RBECT
Revista Brasileira de Ensino de Ciência e Tecnologia

Revista Brasileira de Ensino de Ciência e Tecnologia
ISSN: 1982-873X

https://periodicos.utfpr.edu.br/rbect

An Analysis of Children's Perception of the Ocean Through Drawing

Débora Teixeira dos Santos e Menezes
deboratsantos@gmail.com
0000-0003-2028-2255
Universidade Federal do Rio de Janeiro; Université de Toulouse, Rio de Janeiro; Occitanie, Brasil; França.

Marcela Vitor Alvaro
marcelavalvaro@gmail.com
0000-0001-5201-4875
Instituto de Bioquímica Médica, UFRJ; Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Rio de Janeiro, Rio de Janeiro, Brasil.

Luisa Massarani
luisa.massarani@fiocruz.br
0000-0002-5710-7242
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia; Casa de Oswaldo Cruz - Fiocruz, Rio de Janeiro, Rio de Janeiro, Brasil.

Catarina Chagas
catarinachagas@gmail.com
0000-0002-8698-9563
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Kingston, Ontário, Canadá.

Graziele Aparecida de Moraes Scalfi
graziscalfi@gmail.com
0000-0002-1417-1287
Instituto Nacional de Comunicação Pública da Ciência e Tecnologia, Paulínia, São Paulo, Brasil.

ABSTRACT

This qualitative study aimed to explore children's perception of the ocean. Twenty children living in the city of Rio de Janeiro participated in this study. The data collection instruments used were drawing and interviews. As a result, it was found that children perceived the ocean as a place of fascination, beauty, and leisure. The drawings revealed representations of the ocean that included fauna, flora, and abiotic elements, mostly associated with a naturalistic view of the environment. Although the children chose not to depict environmental issues in their drawings, they demonstrated awareness of them in their interview responses—highlighting the importance of combining drawings and interviews in this study.

KEYWORDS: Non-formal education. Environmental perception. Visual research. Ocean Decade.

1 INTRODUCTION

The United Nations (UN) designated the period from 2021 to 2030 as the Decade of Ocean Science for Sustainable Development, aiming to stimulate global awareness, public knowledge, and the management of ocean resources (Pendleton; Martin; Webster, 2001; United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). The ocean stabilizes the climate, sustains life on Earth, and supports human well-being. However, much of the ocean is seriously degraded. In this context, countries are called to commit to policies of adaptation and mitigation of the pressures faced by the ocean, promoting research and actions for sustainable development and enhancing scientific understanding of the ocean (UNESCO, 2021). In parallel, communication programs and actions, such as Generation Ocean and Ocean Literacy for All: A Tool Kit (UNESCO, 2017), aim to provide more information and connect citizens to the topic so they can restore, protect, and live better with the ocean.

Children are a target audience to which institutions have directed efforts to engage with ocean issues. According to UNESCO (2021), it is necessary to support and empower children and youth to understand the importance and need to contribute to ocean health, including decision-making, promoting and supporting quality education, and lifelong learning for ocean literacy. Children's interest and curiosity about the ocean are important allies in raising awareness and fostering responsible action regarding the marine environment in future generations. Several authors state that children are an important source of social influence and can shape the environmental values, knowledge, attitudes, and behaviors of their peers (Ballantyne, 2004; Hartley; Thompson; Pahl, 2015). Furthermore, they will be the new generation of ocean leaders and will also be the most affected by the current threats to the planet. As adults, they will need to make informed and responsible decisions about the ocean, its role in regulating the planet's climate, and the sustainable use of its resources (Cava *et al*., 2005).

Although studies focused on children's perceptions of the marine environment indicate that children see the ocean as important in their lives (Guest; Lotze; Wallace, 2015) and express interest in protecting it, few actual actions are taken by them (Guest; Lotze; Wallace, 2015; Wen; Lu, 2013). Examples of such actions include engaging in home habit and consumption changes, participating in coastal monitoring projects, and spreading environmental awareness to parents and friends. Other studies also show a low level of knowledge on topics related to the ocean, especially concerning physical and chemical issues such as tides, currents, waves, depth, salinity, and ocean acidification (Ballantyne, 2004; Guest; Lotze; Wallace, 2015). When children are asked about the threats the ocean faces, pollution is most frequently and severely mentioned (Guest; Lotze; Wallace, 2015; Hartley; Thompson; Pahl, 2015). Other significant threats, such as the effects of overfishing, coastal development, and global warming, are rarely mentioned. These results demonstrate the need to strengthen children's understanding of ocean issues.

To make this a reality, various authors agree that it is crucial to understand how children perceive the ocean (Bennett, 2019; Gelcich *et al*., 2014; Jefferson *et al*., 2014; Potts *et al*., 2016). It is evident that various ideas have been implemented, and that social, national, and international efforts have been made to raise children's attention to what is happening with the ocean. However, it is

necessary to understand in advance the state of these perceptions in order to support the consolidation of marine environmental education strategies.

In this study, perception is understood as the way in which an individual observes, recognizes, organizes, understands, interprets, and evaluates an object, action, experience, individual, policy, or related outcome (Bennett, 2016; Marques; Ursi; Geisly, 2020). Santos and Teixeira (2017) indicate that from an environmental perspective, perception has been recognized for enabling the study of the interrelations between humans and the environment. Therefore, understanding children's perceptions of the ocean is an important step toward a more inclusive approach in defining strategies aimed at increasing knowledge and changing public attitudes toward the marine environment (Eleiton; Corless; Hynes, 2015; Jefferson *et al*., 2014; Potts *et al*., 2011). In this context, it is worth noting that children's perception of the ocean is not homogeneous among children living in different parts of the globe. Studies show that sociodemographic issues and other variables, such as living near (or not) the sea, and cultural factors influence how children perceive the ocean (Bennett, 2016; Jefferson *et al*., 2014). Thus, this study aims to contribute to research on public perception of the ocean, specifically in the Brazilian context, where few studies of this kind have been developed.

1.1 Drawings and the Perception of the Ocean

Numerous research techniques have been used to analyze children's thinking processes about the natural environment, including interviews and questionnaires (Greaves *et al*., 1993), analysis of responses to photographs (Dove; Everett; Preece, 2000), and interpretation of drawings (Trend; Everett; Dove, 2000). In this study, drawings were chosen as a tool to investigate children's perceptions of the environment because they allow children the freedom to express their knowledge without language limitations (Alerby, 2000).

Drawing on childhood sociology studies (Corsaro, 2011; Sarmento, 2011), which consider the child as a producer of culture, children's drawings are seen as a differentiated symbolic production that helps amplify the voice and participation of children in research (Gobbi, 2009; Sarmento, 2011). Thus, drawing helps to know and interpret the children's world through their own perspective and production. For Sarmento (2011, p. 29), "children's drawings communicate, and they do so because images are evocative and referential in a way that verbal language cannot." Sorin and Gordon (2013) emphasize that when adopting methodologies using children's drawings, it is essential: a) to listen to the story that the child tells about the drawing, in order to infer what is represented in the drawing and in the child's thoughts; b) to consider the prior knowledge of each child to understand the child's context and learning experiences; c) to be aware that children draw literally what they see but also represent images of their interests, which may not necessarily relate to their perception of the environment. Through drawings, it is possible to gain insights from children, assess their perceptions, and provide a vehicle for their voices to be expressed, especially in cases where children are reluctant to speak or share their ideas with adults (Bland, 2018).

Meijden (2020) investigated the perception of 10 Indonesian students aged 5 to 8 years about the marine environment (beach and sea) and their environmental

attitudes toward marine pollution. The researcher conducted an educational lecture in the classroom and then assessed the students through drawings, narratives, and discussion. The categories for analyzing the contents of the drawings were defined based on elements associated with a) the environment, b) human occupation or intervention, and c) animals. As a result, the author highlights that the drawings were more representative of the sea than the beach; marine animals perceived as 'beautiful' and/or 'big' were more represented than plants; and almost all the drawings depicted some form of human intervention—such as fishing, barbecues, picnics, and restaurants. In general, the children represented ecological attitudes toward animals in their drawings, including interest in controlling and managing animals, moral concerns about the proper and improper treatment of animals, negativity (indifference, antipathy, or fear), and utilitarian views (practical and material value placed on animals).

Soares (2017) investigated the perception of the seabed among 153 children aged 5 to 7 years, students from six schools in Greater Lisbon. The study included drawings made before and after a presentation on topics related to the sea. Three schools formed the control group, which did not attend the presentation. The researcher analyzed the drawings in two stages. In the first, she identified the presence and absence of marine environment elements within each drawing (e.g., whale, shell, jellyfish). In the second, she grouped the elements into four categories: a) marine elements, b) human intervention elements, c) mythical elements, and d) others. The group that attended the presentation was more sensitive to environmental issues, including more human intervention elements, specifically marine debris, in their drawings. Additionally, the children in this group included other elements such as deep-sea creatures, algae, crustaceans, and phytoplankton/zooplankton, which were not present in their drawings before the intervention.

In Brazil, Carvalho-Souza *et al*. (2018) investigated the perception of marine litter among 20 children aged 3 to 11 years, visitors to a tent offering various activities during the National Science and Technology Week (SNCT) in Salvador, Bahia. Among the 44 identified elements, such as the ocean, animals, waves, and boats, the most prevalent were those emphasizing the natural landscape (20), followed by the built landscape (10), and immobile and human elements (7). Only five drawings represented marine litter, and one depicted sewage. In the same vein, Rua and collaborators (2015) collected drawings from 82 children aged 4 to 12 years about the marine environment during an environmental action held in a public square in Rio de Janeiro. The researchers concluded that most participants depicted an untouched nature—representations of macroelements of nature accounted for 85% of the 54 identified elements.

Thus, children's drawings gather knowledge and visual perceptions that are displayed in the construction of their mental representations. Additionally, they allow children to communicate their worldview and provide valuable insights into the development of their environmental perceptions (Meijden, 2020).

2 METHODOLOGICAL PROCEDURES

Adopting a qualitative approach, this study aimed to explore Brazilian children's perceptions of the ocean. The project was approved by the Ethics

Committee of the Joaquim Venâncio Polytechnic School of Health at the Oswaldo Cruz Foundation, under approval number 466/2012. The children were identified as Participants 1, 2, and so forth, ensuring both their differentiation and anonymity.

2.1 Procedures

The instruments used for direct data collection were drawings and interviews with the children. Before contacting potential research participants, the team conducted a pilot interview with a child (a 10-year-old girl) to test the questions and language used. Minor adjustments were made to ensure the questions were clearer for the participants. Data collection took place between August and December 2021 and between March and April 2022 in the city of Rio de Janeiro, Brazil. Families were initially invited through convenience sampling, using messages and posts shared via email, social media, or instant messaging applications, which were subsequently forwarded by colleagues, relatives, and other participants.

The invitation process aimed to include the widest possible diversity of families with participating children, ensuring representation of both boys and girls, students from public and private schools, and residents from different areas of the city. Families who agreed to participate received a link to a document outlining the research objectives and an informed consent form. They also filled out a questionnaire providing information about their sociocultural background. A total of 22 families responded to the questionnaire as potential participants. Two families withdrew due to scheduling conflicts.

After completing the questionnaire, families received a one-minute video, which was suggested to be watched by the child accompanied by a responsible adult. In this video, children were invited to create a drawing about “what the ocean means to you.” The video aimed to ensure greater uniformity in the task prompt for the drawing activity and included recommendations for parents on how to properly photograph and submit the drawings.

In the next stage, researchers scheduled online interviews with the children using the Teams conference platform. The interview followed a semi-structured script divided into two stages. The first stage aimed to make the child feel comfortable by discussing familiar topics and personal interests. Next, a 20-second video featuring typical beach scenes was shown, followed by questions introducing a discussion on memories, emotions, and sensations related to the beach, as well as an imagination exercise: what the child would find if they were to dive into the ocean. In the second stage, the child was invited to comment on their drawing, initially speaking freely about what came to mind while creating it. Finally, specific questions were asked to better understand the elements present in the drawings.

2.2 Participants

This study included 20 children (12 girls and eight boys) aged between 7 and 11 years old, residing in the city of Rio de Janeiro, Brazil. This age group was chosen due to the authors' interest in investigating the perceptions of children in the early years of primary education. During this period, children demonstrate reflective and

mental planning abilities (Elkonin, 1960; Vygotsky, 1993), which facilitate interaction and dialogue. Regarding education, the children were enrolled in primary school, with seven attending public schools and 13 attending private schools. The participants were geographically diverse, with nine residing in the North Zone, eight in the South Zone, and three in the West Zone of the city. The majority of respondents (n = 18) reported engaging in leisure activities related to the beach or ocean, with nine participants indicating frequent participation and another nine occasional participations. The most frequently mentioned leisure activity was "going to the beach on weekends, holidays, or vacations" (n = 19).

2.3 Analysis

2.3.1 Analysis of the Content of Drawings

The representations of the marine environment were analyzed based on the content of the elements present (Meijden, 2020; Trend; Everett; Dove, 2000). This approach is essentially inductive, drawing insights from the drawings themselves. To assess the level of detail, each element was counted (e.g., turtle, ship, cloud, and sun). The elements were categorized into five main groups: 1) Marine biodiversity, 2) Abiotic elements, 3) People, 4) Human-made structures and 5) Activities/Environmental impacts, as outlined in the following table (Table 1):

Table 1 – Coding Scheme and Description of Study Categories

Elements	Description	Examples
Marine biodiversity	Species of fauna and flora found in the sea.	Turtle, algae, shark, etc.
Abiotic elements	Non-living elements of the environment.	Sand, sun, rock, cloud, etc.
People	Representations of people or oneself.	Man, woman, child, etc.
Human-made elements	Human-made structures that may be found in a landscape.	Ships, trash bins, beach umbrellas, sarongs, buildings, etc.
Activities/Environmental impacts	Human use/consumption activities and interventions causing environmental impacts.	Fishing, commerce, tourism, litter, sewage, oil spills, etc.

Source: The authors (2023).

2.3.2 Analysis of Narratives

According to Faria, Demartini, and Prado (2002, p. 71), “drawing and orality are understood as revealing children's views and conceptions of their social, historical, and cultural contexts—thought, experienced, and desired.” In line with this statement, it is considered that, although drawing is often analyzed as a visual

method, from the perspective of social semiotics, it is a multimodal method—that is, it goes beyond the visual image perceived on the page.

To more comprehensively study children's perceptions of the ocean, as well as what is expressed through their representational choices in their drawings, each drawing was analyzed alongside the transcriptions of the interviews. This approach ensured that the meanings attributed by the children were correctly assigned to their representations. This type of analysis has been used by various researchers studying children's environmental drawings (see, for example, Soares, 2017; Sorin & Gordon, 2013; Wright, 2008). These researchers argue that when children's environmental drawings are accompanied by narratives, they provide a window into children's perspectives, helping to understand whether they view the future optimistically, pessimistically, fatalistically, futuristically, or in another way.

3 RESULTS AND DISCUSSION

In the analysis of the content of the drawings, a total of 47 elements were identified, distributed among the following categories: Marine Biodiversity (n=17), Abiotic Elements (n=12), People (n=2), Human-made Elements (n=6), and Activities/Environmental Impact (n=1), as specified in the table below.

Table 2 – Categories of Drawing Analysis

Categories	Identified Elements	Most Frequent Elements (in descending order)	Total Element Occurrences
Marine Biodiversity	17	Fish (25), turtle (7), algae (7), birds (6), etc.	75
Abiotic Elements	2	Sea (20), sun (15), clouds (9), rocks (6), sky (6), etc.	72
People	2	Children (4) and adults (1)	5
Human-made Elements	6	Sailboat (2), ship (1), surfboard (1), beach umbrella (1), beach chair (1)	6
Activities/Environmental Impacts	1	Fishing (1)	1

Source: Research data (2023).

The most diverse category of elements was marine biodiversity. The children emphasized the presence of marine fauna and flora, and in some drawings, the richness of detail allowed the researcher to identify the species of the animal. Fish were the most commonly represented elements in the marine biodiversity category, considering the number of occurrences (n=25). The representations included different species, such as sharks (n=6), moray eel (n=1), pufferfish (n=1), seahorse (n=1), swordfish (n=1), clownfish (n=2), etc. Other frequently observed elements in the marine biodiversity category were turtles and algae, each with

seven occurrences. Within the abiotic elements category, the sea was the only element present in all drawings (20), an expected result given the research theme. In second place, the sun appeared in 15 drawings, with seven children choosing to depict a rising or setting sun. This result is similar to the findings of Rua *et al*. (2015), whose study also identified the sea as the most frequently represented natural macroelement, followed by the sun.

Most of the drawings (15) depicted a vision of untouched nature, featuring landscapes highlighting the horizon, the seabed, marine animals, or a combination of these elements. In three drawings, the People category was identified, represented by two adults and two children. In these drawings, humans were depicted engaging in activities integrated with nature, such as leisure and sports. These activities contributed to the presence of elements in the Human-made Elements category, including a sailboat, ship, surfboard, beach umbrella, etc. Only one drawing represented the Activities/Environmental Impacts category, depicting a fishing vessel with a net extending from the boat containing fish inside.

Three drawings featured spontaneous textual expressions, reflecting religious sentiments ("The ocean, to me, is peace that meets the angels in the sky," Participant 4), descriptive elements ("Swimming and having fun; Ocean," Participant 3), and awareness of biodiversity ("The sea is home to many marine animals," Participant 19). The majority (n=16) of the drawings were realistic. Only four participants (Participants 3, 7, 17, and 19) assigned human expressions to the elements in their drawings. Participant 3 drew a smiling sun, as well as clouds and fish with varied facial expressions. Participant 17 illustrated an oyster sticking out its tongue to show the pearl. Participant 7 drew an octopus winking, while Participant 19 depicted a red fish with eyelashes. Below, a sample of the drawings is presented (Figure 1) to illustrate how the elements were represented.

Figure 1 – Examples of Drawings and Present Elements

Source: Participants' Drawings.A) Participant 20, girl, 7 years old; B) Participant 1, girl, 10 years old; C) Participant 14, girl, 7 years old; D) Participant 11, boy, 9 years old; and E) Participant 6, boy, 9 years old.

3.1 Listening to Children: Drawing and Perception of the Ocean

The interviews provided an opportunity to listen to the children. Their responses to the question, "Can you tell me about your drawing?" offered the necessary context to understand their perception of the ocean and biodiversity. In summary, the children in this study perceived the ocean as a place of fascination, beauty, and entertainment. The following section details these perspectives and discusses them in light of the literature.

3.2 A Naturalistic Perspective

Most of the children (n = 17) described their drawings from a naturalistic perspective, in line with the most frequently represented categories in their drawings (marine biodiversity and abiotic elements). In general, the children spoke about the ocean with an aesthetic viewpoint, associating it with the beauty of the environment and a symbolic sense of peacefulness. Some mentioned the marine environment as a system of interrelations between species and their surroundings, as observed in the statements presented in Table 2 below.

Table 1 – Children's Drawings: Interrelations Between Species and the Environment

Participant 8 (boy, 8 years old)  "I think the ocean is very clean, with fish, so I drew an ocean with fish, and a sun there so the fish can swim peacefully, with the birds up there [...] I think the sunset is very beautiful."	Participant 12 (girl, 8 years old)  "I decided to draw the palm tree because I think nature inspired me."
Participant 4 (girl, 9 years old)  "I drew the sea, a sunset, and a bird [...] To me, the ocean is peace that meets the angels in the sky." (Phrase written in pencil, upper part of the drawing).	Participant 15 (boy, 10 years old)  "I made this drawing because I really like the sea and [...] the view when it's [...] kind of at sunset. I really like the fish, the animals [...] sharks, octopuses, and seaweed."

Participant 19 (girl, 10 years old)	Participant 9 (girl, 8 years old)
 "The sea is home to many marine animals, right? [...] So that's what my drawing represents, that all marine animals stay underwater because it's their home."	 "I wanted to show that everyone can coexist together in the sea."

Source: Research Data (2025).

This naturalistic view of the ocean may be related to an environmental framework that children develop based on their location. The children in this study live in the city of Rio de Janeiro, which is part of a state with approximately 1,160 km of coastal area, covering 33 municipalities and 40.1% of the state's territory, where about 83% of the population resides (Instituto Estadual do Ambiente [INEA], 2018). The city is an international tourist destination, with beaches that are part of this attraction hub, such as Copacabana, Ipanema, and Leblon (INEA, 2018).

As a general rule, children tend to draw elements that are closer to the reality they are familiar with, as opposed to elements that, although they know exist or have heard about, are more abstract (Bayne *et al*., 2015). In this sense, the high representation of landscapes featuring the horizon, the setting, or the rising sun may indicate the concrete presence of what is frequently observed by children. When going to the beach, that is what they actually see. Few children (and adults) have the opportunity to experience the ocean depths firsthand, either through diving or other activities, and see marine biodiversity up close. As Carson (1962, p. 22) states, “With our senses tied to the land, we know the foam and the tide wave that washes over the crab hidden beneath the seaweed in its tidal home [...] and the dolphin that breaks the waves to breathe the upper atmosphere.”

The analysis of children's statements about drawings representing biodiversity reinforces the idea of the ocean as the place/home of these animals. This result is interpreted as a reflection of children's prior knowledge and experiences. Sorin and Gordon (2013) argue that several factors are essential to environmental perception: the context in which the child lives, the knowledge acquired in school, activities encouraged by family involvement—such as reading books, watching films and documentaries—and engaging in sports and games. Additionally, the results indicate that some children have already developed an understanding of ecology and biological knowledge, as evidenced by their accurate representation of complex ecosystems, including species interactions.

For example, while describing their drawings, some children shared curiosities and scientific-ecological knowledge about the subject. Participant 2 (boy, 9 years old) told the researcher: "Down there, there is that fish that I know stays in the deep. [...] These little pink creatures, I don’t know if you’ve heard of them, but they are axolotls [...] a typical fish (sic) from Mexico” (Figure 2). Participant 9, an 8-year-old girl, while explaining why she drew a whale, told the researcher:

My favorite sea animal is the blue whale because it is the largest animal on Earth, and there aren't many blue whales (sic) [...] The blue whale doesn't have teeth, while others do. It has something here that it uses to eat. I wanted to show you that everyone can coexist in the sea; they can meet each other because the blue whale lives alone, but there are groups of blue whales, and they find each other through a very deep sound, like a dog.

Figure 2 – Drawing by Participant 2

Source: Research Data (2025).

In Figure 2, Participant 2 (boy, 9 years old) mentioned that he learned about the axolotl from a game. The animal is a character in *Minecraft* and *Pokémon* trading cards. The information he provided—that it lives in Mexico—is accurate. According to Vance (2017), the axolotl is a type of salamander and is considered an endangered species. However, it is found only in Mexican lakes, not in the ocean. The participant's statement suggests the influence of deep-sea representations found in entertainment media. This result aligns with previous studies that observed children's illustrations depicting fictional characters that sparked their interest (Rua *et al*., 2015; Sorin & Gordon, 2013). Another drawing featured two orange betta fish. According to the child (Participant 9), the drawing was inspired by her pet. Both Participant 2's and Participant 9's drawings suggest some confusion between species that inhabit the ocean and those that live in other aquatic environments, as both the axolotl and the betta fish are freshwater species.

According to Kellert (1985), acquiring or seeking knowledge and understanding of nature reflects a scientific-ecological appreciation of the natural world. In this study, it was observed that children also demonstrated knowledge of animals by incorporating details that enabled species recognition, such as the hammerhead shark, the humpback whale, and the clownfish. In three drawings, children emphasized the food chain, depicting sharks and a moray eel with open mouths hunting smaller fish (Participants 2, 14, and 19). During the interviews, five other children (Participants 3, 9, 11, 13, and 15) mentioned the food chain. Participant 14's drawing also highlighted an octopus's defense strategy: releasing ink when in danger. During the interview, Participant 2 elaborated on his drawing: "I drew a fish escaping from a shark" (boy, 9 years old). It is also worth noting that out of the 20 drawings analyzed, 18 featured representations of at least one fauna species. Flora was represented in 11 drawings. This result is similar to the findings of Meijden (2020), which showed that children's drawings tend to depict animals more frequently than plants.

3.3 An Integrative Perspective

Some drawings, as previously mentioned, went beyond the representation of a contemplative and biodiverse natural world, integrating humans and their activities into the illustrations. Özsoy (2012) argues that depicting human presence in drawings may indicate that children see humans as an integral part of nature.

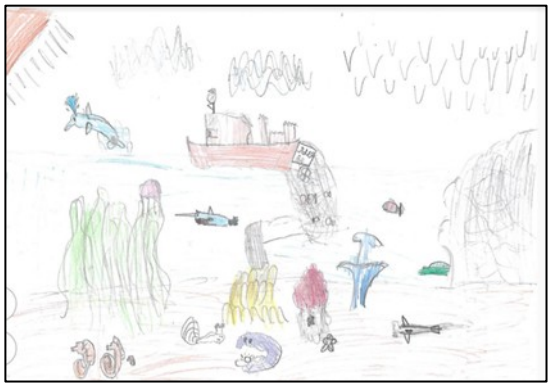
The results of this study suggest that children interact with the ocean mainly in recreational settings, such as on weekends or during family vacations. These activities contribute to the emergence of a leisure perspective in their drawings, where children engage in games and activities (King & Church, 2013). It was observed that three children illustrated their interactions with the sea in recreational activities such as sailing, surfing, and contemplating the ocean (Participants 1, 3, and 5). In their statements, they emphasized the entertainment value the sea provides. For example, Participant 5 explained that she created her drawing “inspired by a part of sailing that we do, which is sailing against the wind” (Participant 5, girl, 10 years old). Participant 1, who drew a self-portrait of herself surfing and spending a day at the beach with her family, mentioned: "Here, this is me surfing the wave... [...] Down here, on the beach towel, is my mom, on the sand. Then, under the beach umbrella, is my dad, watching me, and my brother.” She also highlighted that she “likes going up and down the waves.” Some children, even without depicting leisure activities in their drawings, mentioned this perspective in their statements. For example, Participant 8 said: “I go to Praia da Bica just to play in the sand” (boy, 8 years old). These findings are similar to those described by Tapsell (1997), who suggested that children value outdoor spaces as places to play and explore.

Figure 3 – Drawings Featuring Human Presence

Source: Research Data (2025).

Only one drawing depicted the ocean with an activity marked by environmental impact (Figure 4). In this case, Participant 17 highlighted a fishing boat and the sea as a source of natural resources essential for human survival. He described: “A boat with a net… Catching fish…” Other statements during the interviews mentioned pollution issues, both on the beach sand and in the ocean. For example, Participant 6 said she often goes to Ponta Negra Beach (Maricá, RJ) with her aunt and cousin, and what bothers her most is the trash, which, according to her, “is on the sand… and sometimes appears in the sea.” She mentioned plastic bottles and bags as examples. Similarly, Participant 8, a boy from Ilha do Governador, stated that he goes to the beach near his home but only stays on the sand because the sea is “too dirty.” Some children even mentioned that they often pick up trash they find on the beach. This is the case of Participant 3, a girl, who reported: “When I go to the beach, I pick up the trash… my dad helps too, but I don’t always do it.”

Figure 4 – Drawing Featuring Environmental Activity/Impact, Participant 17.



Source: Research Data (2025).

During the interviews, there was also a mention of “sad” fish due to the murky sea (Participant 3) and the perception that the ocean is distinct from the beach; otherwise, it would already be polluted (Participant 8). In his words, Participant 8 explained: “I think the ocean is very clean, with fish, so I drew an ocean with fish, and a sun there so the fish can swim peacefully, with birds above them.” For him, the beach he visits is not part of the ocean, “because if this beach were part of the ocean, the ocean would already be completely polluted.” Participant 10 demonstrated a conscious choice to depict a clean sea in his drawing: “Here in the drawing, it’s the clean sea. That was my imagination.”

4 FINAL CONSIDERATIONS

The objective of this study was to investigate the perceptions of children aged 7 to 11, living in Rio de Janeiro, about the ocean, through the creation of a drawing guided by the question: "What is the ocean for you?"

The drawings featured various components of fauna, flora, and abiotic elements, which were mostly associated with a naturalistic view of the environment and the contemplation of the ocean as a beautiful, clean, peaceful place rich in biodiversity. In the drawings where human-made elements appeared alongside human presence, the children's perceptions indicated a recreational perspective.

An important aspect that stood out in this study was the gap between how the participants depicted the ocean (as they sought to reproduce an untouched nature) and the reality they themselves reported encountering at the beach and in the sea, which included litter, bottles, plastic bags, and water unsuitable for swimming. Although the children did not represent environmental issues in their drawings, they demonstrated awareness of them. Previous studies suggest that representations of negative aspects of the environment emerge only when prompted by some form of action, whether in formal or informal education settings.

Children's perceptions of the ocean are crucial for successful social engagement and the integration of human dimensions into marine conservation. Furthermore, education plays a key role in building awareness, concern, and responsibility toward the environment. Understanding children's perceptions of the ocean is extremely important to ensure that marine conservation efforts

effectively engage their target audience. The drawings were considered useful tools in stimulating an important thought process, allowing children to communicate ideas, concepts, and emotions that can provide insights with the potential to support pro-environmental actions regarding the ocean.

UMA ANÁLISE DA PERCEPÇÃO DE CRIANÇAS SOBRE O OCEANO POR MEIO DO DESENHO

RESUMO

Este estudo qualitativo, teve como objetivo explorar a percepção de crianças sobre o oceano. Participaram deste estudo 20 crianças moradoras da cidade do Rio de Janeiro. Os instrumentos utilizados para a coleta de dados foram o desenho e a entrevista. Como resultado, verificou-se que as crianças perceberam o oceano como um local de fascínio, beleza e lazer. Os desenhos evidenciaram representações do oceano que incluíram fauna, flora e elementos abióticos, que estiveram, em sua maioria, associados à visão naturalista do ambiente. Embora as crianças tenham optado por não representar problemas ambientais em seus desenhos, elas se mostram conscientes deles em suas falas durante a entrevista — evidenciando a importância de associar desenhos e entrevistas neste estudo.

PALAVRAS-CHAVE: Educação não formal. Percepção ambiental. Pesquisa visual. Década do Oceano.

ACKNOWLEDGMENTS

This study was conducted within the scope of the National Institute for Public Communication of Science and Technology, with support from the funding agencies Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq, 465658/2014-8) and Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ, E-26/200.89972018). The study also received support from CNPq through the project funded by the Universal Call (405249/2018-7, Luisa Massarani). Luisa Massarani acknowledges CNPq for the Productivity Grant and FAPERJ for the "Cientista do Nosso Estado" award. Author Graziele Scalfi acknowledges CNPq for her DTI scholarships. All authors express their gratitude to the families who accepted our invitation to participate in this study.

BIBLIOGRAPHIC REFERENCES

ALERBY, E. A Way of Visualising Children's and Young People's Thoughts about the Environment: A study of drawings. **Environmental Education Research**, v. 6, n. 3, p. 205-222, 2000. Available at: https://doi.org/10.1080/13504620050076713. Access on: Apr. 12nd, 2022.

BALLANTYNE, R. 'Young students' conceptions of the marine environment and their role in the development of aquaria exhibits. **Geo Journal**, v. 60, n. 2, p. 159-63, 2004. Available at: https://www.jstor.org/stable/41147877. Access on: Jun. 20th, 2023.

Bayne, K.; Höck, B.; Spence, H.; Crawford, K.; Payn, T.; Barnard, T. New Zealand school children's perceptions of local forests and the Montréal Process Criteria and Indicators: comparing local and international value systems. **New Zealand Journal Of Forestry Science**, v. 45, n. 1, 2015. Available at: https://doi.org/10.1186/s40490-015-0051-x. Access on: Apr. 11st, 2023.

BENNETT, N. J. Marine social science for the peopled seas. **Coast. Manag**, v. 47, p. 244–252, 2019. Available at: https://doi.org/10.1080/08920753.2019.1564958. Access on: Apr. 11st, 2024.

BENNETT, N. J. Using perceptions as evidence to improve conservation and environmental management. **Conserv. Biol**., v. 30, p. 582-592, 2016. Disponível Available at: https://doi.org/10.1111/cobi.12681. Access on: Apr. 22nd, 2023.

BLAND, D. Using drawing in research with children: lessons from practice. **International Journal of Research & Method in Education**, v. 41, n. 3, 2018. Available at: https://doi.org/10.1080/1743727X.2017.1307957. Access on: Apr. 2nd, 2019.

CARSON, R. **Primavera Silenciosa**. São Paulo: Gaia, 1962, 305p.

CARVALHO-SOUZA, G. F.; OGASAWARA, L. H.; ABRÃO-OLIVEIRA, J. G.; AGUIAR, L. G. P. A.; BARRETO, G. S. A Percepção de Crianças sobre o Lixo Marinho: Uma Abordagem Lúdica na Popularização das Ciências. **Educação Ambiental em Ação**, v. XXI, n. 42, p. 1-7, 2018. Available at: http://www.revistaea.org/artigo.php?idartigo=1356. Access on: Jun. 20th, 2022.

CAVA, F.; SCHOEDINGER, S.; STRANG, C.; TUDDENHAM, P. **Science Content and Standards for Ocean Literacy**: An Ocean Literacy Update. 2005. Available at: http://www.coexploration.org/oceanliteracy/documents/OLit2004_Final_000.pdf. Access on: Aug. 23rd, 2022.

CORSARO, W. A. **Sociologia da Infância**. São Paulo: Artmed, 2011.

DOVE, F. E.; EVERETT, L. A.; PREECE, P. F. W. Exploring a hydrological concept through children's drawings. **International Journal of Science Education**, v. 21, n. 5, p. 485-497, 1999.

ELEITON, N. E.; CORLESS, R.; HYNES, S. Public Perceptions of Marine Environmental Issues: A Review, Working Papers, **National University of Ireland**, Galway, Socio-Economic Marine Research Unit., 2015.

ELKONIN, D. B. Desarrollo psiquico del niño desde el nascimiento hasta el ingreso en la escuela. *In*: SMIRNOV, A.; RUBINSTEIN, S. L.; LEONTIEV, A. N.; TIEPLOV, B. M. (Eds). **Psicología**. México: Grijalbo, 1960. (pp. 504-522).

FARIA, A. L. G.; DEMARTINI, Z. B. F.; PRADO, P. D. (org). **Por uma cultura da infância: metodologias de pesquisa com crianças**. Campinas, São Paulo: Autores Associados, 2002.

GELCICH, S.; BUCKLEY, P.; PINNEGAR, J. K.; CHILVERS, J.; LORENZONI, I.; TERRY, G.; GUERRERO, M.; CASTILLA, J. C.; VALDEBENITO, A.; DUARTE, C Public awareness, concerns, and priorities about anthropogenic impacts on marine environments. **Proc. Natl. Acad. Sci**, v. 111, p. 15042-15047, 2014. Available at: https://doi.org/10.1073/pnas.1417344111. Access on: Aug. 12nd, 2016.

GOBBI, M. A. Desenho infantil e oralidade: instrumentos para pesquisas com crianças pequenas. *In*: FARIA, A. L. G.; DEMARTINI, Z. B. F.; PRADO, P. D. (Orgs.). **Por uma cultura da infância**: metodologias de pesquisa com crianças, pp. 69-93. Campinas: Autores Associados, 2009.

GRREAVES, E.; STANISSTREET, M.; BOYES, E.; WILLIAMS, T. Children's ideas about rainforests. **Journal of Biological Education**, v. 27, n. 3, p. 189-194, 1993. Available at: https://doi.org/10.1080/00219266.1993.9655332. Access on: Sep. 6th, 2021.

GUEST, H.; LOTZE, H. K.; WALLACE, D. Youth and the sea: Ocean literacy in Nova Scotia, Canada. **Marine Policy**, v.58, p. 98-107, 2015. Available at: https://doi.org/10.1016/j.marpol.2015.04.007. Access on: Dec. 12nd,. 2020.

HARTLEY, B. L.; THOMPSON, R. C.; PAHL, S. Marine litter education boosts children's understanding and self-reported actions. **Marine pollution bulletin**, v. 90, n. 1-2, p. 209-217, 2015. Available at: https://doi.org/10.1016/j.marpolbul.2014.10.049. Access on: Nov. 4th, 2022.

Instituto Estadual do Ambiente [INEA]. **Relatório de auditoria ambiental de acompanhamento**. Cumprimento à Lei Estadual Nº1898/91 com escopo na diretriz INEA DZ056-R. 3 Estaleiro Brasfel LTDA. Relatório Final, 49p. 2018. Available at: https://esg.gna.com.br/assets/documents/documentos_balizadores/08_relatorio_de_auditoria_ambiental/3-relatorio-de-auditoria-ambiental-de-acompanhamento-tgnl.pdf. Access on: Apr. 21st, 2021.

JEFFERSON, R. L.; BAILEY, I.; LAFFOLEY, D. D.; RICHARDS, J. P.; ATTRILL, M. Public Perceptions of the UK Marine Environment. **Marine Policy**, v. 43, p. 327-337, 2014. Available at: https://doi.org/10.1016/j.marpol.2013.07.004. Access on: Feb. 2nd, 2022.

KELLERT, S. R. Attitudes toward animals: Age-related development among children. **Advances in animal welfare science**, v. 16, n. 3, p. 29-39, 1985. Available at: https://www.wellbeingintlstudiesrepository.org/cgi/viewcontent.cgi?article=1001&context=acwp_sata. Access on: Feb. 4th, 2022.

KING, K.; CHURCH, A. We don't enjoy nature like that: Youth identity and lifestyle in the countryside. **Journal of Rural Studies**, v. 31, p. 67-76, 2013. Available at: https://doi.org/10.1016/j.jrurstud.2013.02.004. Access on: Nov. 9th, 2021.

MARQUES, V.; URSI, S.; GEISLY, E. L. S. Environmental Perception: Notes on Transdisciplinary Approach. **Sci J Biol & Life Sci**., v. 1, n. 2, 2020. Available at: https://doi.org/10.33552/SJBLS.2020.01.000511. Access on: May 10th, 2021.

MEIJDEN, R. **Threatened and Threatening Seas**: Children's Perceptions of the Marine Environment and Environmental Attitudes towards Marine Pollution in

Kuta, Lombok.2020. Available at: https://gupea.ub.gu.se/handle/2077/66806?show=full. Access on: Jul. 4th, 2022.

ÖZSOY, S. Investigating Elementary School Students' Perceptions About Environment Through Their Drawings. **Educational Sciences: Theory & Practice**, v. 12, n. 2, p. 1132-1139, 2012. Available at: https://eric.ed.gov/?id=EJ981833. Access on: Nov. 9th, 2021.

PENDLETON, L.; MARTIN, N.; WEBSTER, D. Public perceptions of environmental quality: A survey study of beach use and perceptions in Los Angeles County. **Marine pollution bulletin**, v. 42, n. 11, p. 1155-1160, 2001. Available at: https://doi.org/10.1016/s0025-326x(01)00131-x. Access on: Jul. 4th, 2022.

POTTS, T.; O'HIGGINS, T.; MEE, L.; PITA, C. **Public perceptions of Europe's Seas - A Policy Brief**. EU FP7 KNOWSEAS Project, 2011. Available at: https://www.msfd.eu/knowseas/library/PB1.pdf. Access on: Jul. 2nd, 2022.

POTTS, T.; PITA, C.; O'HIGGINS, T.; MEE, L. D. Who cares? European attitudes towards marine and coastal environments. **Marine Policy**, v. 72, p. 59-66, 2016. Available at: https://doi.org/10.1016/j.marpol.2016.06.012. Access on: Jul. 4th, 2022.

RUA, M. B.; PEDRINI, A. G.; BERNARDES, L.; MARIANO, D.; FONSECA, B.; NUNES, R. M.; BROTTO, D. S. Percepção do ambiente marinho por crianças no Rio de Janeiro, Brasil. **Revista Biociências**, v. 21, n. 1, p. 27-44, 2015. Available at: https://periodicos.unitau.br/biociencias/article/view/2109. Access on: Aug. 9th, 2023.

SANTOS, F. A. S.; TEIXEIRA, L. N. Percepção ambiental e análise de desenhos: prática em curso de extensão universitária. **Revista Brasileira De Educação Ambiental (RevBEA)**, v. 12, n. 2, p. 156-177, 2017. Available at: http://dx.doi.org/10.33448/rsd-v11i2.20875. Access on: Apr. 29th, 2021.

SARMENTO, M. J. A reinvenção do ofício de aluno e de criança. **Atos de Pesquisa em Educação**, v. 6, n. 3, p. 581-602, 2011. Available at: https://hdl.handle.net/1822/36733. Access on: Sep. 9th, 2023.

SOARES, J. R. C. N. **Conceptualizing the marine environment through the analysis of children's drawings**. 2017. Dissertação (Mestrado em Ecologia e Gestão Ambiental) – Universidade de Lisboa, Lisboa, 2017. Available at: http://hdl.handle.net/10451/32067. Access on: Apr. 12nd, 2018.

SORIN, R.; GORDON, I. J. Developing a methodology to assess children's perceptions of the tropical environment. **International Education Studies**, v. 6, n. 2, p. 96-109, 2013. Available at: http://dx.doi.org/10.5539/ies.v6n2p96. Access on: Feb. 10th, 2023.

TAPSELL, S. M. Rivers and river restoration: A child's-eye view. **Landscape Research**, v. 22, n. 1, p. 45-65, 1997. Available at: https://doi.org/10.1080/01426399708706500. Access on: May 25th, 2023.

Trend, R.; Everett, L.; Dove, J. Interpreting primary children's representations of mountains and mountainous landscapes and environments. **Research in Science & Technological Education**, v. 18, n. 1, p. 85-112, 2000. Available at: https://doi.org/10.1080/02635140050031064. Access on: May 25th, 2023.

Organização das Nações Unidas para a Educação, a Ciência e a Cultura [UNESCO]. **Implementation Plan**. Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization, France, 2021. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000377082. Access on: Aug. 12nd, 2022.

UNESCO. **Ocean e Ocean literacy for all**: a tool kit. IOC/UNESCO &UNESCO, Venice Oficce, Paris. 2017. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000260721. Access on: Feb. 18th, 2021.

VANCE, E. The Axolotl Paradox. **Nature**, v. 551, p. 286-290, 2017. Available at: https://www.nature.com/articles/d41586-017-05921-w. Access on: Jun. 11st, 2023.

VIGOTSKY, L. S. **A construção do pensamento e da linguagem**. São Paulo: Martins Fontes, 1993.

WEN, W. C.; LU, S.Y. Marine environmental protection knowledge, attitudes, behaviours, and curricular involvement of Taiwanese primary school students in senior grades. **Environmental Education Research**, v. 19, n. 5, p. 600-619, 2013. Available at: https://doi.org/10.1080/13504622.2012.717219. Access on: Jul. 17th, 2023.

WRIGHT, S. Young Children's meaning making through drawing and 'telling': Analogies to filmic textual features. **Australian Journal of Early Childhood**, v. 32, n. 4, p. 37-48, 2008. Available at: https://doi.org/10.1177/18369391070320040. Access on: Jul. 18th, 2023.

Received: Jun. 17th, 2023.
Approved: Jan. 13rd, 2025.
DOI: 10.3895/rbect.v18n1.17142
How to cite: MENEZES, D. T. S.; ALVARO, M. V.; MASSARANI, L.; CHAGAS, C.; SCALFI, G. A. M. An Analysis of Children's Perception of the Ocean Through Drawing. **Brazilian Journal of Science Teaching and Technology**, Ponta Grossa, v.18, p. 1-21, 2025. Available at: <https://periodicos.utfpr.edu.br/rbect/article/view/17142>. Access on: XXX.
Mailing address: Débora Teixeira dos Santos e Menezes - deboratsantos@gmail.com