

Environmental Education in Protected Areas in Petrópolis

Rio de Janeiro: children as agents of empathy for and engagement with the cause of nature conservation

Marianne Von Lachmann, Rita Maria de Souza Couto and Roberta Portas

https://doi.org/10.21606/drs_lxd2021.02.130

This article presents examples of environmental education programs and events run in protected areas of Petrópolis, Rio de Janeiro state, Brazil, and a brief overview of novel findings in the history, sociology, anthropology, and geography of childhood, converging with those from the area of education, in which children's agency in cultural production, the diversity of children's cultures, and multiple childhoods are recognized. This article outlines the importance of continued efforts to take children from private and public schools, from kindergarten to high school, to engage in playful activities in preserved nature, as demonstrated in the initiatives described. When the full potential of protected areas is harnessed for children's development and education, in particular by helping them forge emotional bonds with space, which transform space into place and are essential for human memory, then new ways of fostering empathy and engagement with nature conservation can come to light. These attributes kindle and excite curiosity, the desire to learn and discover, boosting the learning process in an organic, spontaneous, and integrated way.

Keywords: Partnership Design, protected areas, play, empathy, teaching materials

Introduction

This article presents examples of environmental education programs and events run in protected areas in Petrópolis, Rio de Janeiro state, Brazil, and a brief overview of novel findings in the history, sociology, anthropology, and geography of childhood and their convergence with new ideas in the area of education, in which children's agency in cultural production, the diversity of children's cultures, and multiple childhoods are recognized. Drawing on these conceptions, the aim is to outline the importance of continued efforts to give children of all ages from private and public schools the chance to engage in playful activities in preserved nature.

The experiment presented here is based on the master's research conducted by Marianne Von Lachmann at the graduate program in Design of the Pontifical Catholic University of Rio de Janeiro, Brazil, under the supervision of the co-authors Dr. Rita Maria de Souza Couto and Dr. Roberta Portas. Developed within an exploratory, qualitative approach, it is guided by the methodology of Partnership Design, which, according to Couto (2017), implies interactive work that can only be achieved when there is real social commitment and direct contact with the stakeholders in order to draw on their first-hand experience of the reality.

In Brazil, organized civil society first became engaged with environmental matters in the 1980s, with the first national meetings, social movements, and scholarly output. The National Environmental Policy, based on Law # 6.938 of 08/31/1981, included environmental education as a principle and provided for "environmental education at all levels of teaching, including community education, aiming to provide them with the means to participate actively in defense of the environment" (BRASIL, 1981). Environmental education is also part of the National Curriculum, launched in 1997, and is included in the Federal Law signed on April 27, 1999, that defines the National Environmental Education Policy (BRASIL, 1999).



This work is licensed under a

[Creative Commons Attribution-NonCommercial-Share Alike 4.0 International License.](https://creativecommons.org/licenses/by-nc-sa/4.0/)

<https://creativecommons.org/licenses/by-nc-sa/4.0/>

In 2000, with the passing of Law # 9,985, the national system of protected areas was established, and recommendations were put forward for the design and execution of environmental education programs, including mechanisms to regulate how society participates in the management of protected areas, strengthening the relationship between the state, citizens, and the environment.

Under the new system, protected areas must have a management and assessment plan, a buffer zone, and ecological corridors, including measures to ensure alignment with the economic and social needs of neighboring communities. In other words, the law that establishes the national system of protected areas sets the criteria and standards for a more participative approach to the creation, execution, and management of protected areas. Although public policies promote the implementation of educational actions in communities contiguous to protected areas, and environmental education programs are included in many protected areas' management plans, most communities in their buffer zones have a sensitive relationship with them due to land-related issues, making it harder for the objectives set in their management instruments to be achieved.

The examples of environmental education programs and events presented in this article have not been published elsewhere and are not available to the general public. This survey was only made possible by adopting Partnership Design, through which it was possible to identify the hubs of the networks that enabled these programs, as described below. It should also be noted that each of the initiatives was developed through institutional partnerships, making it impossible to attribute individual authorship.

Spatial dimension of protected areas in the municipality of Petrópolis

According to the mapping developed by the Petrópolis campus of CEFET/RJ in 2020, more than half of the municipality of Petrópolis is occupied by protected areas, not counting private natural heritage reserves. The largest ones are Serra dos Órgãos National Park (PARNASO) and the Petrópolis Mountainous Region protected area (APA Petrópolis), both federal protected areas run by the Chico Mendes Institute for Biodiversity Conservation (ICMBio).

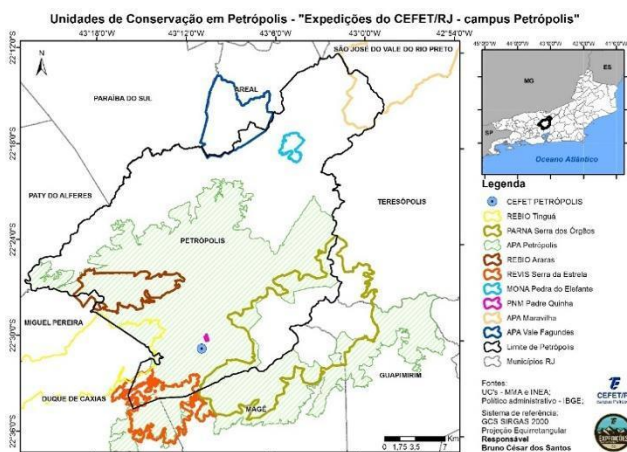


Figure 1. Map of public protected areas in Petrópolis, 2020 (Source: CEFET/RJ, Petrópolis Expedition Project archive).

Covering 20,024 hectares in the municipalities of Teresópolis, Petrópolis, Magé, and Guapimirim, PARNASO was founded in 1939 to preserve the outstanding landscape and biodiversity of this stretch of the Serra do Mar mountain range in the state of Rio de Janeiro. Forty percent of the protected area is in the municipality of Petrópolis and occupies a central position in the state's Atlantic Forest mosaic and Serra do Mar biodiversity corridor. It is considered the largest forest patch in the state of Rio de Janeiro and is of extreme biological importance, being essential for the preservation of water sources and having great ecotourism potential. During the United Nations Conference on Environment and Development (UNCED), held in Rio in 1992, it was named the Atlantic Forest Biosphere Reserve by UNESCO. Meanwhile, APA Petrópolis is mostly (70%) in the municipality of Petrópolis. It was the first protected area in Brazil to be classified as being of sustainable use, in September 1982, and covers 68,224.29 hectares. Both areas are under considerable stress because of the rapid and unruly urbanization process in the area, not to mention the freezing of funds from the federal budget.

New findings and their relevance for children's activities in preserved nature

This article is the result of a field experiment guided by the question: "How can behaviors with destructive

effects on the biophysical environment and the quality of life of the population be changed?”. The aim was to acquire knowledge and a broader understanding of children’s cultures and their agency and autonomy in constructing these cultures, drawing on insights from the Social History of Childhood, the Sociology of Childhood, and the Anthropology of Childhood. The purpose is also to find effective ways of exploring and enabling engagement with conservation and empathy with preserved nature, the core of the study. The conceptions of childhood resulting from the innovative research in these disciplines recognize that childhood is experienced by children in myriad ways, constituting what Manuel Jacinto Sarmento (2007, p. 28-29) calls “cultural belonging” (2007, p. 28-29); i.e., culture shapes childhood. Within a given cultural space, different conceptions of childhood will coexist, depending on the social class, predominant religion, ethnic group, education level of the population, and other socioeconomic factors.

Similarly, we also draw on contributions from the Geography of Childhood and the notion of topophilia, which relates to the attachment people feel for spaces, which is a prerequisite for turning space into place. These concepts help shed light on experiences shaped by emotional attachment to spaces, without which there can be no human memory or experience (LOPES, 2013, 2019). For Lopes, the concept of topophilia, coined by Yi-Fu Tuan (1980), is an essential precondition for human memory and the learning acquired through lived experiences. It is a concept that highlights the importance of games and playing as elements of culture and for transforming space into place, constituting channels through which children can express their love for a space, enabling the development of memory and nourishing the production of meanings by children. These conceptions can be used to assess initiatives capable of helping forge links with and appreciation of preserved nature, and which develop environmental education inside and outside the classroom, as reported below.

Environmental education initiatives in Petrópolis’s protected areas

The environmental education initiatives implemented in Petrópolis’s protected areas are the result of the public environmental governance mechanisms developed in Brazil in the aftermath of the United Nations Conference on the Environment (Stockholm, 1972) and their consolidation by social movements with the broad participation of society. The National Environmental Education Policy (Law 9,795 of 1999) defines environmental education as “processes through which the individual and the collective build social values, knowledge, skills, behaviors, and competencies aimed at the conservation of the environment, an asset destined for the common use of the people, essential for the healthy quality of life and its sustainability” (Art. 1). According to José da Silva Quintas (2006), environmental education is a government responsibility, pursuant to the Federal Constitution, since it is necessary to fulfill the principles set forth in article 225. According to law 9,795, everybody has the right to environmental education as “part of the broader educational process,” which “must be included and coordinated with all levels and modes of education, both formal and non-formal” (Articles 3 and 4).

In Petrópolis’s protected areas, environmental education programs and actions are carried out through the formation of networks between organizations, which then have a seat on their boards: residents’ and farmers’ associations, community leaders, sports associations, NGOs, and small tourism businesses. At PARNASO and APA Petrópolis, their respective technical teams carry out the planning and structuring of the initiatives.

1 -- Environmental Education Activities at PARNASO

1.1 PARNASO environmental education program and educational events

As a member of the National Environment System, ICMBio promotes programs integrated with preservation and sustainable development activities, as listed in Decree 4,281 of 06/25/2002 (BRASIL, 2002), which regulates the National Environmental Education Policy. Accordingly, PARNASO’s technical team have developed “two major projects: the Boa Vizinhança Project, which brings together actions aimed at integrating and mediating conflicts with surrounding communities, including the work of the Advisory Council; and the Cenário Verde Project, which includes actions aimed at raising visitor awareness and the use of the park as an educational space, through school visits.” (PARNASO Management Plan).

Launched in 2001, the Cenário Verde project supports formal education both by including environmental topics in school curricula and by raising visitor awareness. It has three lines of action: production of educational material; training of teachers from nearby schools; and interpretive trails and information leaflets. In the first line of action, the PARNASO educators act as assistants, meeting teachers’ requirements in alignment with their schools’ pedagogical programs. Between 2010 and 2019, the programs attracted an average of eight thousand participants a year, including students and educators from more than 150 educational institutions, mostly public schools from Teresópolis. In the second line of action, four courses were held between 2006 and 2008 for teachers from 30 public schools. As for the interpretive trails and information

leaflets, the third line of action, signs written in accessible language have been put up at the Teresópolis and Guapimirim headquarters, providing information on local environmental themes such as the city–forest relationship, riparian forests, and ecological succession. In addition, two leaflets have been produced: one with guidelines on appropriate behavior in natural environments, information on camping areas, water sources, and ecological concepts for the Petrópolis-Teresópolis crossing; and another from the Philips Guide, with general information for visitors.

Implemented in 2005 during the reformulation of the PARNASO administration, the Boa Vizinhança project “brings together all PARNASO’s non-formal environmental education actions and has the general objective of strengthening the relations between neighboring communities and the Park, through environmental education actions that contribute to the development of critical thinking about the environmental problems faced by each community, the development of values aimed at environmental preservation, and active participation with the purpose of improving the quality of life of these groups” (PARNASO Management Plan). To this end, it seeks to include the people living in the immediate vicinity of the park in its management process by involving them in initiatives already underway, in partnership with entities with a seat on the Board.

The most successful and far-reaching environmental education actions for the municipality of Petrópolis have originated from the Boa Vizinhança project. These include the acquisition of the new Petrópolis headquarters and the signing of a memorandum of understanding by the presidents of ICMBio and the Association of Rural Producers of Bonfim (APRB) on 30/09/2019, both part of the process of redefining the borders of PARNASO in Bonfim, concluded with the enactment of Bill 8,823 of 2017. These initiatives put an end to an over 30-year-long land conflict and include the delivery of equipment for a sanitation system in the neighborhood and the beginning of the land titling process for the rural properties that had previously been considered illegal for being inside the Park’s territory.

Environmental education, as conceived by PARNASO, is an integral part of the memorandum of understanding, in which ICMBio undertakes to carry out environmental education in the Bonfim neighborhood twice a year. In addition to Bonfim, the Boa Vizinhança project is also present in other districts and communities bordering PARNASO in Petrópolis.



Figures 2 and 3 Partnership with Christian (catholic and evangelical) churches in Petrópolis, a pilot for visits by disabled people on educational trails, using a Julietti wheelchair prototype and adapted backpack, summer of 2020 (Source: Marcus Gomes Archive).

1.2 Educational Events

Held since 2005, the Nature at Party events are planned in partnership with farmers’ and residents’ associations and/or NGOs according to the interests of each group involved and themes of relevance to the management of the park. The 2005 model, widely reproduced until today, is based on leisure, sporting, and cultural activities, interspersed with lectures focusing on themes designed to reflect processes underway in the territory. Throughout the year, several cultural and educational events are held for the local community and society at large to raise awareness and engage the public with environmental issues, always in partnership with businesses, associations, and the local government.

2 – Núcleo de Alfabetização Ecológica (Ecological Literacy Group)

Located in Sertão do Carangola, a neighborhood in Cascatinha, the most densely populated district in Petrópolis, Núcleo de Alfabetização Ecológica is a non-profit organization founded in 2007 by two civil organizations: SEOP (Education and People’s Organization Service) and Água Doce, from Petrópolis and Magé,

respectively. The project stems from the installation, in 1996, of a biodigester and a biosystem for the community's sanitation. In 1998, the first actions were carried out by voluntary instructors in outdoor areas as extracurricular leisure activities, including community vegetable farming, composting, and fishing for children and teenagers. In less than ten years, in response to the exceptional results achieved by the sanitation system and the environmental education initiatives taken with children in the neighborhood, a group of Italian citizens financed the construction of a headquarters to enable educational programs to be organized and expanded. The new premises, opened in September 2007, host activities involving music, cooking, sports, handicrafts, weaving, sewing, capoeira, citizenship, basic sustainability, as well as remedial education. An average of 50 children between the ages of five and fifteen participate every year.

3 - INEA Environmental Education Program / Piabanha Regional Superintendence

Between 2010 and 2017, under the umbrella title of Environmental Caravan, the Piabanha regional office of the Rio de Janeiro State Environment Institute (INEA) formed partnership networks with the purpose of carrying out a set of projects to coordinate and join up the issues of water availability, forests, protected areas, local people's quality of life, food production, environmental awareness, and climate change. Designed to sensitize students from the public school system in nine municipalities covered by the Piabanha River Basin Committee, including Petrópolis, the largest in area and population, the partnership network was administrated by INEA, municipal environment, and education departments, the Piabanha River Basin Committee, COMDEP (Petrópolis municipal development company) and Águas do Imperador (water utility), which elected a district of the municipality in which the program would be carried out during each quarter. The INEA regional office contacted the public schools in that district to select the theme to be worked on. Through different actions in the schools, which included interactive presentations, painting workshops, films, walks with students on trails at the partner protected areas, distribution of seedlings, gardening, composting, and exhibitions, the program gained great visibility, while also attracting the interest and engagement of the population. In addition to the workshops, the schools had to complete one of the following tasks: clean a stretch of the river in their neighborhood and erect educational signs made by the students; reforest the riparian forest; perform water analyses; produce interpretive trails, or visit water and sewage treatment plants.

Three districts took part in the program every year, totaling 144 workshops, as well as a number of schools, universities, and individuals, which varied according to the demographic density of each district. In 2015, the year in which the program had its largest audience, around 15,000 people from 74 schools and six universities from the nine municipalities participated. In addition to the partners of the administrative group, mentioned above, the network included the municipal departments of culture, agriculture, sport and leisure, planning and economic development, and civil protection and defense; the fire department; universities; PARNASO; APA Petrópolis; Três Picos State Park; REBIO Araras; Central Fluminense Mosaic; Petrópolis municipal protected areas; the INEA seed bank and environmental education team; FIRJAN (Federation of Industries of Rio de Janeiro); Association of Residents and Friends of Petrópolis, the Petrópolis Visitors Center; SESC; and several NGOs.

Once or twice a year, the network of partners selected a public space – usually Praça da Liberdade square, in the center of Petrópolis – to hold a large exhibition of the work produced by the students from the local schools in the workshops and the classroom. These exhibitions were designed to show how important the protected areas and forest remnants are for preserving water supplies and biodiversity, and involved sharing information and promoting exchanges, recreation, and entertainment for the other visiting schools from the Caravan and for the public in general. The interactive model – pedagogically important for raising awareness – represented a riverbed between two mountains, one with vegetation and the other one deforested, made especially to explain the importance of forests to the water cycle.

4 – REBIO Araras (State Biological Reserve of Araras)

Of great relevance to the context of the Central Fluminense Mosaic, it was only possible to begin providing environmental education in this protected area as of 2012, after park rangers were employed to work there. Since then, REBIO Araras has received groups of public school students every year, from preschool to high school. The actions consist of guided tours with park rangers along interpretive trails chosen according to the group's age range, where the participants get to know the preserved nature and observe the flora and fauna along the route. School visits include a presentation at the headquarters by the protected area's technical team. The language and illustrations used are adapted to different age groups and include supplementary materials and slideshows. The topics covered include institutional data, the types of protected areas and their mission, the importance of preserving nature, the work of park rangers, characteristics of the Atlantic Forest

biome, its flora and fauna, ecosystem services, the importance of forests and the Araras biological reserve for regulating the region's climate, scientific research, and how to take care of forests. In 2020, due to the COVID 19 pandemic, environmental education actions were suspended.



Figure 4 Students from Professor Paulo Monte Municipal School on a visit to the Araras biological reserve. Araras, Petrópolis, November 2017 (Source: Amigos da REBIO Araras Archive).

5 – APA Petrópolis (Petrópolis Protected Area) Cycling Environmental Cup

This event was held by the Petrópolis Protected Area in May 2012, organized by its technical sustainable development committee and the Cycling Federation of the State of Rio de Janeiro, aiming to raise public awareness about the existence of the protected area, emphasizing the importance of preserving the region's natural heritage. The project consisted of two activities: a four-stage cycling competition, environmental education, and pro-sustainability activities. The organizers' intention was to take advantage of the tournament to encourage cycling along the local roads and to offer environmental education and social sustainability actions in each of the competition areas. Additionally, the event was designed as a pilot for possible replication in protected areas with similar characteristics. The educational activities included poetry and photography contests on related themes to enable non-cyclists to take part and to expand support for environmental conservation among citizens. On average, around 100 to 200 cyclists participated in each stage, in various categories, including children, with a Kids Cup contest taking place in two of the four stages.



Figure 5 Leaflet for the APA Petrópolis Environmental Cup (Source: Marcos Werneck Archive).

6 - Muda Tudo Plant Nursery

Located in Vale das Videiras, Petrópolis district, Muda Tudo Plant Nursery (Viveiro Muda Tudo) was inaugurated in October 2016, bordering the Araras biological reserve, APA Petrópolis, the Palmares, Santana River, and Guandu River protected areas, PARNASO, and the Tinguá biological reserve. In December of that same year, representing Vale das Videiras Residents' Association (AMAVALE), Muda Tudo became a deputy

member of the Piabanha River Basin Committee. This movement resulted in the beginning of a project to recover the springs, protect the banks of the watercourses, create ecological corridors, and improve water quality and quantity, the most urgent issue for the region's residents. In 2019, in an initiative related to the actions reported above, AMAVALE began measuring the amount of rain with rain gauges installed at five different points in the valley. Based on the data collected, it was found that in winter 2020, it rained 70% less than in the same period of 2019. The activities offered at the headquarters attract an average of 30 people each day. From its inauguration until March 2020, 40 events were held, including lectures and workshops covering topics central to the nursery's objectives, namely: the planting of seeds and seedlings native to the Atlantic Forest; ecological restoration; composting; sorting of waste for recycling, and reuse; bioconstruction, conscious nutrition; syntropic farming; and others. Key among the more than one thousand people who experienced the events were the 300 students from preschool to middle school age from Américo Fernandes Ribeiro Municipal School, adjacent to the Nursery.

7 - CEFET/RJ Petrópolis Expeditions Project

The CEFET/RJ Expeditions Project was launched in 2016, offering a mixture of environmental education and interpretation activities on trails in protected areas in Petrópolis. The aim is to study the natural and social diversity along the routes and protected areas and foster multidisciplinary actions in the areas of ecology, geography, health, and physical education. In 2020, due to the pandemic, the project was adapted to a remote format, with a greater focus on research in three main areas: protected areas and trails in the municipality of Petrópolis, the long-distance trail in PARNASO, and how to enable visits to natural areas during the pandemic. A survey of all the protected areas situated entirely or partially in the municipality was prepared with a view to collating data not available in official sources. The pandemic prompted greater reflection about society and nature and the benefits of hiking on trails for physical and mental health, leading the project team to organize the data from the expeditions in previous years. The expansion of knowledge on the areas visited led to investigations into how to improve the carrying capacity of natural attractions, risk mapping, improved management, trail signaling, among others. The multidisciplinary nature of the group, with professionals from diverse and complementary areas, such as adventure tourism, geoprocessing, technologies, race relations, and environmental conflicts, was important for the success of the mapping process and demonstrated the importance of knowing the limits of protected areas to better plan the activities to be carried out. The data gathered demonstrate the importance of public use for the protection of natural resources, helping to increase local awareness and environmental management in the municipality.



Figure 6 PARNASO Trail, Expedition Project (Source: CEFET/RJ archive, Petrópolis campus).

8 - Environmental Intelligence Project run by the Petrópolis Municipal Department of the Environment

This is the local department of the environment's first environmental education program. It draws on a teaching methodology and a theoretical framework and involves fifteen subprojects and an annual schedule of permanent actions. The project aims to motivate and develop formal and non-formal environmental education in schools, residents' associations, factories, and public departments in Petrópolis, through six thematic areas: protected areas and water; citizenship and heritage; meteorology and civil defense; waste, waste sorting, and crafts; animal welfare; Atlantic Forest seeds and trees. Between August 2017 and March 2020, more than 700

initiatives were carried out through a large network formed of the department's technical team, who conceived the project, and their partners INEA, ICMBio, municipal protected areas, IPHAN (national heritage protection agency), the Imperial Museum, CEFET, Air Force, Municipal Department of Security and Civil Defense, Fire Department, COMDEP, Municipal Guard, COBEA (animal welfare group), in addition to residents' associations and various NGOs. Approximately 1,800 students from public and private schools, from preschool to university level, participated in activities such as educational ecological walks on city trails, visits by staff of the municipal department of the environment to schools, factories, and communities to give awareness-raising presentations, planting Atlantic Forest tree seedlings in schools, universities, and degraded areas, river cleaning efforts, training of public and private teachers, support for sporting events, distribution of Atlantic Forest tree seedlings in squares in the center of Petrópolis, among others. Special attention was paid to documenting the actions in order to compile information and contacts and thereby collate the data and facilitate access to references for the continuous improvement of the local government's environmental education initiatives.



Figure 7 Planting of seedlings in Cuiabá valley, December 2018 (Source: Archive of the Petrópolis Municipal Department of the Environment, Environmental Intelligence Project).

9 - Project Workshop for the Bonfim Farmers' Association

Held at the height of the Covid-19 pandemic, on 15 August 2020, by the Bonfim Farmers Association, this initiative was guided by the principle that all human activity causes environmental impacts and all environmental impacts can be minimized. Empowering those who observe and live with environmental problems leads to the full exercise of citizenship and solutions to the environmental problems that affect them. Fifteen participants attended the eight-hour workshop, which was sponsored by local residents and the Environment Committee of the Vale do Mata Porcos Residents' Association, from a valley adjacent to Bonfim. The support of the Bonfim health center was essential for the event, which took place in an open-sided building, in compliance with safety protocols. The main objective – to train citizens to take a stance toward socio-environmental issues and become agents of change – was developed in four modules, through the presentation of a simple model for devising projects and basic training in relevant areas. The focus was to show in practical terms how low- and medium-impact environmental problems can be solved to a large extent with small individual actions and also to show that more complex cases must be conveyed to the government in clear language in order to enable an effective solution to be reached. The participants included employees of ICMBio, the Bonfim health center, fire fighters, and local farmers, artisans, and small ecotourism entrepreneurs.

10 - 2020 Children's Day celebration in Bonfim held by the local partnership network

On the initiative of the Bonfim Farmers' Association, with a view to carrying out environmental education activities to celebrate Children's Day in Bonfim, a partnership network was formed in the neighborhood as a spin-off from the aforementioned Project Workshop. Joining the farmers' association in the network were the family health center, Odette Young Monteiro Municipal School, Bonfim Residents' Association, the Environment Committee of the Vale do Mata Porcos Residents' Association, and the Interdisciplinary Laboratory of Design Education (LIDE) of PUC-Rio,¹

¹ Master's research advised by Dr. Rita Maria de Souza Couto and Dr. Roberta Portas, with funding from the

The initial idea was to celebrate Children’s Day with an outdoor event at the new Petrópolis headquarters of PARNASO. Due to the pandemic, the original plan was canceled and replaced by a program designed to take the essence of the original program to families with children enrolled at Odette Young Monteiro Municipal School, through the production of kits and the use of the school system for the delivery of materials, in place since the beginning of the quarantine. Having learned at the Project Workshop about the master's research and fieldwork to be carried out through the distribution of kits with materials from nature, the partners held a meeting on 25 August 2020, to plan its execution.

At the meeting, it was decided that three kits would be produced for each family: a memory game with 9 pairs of cards containing photographs of the region’s fauna and flora; a six-sided leaflet to playfully address three major local environmental challenges (fire prevention, recycling of solid waste, plastic kites), and a box containing two games with nature materials (“Nature Dominoes” and “Family Mandala”).

The lively engagement of the partners and volunteers was paramount to the achievement of the proposed goals: in less than 60 days, 264 kits were delivered to 88 families together with the “Little Animals” series, donated to the Odette Young Monteiro Municipal School collection, demonstration videos, and the installation of the “Give your garbage a good end” banner in the neighborhood ecopoint.

The second-grade elementary school teacher sent the following comment on WhatsApp about the benefits the kit activities brought to the children and their families: “I found that playing together is not only fun, it also brings people together, creates a common repertoire of themes that enrich family life. We noticed that the children’s interaction with nature goes far beyond being provided with a green area to play. (...) During lockdown, the games became important as an alternative for play and learning among family members during the period of isolation.”



Figure 8: Nature materials collected for “Games with Materials from Nature.” Photo taken by the researcher on Sep. 14, 2020. (Source: LIDE collection)



Figure 9: Cardboard packaging collected to assemble the boxes for the “Games with Materials from Nature” kits. Photo taken by the researcher on Oct. 14, 2020. (Source: LIDE Collection).

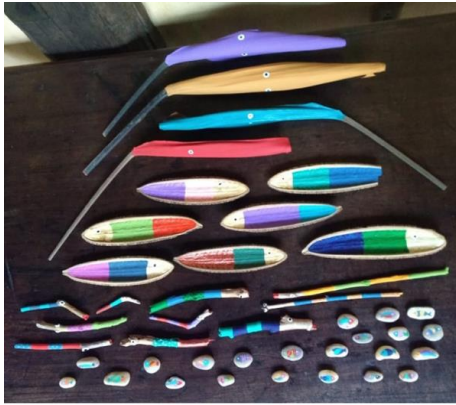


Figure 10: "Little Animals" donation to the Odette Young Monteiro Municipal School collection. Photo taken by the researcher on Sep. 9, 2020. (Source: LIDE Collection).



Figure 13: Figuring out how to play "Games with Materials from Nature." Photo posted by the family on the school's WhatsApp group on Oct. 13, 2020. (Source: Odette Young Monteiro Municipal School director's collection).



Figure 11: Delivery of kits to families at school on Oct. 9, 2020. (Source: Odette Young Monteiro Municipal School director's collection).



Figure 14: Making a kite following the instructions in the "Six-sided leaflet." Photo posted by the family in the school's WhatsApp group on Oct. 11, 2020 (Source: Odette Young Monteiro Municipal School director's collection).



Figure 12: Children playing with the Memory Game. Photo posted by the family on the school's WhatsApp group on Oct. 12, 2020. (Source: Odette Young Monteiro Municipal School director's collection).



Figure 15: Children playing with "Games with Materials from Nature." Photo posted by the family in the school's WhatsApp group on Oct. 10, 2020. (Source: Odette Young Monteiro Municipal School director's collection).



Figure 16: Children playing with the kits. Photo posted on the Odette Young Monteiro Municipal School WhatsApp group on Oct. 10, 2020. (Source: Odette Young Monteiro Municipal School director's collection).



Figure 17: Installation of the "Give your garbage a good end" banner at the neighborhood ecopoint. Photo taken by the researcher on Oct. 10, 2020. (Source: LIDE Collection).

Concluding remarks

According to Barbosa (2014, p. 645-667), family, school, and media cultures intersect in children, since they are the basis for their daily activities, "in which they repeat their actions, propositions and reiterate their achievements," leading to the creation of multiple "children's cultures" and "multiple childhoods." This web of cultures constitutes the environment in which children develop and grow up and is also linked to play and the interweaving of fantasy and reality that are so characteristic of childhood. Children interact, influencing and being influenced by others, in an intense, ongoing process of understanding the world and producing meanings and possibilities for building their existence (Pinto, 1999, p. 33-73).

Regardless of the size or capacity of the physical infrastructure, resources invested, and scientific knowledge, efforts to enable children and youth to try out activities in preserved nature – the common denominator of practically all the initiatives mentioned here – are pursued in recognition of a conception of childhood that envisages some degree of autonomy and agency for children in such activities. Furthermore, the ability of preserved nature to encompass the broad spectrum of cultures and childhoods existing in any given school group, allowing each child to experience the space in their own unique way both individually and in a group, spontaneously leads to the medley of multidisciplinary knowledge from which these innovative findings came. For Pinto (1999, p. 70), a "plurality of focuses is an essential condition for a better understanding and appreciation of the place of childhood in society."

The objectives of the programs and actions presented here point to an urgent issue for (early) childhood education: the importance of raising awareness about the seriousness of schooling being based on the acquisition and development of knowledge, using models that separate science, art, and life, with preset, predictable proposed solutions, as indicated by the research group on Childhood, Training and Culture (Infoc) at PUC-Rio, led by Sonia Kramer, Maria Fernanda Nunes and Cristina Carvalho (2013).

The urgency is related to the construction of the concept of citizenship and the "3 Ps" (provision, protection, and participation). The Infoc research concludes that without the command of language, to be acquired in elementary school, children and adults cannot operate in the world, develop and be developed by discourses, interact with cultures, and construct meanings. The research recommends schools to adopt pedagogical practices "that favor the construction of singular meanings constituted in historical events" (p. 47).

The environmental education initiatives described in this article, most of which are non-formal activities run in coordination with public and private schools, essentially addressed the following question: how can empathy and engagement with nature be fostered among the public? The answers, despite varying widely among the different projects, centered on the same point: you have to know something before you can appreciate it.

The forging of bonds between people and spaces depends on knowledge, which arises from games and playing. Playing in preserved nature should be seen as a strategy for transitioning from one stage of migration to another. As highlighted by the members of Infoc, "operating at points of transition can help create spaces in

school and preschool settings where narratives can be constructed that foster personal, institutional, and political change” (p. 47).

The results of the programs and events reported on here, based on the field research conducted by Marianne Lachmann, recognize children’s agency in cultural production, the diversity of children’s cultures, and multiple childhoods. When the full potential of protected areas is harnessed for children’s development and education, in particular by helping them forge emotional bonds with space, which transform space into place and are essential for human memory, then new ways of fostering empathy and engagement with nature conservation can come to light. These attributes kindle and excite curiosity and the desire to learn and discover, boosting the learning process in an organic, spontaneous, and integrated way.

Acknowledgment

This study is being financed by CAPES – Coordination for the Improvement of Higher Education Personnel and by PUC-Rio.

References

- Barbosa, M. C. S. (2014). Culturas infantis: contribuições e reflexões. *Revista Diálogo Educacional*, Curitiba, v. 14, n. 43, p. 645-667, set/dez.
- Brasil. Lei Federal 6.938 de 31/08/1981, que institui a Política Nacional do Meio Ambiente. (1981). Recuperado em 04 junho, 2021, de <https://www2.camara.leg.br/legin/fed/lei/1980-1987/lei-6938-31-agosto-1981-366135-publicacaooriginal-1-pl.html>
- Brasil. Lei Federal 9.795 de 27/04/1999, que institui a Política Nacional de Educação Ambiental. (1999). Recuperado em 05 dezembro, 2020, de http://www.planalto.gov.br/ccivil_03/leis/l9795.htm#:~:text=L9795&text=LEI%20No%209.795%2C%20DE%2027%20DE%20ABRIL%20DE%201999.&text=Disp%C3%B5e%20sobre%20a%20educa%C3%A7%C3%A3o%20ambiental,Ambiental%20e%20d%C3%A1%20outras%20provid%C3%AAs
- Brasil. Lei Federal 9.985 de 18/07/2000, que institui o Sistema Nacional de Unidades de Conservação. (2000) Recuperado em 05 dezembro, 2020, de http://www.planalto.gov.br/ccivil_03/leis/l9985.htm#:~:text=LEI%20No%209.985%2C%20DE%2018%20DE%20JULHO%20DE%202000.&text=Regulamenta%20o%20art.,Natureza%20e%20d%C3%A1%20outras%20provid%C3%AAs.&text=Art.,-1o%20Esta
- Brasil. Decreto Lei 4.281 de 25/06/2002, que regulamenta a Lei 9.795 de 27/04/1999. (2002) Recuperado em 04 setembro, 2020, de http://www.planalto.gov.br/ccivil_03/decreto/2002/d4281.htm.
- Couto, R. M. de S. O Design Social na PUC-Rio. (2017). In: Oliveira, A. J; Franzato, C.; Del Gaudio, C.. (Org.). *Ecovisões Projetuais: pesquisas em Design e Sustentabilidade no Brasil*. 1ed. São Paulo: Blucher, v. 1, p. 7-42.
- Huizinga, J. (2014). *Homo ludens: o jogo como elemento da cultura*. São Paulo: Perspectiva.
- Instituto Chico Mendes de Conservação da Biodiversidade. *Educação ambiental em unidades de conservação: ações voltadas para comunidades escolares no contexto da gestão pública da biodiversidade*. Guia informativo, orientador e inspirador. MMA/WWF, Brasília, Brasil, (2016). Retrieved from <https://www.icmbio.gov.br> [accessed on 05 Dez 2020]
- _____. *Gestão e Plano de Manejo do PARNASO*. (2008). Retrieved from <https://www.icmbio.gov.br/parnaserradosorgaos/o-que-fazemos/gestao-e-manejo.html> [accessed on 05 Dez 2020]
- _____. Portaria 426 de 11/05/2020. (2020), Retrieved from <https://www.in.gov.br/web/dou> [accessed on 05 Dez 2020]
- Kramer, S.; Nunes, M. F.; Carvalho, M. C. (2013) (orgs.). *Educação infantil: formação e responsabilidade*. 1ª ed., Campinas, SP: Papirus.
- Lopes, J. J. M. (2013). Geografia da infância: contribuições aos estudos das crianças e suas infâncias. *Revista Educação Pública*, Cuiabá, volume 22, n. 49/1, p. 283-294, maio/ago.
- Lopes, J. J. M. (2019). *Geografia da infância, justiça existencial e amorosidade espacial*, ainda no prelo.
- Milano, M. S. (2001). *Unidades de conservação: técnica, lei e ética para a conservação da biodiversidade*. In: *Direito ambiental das áreas protegidas – o regime jurídico das unidades de conservação*. Coord. Antônio Herman Benjamin. Rio de Janeiro: Forense Universitária, p.3 a 41.
- Pinto, M. e Sarmiento, M. (1999) *As crianças: contextos e identidades*. Braga/Portugal: Bezerra Editora, p. 33 a 73.
- PROJETO DE LEI 8.883 de 2017. Recuperado em 05 maio, 2020, de http://www.camara.gov.br/internet/sileg/Prop_Detalhe.asp?id=2155470.

- Quintas, J. S. (2006) Introdução à gestão ambiental pública. Brasília: Ibama, 2006. (Coleção Meio Ambiente. Série Educação Ambiental, 5).
- Rocha, E. A. C. (2008) Por que ouvir as crianças? Algumas questões para um debate científico multidisciplinar. Palestra realizada no Seminário Ouvindo Crianças, promovido pelo Movimento Interfóruns de Educação Infantil do Brasil (MIEIB), com apoio da Save the Children Reino Unido, na Universidade Federal do Ceará (UFC), em agosto de 2005. Cruz, S. (org.). A criança fala: a escuta de crianças em pesquisas. São Paulo: Cortez Editora.
- Vasconcellos, V. e Sarmiento, M. J. (2007). Infância (in)visível. Araraquara/SP, Editora Junqueira e Martin.
- Vivacqua, M.; Vieira, P. (2005, outubro) Conflitos socioambientais em unidades de conservação. Política e Sociedade, número 7.

Marianne Von Lachmann

Pontifícia Universidade Católica do Rio de Janeiro, PUC-Rio, Brazil
marianne@lachmann.com.br
Entrepreneur, Bachelor in Public Administration from Escola Brasileira de Administração Pública, Fundação Getúlio Vargas in 1983, postgraduation from Harvard Business School's Owner/President Management Course in 2009, currently developing a Master's research in PUC-Rio's Graduate Program in Design, member of FIRJAN's (Federation of Industries of Rio de Janeiro) International Relations Entrepreneurial Board, AEB's (Brazilian Foreign Trade Association) Board and FUNBIO's (Brazilian Fund for Biodiversity) Board.

Rita Maria de Souza Couto

Pontifícia Universidade Católica do Rio de Janeiro, PUC-Rio, Brazil
ricouto@puc-rio.br
Bachelor in Industrial Design and Visual Communication from PUC-Rio, Master's and PHD in Education from PUC-Rio, teacher and advisor for Bachelor's, Master's and Doctoral researches in PUC-Rio's Graduate Program in Design, Coordinator of LIDE/PUC-Rio, Joint Coordinator of PUC-Rio's Graduate Program in Design, leader of APRENDESIGN research group: design in teaching-learning situations, author of several books and articles published in National and International magazines and conferences' proceedings.

Roberta Portas

Pontifícia Universidade Católica do Rio de Janeiro, PUC-Rio, Brazil
robertaportas@puc-rio.br
Bachelor's in Industrial Design from the Faculty of the City, with a degree in Visual Communication in 1994, Master's and PhD in Design from PUC-Rio in 2009, teacher, advisor and Coordinator of the bachelor's course in PUC-Rio's Graduate Program in Design, co-advisor for Master and PHD research in PUC-Rio's Graduate Program in Design, researcher at LIDE/PUC-Rio in the research lines Pedagogy of Design and Design in teaching-learning situations.