

# Environmental Thematic in Brazilian journals of Physics Education and Environmental Education

Wednesday 15 December 2021 17:00 (20 minutes)

**Abstract:** *What kind of articulations between physics and environmental theme can be identified in some papers published in Brazilian journals on Physics Education and Environmental Education? The investigation was qualitative and bibliographical and aimed to understand the Brazilian knowledge produced by researchers who seek to build bridges between Physics Education and Environmental Education. The research was based on Analysis Content procedures. The data indicate a more critical perspective on the environmental issue and pedagogical perspectives aimed at building citizenship and a process of questioning socio-environmental injustices. This information contributes to outline an overview of Environmental approaches in Physics Teaching.*

## 1. Introduction

Environmental issues present many important challenges for our society. Some environmentalists indicate that there is an environmental crisis [1]. In Brazil, the field of science education has been a kind of gateway to the presentation of environmental issues for students from 6 to 17 years old [2]. Although, traditionally, the discussion of environmental issues has turned more often to ecological issues. However, other fields of science may contemplate other dimensions of environmental issues. Physics, for example, is essential to understanding complex problems such as global warming [3].

In this context, there are few articles relating Physics Education and Environmental Education [4,5,6]. According to [4], this small number of articles may be associated with the fact that the Teaching of Physics, for many years in Brazil, has focused on considerations specifically aimed at teaching specific contents of Physics. However, the number of articles that are focused in Environmental Education and Physics Education has increased significantly since the 2000s. Most of them present the links between environmental issues and social injustices [4,5].

Seeking to contribute to outline a panoramic perspective of the connections between Physics Education and Environmental Education in the Brazilian context, a question was elaborated: what kind of articulations between physics and environmental theme can be identified in some papers published in Brazilian journals on Physics Education and Environmental Education?

Four Brazilian journals were chosen to this investigation. The *Revista Brasileira de Ensino de Física* and the *Caderno Brasileiro de Ensino de Física* are associated with physics education. The *Revista Brasileira de Educação Ambiental* and the *Revista Pesquisa em Educação Ambiental* are associated with Environmental Education. The documentary corpus was constituted by searching for articles in electronic address of these four journals. Two terms were chosen for this search: environment and physics. From 3,383 articles, 23 were chosen at this stage of the research.

The researcher have read the 23 articles. After reading the articles, 14 articles were chosen to compose the documentary corpus of the research. All these 14 articles bring a discussion that articulates the environmental theme and the physics education. Content analysis [7] techniques were used for the analysis. Excerpts with relevant content for this investigation were found in the articles and then organized into groups according to the similarities of ideas and named by a unit of meaning that converges to broader categories.

## 2. Findings

### 2.1 Environmental Thematic understands

Two categories were named. The first is the Social Dimension of the Environmental Theme and the second the Complexities, Controversies and Uncertainties of the Environmental Theme. These categories include ideas related to the anthropogenic and cultural influence on the intensification of environmental issues, criticisms of the American way of life, considerations about the implications of environmental problems for human

life and the importance of the media for the massive understanding of environmental issues. Considerations about the complexities, controversies and uncertainties intrinsic to environmental issues were found.

## 2.2. *Articulations between Environmental Thematic and Physics Education*

Five pedagogical strategies were identified to articulated contents of Physics and environmental themes: 1) Approaches based on Environmental Education; 2) Contextualization perspective from social and environmental themes; 3) Science, Technology, Society and Environmental (STS/STSE) education; 4) Interdisciplinary and 5) Scientific and Technological Learning.

## 3. Conclusion

There is in these articles a more critical perspective on the environmental theme. These articles also contain considerations on citizenship and social justice. It is important to expand studies like this to theses, dissertations and other articles from other journals. Building an overview of environmental issues in the literature on Physics Education can indicate significant perspectives for the area and guide teaching practice.

## References

- [1] E. LEFF, *Epistemologia Ambiental*, Cortez, São Paulo, 2002.
- [2] L. F. SILVA and L. M. de Carvalho, *Educação em Ciências e Temática Ambiental: aproximações teórico-metodológicas com a perspectiva educacional Freireana*. In G. W. CAMELO, *Educação Científica Freiriana na Escola*, São Paulo, Editora da Física, 2019, 149-16.
- [3] G. W. CAMELO. *Aspectos da complexidade: Contribuição da Física para a compreensão do tema ambiental*, São Paulo, 2012.
- [4] L. F. SILVA, M. F. CAVALARI and C. MUENCHEN, *Compreensões de Pesquisadores da Área de Ensino de Física sobre a Temática Ambiental e as suas Articulações com o Processo Educativo*. *Ens. Pesqui. Educ. Ciênc.*, Belo Horizonte, 17 2015 283-307.
- [5] G. L. MELO and L. F. SILVA, *A temática ambiental e o ensino de Física: um estudo a partir dos trabalhos apresentados nos anais do Simpósio Nacional de Ensino de Física, REnCiMa*, 10 2019 37-57.
- [6] P. SUDÁRIO, I. FORTUNATO and C. LOURENÇO, *A Educação Ambiental em periódicos brasileiros de ensino de física*. *RevBEA*, 11 2016 127-138.
- [7] L. BARDIN, *Análise de conteúdo*, Edições 70, Lisboa 2009.

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**Session Classification:** Parallel 8 - Wrocław/Guayaquil

**Track Classification:** 18. Physics for environment and social issues