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RETHINKING ENVIRONMENTAL EDUCATION: CHALLENGES, REFLECTIONS AND PERSPECTIVES

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Abstract: This study examines the challenges faced in teaching Environmental Education, with an emphasis on the lack of teacher training, shortage of teaching resources and resistance to environmental issues. The investigation covers the understanding of fundamental concepts and the historical context, providing a comprehensive view that generates solutions to improve teaching. Updating the National Common Core Curriculum is highlighted as essential, requiring the incorporation of pedagogical practices that directly impact students' local lives. For these practices to be effective, it is crucial to improve the curriculum, allowing students to disseminate the knowledge they have acquired and contribute positively to sustainable development. The study suggests that an integrated and practical approach to teacher training, combined with the provision of appropriate teaching resources, can reduce resistance to environmental issues and promote more effective environmental education. The research reinforces the importance of well-structured environmental education for the formation of aware citizens committed to sustainability. Thus, the review and implementation of an updated curriculum are fundamental steps towards achieving more effective and comprehensive environmental education teaching.

Keywords: Teaching, pedagogical practice, environmental education.

INTRODUCTION

The complex relationship between human beings and the environment dates back to the dawn of history and has taken on worrying contours with the advance of industrialization and technology. The growing distance between humanity and the earth, driven by the development of artificial environments and the incessant search for natural resources, has led to a suppression of diversity and the denial of the multiple forms of life that share our planet.

The environmental issue, more than an ecological problem, is a crisis of thought and understanding, of the ontology and epistemology with which Western civilization has understood being, beings and things; of the scientific and technological rationality with which nature has been dominated and the modern world economized; of the relationships and interdependencies between material and symbolic, natural and technological processes (Leff, 2003, p.3).

Leff(2003) points out that the environmental issue transcends a simple ecological problem and is configured as a profound crisis of human thought and understanding. He argues that this crisis encompasses ontological and epistemological aspects, questioning the ways in which Western civilization has understood existence, beings and things. Leff criticizes the scientific and technological rationality that has dominated nature and shaped the modern world, pointing out that this reductionist perspective fails to recognize the complexity of the interactions between material and symbolic processes, as well as between natural and technological elements. The environmental crisis, therefore, is not just a reflection of ecological degradation, but also a manifestation of fundamental flaws in the way Western society conceives of and interacts with the world. This vision calls for a reassessment of the philosophical and scientific bases that underpin our actions and decisions, promoting a more holistic and integrated approach to dealing with contemporary environmental challenges.

For Ailton Krenak (2019), this distancing affects our perception of citizenship, turning us into mere consumers of the environment, rather than conscious and active agents in its preservation. This reflection becomes even more crucial in a global context where environmental awareness has only recently emerged, with milestones such as the Stockholm Conference in 1972, giving

rise to the debate and dissemination of Environmental Education (EE) as an essential tool for conservation and civic engagement. Thus, “environmental education has undergone a civilizing process of change since its creation, as it could not be otherwise, since it is education” (Fonseca; Mendes, 2013, p.1).

In Brazil, Environmental Education is supported by policies such as the National Environmental Education Policy (PNEA) and the National Curriculum Parameters (PCN), which establish guidelines for its effective implementation in the education system. However, the implementation of these guidelines comes up against significant challenges, especially with regard to the training and qualification of teachers.

Teachers play a fundamental role in integrating students into the environment and promoting active environmental awareness. However, most do not receive adequate training on the subject during their academic career, which limits their teaching practices. The lack of preparation and support to address environmental issues in an interdisciplinary and contextualized way compromises teaching effectiveness.

[...] that the environment be highlighted as part of the general context of human/being and human/nature relations, in all areas of teaching, in the approach to different contents: whether in the study of the various forms of social and cultural organization, with their most diverse conflicts or in the work with the various forms of communication, expression and interaction, whether in the study of the phenomena and characteristics of nature or in the discussion of the technologies that mediate the various dimensions of current life (BRASIL, 2000, p. 194).

Understanding teachers’ conceptions and practices in relation to Environmental Education is essential to directing effective teaching and training strategies. This work seeks not only to reflect on the challenges faced by educators, but also to identify their

conceptions of the subject and propose ways of integrating it more effectively into the school curriculum.

In addition, it is necessary to explore the potential of technological tools in the educational context, offering new opportunities to engage students and promote a deeper understanding of environmental issues.

This work aims not only to raise awareness of the importance of Environmental Education, but also to provide insights and practical guidelines for overcoming the challenges inherent in its effective implementation in Brazilian schools. Through a reflective and propositional approach, it seeks to empower educators so that they can play a fundamental role in the formation of environmentally aware and engaged citizens.

THE TRAJECTORY OF ENVIRONMENTAL EDUCATION: CONCEPTS AND DEVELOPMENT THROUGHOUT HISTORY

The trajectory of Environmental Education (EE) throughout history is marked by significant milestones that reflect the growing global concern about environmental issues and the urgent need to promote sustainability. In response to the challenges posed by environmental disasters, extreme climate change and the degradation of natural resources, EE has emerged as an essential tool for cultivating environmental awareness and responsibility among individuals and communities.

Since its formal conception, environmental education has evolved beyond the simple transmission of knowledge about the environment. According to Leff (2003), environmental education is a dynamic process in which everyone is both a learner and an educator, emphasizing the need for a holistic and participatory approach to tackling today’s complex environmental challenges.

The official recognition of environmental education as a field of study and practice came after the Stockholm Conference in 1972, a crucial milestone where world leaders discussed global environmental issues for the first time and drew up the Charter of Principles on the Human Environment. However, it was during the Belgrade Meeting in 1975, promoted by UNESCO, that the International Program for Environmental Education (PIEA) was established, emphasizing the continuous and integrated nature of EE, adaptable to regional and local needs (Rocha, Cruz, Leão, 2015).

The consolidation of the “conceptual framework” of environmental education took place at the First Intergovernmental Conference on Environmental Education in 1977, known as the Tbilisi Conference, which emphasized its interdisciplinary and participatory approach (Dias, 2000). This event was crucial in affirming that environmental education should not be limited to an isolated discipline, but should be integrated with the various areas of knowledge, aiming not only to inform, but also to develop skills and responsible attitudes towards the environment.

Over the following decades, environmental education has continued to develop and adapt to changes in environmental concerns and global educational contexts. The integration of environmental education into educational policies has become a priority, recognizing its ability to influence attitudes from childhood to adulthood, promoting a culture of sustainability and environmental responsibility in contemporary society.

The historical evolution of environmental education reflects not only the growing awareness of environmental challenges, but also the pressing need for an educational approach that empowers individuals to act responsibly towards the environment. EE is not just a field of study, but an ongoing

practice of engagement and learning, essential for building a sustainable future for present and future generations.

ENVIRONMENTAL EDUCATION IN BRAZIL: LEGISLATIVE ADVANCES AND EDUCATIONAL CHALLENGES

The Stockholm Conference in 1972 marked a crucial moment for the development of Environmental Education (EE) in Brazil. Soon after this event, in response to international recommendations, the Special Secretariat for the Environment (SEMA) was established in the country. This initiative aimed to educate Brazilians about the proper use of natural resources and the importance of environmental conservation.

In 1981, President João Figueiredo formalized the National Environmental Policy through Law 6938/81. This policy represented an important legal milestone when it made environmental education compulsory at all levels of education. This requirement was reinforced in the 1988 Brazilian Constitution, which charged the public authorities with promoting environmental education at all educational levels (Sousa, 2014).

Rio-92, held in the city of Rio de Janeiro in 1992, recognized environmental education as an essential pillar for building a sustainable society. Cuba (2010) points out that this event emphasized the interdisciplinary and participatory nature of environmental education, promoting a holistic and inclusive vision of sustainable development.

Environmental Education is understood to be the processes through which individuals and the community build social values, knowledge, skills, attitudes and competencies aimed at conserving the environment, which is a good for the common use of the people, essential to a healthy quality of life and its sustainability (BRASIL, 1999, p. 1).

Law 9795/99, which established the National Environmental Education Policy, was an important milestone for the advancement of environmental education in Brazil. This law defined the objectives and principles of environmental education, with the aim of promoting awareness and concrete actions to protect the environment. Among the main aspects addressed by the policy are interdisciplinarity, collective rights, sustainability and the training of human resources (Brasil, 1999).

The effective implementation of environmental education depends largely on the commitment of teachers and the pedagogical practices adopted in schools. The 1996 National Education Guidelines and Bases Law (LDBEN) and the National Curriculum Parameters (PCN) for Primary and Secondary Education have been important instruments in this regard. These documents establish guidelines for the integration of environmental education into the school curriculum, enabling students to become agents for transforming the environment (Brasil, 2000).

Schools play a crucial role in promoting environmental education, providing spaces for integration between students, teachers and the local community. The PCNs for secondary education have been particularly relevant in guiding teachers' pedagogical practices, emphasizing the formation of values and attitudes that integrate students into the environment in which they live (Marinho, 2004).

In 2012, the Brazilian government established the National Curriculum Guidelines (NCG) for Environmental Education, an important milestone for the consolidation of environmental education in the Brazilian education system. These guidelines aim to guide the organization and development of pedagogical proposals in all the country's education networks, promoting quality education that respects social, cultural and ethnic diversity (Brasil, 2013).

Brazil has made significant progress in promoting environmental education through legal frameworks and educational policies. However, there are still challenges to be faced, especially with regard to the implementation of pedagogical practices and the integration of environmental education into the school curriculum in a transversal and interdisciplinary way. The consolidation of environmental education in the Brazilian education system requires a joint effort by governments, educational institutions, teachers and local communities.

THE IMPORTANCE OF THE COMMON NATIONAL CURRICULUM BASE (BNCC) IN PROMOTING ENVIRONMENTAL EDUCATION

The implementation of the Common National Curriculum Base (BNCC) in 2015 represents a significant milestone in the history of Brazilian education. After several mobilizations and debates, the BNCC was approved in its full version three years later, initiating a process of teacher training and support for state and municipal education systems to prepare and adapt school curricula (Brasil, 2018).

The fundamental aim of the BNCC is to promote comprehensive human development and contribute to building a fair, democratic and inclusive society. To achieve this, the BNCC establishes ten general competences to guide teaching at all stages of basic education. These competences reflect not only students' learning and development rights, but also the values that are essential for building a more humane, socially just society that is committed to preserving the environment (Brasil, 2018).

The BNCC is aligned with the United Nations (UN) 2030 Agenda, specifically Sustainable Development Goal (SDG) 4, which aims to ensure inclusive, equitable and quality

education for all, promoting lifelong learning opportunities (UN, 2015). This demonstrates Brazil's commitment to promoting education that prepares students to face the challenges of the 21st century, including environmental issues.

The BNCC covers Early Childhood Education, Primary Education and Secondary Education, ensuring an integrated and progressive approach throughout basic education. Each educational stage has its own specific guidelines, but all are guided by the principles of the BNCC, which aim to develop essential skills in students (Brasil, 2018). In Early Childhood Education, for example, six learning and development rights are guaranteed, including the right to live, play, participate, explore, express oneself and get to know oneself (Brasil, 2018).

In elementary school, the subjects are organized into five areas of knowledge, each with its own specific objectives and roles in the comprehensive education of students (Brasil, 2018). Secondary education, in turn, is divided into four areas of knowledge, all interrelated and contextualized to enable a more comprehensive understanding of reality (Brasil, 2018). In all areas, the BNCC highlights the importance of Environmental Education as an essential dimension of students' education.

Each area of knowledge establishes specific competencies related to Environmental Education, which aim to develop students' critical understanding of environmental challenges and ability to propose sustainable solutions (Brasil, 2018). For example, in the area of "Natural Sciences and their Technologies", students are encouraged to analyze environmental processes and phenomena and propose actions to minimize socio-environmental impacts (Brasil, 2018).

Fonseca and Mendes (2013) highlight the importance of approaching Environmental

Education critically in schools, allowing students to develop the skills to analyze and act on socio-environmental problems. This requires an interdisciplinary approach that integrates knowledge and practices of environmental conservation, making students agents of transformation in their communities.

The BNCC's focus on environmental education is not just limited to curriculum content, but also involves promoting values and attitudes that encourage respect for and preservation of the environment. Environmental education should be seen as a continuous and comprehensive process that goes beyond the boundaries of the classroom and extends into students' everyday lives. In this way, the BNCC promotes the incorporation of sustainable practices and environmental awareness as integral parts of students' all-round development.

In addition, the BNCC encourages the active participation of students in projects and activities aimed at environmental conservation and sustainability. School garden projects, recycling, conservation of natural resources and other initiatives can be integrated into the school curriculum, providing practical and meaningful learning. These projects allow students to experience and understand the impacts of their actions on the environment, fostering a proactive and responsible attitude towards the environment.

Continuing teacher training is also a crucial aspect for the successful implementation of Environmental Education as guided by the BNCC. It is essential that educators are prepared to address environmental issues in an interdisciplinary and contextualized way, using innovative methodologies and appropriate teaching resources. Teacher training should include theoretical and practical knowledge about environmental education, as well as strategies to engage students and promote meaningful learning.

The integration of Environmental Education into the school curriculum, as proposed by the BNCC, contributes significantly to the formation of a critical and active environmental awareness among students. Through an educational approach that values sustainability and environmental preservation, the BNCC prepares students to face the environmental challenges of the 21st century and contribute to building a more sustainable future.

The BNCC plays a key role in promoting Environmental Education in Brazil, ensuring that students develop essential skills to understand, analyze and act on contemporary environmental challenges. This integrated and progressive approach contributes to the formation of aware and responsible citizens, capable of contributing to the construction of a fairer, more democratic and sustainable society. By ensuring that environmental education is present at all stages of basic education, the BNCC lays the foundations for a future where environmental preservation and sustainability are fundamental priorities.

CHALLENGES AND OPPORTUNITIES IN ENVIRONMENTAL EDUCATION IN A TECHNOLOGICAL WORLD

Environmental education (EE) plays a crucial role in raising awareness and changing behavior towards the environment. However, simply transmitting information is not enough to have a significant impact on students. A collective and critical engagement is needed to reverse misconceptions and promote a new environmental awareness.

As noted by Ferraz (2004), the holistic approach to environmental education aims to rethink the values that have led to environmental degradation, emphasizing the interdependence between human beings and the environment. In this context, Environmental Education

in schools must transcend conservationism, incorporating a broader and more integrative vision (Dias, 2010).

However, we face a number of challenges in making environmental education a reality, especially in the face of the urgent environmental crisis. Educational activities are often hampered by a lack of time and an overload of content (Soares, 2000). Educators end up stuck in established patterns, without adding value to the students. In addition, educators' training often does not adequately equip them to deal with Environmental Education in an interdisciplinary and contextualized way (Cuba, 2010). In high school, for example, the focus on the entrance exam can divert attention from the students' critical and civic education.

Technological advances have also had a significant impact on how we relate to the environment and how we learn. The so-called "Generation Z", born in the digital age, has an intrinsic relationship with technology (Lara & Quartiero, 2010). For many students, digital learning is more attractive and effective. In this sense, educators have the opportunity to use technological tools to enrich the educational process. Familiarization with technological trends in education allows teachers to explore new ways of teaching and adapting to change (França, 2018).

However, it is essential that the use of technology in education is carefully planned and oriented towards pedagogical objectives. Educators must ensure that students understand the reasons behind the use of technological tools and are able to use them critically and responsibly. Technology, when used well, can be a powerful ally in promoting effective and engaging environmental education. Tools such as digital platforms, interactive applications, educational games and multimedia resources can transform the way students perceive and interact with the environment.

The integration of environmental education with educational technologies offers exciting opportunities to promote a new environmental awareness. For example, the use of simulators and virtual models can help students visualize the impacts of human actions on the environment in a more tangible and immediate way. In addition, collaborative online projects can foster more participatory and community-based learning, allowing students to work together on solutions to real environmental problems.

However, it is essential to overcome the existing challenges and ensure that environmental education is effective, relevant and accessible to all students. This requires continuous investment in training educators, providing them with the necessary skills and knowledge to integrate technology meaningfully into their teaching practices. Continuing education programs and practical workshops can be key to making teachers feel confident and empowered to use technology for the benefit of environmental education.

Furthermore, the inclusion of environmental education in school curricula should be done in an integrated and interdisciplinary way, allowing students to make connections between different areas of knowledge and understand the complexity of environmental issues. Collaboration between different disciplines, such as science, geography, history and technology, can enrich students' understanding of the interdependencies between natural and social systems.

Finally, it is important that educational policies support and encourage the implementation of environmental education in schools. The creation of programs and initiatives that value environmental education, combined with the use of technology, can be a significant step towards preparing future generations for the environmental challenges of the 21st century.

Environmental education in a technological world presents both challenges and opportunities. By tackling these issues head on and taking advantage of the technological tools available, we can promote more engaging, critical and transformative environmental education. This will not only enable students to become aware and responsible citizens, but will also contribute to building a more sustainable and balanced future.

CONCLUSION

Environmental Education has emerged as an innovative and vital topic for the Brazilian educational context, despite the fact that it is still little explored in school practices. Recognizing the importance of this topic and learning to transform attitudes towards the learning process are fundamental steps towards guaranteeing better living conditions for future generations.

As Carvalho (2016) points out, it is essential that schools rethink their approaches to incorporate environmental education in a more humanized way. Pedagogical work must be rooted in students' local realities, encouraging awareness and appreciation of the environment in which they live. In this way, Environmental Education appears to be a crucial way of promoting a change in both individual and collective thinking, enabling students to better understand society and its interactions, and thus become environmentally aware citizens, engaged in promoting ethics, freedom and sustainability, effectively contributing to the local development of communities.

Despite the requirement of the National Education Policy to include the environmental dimension in teacher training curricula, many educators still lack pedagogical tools applicable to their local realities (Brasil, 1999). In this sense, it is essential to invest in complementary training programs in the area,

with the aim of enabling teachers to effectively address Environmental Education in their educational practices. Teachers' ongoing training should be a priority, providing them with the knowledge and skills needed to integrate Environmental Education effectively and meaningfully into the school curriculum.

The use of technology in education has emerged as an unavoidable solution to overcome the challenges faced in pedagogical practice, not just in the environmental context, but in all areas of teaching. Through platforms, applications, games and other digital tools, it is possible to involve students in a more dynamic and participatory way, stimulating interest in environmental preservation and promoting the collective construction of knowledge (Cuba, 2010). These technologies can provide more interactive and engaging learning experiences, facilitating the understanding of complex environmental concepts and encouraging positive environmental action.

In short, Environmental Education is a fundamental element in the education of students, enabling them to face the environmental challenges of the 21st century in a conscious and engaged way. By integrating the environmental dimension into educational practices, promoting a contextualized and interdisciplinary approach, schools can play a

crucial role in building a more sustainable and environmentally responsible society. For this to be achieved, a joint effort is needed from educators, school managers, policy makers and the community in general, aimed at creating an educational environment that values and promotes Environmental Education.

Therefore, the effective implementation of environmental education in schools requires a paradigm shift in the way education is conceived and practiced. Public education policies need to be robust and sustainable, supporting initiatives that encourage environmental education from early childhood through to higher education. In addition, collaboration between schools, families and communities is essential to ensure that environmental education efforts are widely understood and supported.

In conclusion, Environmental Education is not just a subject to be taught, but a practice to be lived, which promotes environmental awareness and responsibility in all spheres of life. By cultivating this awareness in future generations, we will be building a solid foundation for a greener and more sustainable future, where respect for the environment and the search for sustainable solutions become core values of society.

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