



**Environmental education in brazilian Protected Areas: a systematic  
review of political-pedagogical macrotrends**

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#### ABSTRACT

Protected Areas (PAs) are non-formal educational environments with great potential for the development of actions in Environmental Education (EE). Thus, this paper aimed to analyze, through a systematic review in meta-analysis, the environmental education developed in Brazilian protected areas in the last 10 years. The constitution of the research corpus was done through the CAPES Periodicals database, using the descriptors "environmental education" and "protected areas" in all fields. A total of 180 articles were found, and after reading the titles and abstracts, only those that presented some intervention, course or action of EE were selected, totaling 25 articles, which were read in full and later submitted to content analysis. The results indicate that the activities were developed in PAs of different management categories, by all levels of education and with various different methodologies. The actions still mostly present elements of the conservationist macrotrend, however, a high rate of work based on critical EE was noticed, demonstrating the inclusion of activities that are based on an EE that is popular, emancipatory and transformative. Relating the number of Brazilian PAs and the number of published researches, a discrepancy was seen in the field, which highlights the necessity for more activities and publications that seek to raise the awareness of citizens about socioenvironmental problems and the importance of PAs in the conservation of natural resources.

**KEYWORDS:** CAPES Periodicals. Critical Environmental Education. Socioenvironmental issue.

## 1 INTRODUCTION

With the Industrial Revolution, machines became part of the production process, causing radical changes in the use of equipment, initiating mass production, in prices lowering and, consequently, increase of consumption. Thus, problems that came to light in the last decades also surfaced, such as the transformation in the relationship between man and nature, with the indiscriminate use of natural resources, putting the entire planet at risk (FRIEDE, 2022). Brazil, despite its great wealth in natural resources, has suffered a significant loss in biodiversity, threatening the integrity of ecosystems (FIGUEIREDO *et al.*, 2017).

In face of these concerns emerged the urgency in forming spaces that would maintain the natural environment and protect the ecosystems (HASSLER, 2005). The creation of Protected Areas (PAs) is one of the main biodiversity preservation strategies facing global change in the use of natural resources (CEBRIÁN-PIQUERAS *et al.*, 2020).

Therefore, the National Conservation Units System (SNUC), set by law No. 9.985/2000, establishes criteria and regulations for the creation, deployment and management of PAs, dividing them in two big groups: PAs of Full protection and PAs of Sustainable use. The first has as an objective to preserve nature, only allowing the indirect use of their natural resources, but the second aligns the conservation of nature with the sustainable use of part of their natural resources (BRASIL, 2000).

However, PAs face numerous conflicts intrinsic to management, above all, because there is a lack of knowledge about the PAs and their conservation objectives by a large part of the population, leading people to not comprehend what is permitted or not (SILVA; OLIVEIRA; MELLO, 2021). Furthermore, the expropriation of the areas to mark them off as PAs of full protection brought to the affected population a feeling of non-belonging, exclusion and exemption of liability regarding the environment. Seeking the mitigation of conflicts, educational activities can bring subsidies for better communication and problem solving in a participatory way (BORGES; GUILHERME, 2020). The citizens' awareness and consciousness from

Environmental Education (EE) is one of the main means of mitigation of socioenvironmental problems and conflicts (MADEIRA *et al.*, 2019).

Different authors take on distinct discourse on EE. This paper will follow the assumptions of Layrargues and Lima (2014), that present three macro-trends as political-pedagogical models for EE, the conservationist, the pragmatic and the critical.

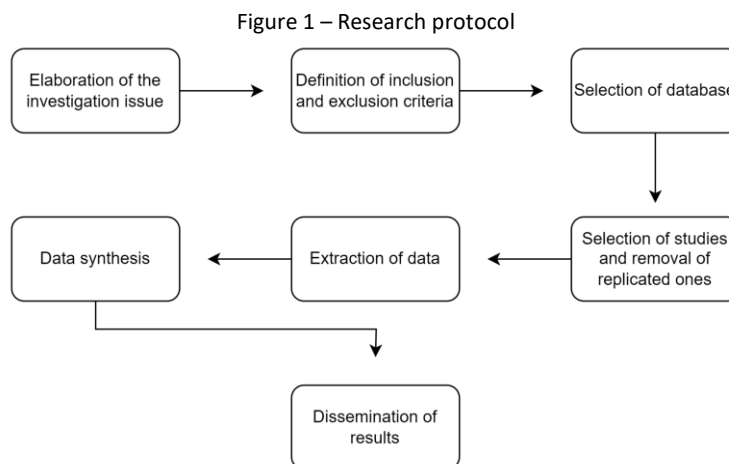
The conservationist searches for the sensitization of the human being in relation to nature, developing the logic of “know to love, love to preserve”, which seeks an awareness that is basically ecological. The pragmatic macro-trend covers the currents of Education for Sustainable Development and Sustainable Consumption, relying in clean technologies, corporate eco-efficiency, environmental management systems, creation of green markets, ecosystem services, rationalization of consumption patterns, zero impact, creation of sustainability indicators, among others. Yet, for there to be a change in the society-nature relationship it is necessary to have a change happen in the social structure (KATAOKA; OBARA; AFFONSO, 2020, own translation). So, the Critical EE agglutinates the currents of Popular, Emancipatory, Transformative Environmental Education and in the Environmental Management Process, supporting that there is no way of treating environmental issues dissociated from social conflicts (LAYRARGUES; LIMA, 2014).

For a critical conception of EE it is fundamental that the environmental topics and issues worked on come from a daily context, aiming at the construction of a critical and investigative environmental knowledge, resulting in a dialog of knowledge (PINTO; GUIMARÃES, 2017). In this sense, PAs show great educational potential, possibly developing many activities involving EE, like interpretive trails, contemplation of natural environments and activities related to participatory management, with the involvement of surrounding communities (KATAOKA; OBARA; AFFONSO, 2020). Thus, this paper has by objective to analyze, by means of a systematic review in meta-analysis, the EE developed in Brazilian PAs in the last 10 years.

## 2 METHODOLOGY

The present research presents a qualitative approach, with exploratory and descriptive goal, of the systematic literature review kind. According to Donato H. and Donato M. (2019), “the systematic review responds to a well defined issue of investigation and is characterized for being methodologically comprehensive, transparent and replicable”, systematically identifying the published documents in a question of investigation.

The research corpus constitution came through the CAPES Periodicals database. Works in the article category, published in the last 10 years, were selected (2012 to 2022). The designated descriptors in this search were “environmental education” and “preservation areas”, using the boolean operator “and”, searching in all fields. Figure 01 shows the protocol used for the research, adapted from the stages of the process of systematic review suggested by Donato H. and Donato M. (2019).



Source: The authors (2023).

Initially, the research resulted in 180 works and, after the exclusion of the replicated ones, it succeeded in the reading of titles and summaries of 148 articles. From this, there was the classification of works according to the chosen approach. There were 26 articles found that presented some action in EE, 17 articles of literature review and documentary research, 16 theoretical articles, 17 works that presented proposals of activities and didactic materials, 21 articles that investigated perceptions, conceptions and knowledge, 18 articles that raised actions of EE in a certain region and 33 articles that were classified as “others” for containing the most diverse approaches and topics of research.

For the present work, only articles that had some intervention, course or action of EE were selected, following the research’s goals. This way, only 17.6% of the total sample was selected for reading in full, in other words, 26 articles. But, one of the selected articles was not found in any online search, given that the file available in the published periodical was corrupted; due to this, 25 articles were analyzed.

The analysis results came from the Content Analysis (BARDIN, 2011), the research corpus being defined and organized initially (pre-analysis), followed by a category grouping (exploration of the material) and creation of their meaning (result processing). The meaning units were grouped according with the macrotrend of the EE utilized, in three categories: 1. Conservationist EE; 2. Pragmatic EE; and 3. Critical EE. In addition to this, in the research there was a pursuit for identifying the distribution of researches over the defined period, the distribution of periodicals, the levels of teaching and target audience, the predominant regions and in which categories of PAs the activities were applied.

### 3 RESULTS AND DISCUSSIONS

Firstly, the organization of the selected articles was done according to authors, title, periodical and year of publication (Table 01). The articles were coded in order to facilitate the descriptive indication of the data.

Code	Authors	Titles	Periodicals	Year
A01	MACHADO, S.F.; MONTEIRO, J.C.L., ALVES, K.S.	Environmental Education as a promoter of environmental consciousness in public education of Ouro Preto (MG, Brazil)	Brazilian Ecotourism Journal	2013
A02	SOUZA, J. G. S.; ALMEIDA, E. A.	Environmental Educommunication: comparing actions taken in school and along the way of a class trip in a coastal conservation area	Pesquisa em Educação Ambiental	2013
A03	LODI, M. A. V.	Phenomenological paths in Instituto Terra, Aimorés, Brazil: thinking environmental education and popular education by means of transdisciplinarity	Rev. Ed. Popular	2014
A04	PINHEIRO, M.A.P.; RODRIGUES, C.G.O.; ROBLES, R.A.	“Tartarugada”: an undertaking of environmental awareness in the Fernando de Noronha Marine National Park (PE)	Brazilian Ecotourism Journal	2014
A05	NEVE, N. M. <i>et al.</i>	Environmental Education in protected areas in Alegre-ES	Revista Práxis	2015
A06	SANTOS, S. J. S.; SILVA, G. A. GONÇALVES, F. D. S.	<i>A aprendizagem socioambiental das mulheres do curso de artefatos de bambu no assentamento José Emídio dos Santos</i> (“The socioenvironmental learning of women in the course of bamboo artifacts in the José Emídio dos Santos settlement”, own translation)	Revista Sergipana de Educação Ambiental	2016
A07	COSTA, R. N.; BRANQUINHO, F.	The boundary between the community and the conservation unit chewed by the ant-ounce	Iluminuras	2016
A08	FUENTES, N. M. M.; COSTA, R. N.; RUTA, C.	Environmental Cinema and Education in the Restinga de Jurubatiba National Park: Interdisciplinary and Transversal Reflections and Practices	Educação e Sociedade	2016
A09	ROCHA, V. N. L.; SOUZA, W.	Environmental Education in the Brazilian Amazon: formation of environmental disseminators around conservation units	Natural Resouces	2017
A10	MATOS, B. C. S.; FERREIRA, M. P. S.; ZAMPIERON, S. L. M.	Formation of disseminator agents of environmental education process for conservation areas with emphasis in National Park of Serra da Canastra, State of Minas Gerais, Brazil	Em extensão	2017
A11	MATTA, R. R.; ROCHA, M. B.	Scientific Dissemination and Environmental Education: working with Conservation Units in the basic education through a documentary	Revista Práxis	2017
A12	BORBA, R.; CUNHA, M. B.	Teacher training and environmental theme in formal education: the case of the National Park of Iguaçu	Ideação	2017
A13	SOARES, E. C. <i>et al.</i>	Environmental education at Victório Siquierolli Municipal Park: elaboration, development and evaluation of a pedagogical plan	Rev. Ed. Popular	2018
A14	MOREIRA, J. C.	Interpretive games and talks: environmental education tools at Campos Gerais National Park (Paraná)	Terrae Didat.	2018
A15	COSTA, N. M. C.; COSTA, V. C.	The challenge of environmental education in protected area at Rio de Janeiro city	Geo UERJ	2018
A16	ARAÚJO, R. C. S. <i>et al.</i>	The use of APA Morros Garapenses (Brazil) as a didactic tool in the course of Biological Sciences	Brazilian Journal of Environment	2019
A17	SALVADOR, M. S. S.; BARBOSA, V. A.; LIMA, V. R. P.	Environmental education practices a multisseriated school in the environmental protection area (APA) of Cariri - PB	Ensino de Geografia	2020
A18	ALMEIDA-FILHO, M. A. <i>et al.</i>	Potential of trails as a practice of Environmental Education in a Conservation Unit within a university campus in the municipality of Fortaleza-CE	Scientia Plena	2020
A19	MOREIRA, C. J.; BISPO, M. O.	Environmental Education at the State Park of the Cantão, State of Tocantins, Brazil - an experience at the transition between Brazilian Savanna and the Amazonian Forest	Geografia em questão	2020
A20	SELEM, S. L. O.; MOREIRA, A. L. O. R.	Interpretative tracks as a instrument for Environmental Education: a participating construction with the community around a forest urban reserve	Revista Ciências & Ideias	2021
A21	SILVEIRA, D. I.;	Analysis of the Students’ Environmental Perception on the	Ensino	2021

	LORENCINI JUNIR, A.	Route of a Trail in a Conservation Unit		
A22	GOMES, R. S.; AGUIAR, A. A.	The mobile exhibition of Ilhas do Rio Project	ACTIO	2021
A23	SOUZA, B. A.; SANTANA, O. A.	TRILHAPA: Information and Education App for Basic Education about the Environmental Protection Area of Santa Cruz/PE	Revista Sergipana de Educação Ambiental	2021
A24	DIAS, P. C. <i>et al.</i>	Educational games' applicability of teaching about biodiversity from the Tumucumaque Mountains National Park	Diversitas Journal	2021
A25	TAQUES, R. C. V. <i>et al.</i>	Environmental Education, University Extension Programs and the socio-regional development of Turvo, Paraná	Brazilian Journal of University Extension	2022

Source: The authors, 2023.

It is important to note that the year with the most publications in the field was 2021, with five published articles, followed by the year of 2017, with four. Among the delimited years for the research, 2012 was the only one that did not return any article according with the established criteria. The periodicals with the most publications were the *Revista Sergipana de Educação Ambiental*, the *Revista Práxis*, the Brazilian Ecotourism Journal and the *Revista Educação Popular*, all with two publications at the time.

About the authors, only one of them had two articles selected, Rafael Nogueira Costa, who acted as first author of the A07 research and second author on the A08 research, both published in the year of 2016 and developed at the National Park (*Parna*) of *Restinga de Jurubatiba*.

### 3.1. Distribution by levels of education and target audience

Within the selected articles, ten worked with Basic Education students, four with High School students, three with Higher Education students, four with teachers and six with the community in general.

Within the work carried out in Basic Education, the A17 authors developed the activities with students from the initial grades in a school of multiseried education, using different didactic resources, like drawings of environmental perception, mental maps of the place and filmic playbacks. The A01 researchers defined as target audience, children of ages ranging between 8 and 12 years old, presenting results obtained from a study developed with students who participated in the project “*A Escola vai ao Parque*” (“The School goes to the Park”) promoted by the Ouro Preto’s Municipal Government. The A02 research applied diversified pedagogical activities, with 4th and 5th grade students, among them, tour-class, environmental map and mural journal, such as sociocultural practices for the appropriation of new knowledge.

The A11 and A14 researchers worked with four different classes, from the 6th, 7th, 8th and 9th grade. The first one applied a sequence of activities in class, since the research had the exhibit of a documentary as main focus. The second one presented a project made by ICMBio, where there were lectures and the application of an interpretation, with the intent of identifying the students’ perception about a PA.

The A13 and A23 researches developed activities with students from the 9th grade. The A13 researchers developed and evaluated, along with the students, a pedagogical plan divided



in three phases: socialization of knowledge, problem and reflection. The A23 research developed, validated and evaluated an application about the use of interpretive trails as a pedagogical tool for basic education.

In the A22 research were elaborated activities in a field class using an ecological trail as didactic resource, with the objective of enhancing the environmental perception of 6th grade students. The A19 authors did a pedagogical intervention involving drawings, elaboration of stories and cartographic interpretation, with students from the 6th, 7th, 8th grade.

In the works done with high school students, the A10 paper had adolescents of ages above 16 years old that were taking or finishing the final years as target audience, as to enable them as guides of a PA, giving them an opportunity to learn and comprehend the importance of the property and enter them into the job market. Whereas the A05 and A24 authors held activities with classes of the 1st year. The first one applied various activities, involving interpretive trails, dynamics and mental maps. The second one had lectures and a didactic game to teach biodiversity of a PA.

In Higher Education, the activities were implemented in a Biological Sciences Course, where A18 worked with graduates of the State University of Ceará and A16 applied activities in the State University of Maranhão. Both studies had interpretive trails, aiming to define their potential as practice of EE. The A08 worked with students of Post-Graduation in Environmental and Conservation Sciences, besides the Biological Sciences course, in the Federal University of Rio de Janeiro, promoting the making of documentaries involving a PA.

Amongst the target audience of teachers, all of them worked with continuous training courses in EA. The A09 authors developed a course of autotraining with the whole teaching staff of three municipal schools. In the A12 research was developed a focal group of seven teachers from the public system of education, participants of a training course. In the same way, A25 also developed a continuous training course in EE for teachers from the municipal system.

The A03 author worked with the community and students who attend at a Preservation Area, through phenomenological paths. The A20 research worked with residents of the PA's surroundings, of ages 20 to 60 years old, represented by students, retirees, researchers and workers, elaborating and applying and evaluating an interpretive trail. The A07 researchers, working with children from a peripheral community, present photos that make the film called “*Um dia novinho em folha*” (“A brand new day”, own translation), which, by the observation of an ant, seeks a representation of the dichotomy nature/society. The research A04 analyzed an activity, applied with residents and tourists, known as “Tartarugada”, promoted by the TAMAR Project.

The A22 researchers seeks to bring scientific knowledge to the communities, stemming from an itinerant exhibition, performed in an adapted vehicle equipped with monitor to display audiovisual material, photographic exhibition, exhibition of the didactic-scientific collection of the Teaching Assistance Section (SAE) of the National Museum-UFRJ, diver mannequin equipped for underwater activities, microscope, stereoscope, didactic panels, communication resources such as books, folders, booklets and children's space for playful activities.

The A06 research developed activities with participants of the bamboo artifacts course, analyzing the socioenvironmental perception of women of the community. Finally, A15 enabled teachers and students, on the training path of a knowledge system, by means of participatory

theoretical classes, extraclass practical activities, educational videos, reading of texts, field assignments, awareness raising techniques and group dynamics.

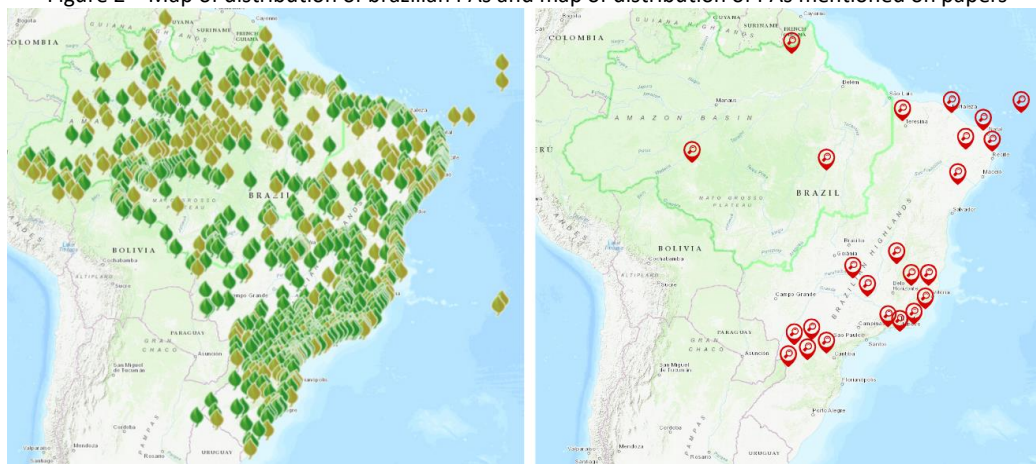
In relation to the scope where the researches were held, 52% of the selected works developed activities of formal EE, while 48% developed activities, like interpretive trails, exhibits and courses, in non-formal education spaces. The classification of the kind of space was based on Law No. 9795, that institutes the National Policy of Environmental Education, and defines formal education as that which is developed at schools, in the scope of the curriculums of public and private education institutions, and the non-formal education, such as educational actions and practices directed at the awareness of the community on environmental issues. According to Reis, Semêdo and Gomes (2012) the non-formal EE is that which does not restrict itself to the school, but pursues the integration with it, with the government and private institutions, in order to involve the whole community in the education process. Due to this, the EE brings important subsidies for the socioenvironmental trainings in non-formal educational spaces, like in the case of the PAs, once these spaces awaken a citizenship training, with the competency of building a new socioenvironmental dynamic (QUEIROZ; GUIMARÃES, 2016).

### 3.2 Areas of predominance of the activities and characterization of the PAs

The researches were developed in four brazilian areas. The area with the most published works was the Southeast (10 researches), followed by Northeast (7 researches, South (5 researches), and North (3 researches). Among the states with the most publications are Paraná and Rio de Janeiro. It is highlighted that two works were held in the National Park of *Restinga de Jurubatiba*, PA located in Macaé - RJ. It is also pointed out that the A05 research carried out activities in two different PAs, in the *Cachoeira da Fumaça* State Park and in the Laerth Paiva Gama Area of Relevant Ecological Interest.

The first map (Figure 2a), brings an overview of 2023’s existing brazilian PAs, in which the dark greens spots represent the State PAs and the lighter spots represent the Federal PAs and the second map (Figure 2b), represents the distribution of the PAs mentioned on the selected papers, as well as the research’s locations.

Figure 2 – Map of distribution of brazilian PAs and map of distribution of PAs mentioned on papers



Source: Figure 2a: Socioenvironmental Institute (2023). Figure 2b: The authors (2023).



By comparing the two figures, it is possible to say that the studies had higher concentration where there is a higher distribution of PAs, as mentioned previously, on the Southeast and South, with emphasis for the states of Rio de Janeiro, which has 360 PAs, covering more than 13% of Brazilian protected areas and Minas Gerais, which now has 291 PAs, totaling 11%. Paraná stood out in the number of researches, since there are 100 PAs in the territory (3,8% of the total in protected areas) and there was an elevated number of publications at the time.

An unexpected and singular factor was the absence of selected articles in São Paulo, since the state holds high concentration of PAs, surpassing 10% of the entire Brazilian protected territory and being the third Brazilian state in concentration of protected areas, according to data from the Panel of Brazilian Protected Areas (2023). It is also important to consider that no article originating from researches carried out in the Center-West area was found. Vogel *et al.* (2015), argue that many authors do not disclose results of activities and researches developed in the PAs and highlight that the disclosure of activities developed in these locations is of extreme importance to achieve the environmental preservation objectives.

In relation to the category of management of the PAs where the activities were applied, the one with most works developed was the category National Park (*PARNA*), with six researches, followed by the Area of Environmental Protection (*APA*), with four researches and Municipal and State Park, with three researches in each category. The other categories that had researches done were: Biological Reserve (*REBIO*), Wildlife Refuge (*RVS*), Natural Monument (*MONA*), Ecological Station (*ESEC*), Area of Relevant Ecological Interest (*ARIE*), and Private Reserve of the Natural Patrimony (*RPPN*), of which the four primary ones belong to the group of Full Protection and the two last ones to the group of Sustainable Use.

All categories of the Full Protection group showed up in the researches, however there was no work found in the categories: National Forest (*FLONA*), Extractive Reserve (*RESEX*) and Sustainable Development Reserve (*RDS*), of the group of PAs of Sustainable Use. It is also important to note that until this moment there is no Brazilian PA classified as a Fauna Reserve (*REFAU*).

That way, 68% of the works were developed in PAs of Full Protection, while 20% were applied in PAs of Sustainable Use. Amongst these, two researches worked widely on PAs and one of them did not specify the name of the area in which held the research.

The *Parnas* mentioned were the *Parna Campos Gerais*, *Parna Serra da Canastra*, *Parna Iguaçu*, *Parna Marinho de Fernando de Noronha*, *Parna Montanhas do Tumucumaque* and *Parna Restinga de Jurubatiba*. The State Parks covered were the *Parque Estadual da Cachoeira da Fumaça*, *Parque Estadual da Pedra Branca* and *Parque Estadual do Cantão*. The Municipal Parks were the *Parque Municipal Victório Siquierolli*, *Parque Municipal do Cinquentenário* and *Parque Natural Municipal das Andorinhas*. According to Art. 11 of *SNUC*, the Parks have as objective “the preservation of natural ecosystems of great ecological importance and scenic beauty” (BRASIL, 2000, own translation).

The *APAs* mentioned in the articles were the *APA Morro Garapenses*, *APA de Santa Cruz*, *APA Jenipabu* and *APA do Cariri*. According to Art.15 of *SNUC*, the *APA* is an area generally extensive, with a certain degree of human occupation, “equipped with abiotic, biotic, aesthetic

or cultural attributes especially important for the quality of life and well-being of human populations” and aims to protect biodiversity, moderate the occupation processes and ensure the sustainable use of natural resources (BRASIL, 2000, own translation).

In a study were applied activities in two different *ESECs* (Ecological Stations), which are *ESEC Rio Bonito* and *ESEC Felipe Paulo Rickli*. According to Art. 9 of *SNUC*, this category of PA has as a goal “the preservation of nature and realization of scientific researches”, prohibiting public visitation, except for educational purposes (BRASIL, 2000, own translation).

There were also activities happening in the *REBIO* of Jarú. The Art. 10 of *SNUC* sets as this category’s objective “the full preservation of biota and other natural attributes existing in its limits, without direct human interferences or environmental modifications”, except for measures of ecosystems’ recovery and management actions (BRASIL, 2000, own translation). The A06 research developed activities around the *RDS Mata do Junco*. The PAs of this category, house “traditional populations whose existence is based on sustainable systems of exploration of natural resources, developed over generations and adapted to the local ecological conditions” (BRASIL, 2000, own translation)

The A03 research had experiences in the *RPPN Instituto Terra*. The *RPPN* is set in private areas, recorded perpetually, and aims at the conservation of biodiversity (BRASIL, 2000). The A22 researchers sensitized residents about the *MONA Cagarras*. This type of PA has as a goal to “preserve rare, unique or greatly beautiful natural sites” (BRASIL, 2000, own translation). There were also activities developed in *ARIE Laerth Paiva Gama*. The *ARIE* usually has a small range, “with extraordinary natural characteristics or rare pieces of regional biota” (BRASIL, 2000, own translation).

### 3.3 Categorization according to the used Macrotrend

In order to facilitate the categorization of researches, following the political-pedagogical macrotrend of EE used in the selected researches, table 2 was elaborated, based on the definitions and elements established by the authors Layrargues and Lima (2014).

Table 2 - Characterization of political-pedagogical macrotrends of EE

Perspective	Political-Pedagogical Macrotrend of EE		
	Conservationist	Pragmatic	Critical
	Conservative	Conservative	Alternative
<b>Disciplinary Position</b>	Ecological Science; Conservationist, behavioral and individualistic trend; Ecological literacy.	Behavioral and individualistic; Issue of urban-industrial waste in the cities; Environmentalism of results; Contemporary Pragmatism; Market environmentalism; Market dominance; Consumption ideology; Market capitalism.	Popular, Emancipatory, Transformative Environmental Education Trends and in the Environmental Management Process; Politicizing and higher complexity historical context; The political and social dimensions are fundamental for comprehension, but do not exist apart from the existence of individuals, their values, beliefs and subjectivities.
<b>EE Objective</b>	Awakening of a new human sensibility towards nature; “know to love, love to preserve”.	Correct the “imperfections” of the productive system based on consumerism, planned obsolescence and disposability of consumer goods.	Political confrontation of inequality and socioenvironmental injustice; Contextualize and politicize the environmental debate; Problematicize the contradictions of the

			development models and society.
<b>EE Agenda</b>	Green agenda; Biodiversity; PAs; Biomes; Ecotourism; Agroecological experiences.	Brown agenda; Sustainable consumption; Sustainable development; Resource economics; Solid waste; Carbon market; Eco-technologies; Decrease in “ecological footprint”.	Citizenship; Democracy; Participation; Emancipation; Conflict; Environmental Justice; Social Transformation.
<b>Perception of Environmental Issues</b>	Side effects of an inevitable modernization project.	Perceives the environment as a mere collection of depleting natural resources, mentioning the fight against waste and the review of the paradigm of the waste that starts to be seen as substance; Lack of reflection which allows for contextualized and articulated comprehension of causes and consequences of environmental issues.	The contemporary issues do not encounter answers in reductionist solutions; Incorporation of cultural, individual and subjective issues that emerge with the transformations of societies, the redefinition of the political notion, the politicization of daily life in the private sector.

Source: The authors, 2023. Adapted from Layrargues and Lima, 2014.

After the evaluation of the activities developed by the authors, from the full reading of all articles, the classifications were systematized on Table 6.

Table 6 - Political-pedagogical Macrotrends in the selected articles

Code	A01	A02	A03	A04	A05	A06	A07	A08	A09	A10	A11	A12	A13
Conservative	X	X	X	X	X	X	X	X	X	X	X	X	X
Pragmatic					X	X			X	X			
Critical	X		X			X	X	X	X	X		X	X
Code	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	
Conservative	X	X	X	X	X	X	X	X	X	X	X	X	
Pragmatic		X					X						
Critical		X		X			X					X	

Source: The authors, 2023.

As observed, all selected works presented some element of the conservationist macrotrend, characterizing 100% of the sampling, since all of them exposed characteristics and objective of awakening a new human awareness towards nature, by means of the use of PAs as a teaching space. Of these, 44% of the articles were identified with exclusive conservationist bias. This factor was already expected, given that one of *SNUC*'s goals is to “favor conditions and promote environmental education and interpretation, the recreation in contact with nature and the ecological tourism” (BRASIL, 2000, own translation), highlighting as key elements of the first macrotrend. Dias and Megid Neto (2020) got similar results by analyzing brazilian dissertations and theses and complement that, regardless of the management category, the PAs present the goal of conservation of natural environments, stimulating conservationist practices.

The smallest sampling referred to the pragmatic macrotrend, which appeared in 24% of researches, given that the works had focused, mainly, on practices related to the sustainable development, sustainable consumption and concern with the incorrect disposal of solid waste.

Yet, the critical macrotrend appeared in 52% of the works, where the pedagogical practice was geared towards the activities of critical analysis to the anthropocene, critical thinking, socioenvironmental learning, socioenvironmental conflicts, training of critical environmental disseminators, environmental issues in the environmental, cultural and political

context, pedagogical practices and participatory management, sociocultural impacts and the commitment and participation in the resolution of environmental issues.

It is emphasized that all researches involving the training of teachers and disseminators, showed elements of the critical macrotrend. In this sense, Maciel and Andrade (2022) note the importance of continuous training of teachers, so that the formative process can assist in the reflection of the teaching practice, improving the way of teaching and learning.

Despite having greater value, the EE in PAs must not be directed solely to environmental awareness and interpretation, but to awaken the critical sense, generating reflections, in order for individuals to be able to identify the causes and formulate solutions for problems caused by man to nature, and be participative in decision-making processes (QUEIROZ; GUIMARÃES, 2016). To this end, there must continuously be, whether formal or non-formal, involving all of society and training disseminators and mindful, responsible and committed citizens, because the citizenship and environmental justice exercise are primordial attributes in EE (REIS; SEMÊDO; GOMES, 2012).

#### **4 FINAL CONSIDERATIONS**

With this paper, it was sought to present an overview of the educational activities developed in the Brazilian PAs in the past 10 years, analyzing the political-pedagogical macrorends in EE used in researches. As expected, the conservationist macrotrend still stands out, since the goals for these locations are the conservation of natural resources. But it is understood that there is a high rate of researches in critical EE, demonstrating the inclusion of activities that rely on a reflection about the complexity of interactions, or even, in a popular, emancipatory and transformative EE.

The activities were developed in all grade levels and in the most diverse modalities, whether it be by application of activities in class, by trails, projects or exhibits, showing that PAs have a wide range of possibilities, in the direct or indirect use of these locations for the development of educational activities.

Therefore, it is important to note the importance of EE in Brazilian PAs, as a subsidy for teaching and learning at the most different levels and for the training of mindful citizens. However, the number of published and selected researches, facing the 2659 currently existing PAs, is still very low, suggesting a discrepancy in the field, reiterating the necessity for more executed and published works, in order to gradually raise people's awareness, in this case, the scientific community on the socioenvironmental issues existing in areas destined for Brazil's conservation, as well as the importance of actions and educational programmes oriented to EE, in a political perspective of EE active in the country.

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