



Childhood, Adolescence, Youth and Climate Change:
Analysis of international scientific research (2020–2024)
Environmental Education
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This bulletin is part of a series aimed at understanding in depth the current debate connecting children, adolescents, and young people to climate change and its impacts. The series is based on articles organized in the bibliographic database "Adolescents, Youth and Climate Change – National and International Academic Production (2020–2024)"; and on reports produced by national, international, and multilateral organizations between 2015 and 2025, also available in the same database.

The research was developed within the scope of the project "Citizen Participation: Child and Youth Population in Focus," coordinated by Professor Irene Rizzini (PUC-Rio/DSS/CIESP), with support from FAPERJ (CNE - Process E-26/201.113/2022). The project analyses different aspects of citizen participation and the leadership role of children, adolescents, and young people in Brazil.

In addition, it is part of the project "Youth and Climate Change in Brazil," also coordinated by Professor Irene Rizzini (PUC-Rio/DSS/CIESP), with support from the José Luiz Egydio Setúbal Foundation and the Nova Institute for Health, in partnership with the Associação Cidade Escola Aprendiz. The research included a survey of 200 students, aged 12 to 18, from all regions of the country, to understand how they think and act in relation to climate change.

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1.0 - Introduction

In many countries, Environmental Education (EE) is frequently driven by international frameworks that aims to guide and strengthen the role of education in addressing the ecological crisis. Documents such as the United Nations' 2030 Agenda, specifically through Target 4.7 of the Sustainable Development Goals (SDGs), and the Climate Empowerment Action (CEA), a guideline of the Paris Agreement, establish common references in which sustainability should be a structural component of human development.

More recently, in 2023, this framework was strengthened by General Comment No. 26 of the UN Committee on the Rights of the Child. This document explicitly states that children have the right to a clean, healthy, and sustainable environment, reinforcing the obligation of States to guarantee an education that empowers children and adolescents as agents of change.

However, it is crucial to understand that national environmental education policies and practices

are more than reflections of these global guidelines. The international literature shows it also results from historical trajectories of local socio-environmental struggles and demands from civil society.

This bulletin summarizes heterogeneous academic research, analysing 85 articles on Environmental Education (EE), published in English, which comprise the database 'Children, Adolescents, Youth and Climate Change - National and International Academic Production (2020-2024)'. Its main objective is to map how different normative and cultural contexts interpret the contemporary environmental challenges by identifying the main theoretical, methodological, and practical trends that characterize the field internationally.

2.0 - Methodology

The methodology described in this section refers specifically to the theme of Environmental Education¹. The bibliographic search was conducted

on the CAPES² Journal's platform, between 2020 and 2024, including articles published in English. Only open access journals were considered. The searches combined the term 'environmental education' with 'children', 'child', 'childhood', and 'youth'.

Due to the extensive results obtained in the English search, the filter 'keyword in title' available on the CAPES Journals platform was applied to refine the results and ensure greater thematic precision in the selection of articles included in the database. Texts that did not fit the format of a scientific article and those that did not address the theme of environmental education or the defined age range were excluded. The filter for peer-reviewed articles was also adopted to ensure greater methodological and scientific rigor.

The age terminology used in this study follows the definitions established in national legal frameworks. The Statute of Children and Adolescents (ECA) considers a child to be a person up to 12 years of age and an adolescent to be a person between 12 and 18 years of age (BRAZIL, 1990). The National Youth Policy defines young people as individuals aged between 15 and 29 years (Brazil, 2005).

We recognize that this survey has limitations stemming from our methodological approach. Although the CAPES Journals platform brings together a wide variety of publications, this study considered only scientific articles published between 2020 and 2024. This timeframe was intentional to concentrate the analysis on more recent research, which reflect the intensification of debates on the climate crisis, socio-environmental justice, and environmental education in the post-pandemic context. This interval allows us to capture the contemporary approaches that emerge in response to new global challenges, public policies, and social mobilizations around the climate agenda.

The focus on open access and peer-reviewed articles aims to ensure greater comparability and methodological rigor, although it implies the exclusion of other relevant forms of research, such as theses, dissertations, books, book chapters, and conference proceedings. However, the research analysed

offers a representative overview of current discussions on environmental education, serving as a basis for cross-referencing with other sources and publication formats.

The survey conducted for the development of the bibliographic database "Adolescents, Youth and Climate Change – National and International Academic Production (2020-2024)" is broader and includes climate change, climate justice, and environmental education, focusing on children, adolescents, and young people. A complete description of the methodology used, as well as all the articles, is available on the CIESPI/PUC-Rio website (www.ciespi.org.br).

Among the international publisher consulted database, we highlight the following: Elsevier, Wiley, Taylor & Francis, Springer, SAGE, Nature Portfolio, Cambridge University Press e Routledge.

3.0 - Main focuses

Analysis of the international bibliographic corpus indicates that the field of environmental education (EE) is undergoing a phase of profound re-configuration. The understanding of EE as a complement to the natural sciences is being abandoned in favour of recognizing it as a field discussed in political, technological, epistemological, and ontological writing.

In this bulletin, four topics were selected to examine the recent research on EE.. Together, they highlight an expansion of the field in multiple directions, from the inclusion of immersive technologies to the recovery of pedagogies of affect, the body, and the territory.

3.1 - Use of technology

The most striking character of the recent literature lies in the integration of immersive technologies, marked by experiences of digitally mediated EA (Environmental Education). Studies indicate that strategies such as mobile learning and gamification transcend mere entertainment, acting as support for learning that enhances intrinsic motivation and al-

lows for situated learning (Jong, 2020; Chen, 2022). Experimental research demonstrates that Augmented Reality³ acts as a mediator capable of making invisible biological phenomena visible, promoting the construction of conceptual knowledge in childhood (Chen, 2022; Simsek, 2024).

However, this trend reveals what critical literature identifies as a profound asymmetry in the production of knowledge. While initiatives focused on Digital Escape Rooms⁴, for example, seek to strengthen the ‘perception of individual climate efficacy’, that is, the belief in the ability of young people to carry out environmental actions (Repetto et al., 2024), the term itself reveals a contradiction, since the measurement of the feeling of efficacy is individual, but the challenge of the climate crisis necessarily demands collective and systemic responses.

Systematic reviews focused on contexts in the Global South warn of the risk of a new technological determinism. Studies such as Khalifé, Chaker & Gasparovic (2022) and Ahmadov et al. (2024) argue that the uncritical importation of digital models, unaccompanied by basic infrastructure and pedagogical reflection, can deterritorialize education, deepening the educational gap between countries of the Global North and South.

Augmented reality (AR) is a “technology that allows a fusion between elements of a real environment with computer-generated virtual elements, providing an interactive digital experience” (Hayes and Downie, n.d.).

According to Classe, Castro, and Oliveira (2025), an escape room is a game genre in which participants are organized into groups and given a mission consisting of challenges to be solved within a limited time. The challenges may range from escaping a specific room or space, which can be online, to solving a puzzle or discovering codes to open safes, among other possibilities. In this format, participants remain immersed in the environment throughout the narrative or the resolution of the presented problem. According to Repetto et al. (2024), educational escape rooms are currently one of the most studied pedagogical tools in the field of Game-Based Learning.

3.2 - The affective turn and nature based education

In a dialectical response to virtualization, a portion of the literature emphasizes the affective, experiential, and well-being dimensions of nature-based education. The field is shifting from a previous approach focused strictly on instruction or habit change, i.e., behaviour, to a holistic approach centered on experience and the body. The literature claims nature-based education not only as a pedagogical strategy but also as a determinant of public health. Quantitative and qualitative research demonstrates impacts on stress reduction in vulnerable populations, suggesting that exposure to nature acts as a psychosocial protective factor (Pirchio et al., 2021; Sprague, Berrigan, and Ekenga, 2020; Talebpour et al., 2024).

The theoretical density of this theme lies in the incorporation of post-humanist perspectives. As an example, developed by Pollitt et al. (2021) and by Iwasaki (2022), based on Neimanis and Walker (2020), learning is perceived as an aesthetic and sensory experience that challenges the Cartesian separation between body and the environment. The concept of ‘weather bodies’ positions human and non-human bodies as intimately entangled and inseparable from the climate.

In this paradigm, the schools share the leading role with the families. Longitudinal and cross-cultural studies indicate that the transmission of values by caregivers is a more robust predictor of sustainable engagement in adult life than formal education alone, pointing to the need for educational policies that involve families (Ferguson & Snell, 2024; Kelly et al., 2023).

3.3 - Territory

One of the trends identified in the literature is the critique of universalist environmental education, proposing a ‘re-territorialization’ of educational practices anchored in Place-Based Education. The territory ceases to be only a setting and becomes a subject of the curriculum. Research from the Global South stands out by demonstrating that cli-

mate resilience is inseparable from territorial identity. In Argentina, Vilá et al. (2020) show how environmental education only makes sense when it engages with local systems. Similarly, Wihardjo et al. (2023) in Indonesia, and Acharibasam and McVittie (2022) in Ghana, demonstrate that traditional knowledge constitutes social technologies for environmental management that should structure education, not just complement it.

This territorial turn also exposes the exclusionary structures within the field itself. Nxumalo and Nayak (2024) argue that critical environmental education must confront the colonial logics of land appropriation. Simultaneously, other studies, notably that of Salvatore and Wolbring (2022), denounce what they call "structural ableism," that is, the systematic invisibility of children and young people with disabilities in environmental research, rarely portrayed as agents of change. In contrast, intersectional approaches reveal how culturally responsive programs are crucial for the engagement of historically marginalized groups, such as racialized girls and youth, reaffirming territory as a space of dispute and belonging (Collins et al., 2024).

4.0 - Final considerations: gaps, considerations, and alternative paths forward

An analysis of the international literature on environmental education reveals a rapidly transforming field, marked by epistemological disputes and structural challenges that vary significantly across contexts. Although recent publications show a broadening of approaches, incorporating digital technologies, pedagogies of affect, decolonial perspectives, and territorialized practices, important gaps remain that limit the emancipatory potential of environmental education.

To begin with, we observe a persistent geopolitical imbalance. Most of the technological innovations and pedagogical models analysed are produced in countries of the Global North, often without considering the material, historical, and cultural conditions of the territories where they will be applied. Reviews from the Global South warn that this

asymmetrical circulation can reinforce dependencies and deepen educational inequalities, especially when technological resources are taken as universal solutions. This scenario highlights the urgency of strengthening local research anchored in the specific knowledge, infrastructure, and challenges of each territory.

Secondly, there is a fragmentation between emotional, bodily, community, and structural dimensions of environmental education. The so-called affective turn repositions the body, nature, and health as central elements of the educational process, but public policies still tend to reduce environmental education to isolated initiatives or extracurricular projects. The literature demonstrates that meaningful environmental experiences require continuity, institutionalization, and multigenerational participation, which implies recognizing the role of families, communities, and socio-environmental justice in education.

The centrality of the territory emerges as one of the most consistent trends among the studies. Research from different countries shows that environmental education becomes more powerful when it engages with local cultural practices, lifestyles, and social technologies. However, the literature also reveals persistent silences within the field itself. Children and young people with disabilities, racialized populations, indigenous peoples, and other historically marginalized groups are still underrepresented as protagonists in environmental education practices and research. Advancing this debate requires incorporating intersectional perspectives and confronting epistemologies that, even in the environmental field, continue to reproduce inequalities.

Based on this body of evidence, three directions emerge as foundational. The first consists of strengthening research and practices produced in the Global South, valuing traditional knowledge and community experiences. The second involves formulating educational policies that integrate environmental education into the curriculum in a cross-cutting manner, guaranteeing material conditions, continuous teacher training, and community involvement. The third refers to the promotion of inter-

sectional and inclusive approaches that recognize children, adolescents, and young people as political subjects and agents of transformation.

onal practices committed to socio-environmental justice is an ethical, political, and pedagogical imperative.

In the context of an accelerating climate crisis, strengthening critical, territorially based education

5.0 - References

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Notes

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