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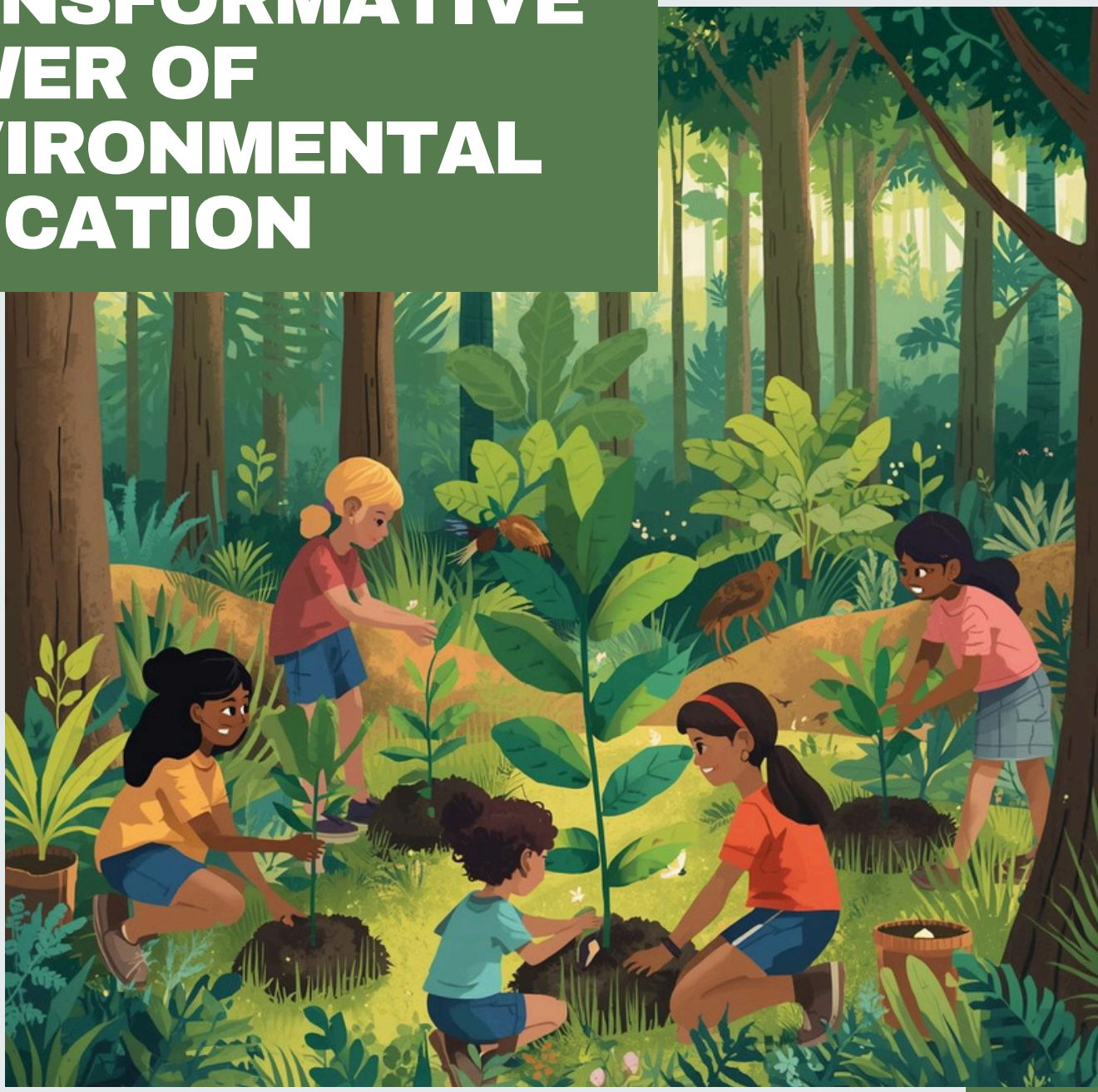
THE TRANSFORMATIVE POWER OF ENVIRONMENTAL EDUCATION



ANA CLÁUDIA SIMÕES FÉLIX THOMÉ

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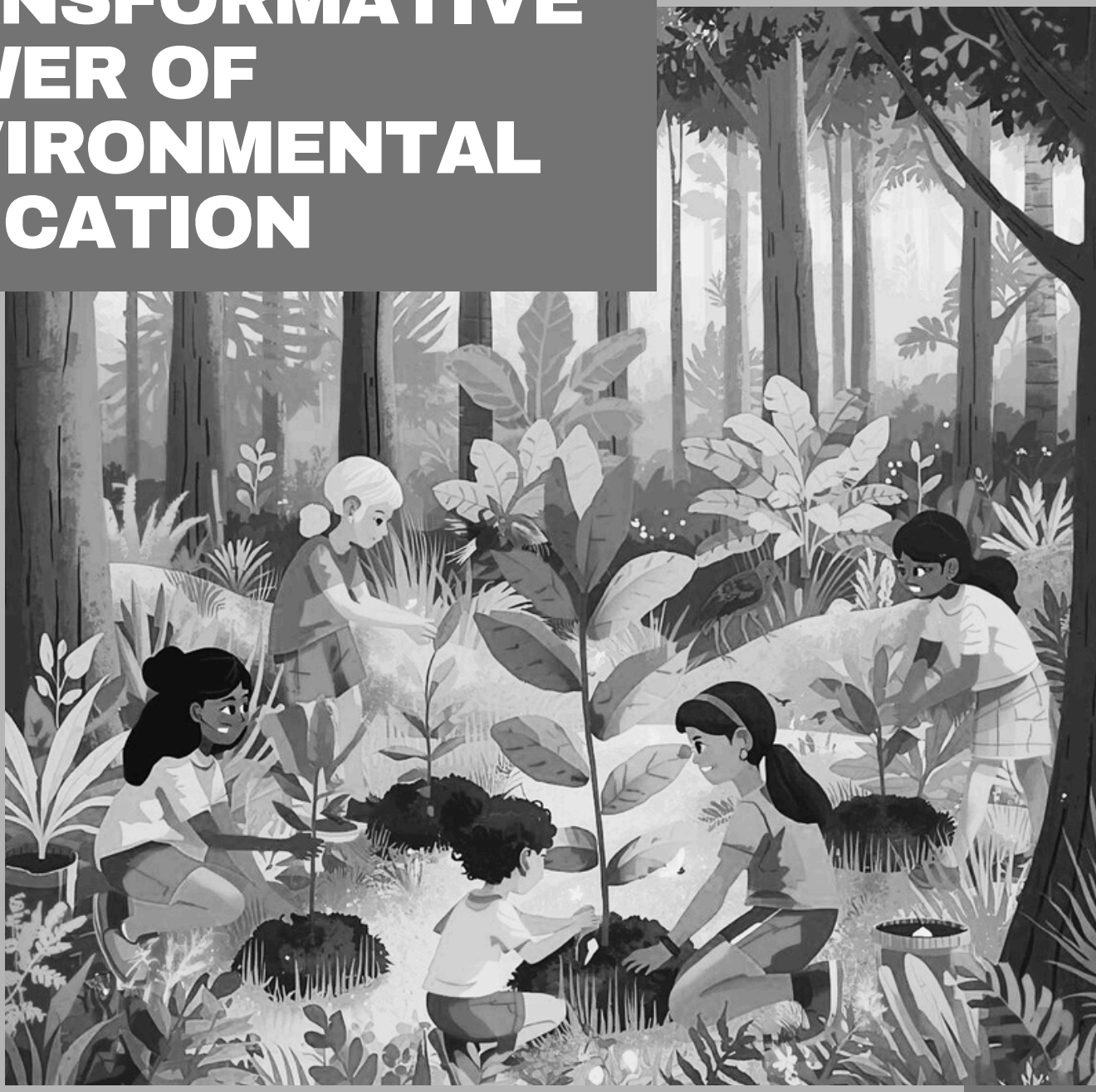

ANA CLÁUDIA SIMÕES FÉLIX THOMÉ

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ABSTRACT

The environmental crisis that characterizes contemporary times highlights the urgent need to rethink the relationships between society, nature, and prevailing development models. Rising global temperatures, the intensification of extreme climatic events, accelerated deforestation, biodiversity loss, and the expansion of unsustainable practices reveal that the impacts of human activity on the planet have reached critical levels, demanding educational approaches capable of promoting profound changes in how individuals think and act. In this context, Environmental Education emerges as a fundamental strategy for addressing the socio-environmental challenges that affect modern societies by integrating scientific knowledge, ethical values, pedagogical practices, and critical reflection on the role of individuals and institutions in environmental preservation. This study aims to analyze the transformative power of Environmental Education, investigating its capacity to form critical, conscious citizens who are committed to building sustainable societies. To achieve this, a theoretical reflection is developed based on renowned authors in the field, educational legislation, and international documents that guide environmental policies.

The research demonstrates that Environmental Education, far from being restricted to the transmission of ecological content, constitutes a broad, interdisciplinary formative process that seeks to stimulate a critical understanding of socio-environmental reality. This critical perspective considers that the environmental crisis is not merely the result of inadequate individual actions but a direct consequence of a civilizational model grounded in excessive consumption, the unlimited exploitation of nature, social inequality, and the capitalist logic of production. Thus, Environmental Education must encourage the problematization of political, economic, and cultural structures that sustain unsustainable practices, promoting active participation in the transformation of society. By dialoguing with the principles of critical pedagogy and complex thought, Environmental Education strengthens autonomy, social engagement, and individuals' capacity for intervention in the pursuit of social justice and ecological balance.

Furthermore, the study highlights that the transformative nature of Environmental Education is also manifested in everyday practices, as it encourages reflection on consumption habits, waste production, water and energy use, food choices, transportation, and interaction with natural spaces. However, it is understood that individual changes, although important, are not sufficient to address environmental problems in their entirety. For this reason, Environmental Education must work in articulation with public policies, community initiatives, and social mobilization processes, assuming a political and collective role in building sustainability. In this way, it contributes to the development of environmental citizenship grounded in the recognition of rights and responsibilities associated with environmental preservation and the protection of common goods.

Another central point discussed in the research is the recognition of Environmental Education as a right guaranteed by Brazilian legislation, particularly by the Federal Constitution of 1988 and Law No. 9.795/1999, which establishes the National Environmental Education Policy. These regulations reinforce that Environmental Education must be continuous, permanent, and integrated into various educational levels and modalities, with shared responsibility among the State, educational institutions, and civil society. Despite these advances, significant challenges remain regarding the effective implementation of Environmental Education, especially concerning teacher training, scarcity of resources, lack of curricular integration, and the predominance of isolated and decontextualized practices.

In conclusion, Environmental Education possesses an effective transformative power, capable of provoking changes at individual, community, and institutional levels. By integrating theory and practice, knowledge and action, it contributes to the formation of individuals who are more aware, critical, and committed to the preservation of the planet. This transformative potential reaffirms the need to expand investments, strengthen public policies, encourage innovative pedagogical practices, and value interdisciplinary approaches. Thus, Environmental Education is consolidated as an indispensable instrument for building sustainable futures, promoting the articulation between social justice, environmental preservation, and the quality of life of present and future generations.

Keywords: Environmental Education; Sustainability; Social transformation; Environmental citizenship; Environment.

DEDICATION

I dedicate this work with great affection to my family and friends, who have always stood by my side during moments of challenge and achievement. Every word of encouragement, gesture of love, and demonstration of trust was like a breath of hope, renewing my strength and driving me forward, even when the path seemed difficult. Without your support and affection, this victory would not shine as brightly. It is ours. Thank you for believing in me and for being part of this journey.

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First and foremost, I thank God, an inexhaustible source of strength, wisdom, and courage. His constant presence illuminated every step of this journey, guiding me with love and purpose. Without His blessing, none of this would have been possible.

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I extend my thanks to all who, directly or indirectly, contributed to making this dream a reality. Every gesture, word, and encouragement left valuable marks on my heart. To all of you, my sincere and eternal gratitude.

SUMMARY

In recent decades, humanity has witnessed environmental transformations of great magnitude, resulting from historical processes marked by accelerated economic development, intense exploitation of natural resources, and productive models based on the logic of profit and the maximization of consumption. This scenario reveals a socio-environmental crisis that is progressively intensifying and compromising the balance of ecosystems and the very survival of species, including humans. The growing emission of greenhouse gases, the increase in the planet's average temperature, the melting of glaciers, the advance of desertification, the scarcity of potable water, ocean pollution, biodiversity loss, and the increasingly frequent occurrence of extreme climatic events demonstrate that the planet is undergoing a critical period that demands urgent and effective responses. These changes, widely discussed by international organizations such as the UN, IPCC, and UNESCO, reveal that environmental damage has ceased to be distant predictions and has become present realities across all parts of the world, affecting rich and poor countries, urban and rural areas, human populations, and entire ecosystems.

In the Brazilian context, this issue presents itself in an even more complex manner due to the characteristics of the national territory, marked by immense biological diversity, a wide variety of biomes, and a historical process characterized by social inequalities, territorial disputes, and profound political contradictions. The deforestation of the Amazon, Cerrado, and Atlantic Forest, the contamination of rivers by mining waste and pesticides, environmental disasters such as those in Mariana and Brumadinho, the water crisis affecting various regions, large-scale wildfires, and urban problems such as poor solid waste management reveal that Brazil faces the impacts of environmental degradation in an intense and continuous way. These conditions, combined with the advance of predatory practices and the weakening of socio-environmental policies, make the adoption of educational measures that promote awareness and collective responsibility for the preservation of natural resources even more urgent.

In this complex and alarming scenario, Environmental Education emerges as an essential field for understanding, confronting, and transforming contemporary socio-environmental reality. Environmental Education is not limited to teaching ecological content or encouraging isolated behavioral changes, such as recycling or saving water; it goes beyond that. It is a broad, continuous, and critical educational process that seeks to promote deep reflection on the relationships between society, nature, economy, politics, technology, and culture, enabling individuals to understand the structural causes of the environmental crisis and to develop values, attitudes, and competencies that make them capable of acting responsibly, consciously, and transformatively. According to authors such as Sauvé (2005), Carvalho (2012), and Guimarães (2004), Environmental Education should stimulate autonomy, social participation, critical thinking, and an ethic of responsibility—elements indispensable for building sustainable societies.

Contextualizing this theme becomes essential when considering that the environmental crisis is not an isolated phenomenon but a reflection of a broader civilizational crisis, as discussed by Leff (2001).

The dominant economic rationality, based on unlimited exploitation and the commodification of nature, has led humanity to a state of profound imbalance that demands paradigmatic changes. Thus, understanding the transformative power of Environmental Education means recognizing that it can contribute both to individual changes and to social, institutional, and structural transformations. Education, when critical and emancipatory, can mobilize communities, pressure governments, strengthen public policies, and influence collective decisions, transforming not only everyday behaviors but also the way social and economic life is organized.

Given this reflection, it becomes fundamental to clearly present the theme of this research: the transformative power of Environmental Education. The interest in this theme arises from the need to understand how Environmental Education, in its various school, community, institutional, formal, and non-formal contexts, can promote significant changes in the formation of conscious citizens and in the transformation of social practices related to the environment. It is a current, relevant, and urgent topic, since the continuity of life on the planet depends directly on the capacity of societies to modify their ways of producing, consuming, and interacting with the environment.

From this theme emerges the research problem that guides this study: How can Environmental Education transform social practices, values, and behaviors, effectively contributing to the construction of a more just, critical, and environmentally sustainable society? This problematization stems from the understanding that, although Environmental Education is present in legal documents, school programs, and community projects, there are still numerous challenges in its practical implementation, especially regarding its ability to generate profound and lasting changes in society. Investigating this question therefore means analyzing not only the content of Environmental Education but also its methodologies, pedagogical approaches, and potential for social mobilization.

To answer this problem, the study establishes the general objective of analyzing the transformative power of Environmental Education in the formation of individuals and communities committed to environmental preservation and the construction of sustainable societies. In addition, the following specific objectives are defined: to understand the theoretical, conceptual, and historical foundations of Environmental Education; to identify pedagogical strategies and methodologies that favor critical and transformative formation; to analyze the impact of Environmental Education on the construction of ethical and responsible values; to investigate its application in different educational contexts; and to reflect on its effective contribution to cultural, social, and environmental change in the contemporary context.

The justification for this research is based on the urgency and severity of the global socio-environmental crisis, which demands educational actions capable of promoting profound changes in the population's ways of life. Environmental Education, as a critical, emancipatory, and interdisciplinary

practice, has a transformative potential that needs to be analyzed, strengthened, and expanded. Furthermore, this research is justified by the need to contribute to the academic field by providing reflections that can support public policies, pedagogical practices, and community initiatives. By understanding how Environmental Education can transform values, behaviors, and social structures, this study also supports the construction of a more conscious, participatory society committed to environmental sustainability. In a historical moment marked by intense environmental conflicts, inequalities, and growing risks, studying the transformative power of Environmental Education is not only relevant but indispensable for the survival and well-being of future generations. For the development of this study, a qualitative methodology was used, based on a bibliographic and documentary review. The research was built from the analysis of books, scientific articles, legislation, international documents, and institutional materials that address Environmental Education, its principles, public policies, and transformative experiences. This approach enabled the construction of a critical and in-depth reflection on the theme, allowing the systematization of concepts, the survey of theoretical perspectives, and the identification of relevant practices in the field of Environmental Education. The bibliographic review was essential to understand the historical evolution of socio-environmental discussions and to support the proposed analysis, ensuring academic rigor and theoretical consistency for the work.

The chapters are well structured and divided as follows: Chapter 1, entitled Theoretical Foundations and Concepts of Environmental Education, presents the main theoretical references that support the understanding of the theme, addressing its historical evolution, conceptual foundations, and legal frameworks, both nationally and internationally. This section discusses how Environmental Education has consolidated over time as a multidisciplinary field essential for confronting the contemporary socio-environmental crisis, incorporating contributions from classical and contemporary authors, as well as documents such as the National Environmental Education Policy, the Stockholm Conference, the Tbilisi Conference, and Agenda 21. It also explores the role of Environmental Education in the formation of values, attitudes, and competencies, highlighting its ethical and critical dimension.

Chapter 2, The Transformative Power of Environmental Education, deepens the analysis of its capacity to promote individual and collective changes. This part seeks to understand how Environmental Education contributes to the formation of critical, responsible, and active citizens, capable of consciously intervening in reality. It also discusses how it enables the construction of new practices, the revision of consumption habits, and the transformation of social relations that directly affect the environment. Reflections are presented on its potential to foster socio-environmental justice, community participation, and the development of a culture of sustainability, evidencing its impact on the transformation of mentalities and the overcoming of the ecological crisis.

Chapter 3, Practices, Methodologies, and Successful Experiences, is dedicated to analyzing strategies and pedagogical approaches used in Environmental Education in formal and non-formal contexts. It explores methodologies such as interdisciplinary projects, outdoor education, investigative practices, field studies, dialogue circles, and community initiatives. The chapter also demonstrates how experiences in schools, universities, social organizations, and communities show that Environmental Education, when applied critically, participatively, and contextually, can generate real and lasting changes. Practical examples, case studies, and reflections on current limitations and challenges also compose this part of the study.

Chapter 4, Critical Analysis and Discussion of Results, presents an in-depth reflection on the elements discussed throughout the research, highlighting convergences, divergences, and relevant contributions to the scientific debate. This section seeks to integrate theory and practice, identifying how the transformative power of Environmental Education manifests in contemporary reality and which gaps still need to be addressed for such potential to be fully developed. Furthermore, the impacts of Environmental Education in different spheres—school, community, political, and social—are discussed, articulating the study's findings with specialized literature.

Finally, Chapter 5, Conclusion, revisits the main results of the research and presents final considerations that synthesize the relevance of Environmental Education as an indispensable instrument in building sustainable societies. This part also emphasizes the need to strengthen public policies, teacher training, and the expansion of transformative pedagogical practices. Additionally, possible directions for future studies are suggested, reinforcing the continuous importance of the theme and its centrality in addressing the global socio-environmental crisis.

ENVIRONMENTAL EDUCATION: CONCEPT, LEGISLATION, PRINCIPLES, AND PERSPECTIVES

Environmental Education has consolidated over recent decades as a multidisciplinary field essential for the critical understanding of the relationships between society, nature, technology, and modes of production. In a context marked by the intensification of the climate crisis, the accelerated loss of biodiversity, the pollution of natural resources, and the socio-environmental impacts of economic development, it assumes the role of a formative and political instrument aimed at building ecological citizenship and a sustainable society. In this sense, several authors point out that Environmental Education is not limited to the transmission of ecological knowledge but involves the problematization of social practices, the stimulation of community participation, and the development of ethical values capable of guiding significant transformations in how individuals relate to the environment (Sauvé, 2005; Reigota, 2017).

The concept of Environmental Education was widely discussed starting in the 1970s, when international organizations began to recognize the urgent need to incorporate environmental issues into educational processes. The Stockholm Conference, held in 1972, was an initial milestone by emphasizing that education should promote responsible attitudes and behaviors oriented toward environmental preservation. Later, the Tbilisi Conference in 1977, organized by UNESCO and UNEP, systematized principles, objectives, and general guidelines for Environmental Education, advocating that it be continuous, integrated, and action-oriented. These documents reinforced that the environment should not be understood merely as a set of natural elements but as the result of social, cultural, economic, and political interactions that shape human life (Dias, 2004; Carvalho, 2012).

Brazilian studies followed the evolution of international discussions and incorporated understandings that articulate ecology, citizenship, and social justice. Reigota (2017) emphasizes that Environmental Education should be understood as a social practice that stimulates critical thinking about environmental inequalities, questioning, for example, unequal access to natural resources, differentiated exposure to environmental risks, and the asymmetric distribution of the benefits and harms of economic development. This perspective aligns with the socio-environmental approach, which asserts that environmental problems cannot be separated from historical and structural issues such as poverty, excessive consumption, environmental racism, and territorial inequality (Acselrad, 2004).

In Brazilian law, Environmental Education acquires a mandatory and permanent character. The Federal Constitution of 1988 establishes, in Article 225, that it is the responsibility of the Public Power to promote Environmental Education at all levels of education, in addition to raising society's awareness for the preservation of an ecologically balanced environment. This constitutional principle was later regulated by Law No. 9.795 of 1999, which instituted the National Environmental Education Policy (PNEA). The

law defines Environmental Education as a process through which individuals and collectives build values, knowledge, skills, attitudes, and competencies aimed at conserving the environment and using natural resources sustainably. It establishes that Environmental Education should be present transversally at all levels and modalities of education, not restricted to a specific subject but constituting an integrating axis of pedagogical practices (Brazil, 1999).

In addition to PNEA, other laws and public policies reinforce the principles of Environmental Education in Brazil. The Law of Guidelines and Bases of National Education (Law No. 9.394/1996) provides, in Article 32, for the need for training for the exercise of citizenship, which includes the environmental dimension. The National Curriculum Parameters (PCNs), published from 1997 onward, incorporate the environment as a transversal theme, encouraging interdisciplinary pedagogical practices. The National Common Curricular Base (BNCC), approved in 2017, also includes the environmental theme as one of the fundamental axes for the development of general competencies such as responsibility and citizenship, argumentation, and cultural repertoire, being a guiding document that reaffirms the commitment to sustainability and the critical formation of students (Brazil, 2017).

From a pedagogical perspective, Environmental Education should be conceived as a continuous, permanent, and contextualized process, considering local realities and the experiences of individuals. Freire (1996) emphasizes that emancipatory education requires dialogue, problematization, and active participation by learners—elements that also structure transformative environmental practices. Thus, working with Environmental Education implies promoting reflection on everyday practices: consumption, waste disposal, mobility, food, water and energy use, connecting them to broader structural issues such as the prevailing socioeconomic model, public policies, and global environmental impacts. By making this connection, schools contribute to forming citizens capable of understanding that sustainability involves not only individual changes but also collective and institutional transformations.

Methodologically, Environmental Education can adopt different approaches, such as interdisciplinary projects, observation of reality, community participation, field classes, investigative practices, and debates that stimulate critical thinking. According to Jacobi (2003), Environmental Education should foster social participation and community strengthening, encouraging processes of democratic management of territory and environmental policies. In this way, it goes beyond the limits of the school and becomes an instrument of social mobilization, fundamental for building more resilient and responsible societies.

Another relevant aspect is the distinction between conservative and critical Environmental Education. The former tends to emphasize individual behaviors and isolated practices, such as recycling and saving water, without questioning the economic structures that produce environmental degradation. Critical Environmental Education, advocated by Carvalho (2012), Guimarães (2004), and Loureiro

(2004), promotes understanding of the deep causes of environmental problems, such as consumerism, the industrial production model, social inequality, and land use. This approach is considered more effective because it promotes structural transformations, strengthening the protagonism of individuals and communities.

In the contemporary scenario, new challenges emerge for Environmental Education. Among them are global climate change, the advance of scientific denialism, the intensification of extreme events, the water crisis in various regions, the loss of forests and ecosystems, the increase in solid waste production, and social inequalities that make certain populations more vulnerable. The digitalization of society and technological advances also impose new debates on consumption, electronic waste production, extraction of rare minerals, and socio-environmental impacts associated with the global economy. Thus, Environmental Education must continuously update itself, incorporating emerging themes and stimulating a critical stance toward the challenges of the 21st century (Leff, 2001; Morin, 2005).

Another relevant point is the importance of Environmental Education not only in basic education but also in higher education, teacher training, non-formal education, and community environments. PNEA establishes that society as a whole is responsible for promoting Environmental Education, which includes companies, social organizations, universities, and public agencies. This perspective reinforces that sustainability is a collective commitment and should involve all social spaces.

Finally, it is important to emphasize that Environmental Education must go hand in hand with effective public policies, environmental monitoring, participatory management, and socio-environmental justice. Education alone does not solve environmental problems, but it contributes to forming critical individuals capable of acting consciously and pressing for structural changes. Thus, it is an indispensable part of a social project that seeks to reconcile economic development, environmental preservation, and social equity.

In summary, Environmental Education constitutes a broad and fundamental field for building sustainable societies. It integrates scientific knowledge, ethical values, pedagogical practices, and social participation, articulating theory and action. Addressing the complexity of the environmental crisis requires forming citizens capable of understanding that sustainability is not just a discourse but a daily and collective practice that demands profound cultural changes, effective public policies, and a permanent commitment to defending life in all its forms.

To broaden the understanding of the foundations of Environmental Education and provide an organized view of the main elements that structure this field of knowledge, a synthetic framework is presented below, bringing together its central concepts, legal frameworks, pedagogical principles, and contemporary perspectives. The construction of this framework aims to complement the theoretical discussion developed in the text, allowing a clear and comparative visualization of the essential aspects that

constitute Environmental Education as a formative, political, and social practice. Furthermore, it contributes to systematizing relevant information, facilitating critical analysis and integrated understanding of the theme. In this way, the framework enables the reader to identify, objectively and structurally, the connections between theory, legislation, pedagogical practices, and current challenges, reinforcing the fundamental role of Environmental Education in building sustainable and socially just societies.

Table 1 - Axes of Analysis of Environmental Education

Axis of Analysis	Detailed and Contextualized Description
Concept of Environmental Education	Environmental Education is understood as a continuous, permanent, and critical formative process aimed at developing knowledge, values, attitudes, and competencies necessary for individuals and communities to act consciously, responsibly, and transformatively toward the environment. It is not limited to the transmission of ecological content but involves understanding the complex relationships between society, nature, economy, culture, and politics, as well as problematizing social practices that contribute to environmental degradation. According to Sauvé (2005) and Reigota (2017), Environmental Education should promote the construction of ecological citizenship and stimulate collective engagement in the defense of life, broadening individuals' critical awareness of environmental inequalities.
Historical Context and Field Construction	From the 1970s onward, Environmental Education gained international prominence through decisive events. The Stockholm Conference (1972) marked the recognition of the need to incorporate environmental issues into educational systems. The Tbilisi Conference (1977), organized by UNESCO/UNEP, systematized objectives, principles, and guidelines, emphasizing that Environmental Education should be continuous, integrated, participatory, and action-oriented. Subsequent decades consolidated the field with documents such as Agenda 21 (1992), reinforcing the need to reorient production and consumption patterns. In Brazil, studies by Dias (2004) and Carvalho (2012) deepened the socio-environmental understanding of the field, incorporating critical and contextualized perspectives.
Socio-Environmental Perspective	The socio-environmental approach asserts that environmental problems cannot be dissociated from social, racial, economic, and territorial inequalities. Reigota (2017) and Acselrad (2004) highlight that issues such as poverty, environmental racism, land concentration, excessive consumption, and injustice in the distribution of environmental impacts are intrinsically related. Thus, Environmental Education must consider the historical, political, and cultural context of individuals, stimulating critical thinking and social engagement to address inequalities and promote environmental justice.
Brazilian Legislation	National legislation establishes Environmental Education as a right and duty. The Federal Constitution of 1988 (Art. 225) determines that the Public Power must promote it at all levels of education and raise public awareness for environmental preservation. Law No. 9.795/1999 institutes the National Environmental Education Policy (PNEA), defining it as a process that develops values, knowledge, and attitudes aimed at environmental conservation. The Law of Guidelines and Bases (1996) reinforces its integration into citizenship education. Documents such as the National Curriculum Parameters (PCNs) and the National Common Curricular Base (BNCC) consolidate the environment as a transversal theme essential to students' comprehensive education.
Pedagogical Principles	Environmental Education should be critical, emancipatory, interdisciplinary, participatory, contextualized, and action-oriented. Freire (1996) emphasizes the importance of dialogue, problematization, and active participation—fundamental elements for forming individuals capable of intervening in reality. From a pedagogical perspective, it integrates cognitive, affective, ethical, and social dimensions, seeking to develop practices of autonomy and co-responsibility.
Methodologies and Educational Strategies	Pedagogical practice in Environmental Education requires diverse and integrative methodologies, such as interdisciplinary projects, field classes, observation of reality, scientific investigation, community participation, dialogue circles, environmental studies, school gardens, and work with solid waste. Jacobi (2003) highlights that such strategies foster citizenship, community management, and student protagonism, contributing to concrete actions for social transformation.

Critical vs. Conservative Environmental Education	The conservative approach emphasizes individual behaviors, such as recycling and water saving, without problematizing structural causes. Critical Environmental Education—advocated by Carvalho (2012), Guimarães (2004), and Loureiro (2004)—seeks to understand the political and economic roots of degradation, breaking with reductionist and instrumentalist views. This approach advocates structural changes, environmental justice, and political participation, being considered more effective in addressing the socio-environmental crisis.
Contemporary Challenges	Environmental Education faces challenges such as the advance of scientific denialism, intensification of the climate crisis, expansion of predatory economic practices, growing production of solid waste, exacerbated consumerism, and socio-environmental vulnerability. The digitalization of daily life also brings new debates on electronic waste, mining, resource extraction, and global environmental inequalities. Leff (2001) and Morin (2005) stress the need to incorporate emerging themes and develop skills to deal with the complexity of environmental reality.
Social and Institutional Responsibility	PNEA establishes that Environmental Education must involve the entire society. Thus, schools, universities, companies, governments, NGOs, and communities must act jointly to promote sustainable practices, strengthen public policies, and encourage environmental protagonism. Teacher training is a crucial point, requiring continuous professional development, pedagogical autonomy, and access to resources that enable transformative practices.
Future Perspectives	Future perspectives for Environmental Education involve strengthening citizenship education, expanding the debate on climate justice, integrating critical digital technologies, fostering sustainable public policies, and articulating schools and communities. Environmental Education should move toward increasingly integrative, critical, and collaborative practices, aiming to build resilient, supportive societies committed to defending life and the planet.

Source: Author's elaboration (2025)

ENVIRONMENTAL EDUCATION IN CONTEMPORARY SOCIETY

The increase in raw material consumption and the significant rise in waste production following the Industrial Revolution, which began in the 18th century, sparked growing social concern in the 19th century about the environmental consequences generated by urban and industrial expansion. The relationship between society and nature began to be widely problematized in works such as Evidence as to Man's Place in Nature (1863) by Thomas Huxley and Man and Nature: Or, Physical Geography as Modified by Human Action (1864) by George Perkins Marsh, who warned of the risks of excessive exploitation of natural resources. In this same historical context, in 1872, the United States created Yellowstone National Park, recognized as the first biodiversity conservation unit (Jackson, 1942).

The environmental damage resulting from industrialization became more evident during the 20th century, when severe episodes of pollution occurred. In 1952, London faced the Great Smog, a dense fog caused by high emissions of smoke and soot from industrial activities, resulting in thousands of deaths and considered the first major contemporary environmental catastrophe (Greater London Authority, 2002). A few years later, in 1956, the Minamata disaster in Japan caused the mercury poisoning of hundreds of people due to industrial waste dumped into the sea, affecting the entire food chain (George, 2002). These tragedies prompted legal changes, such as the approval of the Clean Air Act by the British Parliament in 1956, which established standards for controlling air pollution and restricted coal use in urban areas (Brimblecombe, 2006).

From these initiatives onward, several countries began creating legislation and institutions aimed at environmental protection. In Brazil, Decree No. 50.079/1968 established the Basic Sanitation Technology Center of São Paulo – CETESB, now the Environmental Company of the State of São Paulo, responsible for monitoring and inspecting polluting activities. Over time, CETESB became an international reference, integrating networks of the United Nations and the World Health Organization focused on sanitation and sustainable development (CETESB, 2022). Meanwhile, other environmental issues gained global prominence, such as the impacts of pesticides denounced by Rachel Carson in Silent Spring (1962), a work that criticized the excessive use of DDT and its effects on ecosystems and humans, contributing to the creation of the U.S. Environmental Protection Agency (EPA) (Carson, 1962; Griswold, 2012).

In Brazil, the strengthening of environmental debate was also reflected in the revision of the Forest Code through Law No. 4.771/65, updated in response to the advance of agricultural mechanization and the need to establish stricter rules for forest exploitation (Brazil, 1965). In 1968, the Club of Rome emerged, composed of scientists, entrepreneurs, and policymakers concerned with discussing the limits of economic growth. The report The Limits to Growth (1972), developed by MIT researchers, warned of a scenario of scarcity if consumption and resource exploitation continued at an accelerated pace (Meadows

et al., 1972). Despite its influence, the document was also criticized, especially by Latin American intellectuals, who viewed it as an attempt to restrict the development of poorer nations (Reigota, 2017).

The year 1972 marked a significant international advance with the United Nations Conference on the Human Environment held in Stockholm. It produced 26 principles and 109 recommendations for building environmental policies, including the creation of the International Environmental Education Program (UN, 1973). That same year, the United Nations Environment Programme (UNEP) was established in Kenya to promote environmental conservation and the sustainable use of natural resources (UNEP, 2022). In contrast, Brazil, under military rule and driven by the so-called "economic miracle," prioritized accelerated growth policies, often disregarding the environmental impacts of major projects such as hydroelectric plants and mining activities, distancing itself from global sustainability debates (Duarte, 2015; Prado; Estevam, 2015; Reigota, 2017).

Despite this scenario, the country took important steps by creating, in 1973, the Special Secretariat for the Environment (SEMA), the first national agency responsible for developing policies aimed at ecological preservation (Brazil, 1973). Following the Stockholm Conference guidelines, UNESCO organized the International Seminar on Environmental Education in Belgrade in 1975, which resulted in the Belgrade Charter, recognized as a global reference for environmental education principles and guidelines (UNESCO, 1977). In 1977, UNESCO and UNEP held the first Intergovernmental Conference on Environmental Education in Tbilisi, then in the Soviet Union, consolidating objectives, strategies, and principles to strengthen environmental awareness across all educational spheres (UNESCO, 1977).

These international advances directly influenced the creation of Brazil's National Environmental Policy, established by Law No. 6.938/81. This legislation created the National Environmental Council (CONAMA) and introduced essential instruments for environmental management, such as the Environmental Impact Study (EIA) and the Environmental Impact Report (RIMA), crucial for preventing and mitigating environmental damage from economic activities (Brazil, 1981). In 1983, the UN established the World Commission on Environment and Development, chaired by Gro Harlem Brundtland, which published the report Our Common Future in 1987. This report formalized the concept of sustainable development: a model capable of meeting present needs without compromising the ability of future generations to meet their own needs (UN, 1987). The report reinforced the idea that sustainability must integrate economic, social, and environmental dimensions.

That same year, UNESCO and UNEP organized the International Congress on Environmental Education and Training in Moscow, reaffirming the centrality of education as a fundamental instrument for promoting sustainable practices globally (UNESCO, 1988). Shortly thereafter, the 1988 Federal Constitution definitively incorporated the environmental agenda by declaring that everyone has the right to an ecologically balanced environment, making it mandatory for the government to promote

environmental education at all levels and modalities of education (Brazil, 1988). In this context, the creation of the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA) in 1989 consolidated the reorganization of environmental policy, unifying activities of inspection, licensing, and preservation (Brazil, 1989).

The year 1992 was a global milestone with the United Nations Conference on Environment and Development held in Rio de Janeiro, known as Eco-92. The event brought together representatives from 179 countries and resulted in fundamental documents such as Agenda 21, which proposed guidelines for sustainable development on a planetary scale, as well as conventions on biodiversity and climate change—central milestones in contemporary environmental discussions (UN, 1992a; 1992b; 1992c; 1993).

In the years following Eco-92, Brazil consolidated significant advances in the institutionalization of environmental education. In 1994, the National Environmental Education Program (PRONEA) was created to guide educational actions aimed at sustainability throughout the country. Later, in 1999, Law No. 9.795 established the National Environmental Education Policy (PNEA), defining principles, guidelines, and objectives for incorporating environmental themes into educational systems and non-formal education programs, reinforcing the integration between environmental preservation, citizenship, and social participation (Brazil, 1999; MEC, 2005). These milestones compose a long historical process in which environmental concern evolved from isolated, reactive actions against pollution to a systemic understanding that recognizes the interdependence between nature, society, and economy. Thus, the contemporary environmental perspective is based on the need to reconcile development, social justice, and conservation, understanding that sustainability depends not only on public policies but also on critical individual formation, social engagement, and the adoption of more responsible practices in all spheres of life.

ENVIRONMENTAL EDUCATION AND SOCIAL TRANSFORMATION

Environmental Education was officially introduced in 1965 when the Royal Society of London mentioned it with a limited conception, focused solely on pedagogical practices aimed at preserving living systems (Santos, 2000). According to the International Union for Conservation of Nature (IUCN, 1970), Environmental Education constitutes "a process of identifying values and clarifying concepts aimed at developing essential skills and attitudes to understand and appreciate the interactions between human beings, their culture, and the biophysical environment." This first international definition, adopted by IUCN, reinforces a conservationist perspective centered on the protection of biodiversity and life systems. With the Tbilisi Conference (1977), the concept began to encompass a broader and interdisciplinary vision, understood as a dimension of educational content and practice aimed at solving concrete environmental problems, supported by a sensitive and holistic understanding of the relationship between society and nature. According to Dias (2003), Environmental Education seeks to promote knowledge, understanding, skills, and motivation capable of fostering values, mindsets, and attitudes necessary to address environmental challenges and build sustainable alternatives.

Thus, it presents itself as:

> "…a process that aims to provide people with a critical and global view of the environment, clarifying values and developing attitudes that allow conscious and active participation in issues related to the preservation and proper use of natural resources, favoring the improvement of quality of life and addressing extreme poverty and excessive consumerism" (Minini, 2000, apud Dias, op. cit., p.100).

Currently, Environmental Education is understood as a political practice, as it prepares and encourages individuals to demand social justice, local and planetary citizenship, self-management, and ethical relationships among people and with the natural environment. In this way, critical Environmental Education is oriented toward transformative action in society, seeking sustainability based on new paradigms (Guimarães, 2003).

According to Reigota (2017), the great challenge is to overcome the naïve and conservative vision (biological and political) that for a long time marked this field, proposing social alternatives that recognize the complexity of human and environmental relationships. In this context, Environmental Education is understood as emancipatory, enabling individuals to assume their civic role and responsibilities in interacting with the environment.

An emancipatory perspective of Environmental Education—also called critical or transformative—is characterized by a political approach that seeks to promote autonomy and human freedom in social life, redefining how humans relate to other species and the planet. Emancipatory Environmental Education makes environmental issues public, understood as deeply social and historical.

By valuing democracy and dialogue in exposing environmental conflicts, it proposes paths that integrate scientific knowledge, popular wisdom, cultural expressions, and new ethical forms of relating society and nature (Alcântara, 2008; Loureiro, 2005). The emphasis on social participation, the exercise of citizenship, and the promotion of dialogue between science and popular culture—redefining objects of study and forms of knowledge—constitutes another hallmark of emancipatory Environmental Education. In this approach, processes such as production and consumption; ethics, technology, and sociopolitical context; private and public interests become inseparable.

There is also an effort to break and transform values and social practices that contradict the common good, equity, and solidarity (Loureiro, 2005). The way education occurs in complex societies and the different conceptions of the society-nature relationship make it impossible to have a single Environmental Education, revealing instead a plurality constituted by different ecological subjects, with distinct paradigmatic views of nature and society, intertwined in networks of interests, conflicts, and continuous dialogues (Carvalho, 2001, cited by Loureiro, 2005). Based on these characteristics, Emancipatory and Transformative Environmental Education is understood as one in which dialectical form and content are articulated so that transformations in human activity, associated with the educational process, result in individual and collective changes. From this perspective, educating means emancipating humanity, enabling liberation from historical conditions that we ourselves have produced and fostering the construction of alternatives that overcome such limits (Alcântara, 2008).

Emancipatory action consists of a continuous movement of critical reflection and self-reflection capable of breaking with the barbarity of the current model of society and civilization, starting from the social context in which we are inserted and the "place" each subject occupies, establishing formative experiences—whether school-based or not—in which reflection on totality, sustained by political action, allows the construction of its own dynamics. Emancipating does not mean defining a single path to salvation but opening possibilities for creating trajectories considered more appropriate for social and planetary life, according to the understanding that different cultures and eras possess, producing new modes of existence (Loureiro, 2005b). The conception of Environmental Education guiding this work tends to be understood as a cultural critique, as an interpretative proposal in the face of contemporary challenges, and as a process of qualitative change in everyday life. According to Ruscheinsky (2004): "The pedagogical proposal reinforces the reconstruction of the meaning of relationships in daily life but aims to go beyond simple adherence to recycling initiatives, proper waste disposal, or green area protection; it sets as a goal the understanding of development committed to social justice, reducing consumption by some to enable the civic inclusion of others. Its purpose is to achieve a sustainable society. In its course, it seeks to go beyond specific social groups, segments excluded from the market or

the educational system, aiming to permeate all social relations, including artificial and natural environments.”

TRANSFORMATIVE ENVIRONMENTAL EDUCATION PROJECTS

Over the past decades, Environmental Education (EE) has consolidated itself as a plural field that goes beyond the mere transmission of ecological content, seeking to foster a critical, emancipatory awareness that is socially committed to transforming the relationships between human beings and nature. In the contemporary context—marked by the intensification of the climate crisis, environmental degradation, and deepening social inequalities—transformative EE projects play a strategic role by articulating scientific knowledge, traditional wisdom, social participation, interdisciplinary pedagogical practices, and collective actions aimed at sustainability. This chapter analyzes national and international experiences that stand out for their innovative character, participatory methodologies, and effective impacts on schools and communities. It also presents emblematic case studies and an analysis of observed results, considering social, environmental, and educational indicators.

NATIONAL AND INTERNATIONAL EXPERIENCES IN TRANSFORMATIVE ENVIRONMENTAL EDUCATION

Transformative EE projects have multiplied across different countries, assuming varied configurations according to sociocultural contexts, prevailing public policies, and local environmental challenges. Understanding these experiences is essential for building a comparative and critical overview.

International Experiences

Internationally, noteworthy initiatives have been developed in countries that are pioneers in environmental policies and participatory processes. A prominent example is the Eco-Schools Program, implemented in more than 60 countries under the coordination of the Foundation for Environmental Education (FEE). Created in the 1990s, the program adopts a school management model based on environmental diagnostics, student participation in school committees, implementation of practical actions, and continuous monitoring. Research by Mogensen and Mayer (2009) shows that schools participating in the program report advances in pro-environmental behavior among students, improved infrastructure, and integration of EE into the curriculum.

Another significant case is Finland, a country recognized for its educational policy integrated with sustainability. According to Jensen and Schnack (2006), Finnish environmental education prioritizes action competence, encouraging student autonomy in identifying local environmental problems and developing solutions. Projects such as School Yard Habitats, implemented in partnership with environmental NGOs, transform schoolyards into biodiverse spaces used as living laboratories for science, arts, and social studies.

In Australia, EE projects are strongly linked to Indigenous education and respect for traditional knowledge. The Landcare Program, a national conservation initiative launched in the 1980s, is based on partnerships between schools, communities, and governments. According to Smith and Williams (2014), connecting young people with ancestral practices of sustainable management strengthens community identities and reduces socio-environmental conflicts.

In Latin American countries such as Mexico and Colombia, a critical socio-environmental approach inspired by authors like Paulo Freire and Enrique Leff is observed. Mexico, for example, developed School Environmental Agendas, which combine participatory diagnostics, affective mapping, and collective projects. According to Leff (2016), this perspective reinforces community autonomy and contributes to participatory territorial management.

National Experiences in Brazil

In Brazil, transformative EE experiences are influenced by a trajectory marked by the institutionalization of the theme in public policies—especially after Law No. 9.795/1999—and by theoretical contributions from critical environmentalism (Guimarães, 2003; Loureiro, 2005; Carvalho, 2004). Notable national projects include:

Programa Nacional de Educação Ambiental (ProNEA) [National Environmental Education Program]

ProNEA guides educational policies and practices aimed at sustainability, emphasizing democratic participation and socio-environmental justice. It strengthens intersectoral actions in schools, conservation units, and rural communities (Brazil, 2014).

Programa Eco-Escolas no Brasil [Eco-Schools Program in Brazil]

Adapted to local realities, the program uses participatory methodologies and encourages changes in school management and student behavior.

Projeto Tamar [Tamar Project]

Internationally recognized, Tamar combines marine conservation, environmental education, and social inclusion. Coastal communities involved in the project report greater appreciation of biodiversity and engagement with sustainable practices (Suassuna, 2004).

Com-Vida – School Environment and Quality of Life Commission

Created as an extension of the School Agenda 21, Com-Vida promotes direct democracy, mobilizing students and educators for transformative actions in the school environment (Loureiro, 2012).

Federal Institutes and Extension Projects

Projects involving reforestation, agroecological gardens, and solid waste management have been widely implemented in Federal Institutes, promoting student autonomy and community ties.

CASE STUDIES IN SCHOOLS AND COMMUNITIES

This section presents case studies illustrating transformative EE practices, each with distinct methodology, development, and results.

Case Study 1 – School Agenda 21 in a Public School in Pernambuco

In a state school on the outskirts of Recife, science and geography teachers implemented the School Agenda 21, involving socio-environmental mapping of the community, participatory diagnostics, and collective construction of an action plan. The project, based on Dias (2003) and Freire (1996), encouraged school assemblies, dialogue circles, and participatory investigation.

Actions carried out included:

- Implementation of a community garden;
- Reorganization of selective waste collection;
- Revitalization of the schoolyard;
- Debates on consumption and disposal.

Results indicated improved school climate, increased student self-esteem, and greater integration between school and community (Pernambuco, 2019).

Case Study 2 – Tamar Project and Fishing Communities

In coastal communities of Bahia and Espírito Santo, the Tamar Project developed educational activities with fishers, children, and youth on marine turtle conservation. The methodology included workshops, dialogue circles, recreational activities, and guided visits to conservation centers.

According to Suassuna (2004), the project promoted:

- Strengthened environmental awareness;
- Reduction of accidental capture;
- Promotion of sustainable tourism;
- Job opportunities for residents.

Beyond ecological impacts, Tamar became a reference in transformative EE, integrating science, local culture, and social inclusion.

Case Study 3 – Rural School in Paraná and Agroecology

In a rural settlement of the MST in Paraná, an elementary school developed an agroecology project integrated into an interdisciplinary curriculum. Based on alternating pedagogy and authors such as Caporal and Costabeber (2004), the project involved gardens, nurseries, composting, seedling production, and food sovereignty workshops.

Community participation was intense, with parents and farmers guiding students. Observed results included:

- Improved family food security;
- Strengthened peasant identity;
- Critical understanding of pesticide use;
- Construction of sustainable practices.

Case Study 4 – Eco-Schools in Portugal

A Portuguese elementary school, certified by the Eco-Schools program, implemented an environmental management system through student committees and monitoring indicators such as water, energy, and waste. According to Carvalho and Silva (2018), students demonstrated greater autonomy, decision-making capacity, and engagement in transforming the school environment.

OBSERVED RESULTS: SOCIAL, ENVIRONMENTAL, AND EDUCATIONAL IMPACTS

The comparative analysis of projects reveals common elements that define their transformative character:

Social Impacts

The projects examined show:

- Strengthening of civic participation (Loureiro, 2005);
- Empowerment of historically marginalized groups;
- Greater dialogue between school and community;
- Development of territorial belonging.

In vulnerable communities, EE has proven to be an instrument of emancipation, cultural recovery, and social organization.

Environmental Impacts

Em termos ambientais, os resultados incluem:

- Reduction of solid waste;
- Biodiversity conservation;
- Restoration of degraded areas;
- Adoption of agroecological practices.

Studies indicate that schools participating in EE programs show greater efficiency in resource use (Mogensen; Mayer, 2009).

Educational Impacts

Nos processos pedagógicos, os impactos mais relevantes foram:

- Development of socio-emotional and cognitive skills;
- Meaningful learning (Ausubel, 2003);
- Curricular interdisciplinarity;
- Increased student motivation and engagement;
- Strengthened critical reading of the world (Freire, 1996).

EE, when critical and participatory, breaks with traditional educational models and fosters comprehensive formative experiences. The analyzed projects demonstrate that transformative Environmental Education is a complex, plural practice deeply linked to democracy, social justice, and sustainability. National and international experiences reveal that, when grounded in participatory methodologies and critical conceptions, EE can promote real changes in territories and human relationships. In this sense, these initiatives constitute fundamental tools for reorienting lifestyles, promoting environmental citizenship, and strengthening new socio-environmental rationalities.

ENVIRONMENTAL EDUCATION AND PUBLIC POLICIES

The relationship between environmental education and public policies gained centrality in recent decades, especially in the face of the worsening climate crisis, socio-environmental inequality, and the challenges imposed by current patterns of development. In this context, international documents such as Agenda 21, the Sustainable Development Goals (SDGs), as well as various national legislations, began to guide governments and social institutions in building educational strategies for promoting sustainability. Environmental education, understood as a continuous, critical, and emancipatory process, has become one of the fundamental pillars for the implementation of these policies, since it aims to train citizens capable of understanding the complexity of environmental issues, acting collectively, and proposing solutions to emerging socio-ecological problems (Loureiro, 2004; Jacobi, 2003).

Agenda 21, prepared during the United Nations Conference on Environment and Development (Eco-92), held in Rio de Janeiro, represents a global milestone by establishing guidelines that articulate economic development, environmental protection, and social justice. In the document, environmental education appears as a structuring axis to promote cultural changes, encourage sustainable practices, and strengthen social participation. According to the UN (1992), education, training, and public awareness are essential conditions for society to advance toward a sustainable development model. Thus, the Local Agenda 21, implemented in several Brazilian municipalities and other countries, became an important participatory tool, allowing communities to build socio-environmental diagnoses and define action plans aligned with their realities. Authors such as Carvalho (2008) and Layrargues (2002) highlight that the effectiveness of Agenda 21 depends on the active involvement of the population, the strengthening of environmental citizenship, and the integration between educational and environmental policies.

In 2015, the adoption of Agenda 2030 and the Sustainable Development Goals (SDGs) by the UN expanded the global commitment to sustainability. SDG 4, specifically target 4.7, reinforces the need to ensure that all students acquire knowledge and skills to promote sustainable development, including environmental education, human rights, gender equality, and appreciation of diversity (UN, 2015). SDG 13, which addresses climate action, highlights the role of education as an instrument for mitigation and adaptation to climate change. These documents show that, at the international level, educational processes are understood as a fundamental condition for building resilient, participatory societies committed to socio-environmental justice. Researchers such as Sauvé (2005) and Sterling (2010) argue that incorporating the SDGs into education requires interdisciplinary, critical, and transformative approaches that value dialogue between scientific, cultural, and community knowledge.

In the international scenario, different countries have developed consistent environmental education programs, although with varied approaches. In Europe, initiatives such as the Eco-Schools Program and European Union policies on ecological transition reinforce the importance of integrated

actions between schools, governments, and civil society (Hart, 2013). In Canada, experiences inspired by ecological pedagogy and the strengthening of territorial identities point to the construction of curricula that prioritize the relationship between culture, nature, and community (Sauvé, 2005). In Latin American countries such as Costa Rica and Colombia, robust public policies focused on environmental conservation and civic education have been developed, based on participatory processes and an expanded understanding of the environment as a space for life, culture, and belonging (Gadotti, 2001).

In Brazil, environmental education has a significant trajectory marked by legal and institutional advances. The Federal Constitution of 1988 was pioneering in determining that the government must promote environmental education at all levels of education. Later, the National Environmental Education Policy (PNEA), instituted by Law No. 9.795/1999, consolidated principles, objectives, and guidelines, defining environmental education as an essential and permanent component of national education. According to Dias (2004), PNEA represents an advance by recognizing the transversality of environmental education and reaffirming its participatory, critical, and community character. The regulation of the law took place through Decree No. 4.281/2002, which established mechanisms and responsibilities for the government, including the articulation between the Ministry of Education (MEC) and the Ministry of the Environment (MMA).

Several government programs contributed to expanding the reach of environmental education in the country, among them the ProNEA – National Environmental Education Program, which articulates projects and initiatives in partnership with public institutions, non-governmental organizations, and educational networks. ProNEA seeks to promote continuous training of educators, the production of pedagogical materials, and the integration between sectoral policies. Another highlight is the Coletivos Educadores Program, created in the 2000s to strengthen community-based and emancipatory environmental education, focusing on training popular educators capable of acting in participatory social mobilization processes (Loureiro; Layrargues; Castro, 2002). In addition, programs such as PPRAE – Program for the Protection and Recovery of Degraded Areas, Environmental Education in Schools, and state and municipal initiatives have contributed to building educational practices focused on territory, citizenship, and addressing socio-environmental inequalities.

In the global context, public policies for environmental education present heterogeneity but converge in the understanding that training for sustainability must go beyond the school space and involve different social actors. UNESCO has played a fundamental role through international conferences such as Tbilisi (1977), Thessaloniki (1997), and the Decade of Education for Sustainable Development (2005–2014), which reinforced the need to transform teaching methodologies, promote critical thinking, and encourage community protagonism. According to UNESCO (2017), environmental education policies

must prioritize interdisciplinarity, intercultural dialogue, and teacher training, essential elements to face the challenges of contemporary society.

The integrated analysis of public policies shows that environmental education, when treated structurally and continuously, contributes to building more just, democratic, and environmentally balanced societies. In Brazil, although there are significant advances, challenges persist related to the precariousness of schools, the lack of specific training for teachers, and the discontinuity of government programs. However, as Jacobi (2003) states, strengthening environmental education depends not only on institutional policies but also on social participation and the ability of communities to organize themselves to transform local realities. The implementation of the principles of Agenda 21 and the SDGs therefore requires a collective commitment between governments, educational institutions, civil society, and individuals, recognizing that sustainability is a long-term political and cultural process.

Thus, environmental education within public policies is consolidated as an essential field to promote social transformation, strengthen critical awareness, and build concrete alternatives to the contemporary socio-environmental crisis. Through government programs, international agreements, community actions, and participatory educational processes, it is possible to envision paths that articulate democracy, socio-environmental justice, and sustainability, reaffirming the need to rethink ways of living, producing, and relating to nature.

Given the breadth of this panorama, it becomes necessary to synthesize the main milestones, guidelines, and contributions that underpin the relationship between Environmental Education and public policies. This systematization allows for a clear and organized visualization of the structural elements that guide educational practices, governmental actions, and sustainability strategies, favoring a critical and in-depth analysis of the topic. Thus, the following framework brings together the main concepts, documents, legislation, and programs mentioned throughout this chapter, offering a comprehensive view of the public policies that support Environmental Education and their relevance for building a socially and ecologically balanced future.

Table 2 — Axes of Analysis of Public Policies and Global Milestones of Environmental Education

Axis of Analysis	Detailed and Contextualized Description
Importance of Environmental Education in Public Policies	Environmental Education has consolidated itself as a strategic element for addressing the climate crisis, socio-environmental inequality, and the challenges of current development models. Seen as a critical, continuous, and emancipatory process, it strengthens civic education, encourages social participation, and contributes to transforming cultural and economic patterns that impact the environment (Loureiro, 2004; Jacobi, 2003).
Agenda 21 (Eco-92)	Agenda 21, resulting from the Rio-92 Conference, is a global milestone that articulates sustainable development, social justice, and environmental protection. It recognizes education, training, and awareness as pillars for building sustainable societies. Local Agenda 21, implemented in various municipalities, creates spaces for community participation and socio-environmental diagnostics, enabling populations to plan actions according to their reality (UN, 1992; Carvalho, 2008; Layrargues, 2002).
Agenda 2030 and Sustainable Development Goals (SDGs)	Agenda 2030 (UN, 2015) reinforces the role of education in promoting sustainability. SDG 4.7 establishes that all individuals should acquire competencies to promote sustainable development, while SDG 13 emphasizes education as a tool for climate action. Specialists such as Sauvé (2005) and Sterling (2010) affirm that incorporating the SDGs requires interdisciplinary, critical, and contextualized educational practices.
International Examples	European countries implement programs such as Eco-Schools and ecological transition policies that integrate schools, governments, and civil society (Hart, 2013). In Canada, curricula value territorial identities and ecological pedagogies (Sauvé, 2005). In Latin America, countries like Costa Rica and Colombia develop participatory public policies focused on conservation, community education, and ecological citizenship (Gadotti, 2001).
Brazilian Legal Framework	The Federal Constitution (1988) establishes, in Article 225, the promotion of Environmental Education at all levels. The National Environmental Education Policy (Law No. 9.795/1999) defines principles, objectives, and guidelines, consolidating its transversality, continuity, and critical nature. Decree No. 4.281/2002 regulates governmental responsibilities and coordination between MEC and MMA (Dias, 2004).
Government Programs	ProNEA articulates policies and projects, promotes continuous teacher training, produces materials, and integrates different sectors. The Coletivos Educadores Program strengthens community-based and emancipatory practices, training popular educators for participatory processes (Loureiro; Layrargues; Castro, 2002). Other programs and state and municipal initiatives also contribute to territorial practices of socio-environmental citizenship.
Experiences and Challenges in Brazil	Despite advances, challenges persist such as lack of specific teacher training, school precariousness, lack of resources, curricular fragmentation, and discontinuity of policies. There is difficulty in effectively articulating environmental and educational policies. Social participation remains insufficient to consolidate empowering and transformative practices.
Contribution of International Bodies (UNESCO)	UNESCO, through conferences and programs (Tbilisi 1977, Thessaloniki 1997, Decade of Education for Sustainable Development 2005–2014), guides methodological transformations, encourages critical thinking, and reinforces the need for community protagonism. Education must be interdisciplinary, intercultural, and focused on civic formation (UNESCO, 2017).
Environmental Education as a Pillar of Sustainability	Integrated analysis shows that Environmental Education, when continuous, participatory, and articulated with public policies, promotes more just, democratic, and balanced societies. It strengthens environmental citizenship, encourages transformative practices, and stimulates collective commitment to the future.
Future Perspectives	Strengthening Environmental Education depends on stable policies, government investments, qualified teacher training, and effective civil society participation. Articulating Agenda 21, SDGs, PNEA, and community programs is essential for building sustainable paths in the face of the intensifying socio-environmental crisis.

Source: Author's elaboration (2025)

Thus, the presented framework not only organizes the main theoretical and legal references of the field but also reinforces the importance of understanding Environmental Education as a historical, political, and social process in constant transformation. It demonstrates that building sustainable societies depends on integrated actions that consider local and global contexts, value scientific knowledge and

community wisdom, and promote the formation of individuals capable of critically intervening in reality. In this way, the analysis of legal frameworks and public policies allows for a deeper reflection on the effectiveness of educational practices, their challenges, and their possibilities within the scenario of the contemporary environmental crisis.

CHALLENGES FOR THE CONSOLIDATION OF ENVIRONMENTAL EDUCATION

The consolidation of Environmental Education as a public policy, pedagogical practice, and ethical-political project faces a complex set of challenges that manifest in institutional, cultural, economic, and epistemological dimensions. Although Environmental Education has been internationally recognized since the Stockholm Conference (1972) and reaffirmed in documents such as Tbilisi (1977), Agenda 21 (1992), and the Sustainable Development Goals (2015), its implementation in the daily life of schools, communities, and public institutions is still marked by contradictions and resistances that hinder its effectiveness and transformative impact. According to Layrargues and Lima (2014), Environmental Education is caught between critical proposals aimed at social transformation and conservative, behavioral approaches that reduce environmental training to isolated and depoliticized practices.

One of the main obstacles to the advancement of Environmental Education lies in institutional and cultural barriers. From an institutional perspective, the fragmentation of the Brazilian educational system, combined with the precariousness of teaching conditions and the lack of continuous training, prevents Environmental Education from being incorporated in a transversal, interdisciplinary, and permanent manner, as established by the National Environmental Education Policy (Law No. 9.795/1999). As Loureiro (2004) and Carvalho (2008) point out, many institutions treat Environmental Education as a peripheral content, restricted to commemorative dates or isolated projects, without articulation with the curriculum, territory, or the socio-environmental reality of students. The predominance of a rigid disciplinary logic, inherited from traditional teaching models, hinders the construction of integrated, dialogical, and contextualized pedagogical practices, which are fundamental for critical training.

At the cultural level, it is observed that much of society still conceives the environment only as untouched nature or as an economic resource, disregarding the political, historical, and social dimensions that structure contemporary environmental conflicts. As Guimarães (2003) states, this reductionist view is deeply rooted in social and educational practices, reinforcing the idea that environmental problems stem exclusively from inadequate individual behaviors, and not from structural development models based on intensive resource exploitation and socioeconomic inequality. This perspective hinders the advancement of a critical Environmental Education capable of problematizing power mechanisms and the contradictions of the capitalist system that produce environmental degradation and social injustice. Cultural resistance to changing habits, values, and perceptions, associated with the hegemony of consumerism and market logic, prevents sustainable and solidarity-based practices from consolidating in the daily life of school communities and society.

Another element that compromises the consolidation of Environmental Education is the lack of investments and consistent, continuous public policies. The discontinuity of government programs, often interrupted by political-administrative changes, weakens the construction of lasting educational processes.

The National Environmental Education Program (ProNEA) and initiatives such as the Coletivos Educadores, cited by Loureiro, Layrargues, and Castro (2002), have faced periods of expansion and retraction, making it difficult to strengthen educator networks and community projects. Furthermore, the lack of adequate funding compromises the creation of contextualized teaching materials, teacher training, pedagogical monitoring, and articulation between schools, universities, and communities. According to Jacobi (2003), resource limitations reflect the low priority given to Environmental Education on the government agenda, despite its relevance for addressing the climate emergency and promoting socio-environmental justice.

The lack of consistent policies is also expressed in the fragility of monitoring and evaluation mechanisms for environmental education programs. Many projects lack clear indicators or instruments to measure their social, cultural, and environmental impacts, which hinders their improvement and legitimacy. As Sauvé (2005) points out, it is necessary to overcome the short-term vision and implement structural policies that articulate education, science, culture, technology, and social participation, ensuring that efforts toward sustainability are integrated and lasting. In the global context, significant inequalities are also observed among countries regarding their capacity to implement environmental education policies, especially among developing nations that face economic constraints, social inequalities, and more intense environmental vulnerabilities.

Faced with these challenges, several possible paths emerge to overcome obstacles and strengthen the consolidation of Environmental Education. Among them, the need to expand continuous teacher training stands out, promoting courses, workshops, study groups, and collaborative networks that encourage critical reflections and transformative practices. As Carvalho (2008) and Gadotti (2001) argue, training environmentally engaged educators is a fundamental step toward promoting significant changes in schools and communities, since Environmental Education is not limited to content but involves values, attitudes, practices, and ethical-political commitments. Building a critical environmental pedagogy requires teachers to recognize the environment as a field of dispute, permeated by social, economic, and cultural contradictions.

In addition, it is necessary to promote articulation among public policies in education, environment, social development, and science and technology, ensuring that Environmental Education is treated in an intersectoral manner. Transversality, a principle advocated by PNEA, needs to be incorporated into school management, curricular guidelines, and pedagogical practices, preventing Environmental Education from being restricted to Science or Geography. Participatory processes such as school councils, student assemblies, and community intervention projects can strengthen institutional democracy and bring schools closer to the socio-environmental demands of their territories.

Another relevant path involves strengthening social participation in the construction of environmental and educational policies. Local Agenda 21, the SDGs, and various Latin American experiences demonstrate that democratic territorial management helps identify problems, mobilize social actors, and develop collective solutions. As Jacobi (2003) and Ruscheinsky (2004) affirm, participation is a central element for developing critical environmental awareness and consolidating policies that dialogue with the real needs of the population. Citizen participation, however, requires that historically marginalized groups—such as rural populations, Indigenous peoples, quilombolas, and peripheral communities—be included in decision-making processes, valuing their knowledge, practices, and ways of life.

The consolidation of Environmental Education also requires the development of curricula that value cultural diversity, interscientific dialogue, and socio-territorial contextualization. The perspective of emancipatory Environmental Education, advocated by authors such as Loureiro (2004) and Alcântara (2008), highlights the importance of overcoming technicist and behavioral approaches, promoting a critical understanding of environmental inequalities, territorial conflicts, impacts of neoliberalism, and relations between science and power. This path implies recognizing that sustainability cannot be achieved solely through individual changes but demands profound structural transformations based on environmental justice, solidarity economy, agroecology, human rights, and participatory democracy.

Finally, overcoming the challenges of Environmental Education requires strengthening funding policies, ensuring administrative continuity, investing in interdisciplinary research, and promoting integration among schools, universities, civil society, social movements, and governments. Environmental Education, as a political and cultural project, needs robust institutional support and policies that recognize its strategic importance for addressing the global environmental crisis. As Loureiro (2004) concludes, the consolidation of Environmental Education depends on recognizing that to educate is to transform, and that socio-environmental transformation depends on forming critical, participatory subjects committed to building a just, democratic, and sustainable society.

THE TRANSFORMATIVE POWER OF ENVIRONMENTAL EDUCATION

Environmental Education possesses a transformative power that manifests not only in changing individual behaviors but also in its ability to promote profound social transformations, capable of reorienting development models and reconstructing the relationships between human beings, society, and nature. In a global scenario marked by the intensification of climate change, scarcity of natural resources, socio-environmental inequality, and the advance of unsustainable economic practices, becoming environmentally conscious is no longer an option but a civilizational necessity. In this sense, Environmental Education emerges as a formative, political, and ethical strategy that drives the

construction of a more just, sustainable society committed to present and future generations (Reigota, 2017; Carvalho, 2012).

The transformative potential of Environmental Education is related to its critical, emancipatory, and participatory nature. It is not a set of recommendations about resource preservation but a process that problematizes the social, political, and economic structures that produce environmental degradation. As Guimarães (2004) and Loureiro (2004) argue, critical Environmental Education enables individuals to understand the structural causes of environmental problems, overcoming reductionist and merely conservationist views. It reveals that the environmental crisis is not only ecological but also economic, social, cultural, and political, resulting from a production model based on unlimited consumption, unequal territorial exploitation, and the precarization of human and non-human life.

By stimulating critical thinking and reflection on reality, Environmental Education empowers individuals and communities, encouraging social protagonism and civic participation. Freire (1996) already affirmed that education has as its essential function the formation of subjects capable of consciously intervening in the world. Applied to the environmental field, this Freirean perspective strengthens processes of resistance, community organization, and defense of common goods, enabling populations to claim their rights and participate in decisions that affect their territories. This transformative potential is evident in socio-environmental movements that fight for environmental justice, access to quality water, the fight against environmental racism, and the preservation of biomes such as the Amazon, Cerrado, and Pantanal.

The transformation promoted by Environmental Education also manifests in everyday life by proposing a profound review of consumption habits, food choices, urban mobility, waste production and disposal, and the conscious use of water and energy. However, this individual change is not understood as an isolated solution but as part of a broader transformation that articulates personal practices, community actions, and public policies (Jacobi, 2003). Thus, Environmental Education contributes to forming subjects capable of recognizing that sustainability is not limited to isolated practices but depends on structural changes in the ways of producing, consuming, and relating to the environment.

Another dimension of its transformative power lies in its ability to promote interdisciplinarity. Environmental reality is complex and involves ecology, geography, economics, sociology, ethics, technology, and politics. Environmental Education dialogues with all these areas, creating connections that help individuals understand the interdependence between different elements of the environment and society. Morin (2005) emphasizes that complexity requires knowledge to be treated in an integrated manner, overcoming disciplinary fragmentation. This perspective broadens the understanding of environmental problems and enables more comprehensive and effective approaches, whether in school, university, or community settings.

The Brazilian legal framework strengthens the transformative nature of Environmental Education by recognizing it as a central instrument for building socio-environmental democracy. The Federal Constitution of 1988 establishes the mandatory inclusion of Environmental Education at all levels of education, and Law No. 9.795/1999, which institutes the National Environmental Education Policy, determines that it must be continuous, permanent, and integrated into formal and non-formal educational practices. This legislation recognizes Environmental Education as a right for all and a duty of the State and society, reinforcing that environmental transformation is not the exclusive responsibility of schools but of all social spaces (Brazil, 1988; Brazil, 1999).

In the school environment, Environmental Education has proven to be a fundamental tool for forming children and young people who understand their role in society and become capable of acting with environmental responsibility. Pedagogical projects involving school gardens, waste management, water quality monitoring, and field studies stimulate active learning and enable students to perceive the impacts of their actions on the world. More than learning concepts, they recognize themselves as transformative agents capable of proposing solutions to real problems. As Sauvé (2005) states, it is necessary to educate for action, forming people who not only know the environmental crisis but also know how to face it with creativity, critical reflection, and sensitivity.

Environmental Education also acts as an instrument of equity and social justice. The most vulnerable populations—such as riverside communities, Indigenous peoples, quilombolas, and residents of urban peripheries—are those most affected by environmental degradation and extreme climatic events. Promoting Environmental Education in these communities means strengthening their autonomy, valuing their traditional knowledge, supporting community management of natural resources, and creating spaces for participation so they can defend their territorial and environmental rights (Acselrad, 2004). Thus, Environmental Education not only transforms the relationship with nature but also contributes to reducing social inequalities and strengthening citizenship.

Another fundamental aspect is the role of Environmental Education in training professionals from various fields, such as engineers, managers, teachers, environmental technicians, and public agents. By integrating environmental principles into curricula and professional training practices, it becomes possible to build a labor market better prepared to face sustainability challenges, promoting innovations that reduce environmental impacts and favor more just and balanced development models (Leff, 2001).

Furthermore, Environmental Education has a transformative power by promoting profound cultural changes. It acts in the formation of values, emotions, and attitudes, encouraging a new perspective on nature as a space for life and not merely as a resource to be exploited. This change in perception is fundamental to overcoming anthropocentric and utilitarian views that have historically dominated social practices. By developing ecological sensitivity, interspecies empathy, and collective

responsibility, Environmental Education contributes to a culture of care and respect that transcends the school environment and extends to family, community, and professional relationships.

In summary, the transformative power of Environmental Education lies in its ability to articulate knowledge, ethics, social participation, public policy, and cultural transformation. It is a force capable of reorienting behaviors, strengthening communities, supporting the struggle for environmental justice, and promoting a civilizational project committed to life in all its forms. In a world facing unprecedented environmental challenges, Environmental Education is not just a field of knowledge but a social practice indispensable for building a sustainable future. It forms critical, conscious, and engaged subjects capable of transforming reality in the pursuit of ecological balance, social justice, and human dignity.

Environmental Education, throughout this work, has revealed itself as an essential field for understanding and addressing the environmental, social, and cultural challenges that characterize the 21st century. This research made it possible to analyze, from different theoretical and practical perspectives, the transformative power of this area, showing that it represents much more than a simple pedagogical proposal: it is an educational, ethical, political, and social movement capable of changing mindsets, reconstructing relationships, and promoting new ways of living and coexisting on the planet. In a context marked by the intensification of the climate crisis, ecosystem degradation, and the advance of unsustainable behaviors and practices, Environmental Education presents itself as a necessary and urgent response, whose potential for individual and collective transformation becomes increasingly evident.

Throughout the study, it was possible to understand that the environmental crisis cannot be analyzed in isolation, as it stems from a civilizational model that privileges consumption, the uncontrolled exploitation of natural resources, and an economic logic based on profit above life. This understanding reinforces the fundamental role of Environmental Education in deconstructing paradigms that sustain degradation and socio-environmental inequality. Education, when used as a tool for critical reflection and emancipation, enables individuals to understand the deep causes of environmental problems and become capable of intervening in their realities, promoting changes that go beyond the individual level and reach collective, structural, and political dimensions.

Furthermore, it was found that Environmental Education has an interdisciplinary, integrative, and dialogical character, capable of linking scientific knowledge, traditional knowledge, community experiences, and diverse pedagogical practices. This characteristic expands the reach of education and allows it to dialogue with different audiences, ages, and social contexts, from formal educational institutions to community spaces and social movements. By promoting active participation, autonomy, and protagonism, Environmental Education strengthens ecological citizenship and significantly contributes to individuals and social groups adopting a more critical, responsible, and committed stance toward environmental preservation and the fight against socio-environmental injustices. Thus, it is consolidated as a fundamental strategy for building sustainable, fair, and democratically organized societies.

Another relevant aspect discussed in this work concerns the potential of Environmental Education to transform everyday practices. By encouraging reflection on consumption habits, waste production, use of natural resources, food, mobility, and coexistence with nature, it contributes to the emergence of more conscious behaviors and the appreciation of collective practices aimed at social and environmental well-being. However, it became clear that individual changes, although important, are not sufficient to reverse the current scenario of degradation. Therefore, Environmental Education must go beyond mere behavioral

change and assert itself as an instrument of social critique, capable of questioning productive systems, public policies, and historical processes that structure environmental inequality.

The research also showed that Brazilian legislation provides solid foundations for promoting Environmental Education, highlighting the Federal Constitution of 1988, Law No. 9.795/1999, and educational documents such as the PCNs and BNCC. These frameworks establish the responsibility of the State and society in promoting education aimed at sustainability. However, despite legal advances, significant challenges remain regarding the implementation of this policy, such as the lack of adequate teacher training, scarcity of resources, difficulty in articulating theory and practice, and institutional resistance to adopting critical and emancipatory methodologies. These difficulties demonstrate that, for Environmental Education to fully achieve its transformative potential, it is necessary to strengthen public policies, increase investments, and promote continuous, high-quality teacher training, as well as encourage the participation of the school community and society as a whole.

Through the analysis of concepts, practices, and experiences, this work reinforced that Environmental Education should not be treated as an isolated discipline but as a transversal axis that permeates all areas of knowledge and all dimensions of life. Its function is not only to inform but to form subjects capable of understanding the complexity of socio-environmental relationships and acting consciously and transformatively. In this sense, Environmental Education strengthens values such as solidarity, collective responsibility, care, respect for biological and cultural diversity, social justice, and environmental ethics—values essential for facing the current and future challenges of humanity.

The study also shows that, by exercising its transformative power, Environmental Education directly contributes to building new social realities. It fosters the development of more engaged communities, the defense of environmental rights, social mobilization around collective causes, and active participation in decision-making processes. Furthermore, through innovative pedagogical practices such as interdisciplinary projects, outdoor education, school gardens, field studies, and community actions, Environmental Education demonstrates that it is possible to learn from reality and transform that reality through knowledge and conscious action.

Thus, it is concluded that the transformative power of Environmental Education lies precisely in its ability to unite theory and practice, reflection and action, knowledge and social commitment. It does not offer ready-made answers but proposes paths, raises questions, and encourages the collective construction of solutions. In a world marked by environmental conflicts, inequalities, and increasingly evident risks, Environmental Education represents one of the main alternatives for guiding societies toward sustainability and socio-environmental justice. Its role is fundamental not only for forming more conscious citizens but for building development models that are more balanced, democratic, and respectful of all forms of life.

Finally, this research reaffirms the need to strengthen Environmental Education in all spheres—school, community, institutional, and governmental—ensuring that it is treated as a priority public policy and as a collective commitment. Environmental Education is, therefore, an indispensable path for transforming not only individual practices but also mentalities, social structures, and development models. Its transformative power is manifested in the possibility of building a more just, sustainable, and harmonious future, in which present and future generations can live in balance with the environment. Thus, the study concludes that investing in Environmental Education is investing in the very continuity of life on the planet, reaffirming the urgency and relevance of this field in the current context and in the challenges that are yet to come.

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