Universidad Autónoma de Bucaramanga (UNAB) and the educational project ONDAS. We sought to combine music therapy and marine life, taking advantage of children's interest in exploring this topic. The objective was to promote the knowledge and care of marine fauna through the pedagogical strategy "The Museum of the Sea", which integrated ICT and art. With a qualitative approach of Participatory Action Research, techniques such as observation, interviews and questionnaires were used. The children, supported by their parents, investigated marine animals, raising awareness about recycling and care for the planet. The project captured their interest and promoted conversations at home. The conclusions highlight the importance of the participation of educators, parents and the community in incorporating environmental issues into the school curriculum, promoting ecological awareness from childhood.

Keywords: Early childhood education; marine animals; environmental education; sustainable development; ICT; playful strategies; art and pedagogy.

Resumen

Este escrito es resultado de la colaboración entre la Universidad Autónoma de Bucaramanga (UNAB) y el proyecto educativo ONDAS. El objetivo fue promover el conocimiento y cuidado de la fauna marina a través de la estrategia pedagógica "El Museo del Mar", que integró TIC y arte. Con un enfoque cualitativo de Investigación Acción Participativa, se usaron técnicas como observación, entrevistas y cuestionarios. Los niños, apoyados por sus padres, investigaron sobre animales marinos, sensibilizándose sobre el reciclaje y el cuidado del planeta. El proyecto captó su interés y promovió conversaciones en el hogar. Las conclusiones destacan la importancia de la participación de educadores, padres y comunidad para incorporar temas ambientales en el currículo escolar, fomentando la conciencia ecológica desde la infancia.

Palabras clave: Educación infantil; animales marinos; educación ambiental; desarrollo sostenible; TIC; estrategias lúdicas; arte y pedagogía.

INTRODUCTION

In a world where environmental education is becoming more important, including marine life concepts from early childhood is a key strategy for building strong ecological awareness. The oceans, which cover more than 70% of the Earth's surface, are home to a wide variety of species whose preservation is crucial for maintaining planetary balance. From majestic whales to tiny corals, every marine organism plays a vital role in aquatic ecosystems, highlighting the importance of teaching and caring for them early in life.

Based on this premise, an educational issue was identified: children's limited knowledge of marine life, the lack of specific teaching resources, and the low participation of families in environmental education. These findings come from both an institutional assessment and direct observation in the transition classroom, where it was clear that the children had minimal exposure to marine content and that the educators needed more training in this area.

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Data availability: The strategies to promote knowledge and care of marine animals with transition-level children were collected in the municipality of Itagüí, Antioquia, Colombia, within a pedagogical process developed with transition-grade students. The information obtained corresponds to pedagogical observations, activity records, students' graphic and oral productions, as well as learning evidence characteristic of early childhood education. Since this study involves minors and is based on an educational and formative approach, the data are not publicly available in order to protect the identity, integrity, and confidentiality of the children who participated in the research, in accordance with the ethical and regulatory principles in force in Colombia. However, additional descriptive or methodological information may be requested from the author of the article, provided that the request is for academic, research, or educational purposes and that the ethical use of the information is guaranteed. Study conducted in the Department of Antioquia, Municipality of Itagüí, Colombia.



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Early childhood is a crucial period for instilling respect for nature. Several authors note that early experiences shape future behavior and that playful, multisensory interaction with the environment fosters meaningful learning (Piaget, 1952; Vygotsky et al., 1978; Bandura, 1977). In this sense, environmental education for young children should go beyond mere description and focus on practical experiences that strengthen both knowledge and ecological awareness.

A partir de estas consideraciones, el proyecto “El Museo del Mar” se diseñó con el propósito de promover en los niños y niñas de transición de la Institución Educativa Enrique Vélez Escobar el conocimiento y cuidado de la fauna marina mediante estrategias pedagógicas que integran TIC, arte y actividades lúdicas. Se buscó no solo introducir información sobre especies marinas, sino también despertar la curiosidad, fomentar el pensamiento crítico y generar cambios de comportamiento que involucraran a las familias y a la comunidad educativa.

Based on these considerations, the “Sea Museum” project was created to promote knowledge and respect for marine life among preschool children at the Enrique Vélez Escobar Educational Institution through teaching methods that combine ICT, art, and play-based activities. The goal was not only to provide information about marine species but also to ignite curiosity, encourage critical thinking, and inspire behavioral changes that involve families and the educational community.

The research was conducted using a qualitative Participatory Action Research (PAR) approach, which enabled an in-depth understanding of the educational process and the adaptation of activities based on participant feedback. Within this framework, the initial research question—aimed at exploring methods for promoting the care of marine animals—evolved into a more specific formulation: What educational strategies and activities are most effective in helping preschool children develop pro-environmental attitudes toward marine fauna? This evolution reflects the need to move from general approaches to practical, context-specific proposals.

Thus, this research not only addresses a specific educational problem but also contributes to the discussion on how environmental education can be meaningfully integrated into early childhood education, strengthening the link between school, family, and community in favor of sustainability.

REFERENCE FRAMEWORK

En la investigación realizada sobre los animales del mar y el cuidado de la fauna marina con niños de preescolar, el marco referencial abarca varias áreas clave: teorías de desarrollo infantil, enfoques pedagógicos para la educación ambiental, y estudios previos sobre la enseñanza de la vida marina en la primera infancia.

The research on marine animals and the care of marine fauna with preschool children uses a reference framework that covers several key areas: theories of child development, pedagogical approaches to environmental education, and previous studies on teaching marine life in early childhood.

- Theories of Child Development

The theories of Piaget, Bandura, Vygotsky, and Jaramillo are addressed.

Piaget (1952) argues that cognitive development occurs in distinct stages, with the preoperational stage (ages 2-7) relevant to this research. During this stage, children begin to develop symbolic thinking skills and the ability to use language to represent ideas, although their understanding of the world remains concrete and egocentric. This implies that concepts about marine life should be presented visually and tangibly, using elements that children can explore and relate to their own experiences. ICTs, with their multimedia and interactivity, can provide visual representations and hands-on experiences that facilitate understanding and learning.

Bandura (1977), for his part, argues that learning happens through observation and imitation. In environmental education, this means children can learn about marine life and conservation by watching role models, adults, and peers, as well as through direct experiences that reinforce values of respect and care for the environment.

In this context, Vygotsky et al. (1978) highlights the role of the social and cultural environment in learning, suggesting that knowledge is built through social interaction and cultural tools. ICTs, as cultural tools, support collaborative learning and discovery, providing resources that children can explore alone or with others. Their use in environmental education encourages teamwork between children and teachers, promoting socially mediated learning.

Looking at pedagogical approaches to Environmental Education, such as Experiential Learning, developed by Dewey (1938), who emphasizes the importance of direct interaction with the environment to foster deep and meaningful learning. Applied to marine life education, this approach suggests that hands-on activities, such as games, manipulatives, and aquarium visits, can help children better understand marine fauna and develop an emotional connection. Similarly, Discovery Learning, promoted by Bruner (1960), emphasizes active exploration and self-discovery as effective teaching methods. In the context of preschool marine life education, this involves designing activities that allow children to experience and explore concepts of the sea through observation and experimentation, thereby facilitating a deeper, more lasting understanding.

On the other hand, technology-based learning focuses on the use of digital tools to enhance teaching and learning (Greenhow; Lewin, 2016). In the context of environmental education, this includes the use of interactive applications, virtual simulations, and educational games that can make learning about marine life more engaging and accessible for children. These tools enable visualization of marine ecosystems, simulation of species interactions, and exploration of concepts through immersive experiences.

There is also multisensory learning, which is based on the idea that integrating different senses into the educational process enhances information retention and understanding (Gardner, 2011; Sousa, 2016). ICTs enable the creation of educational materials that combine images, sound, and movement, making learning more comprehensive; digital resources such as interactive videos, augmented reality applications, and multimedia games can stimulate multiple senses and help make information about marine life more memorable.

Some research on early childhood environmental education has shown that early exposure to environmental concepts can foster lasting pro-environmental attitudes. For example, a study by the Chilean Ministry of the Environment (Ministerio del Medio Ambiente de Chile, 2018) suggests that teaching about environmental education from an early age can help instill a sense of responsibility towards the environment in children.

En este sentido, (Jaramillo, 2007) "A la concepción de infancia es necesario darle la importancia y reconocer su carácter de conciencia social, porque ella transita entre agentes socializadores; la familia, como primer agente socializador y la escuela, como segundo agente". Es importante tener presente en el desarrollo integral de los niños la participación de la familia o de otros adultos cuidadores que trabajen de manera conjunta con los diferentes adultos u actores a favor de los más pequeños

In this sense, Jaramillo (2007, p. 111) states that "the concept of childhood must be given importance and its character as a social consciousness must be recognized, because it is experienced through the interactions between socializing agents: the family, as the primary socializing agent, and the school, as the secondary agent". It is important to keep in mind that, in the comprehensive development of children, the participation of the family or other adult caregivers, working together with various adults and stakeholders on behalf of the youngest members of the community, is essential

Similarly, various educational programs and curricula are designed to teach children about marine life, often using visual materials, interactive activities, and playful elements to engage young children and aid their understanding. Examples include picture books about the ocean, educational toys related to marine life, and visits to conservation centers and aquariums.

Previous studies on the use of ICT in preschool education have shown that these tools can effectively promote participation, self-directed learning, and collaboration. Educational apps and digital games have been found to boost children's interest and motivation, supporting knowledge acquisition through interactive and playful experiences (Díaz Cárdenas, 2020). These tools have proven effective in teaching basic concepts about marine life and the importance of conservation to children of different ages. For example, studies like those by

LiveKid (Łuszczkiewicz, 2023) suggest that simulations and digital games can help children better understand environmental concepts.

Although ICTs offer many advantages, they also show challenges, such as the need for proper educator training, effective integration into the curriculum, and access to technological resources. Research has shown that the success of ICT implementation in preschool education relies on careful planning and the selection of resources suitable for child development (Plowman; McPake; Stephen, 2008).

By exploring how digital technologies can be used to teach preschool children about marine wildlife, a foundation is established for researching effective methods and developing innovative educational strategies that foster awareness, respect, and care for marine life from an early age.

THEORETICAL FRAMEWORK

In a preschool classroom project focused on marine animals and wildlife conservation, the theoretical framework includes key elements: specific teaching methods for environmental education and relevant earlier research on teaching marine life to young children. The goal is to combine existing knowledge to guide research and develop effective educational strategies. Additionally, it provides a strong foundation for exploring how young children can learn about marine wildlife and foster caring attitudes toward the marine environment through innovative, technology-supported teaching methods.

Environmental education from an early age is crucial for developing a paradigm shift, ecological awareness, and inclusive children and youth to address the climate crisis (Ogando, 2022). Therefore, introducing basic environmental concepts can foster respect for the natural environment and a proactive attitude toward its conservation. In the context of aquatic animals, environmental education helps children understand the importance of aquatic ecosystems and biodiversity.

Pedagogical strategies for environmental education that integrate play, exploration, and active participation are effective in teaching environmental concepts to young children. The study by Callahan et al. (2019) presents the "Phylo Trading Card Game," a Pokémon-based game designed to educate players about species, ecosystems, and negative environmental events. It is an open-source, competitive, and interactive game designed to motivate the prevention of environmental problems and encourage participation in protecting specific species and ecosystems.

The study, conducted by Sandbrook, Adams, and Monteferri (2015), entitled "Digital Games and Biodiversity Conservation," examines how digital games can preserve biodiversity. The authors identify three key areas where games can be useful: education and behavior change, fundraising, and support for research and planning. They emphasize that, to maximize their conservation impact, games should be developed in collaboration with game design experts, have clear, specific objectives, target a relevant audience, and be entertaining. Approaches that incorporate educational games and digital applications can increase children's interest and motivation, facilitating learning about aquatic biodiversity.

The use of digital technologies in preschool education is beneficial for teaching environmental concepts (Ortega Silva, 2023). Research has shown that effective environmental education programs for young children often incorporate playful, interactive, and visual elements that capture their interest and facilitate understanding. Programs that include hands-on activities and direct experiences are more likely to generate a deep understanding of and commitment to environmental conservation (Calderón-Ortega; Sánchez; Gómez, 2023).

In this sense, ICTs have transformed preschool education by offering new ways to present information and facilitate learning. They can increase children's motivation and interest in environmental issues, providing more immersive and participatory learning experiences. Several studies highlight how ICTs can support the development of cognitive and emotional skills related to environmental protection. Therefore, implementing pedagogical strategies that combine play-based learning, digital technologies, and experiential learning can be highly effective for teaching preschool children about aquatic animals and environmental conservation. These practices foster a deeper understanding and greater motivation to engage in pro-environmental behaviors.

METHODOLOGY

A qualitative approach was used, ideally suited for exploring and understanding the experiences, perceptions, and meanings that children, educators, and parents associate with educational activities about marine wildlife. It enables a deep, contextualized investigation of the impact of educational strategies, offering rich, detailed insights into how children engage with the content and how these approaches influence their attitudes toward conservation.

Participatory Action Research (PAR) was used. According to ATLAS.ti (2024), PAR involves active collaboration between researchers and participants to address practical problems and generate changes based on the findings. It is suitable for engaging educators, children, and parents in the research process and in improving educational practices. It requires careful structuring to facilitate active participation by all participants and to provide a deep understanding of the impact of educational strategies. PAR engages participants in the research process to address specific problems and improve practices, enabling close collaboration among researchers, educators, children, and parents to design and evaluate educational strategies about marine wildlife. The purpose was not only to conduct research but also to implement practical changes based on the findings.

The phases of Participatory Action Research (PAR) include:

Preparation Phase, based on the creation and adaptation of educational and data collection materials, including the development of questionnaires, observation guides, and logbooks; training educators in the implementation of activities; observation techniques; and the use of data collection instruments.

Implementation of the Intervention: The activities included games, crafts, and the use of ICT, all based on marine fauna, with the preschool group.

The Evaluation and Reflection phase involved analyzing observations, interviews, and logs qualitatively to identify patterns, themes, and perceptions of the intervention. It also included meetings with educators, parents, and children to discuss the results, gather feedback, and modify strategies if needed.

The Documentation and Report phase consisted of a description of the research process, the findings, the evaluation of the intervention, and recommendations for future educational practices.

The sample, selected based on inclusion and exclusion criteria, consisted of 26 preschool children aged 5 to 6 years, enrolled in Transition Classroom 5 at Enrique Vélez Escobar School in Itagüí, Antioquia. These children are at a developmental stage where they acquire important cognitive, social, and emotional skills. The teacher responsible for Transition Classroom 5 was involved in implementing and developing the educational activities.

Data collection methods such as observation, interviews, questionnaires, logs, and photographic evidence were used to evaluate the impact of the educational activities on marine fauna and conservation.

Direct observation was conducted in the classroom to record how the children interacted with marine life activities and how they responded to the presented content.

Interviews were also conducted with the parents and students of the Transition 5 classroom to gather information about how they perceive the impact of the activities at home and their knowledge of marine conservation.

Each student also kept a logbook to record the development and adjustments made to the activities, along with observations on their progress. Lesson plans were created to document the educational activities, including objectives, resources used, methodologies employed, and learning expectations. These plans were reviewed and revised based on the results and feedback received during the research process. Photographs were also collected to document the activities, the use of teaching materials, and the children's interactions with the educational resources. The photographs helped illustrate the visual aspects of learning and participation.

The research was conducted ethically, with informed consent from the parents or guardians for the children's participation in the study. It was ensured that they understood the study's objectives and how the data would be used. All collected information was guaranteed to be handled confidentially, and the identity of the participating children was protected.

RESULTS

The "Sea Museum" strategy was implemented in the transition classroom at the Enrique Vélez Escobar Educational Institution, with 26 children aged 5 to 6. The designed activities combined playful, artistic, and technological elements, allowing the content to be adapted to the cognitive and emotional characteristics of early childhood.

The initial assessments, obtained through interviews with parents and direct observation, revealed that the children had limited knowledge of marine fauna, focusing mainly on popular species such as dolphins and sharks. It was also found that most families did not address environmental issues at home, although they expressed a willingness to support the project.

The following results were identified throughout the intervention:

1. Sensory exploration

The children manipulated shells, sand, and water, which enhanced their observation, description, and communication skills. This multisensory experience helped them connect the information to concrete experiences, leading to more meaningful learning.

2. Creating crafts with recycled material

By making turtles and fish from recycled materials, the children not only developed motor and creative skills, but also internalized the link between recycling and conservation. Several spontaneously mentioned that they could reuse containers or boxes at home to make new objects.

3. Creation of collective murals

Creating murals about marine animals fostered a collaborative environment. Children were observed negotiating ideas and sharing responsibilities, strengthening their social and teamwork skills. The mural became a valuable visual memory tool that students returned to to recall species and concepts they had learned.

4. Reading stories

Stories about marine animals sparked imagination and oral language development. During the sessions, the children asked questions, expressed emotions about the characters, and showed empathy for the animals, demonstrating the affective dimension of environmental learning.

5. Use of videos and ICT

Los videos educativos y juegos digitales mantuvieron la atención del grupo y facilitaron la comprensión de hábitats y comportamientos marinos. Se observó un incremento en el vocabulario de los niños, quienes empezaron a utilizar términos como "hábitat", "especie" y "contaminación".

Educational videos and digital games kept the group engaged and helped their understanding of marine habitats and behaviors. An increase in the children's vocabulary was observed, as they started using terms such as "habitat," "species," and "pollution."

Impact on families

Subsequent interviews revealed that parents noticed their children showing increased interest in discussing marine animals and promoting simple actions such as saving water or separating waste. Some parents noted that their children asked to repeat similar activities at home as those done at school, indicating a transfer of learning to the home environment.

Summary of findings

The results show that the combination of ICT, art, and practical activities enabled:

- Expand children's knowledge of marine species and their ecosystems.
- Foster environmental awareness through play-based learning.
- Encourage active family participation, strengthening the school-home relationship.



Figure 1. Exhibition of the featured activities, through collage

Overall, the implemented pedagogical strategy proved effective not only in enhancing children's knowledge but also in fostering changes in their behavior and family dynamics related to environmental care.

These activities not only motivated the children but also fostered family interaction and collaborative learning at home. Below are some of the activities mentioned above that stood out for their impact (Figure 1).

DISCUSSION

The results show that the "Museum of the Sea" pedagogical strategy promoted meaningful learning in preschool children by combining sensory experiences, artistic activities, and technological resources. This comprehensive approach aligns with Piaget's (1952) theory that learning in the preoperational stage is reinforced through concrete and symbolic experiences; it also matches Vygotsky's et al. (1978) idea that knowledge is built through interaction with others, which is reflected in the creation of murals and collaborative activities.

The integration of ICTs facilitated key cultural mediation, in line with Greenhow and Lewin's (2016) findings, which emphasize that technologies enhance collaborative learning and motivation. The children successfully grasped environmental terms and concepts through digital games and videos, demonstrating that technology, when pedagogically integrated, can be a powerful resource in children's environmental education.

Art and sensory exploration played a vital role in inspiring curiosity and sensitivity toward marine life. This aligns with studies like those by Dewey (1938), who highlighted the value of experiential learning, and Gardner (2011), who stressed the importance of multisensory approaches. In this research, manipulating materials and creating crafts not only enhanced cognitive understanding but also built emotional bonds with marine animals.

A key aspect was family involvement, which extended beyond the school setting and into the home, aligning with Jaramillo (2007), who emphasizes the family's role as a socializing agent in childhood development. Parents reported discussions about conservation and more responsible household practices, indicating that environmental education in schools can have a broader impact in the community.

However, limitations also emerged. Some families participated more actively than others, reflecting inequalities in commitment and time availability. Furthermore, while ICTs enriched the experience, the need for greater teacher training to make the most of these tools was identified, as Plowman, McPake and Stephen (2008) point out.

From a critical perspective, it is recognized that although the results indicate positive learning, further assessment of sustainable changes over time is necessary. The research focused on a single transition group, which limits how widely the findings can be applied. Expanding the experience to other grade levels and contexts would be essential to compare and reinforce the conclusions.

Looking ahead, this proposal opens up possibilities for:

- Design environmental education programs that integrate art, ICT, and play from early childhood education.
- Expand teacher training in innovative methodologies and the pedagogical use of digital technologies.
- Build collaborative networks with families and the community to strengthen a culture of sustainability from an early age.

In summary, the discussion shows that the implemented strategy not only increased knowledge about marine fauna but also helped develop socio-emotional skills and strengthen family-school relationships. This comprehensive approach makes a significant contribution to children's environmental education, though it requires ongoing effort and expansion to ensure long-term results.

CONCLUSION

The research found that environmental education in early childhood, mediated by ICT and art, fosters the development of proactive attitudes toward the conservation of marine animals. The initial question, focused on promoting care in general, evolved into understanding which specific strategies—such as interactive games, crafts, storytelling, and digital activities—are most effective in generating changes in children's knowledge, behavior, and motivation.

This finding offers practical guidance for teachers and curriculum designers, while also opening the possibility of replicating and adapting the proposal in other school contexts. Thus, the experience contributes not only to environmental education in early childhood but also to strengthening a culture of sustainability from an early age.

Parents reported more frequent conversations about environmental issues at home and a greater willingness among children to participate in conservation-related activities. This evidence confirms that family and school integration are determining factors in the development of environmentally conscious attitudes.

Therefore, the project contributed to the identification of effective educational strategies for teaching children about marine life and demonstrated the value of integrating artistic and technological resources to make learning more engaging and meaningful. When applied to other contexts, this proposal can serve as a model for initiatives focused on the environmental education of new generations.

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Authors contribution

KKJCP: Conceived and designed the study.

MPAA: Supervised the study and critically reviewed the manuscript versions.

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