

The approach to environmental education in the area of natural sciences in the currículo paulista: an analysis in light of the foundations of critical-transformative environmental education through generative themes

ABSTRACT

Rafael Pereira Lobo

rlobo@prof.educacao.sp.gov.br
orcid.org/0000-0002-8207-7348

Universidade Federal de São Carlos
(UFSCar), Sorocaba, São Paulo, Brasil.

Juliana Rezende Torres

julianart@ufscar.br
orcid.org/0000-0002-4598-6702

Universidade Federal de São Carlos
(UFSCar), Sorocaba, São Paulo, Brasil.

Environmental Education (EE) is a fundamental process in changing our relationship with the environment. It is proposed that Critical-Transformative Environmental Education through Generative Themes (EACT-TG), based on pedagogical principles as proposed by Paulo Freire, be a conception of EE aimed at forming critical individuals who actively participate in transforming their environmental reality. The objective of this research is to analyze the presence and approach of EE in the *Currículo Paulista* (São Paulo State Curriculum) within the area of Natural Sciences throughout Elementary Education, from 1st to 9th grade, with regard to its relevance and its alignment or divergence from the foundations of EACT-TG. The investigation into the curriculum's EE-related competencies was conducted through an analysis of the presence or absence of moments involving dialogue, generative themes, and transformative actions. It was found that many of these competencies do not include the perspective of dialogue, and only a minority allows for the incorporation of generative themes or the planning and execution of transformative actions in concrete reality. In the few competencies that do contain traces of these three elements, there is a noticeable tendency toward individual blame, without a critical view of environmental issues. Therefore, the results reveal that the approach to EE in the *Currículo Paulista* within the field of Natural Sciences diverges from the methodological perspective that would incorporate the foundations of a EACT-TG.

KEYWORDS: Environment as a totality; Freirean pedagogy; Science teaching.

A abordagem de educação ambiental na área de ciências da natureza do currículo paulista: uma análise à luz de fundamentos da educação ambiental crítico-transformadora via tema gerador

RESUMO

A Educação Ambiental (EA) é um processo fundamental na mudança da nossa relação com o meio ambiente. Propõe-se que a Educação Ambiental Crítico-Transformadora via Tema Gerador (EACT-TG), com fundamentos pedagógicos conforme propostos por Paulo Freire, seja uma concepção de EA para a formação de indivíduos críticos e atuantes na transformação da sua realidade ambiental. O objetivo desta pesquisa é analisar a presença e abordagem da EA do Currículo Paulista na área de Ciências da Natureza, ao longo do Ensino Fundamental, que vai do 1º ao 9º ano, quanto à sua relevância, buscando proximidades e distanciamentos aos fundamentos da EACT-TG. A investigação no texto das habilidades referentes à EA foi realizada a partir da análise da presença ou não de momentos referentes ao diálogo, aos temas geradores e às ações transformadoras. Constatou-se que muitas destas habilidades não contemplam a perspectiva do diálogo, bem como somente uma minoria contempla a possibilidade de tomada de temas geradores, e de planejamento e execução de ações transformadoras na realidade concreta. Nas poucas habilidades que contêm indícios destes três momentos, constatou-se uma tendência à culpabilidade individual, sem uma visão crítica a respeito dos problemas ambientais. Dessa forma, os resultados revelam que a abordagem da EA no Currículo Paulista na área de Ciências da Natureza, se distancia da perspectiva metodológica que contemplaria os fundamentos de uma EACT-TG.

PALAVRAS-CHAVE: Meio Ambiente como totalidade; Pedagogia Freireana; Ensino de Ciências.

INTRODUCTION

Education is the means by which each individual acquires the cognitive skills necessary to understand the world and, from this understanding, might become an active agent in the dynamics of their own reality. Paulo Freire, the most cited Brazilian author in academic works around the world and a reference in the field of education, defines education as 'an action of men in search of their liberation, which cannot be distant from those who are oppressed, who must be examples to themselves in their humanising process' (Freire, 1987, p. 9). Thus, when aiming to build a more just and egalitarian society, it is necessary to invest in education with a liberating and critical bias, which reveals the injustices of social inequality and the means necessary to overcome this contradiction.

'Contemporary society is currently experiencing an environmental crisis caused by the imbalance between the demand for natural resources promoted by the capitalist system and nature's ability to regenerate these resources' (Pereira; Santos, 2019, p. 1). However, although the main responsible for this crisis are not ordinary people, it is those who are most socially vulnerable who, in turn, will suffer the greatest consequences of an environmental collapse on the planet. In addition to the continued existence of natural resources, the social impacts of damaging the environment must be taken into account. From this point of view, Environmental Education (EE) appears to be an indispensable process for increasing our care for the environment and for enlightening the population about the danger of not reviewing environmental exploitation actions.

According to Torres (2010, p. 28), as a way of strengthening the transformative nature of environmental education, 'it is important that it is developed in line with Freirean pedagogy, which is used as an epistemological and pedagogical basis to enhance its development and implementation'. Therefore, taking into account the need for a transformative approach in the activities that permeate EE, 'it is fundamental that, in its praxis, we seek to achieve moments of preliminary survey of the local reality, analysis of situations/choice of codifications and decoding dialogues' (Oliveira; Torres, 2023, p. 8), such moments are fundamental to the pedagogical process in EE defined by Torres (2010) as Critical-Transformative Environmental Education via a Generative Theme (EACT-TG).

Among the spaces in which environmental education can be implemented, schools stand out first and foremost. 'Its teaching should be part of everyday school life, inserted into subjects and content in an interdisciplinary way and implemented in students' daily lives, so as to teach them to recognise the environment as a home' (Narcizo, 2009, p. 2). As far as the state of São Paulo is concerned:

What we are seeing in this area [education in general] are educational policies aligned with the principles of neoliberalism, which are being implemented gradually through progressive cycles of adaptation, turning the state into a kind of laboratory where neoliberal reforms are tested (Gomide, 2019, p. 299).

In this context, the São Paulo State Department of Education (SEDUC-SP) has drawn up a document called the Paulista Curriculum, which must be followed as a basis by state schools in the development of their pedagogical work. Thus, the

question this research aims to answer is: To what extent does the environmental education effectively prescribed as public policy in the state of São Paulo have parameters that bring it closer to a practice of Critical-Transformative Environmental Education via a Generative Theme? Therefore, the general objective is to analyse the guidelines for the development of environmental education in the Paulista Curriculum - in the area of Natural Sciences at elementary school, which covers the 1st to 9th grades, and their approximation to and/or distancing from the foundations of Critical-Transformative Environmental Education via a Generative Theme.

THE PAULISTA SCIENCE CURRICULUM

The document that serves as the basis for the analysis developed in this research is the Paulista Curriculum, in the field of Natural Sciences (São Paulo, 2019). The document, in its conception, refers to the National Common Curriculum Base (BNCC) (Brasil, 2018), which in turn 'is founded on a model of curricular standardisation, based on competences' (Hypolito, 2021, p. 41). 'One of the main characteristics of this curriculum standard is a teaching proposal based on practical content, with little theoretical foundation and to the detriment of scientific knowledge, stimulating competitiveness, individuality and pragmatic actions' (Silva, Lhamas; Maia, 2025, p. 14). 'The BNCC is defined as a starting point for sub-national curricula, that is, its curricular policy affects all the mechanisms that permeate school practice' (Silva; Paula, 2021, p. 701). Therefore, in order to study the state curriculum document with a focus on the state of São Paulo, the skills analysed in this work were based directly on the Paulista Curriculum.

The document, released in August 2019, describes that once instituted, it becomes 'the promoter of educational equality throughout the state, ending the fragmentation of educational policies since now one educational curriculum should be followed by all students in São Paulo' (Barbosa; Lastória, 2021, p. 3). However, despite having been drawn up with a discourse of developing the skills and competences necessary for critical insertion into society, 'the document is at the service of a market logic and uses the school as a propagator of capitalist ideas' (Forner; Malheiros, 2019, p. 2).

That said, the Paulista curriculum is based on ideals of training labour for the job market, following a neoliberal agenda. In this model of education:

The purpose of the school is to prepare people to fulfil their social roles, taking into account individual aptitudes. But in order to achieve this goal, students must adapt to society's prevailing values and norms (Silva, 2016, p. 2).

In addition, as a result of government policies in the state aimed at a neoliberal agenda, 'what we see are persuasive and prescriptive mechanisms created by the government which constitute a veiled demand for compliance with the curriculum in schools' (Forner; Malheiros, 2019, p. 3). Therefore, contrary to what liberating education preaches, this educational model contemplated by the Paulista Curriculum tends not to look critically at the social problems in which the students are inserted, but to work on knowledge in isolation from the environment in which the students find themselves, without

working with them in the search for emancipatory thinking, which would make them able to transform their own concrete reality. This concept of education is called *banking education* by Paulo Freire, who describes it in his work *Pedagogy of the Oppressed*:

Talking about reality as something stationary, static, compartmentalised and well-behaved, when not talking or dissertating about something completely alien to the existential experience of the students has really been the supreme restlessness of this education. Its unbridled eagerness. In it, the educator appears as its undisputed agent, as its real subject, whose undeniable task is to 'fill' the students with the contents of the educator's narration. These contents are pieces of reality disconnected from the totality in which they are engendered and in whose vision they would gain meaning. The word, in these dissertations, is emptied of the concrete dimension it should have or becomes a hollow word, an alienated and alienating verbiage. That is why it is more sound than meaning, and so it would be better not to say it (Freire, 1987, p. 37).

However, even if there is a path for the student to follow, Forner and Malheiros (2019, p. 3) argue: 'that this path is best understood by those who are actually in the classroom, the teachers, and once such an understanding is realised, they can collaborate in designing a curriculum that is more in line with their students and contexts'. We believe that the concept of EACT-TG can make possible what Guimarães (2004, p. 31) advocates, where 'the adherence of pedagogical action to the movement of social reality, stimulating the formation of leaders of the collective resistance movement and working from the perspective of the construction of knowledge in a contextualised way beyond mere transmission'.

By using a Freirean thematic approach, which consists of the pedagogical implementation of the processes of investigation and thematic reduction as proposed by Paulo Freire, EACT-TG 'presupposes the search for generating themes that highlight the significant situations experienced by the students, allowing for the realisation of a critical interdisciplinary curriculum and the development of truly transformative school practices' (Torres, 2010, p. 323).

THE FOUNDATIONS OF CRITICAL-TRANSFORMATIVE ENVIRONMENTAL EDUCATION VIA GENERATOR THEMES IN THE CONTEXT OF THE FIELD OF ENVIRONMENTAL EDUCATION

The environmental crisis we are experiencing today is a reflection of many years of negligence and disregard for the environment on the part of governments and companies.

The dominant logic of the human-nature relationship is that natural environments are seen as disordered, in contrast to the hegemonic urban model, which leads nature to be seen as a mere space of domination and a place where human needs come from (Henning, 2019, p. 9).

This complaint was also made by Guimarães (2004, p. 28), who says that:

This understanding of the world is the pillar of the current environmental crisis, where it is difficult to think of the whole and the complex totality, but instead focuses on one part of a fragmented world, the human being over the others, over nature, and between them a hierarchical difference is established that builds the logic of domination.

Since environmental education has emerged as a way of tackling the environmental crisis, 'it needs to be promoted in a critical manner, for only in this way can we configure an educational action that is effectively capable of transforming a reality that is in the midst of a serious environmental crisis' (Guimarães, 2004, p. 27). From this point of view, the concepts that are usually worked on in environmental education are:

- (i) understanding the environment as interrelated and interdependent;
- (ii) recognising the world based on the fundamental principles of life (ecological) and the limiting laws of nature (entropy);
- (iii) a unitary understanding of life on Earth, interconnected by biological and social networks;
- (iv) an understanding of socio-environmental problems based on their multiple dimensions and complexity, and hence the principle of uncertainty;
- (v) environmental sustainability guided by new values and knowledge, articulated by interdisciplinarity (Dickmann; Carneiro, 2021, p. 43).

These foundations show that society is intrinsically related to the biological aspects dealt with in environmental education. This education, supported by critical thinking, 'has the challenge of breaking with the positivist model of appropriating nature for economic development and with the capitalist rationality of appropriating environmental discourses for the purposes of economic growth' (Lopes; Abílio, 2021, p. 2). According to Torres (2010, p. 26), as a counterpoint to this current model, in order to have the environmental education of a critical citizen, it is presumed that the latter 'must be able to understand the relationships between society, culture and nature, men and the world, recognising themselves as part of this totality, and in this way, consider themselves to be a transforming agent of reality capable of changing it'.

With this in mind, the EACT-TG, as defended by Torres (2010, p. 5), is used here in this work as an analytical reference:

It takes the local context into account in order to define the environmental problems summarised in generating themes, and then to develop pedagogical approaches around them, problematising students so that they can reflect on their own concrete reality and its limiting factors at a macro-structural level, without holding the individual exclusively responsible for the environmental problems they experience/perceive.

Based on the assumption that truly effective environmental education cannot ignore the reality in which the student is inserted, it follows that:

The environmental educator, in turn, is in a role crossed by the marks of a political action, in which the conditions of the course of environmental education itself subtend the overlap between the marks of a social movement and those of an epistemologically founded and institutionally organised education (Carvalho, 2001, p. 1).

In other words, for the EACT-TG, we have that 'the environment in its totalising perspective is understood from the relationships between nature, society and culture' (Torres, 2010, p. 28).

Historically, a major milestone for environmental education in the world was the Stockholm Conference, organised by the United Nations (UN) in 1972, 'where recommendation no. 96 was created, which recognised the development of environmental education as a critical element in combating the global crisis' (Tannous; Garcia, 2008, p. 4). At the time, 'it was recognised that the current model of education was far removed from the reality of society and unable to promote the necessary changes, and that a new educational model was needed to meet this demand' (Dias; Salgado, 2023, p. 56).

With regard to legislation on environmental education in Brazil, an exclusive piece of legislation on environmental education came into being in 1999, Law No. 9.795, which implemented the National Environmental Education Policy (PNEA) (Brazil, 1999). According to this legislation, 'environmental education must be promoted at all levels and in all teaching modalities in the country, in both formal and non-formal spaces'. Furthermore, according to this law, 'a basic principle of environmental education is the environment in its entirety, also encompassing socio-economic and cultural aspects, without losing focus on sustainability' (Brazil, 1999). Using the text of National Law No. 9.795 as a basis, in 2007 Law No. 12.780 was enacted in São Paulo, establishing the State Environmental Education Policy (São Paulo, 2007). The body of the law states that environmental education is an essential and permanent component of education, and that it 'must be present at municipal and state level, in an articulated and continuous manner, at all levels and modalities of educational processes, whether formal or non-formal'. As such, the enactment of this law is a legal benchmark for the adoption of environmental education as a public policy in the state of São Paulo.

With this in mind, it is worth thinking that environmental education needs to be well represented in the Paulista curriculum in the area of natural sciences. According to the PNEA, 'one of the characteristics of environmental education is its multidisciplinary pedagogical perspective and the association between ethics, education, work and social practices' (Brazil, 1999). Thus, in addition to the presence of themes pertinent to environmental education, in order for the curriculum to be in line with the national legislation, we believe that the environmental education being worked on must have a critical-transformative perspective via a generating theme, so that its aspect of relating ethics, education, work and social practices together with the environmental theme can be achieved.

'Over the years, environmental education has gained various adjectives that complement its practice, such as critical, emancipatory, transformative, liberating, among others, reminiscent of education along the lines of Paulo Freire' (Torres, 2010, p. 223). These definitions have gained strength as a counterpoint to the rational conception of environmental education, in which 'the role of environmental educators is to transmit knowledge that adapts individuals to the rational use of natural resources, bearing in mind the limiting conditions of the natural environment that surrounds them' (Tozoni-Reis, 2001, p. 7). This vision of environmental education can be emblematic, 'because it uses scientific arguments about ecological processes to bring about individual submission, instituting a policy of social control with the justification of avoiding environmental collapse' (Tozoni-Reis, 2001, p. 8).

Therefore, this work seeks to highlight the importance of an EACT-TG practice, based on Paulo Freire's educational theory, as defended in Torres' thesis (2010), by analysing how much the EE proposed in the Paulista Curriculum is close to the foundations of EACT-TG. In order to find this out, it is necessary to search for certain concepts from Freire's pedagogical practice, such as *limiting-situations*, which are defined by Freire (1987, p. 60) as:

Historical determinants that imply that those who experience them have to adapt, and from the moment they become more critical in their actions, their perception of them changes and they are no longer seen as a border between 'being and nothingness', but between 'being and being more'.

Thus, by surveying the *limiting-situations* of a given community, it becomes possible to identify its generating themes. When we work with Freirean pedagogy, the separation between object and subject is unfeasible, because there is no subject without a world, nor a world without a subject, 'for human beings are conscious bodies in the world and the world materialises from this consciousness' (Torres, 2010, p. 40). Indeed:

Generative themes enable individuals to get to know significant dimensions of their concrete reality, which represent interacting parts of a totality, so that when this interaction is realised, it allows the subjects a critical interpretation that changes their attitude towards limiting-situations (Freire, 1987, p. 56).

These Freirean concepts are the starting point for a problematising education that relates to the concept of a critical-transformative EE via a generating theme. In order to identify the limiting-situations and their generating themes, it is essential to know the concrete reality of the students, their dilemmas and convictions about the world, in other words, to establish a dialogue between the worldviews of the students and the educators. Freire (1987, p. 51) states that 'dialogue is not possible between those who deny others the right to speak and those who feel denied of this right.' The environmental education advocated in this work also values dialogue, in contrast to the conservative model of environmental education, 'which produces a pedagogical practice focused on the individual and the transformation of their individual behaviour, thus missing out on the richness and diversity of the relationship between people and their relationship with the environment that surrounds them' (Guimarães, 2004, p. 29).

To summarise, for the themes relating to environmental education in the Paulista Curriculum to have a liberating and emancipatory aspect, which would align them with the Freirean pedagogy, there must first be an approximation of the following principles: the recognition of the environment in which the school is located, contextualising the students' reality; the analysis of contradictory situations experienced by the students; the decoding dialogue with the students in order to obtain the generating themes; the elaboration of curricular programming based on a generating theme and, its development in educational contexts, with a view to carrying out transformative actions in the concrete reality, in order to properly confront the limiting-situations initially identified.

METHODOLOGICAL PATH

The education research to be carried out in this paper is qualitative, chosen because it is the right research approach to analyse issues of a socio-cultural and material nature in concrete reality. The analysis intended in this work would not be possible if only quantitative research was taken into account, 'as this is characterised by rigorously following a previously established plan, with well-defined hypotheses and variables, with the aim of enumerating and measuring events objectively and precisely' (Proetti, 2018, p. 2), which does not correspond to the purpose of this work. Although this research also quantifies the environmental education skills present in the Paulista Curriculum in the area of natural sciences at primary school level, the main focus of the work is still on its qualitative aspect.

In the context of qualitative research, documentary analysis was carried out, 'a practically decisive methodological procedure for some areas, such as the Humanities and Social Sciences' (Cechinel, 2016, p. 1), because through documents, especially the Paulista Curriculum, analysed in this work, it is possible to have an understanding of the phenomena that permeate education, as well as the objectives of public policies aimed at this area, from the perspective of a critical look at what is prescribed in such documents. By carrying out a qualitative analysis of the Paulista Curriculum, we sought to understand how environmental education is being presented to São Paulo students, whether it complies with national legislation and whether or not it comes close to the precepts of a critical-transformative or critical-liberating education. By carrying out documentary analysis, 'evidence can be found to support the researcher's assertions and statements, as they are a source of contextualised information, arising in a particular context and therefore revealing information about that same context' (Lüdke; André, 1986, p. 17).

In order to carry out the research, we initially selected which of the skills have themes referring to environmental education among all the skills that belong to the area of natural sciences in primary schools. They were then quantified in relation to the total number of natural sciences skills, in order to obtain a representation of the percentage of skills that work with environmental education in the Paulista Curriculum. Subsequently, it was assessed whether, in the description of the skills that refer to environmental education, there is the possibility of investigating the students' previous knowledge through dialogue, which is a first step towards obtaining generating themes based on their reality (although, for Freire, this is part of a broader process, also involving the school community as a whole). Thirdly, it is important to assess whether the skills contained in the document make it possible to develop transformative proposals and actions with students, in which they can effectively act on the reality in which they live in order to overcome the environmental contradictions identified. Lastly, to assess whether or not the contents of the Paulista Curriculum related to environmental education are in any way close to these EACT-TG fundamentals.

ANALYSING THE APPROACH TO ENVIRONMENTAL EDUCATION IN THE AREA OF SCIENCE IN THE PAULISTA CURRICULUM IN THE LIGHT OF CRITICAL-TRANSFORMATIVE ENVIRONMENTAL EDUCATION VIA A GENERATOR THEME

Due to its relevance to the environment, science was the subject selected for analysis, with environmental education as its main focus. After analysing the document, some terms that refer to an environmental education practice were selected, with a view to explaining a quantitative dimension present in the skills that range from the 1st to the 9th year of primary school, these being: Environmental Education, Environment, Socio-environmental, Environmental, Ecosystem, Sustainability and Education. The terms researched are distributed in the Nature Sciences skills in the Paulista Curriculum, as shown in Table 1:

Table 1

List of terms searched and their frequency in the Paulista Curriculum for Primary Education (1st to 9th grade) in the area of Natural Sciences.

Searched term	Frequency of terms in the skills of the Paulista Curriculum (Nature Sciences area)
Environmental Education	0
Environment	4
Socio-environmental	3
Environmental	4
Environments	4
Ecosystem	4
Sustainability	2
Preservation	3

Source: Own authorship (2025).

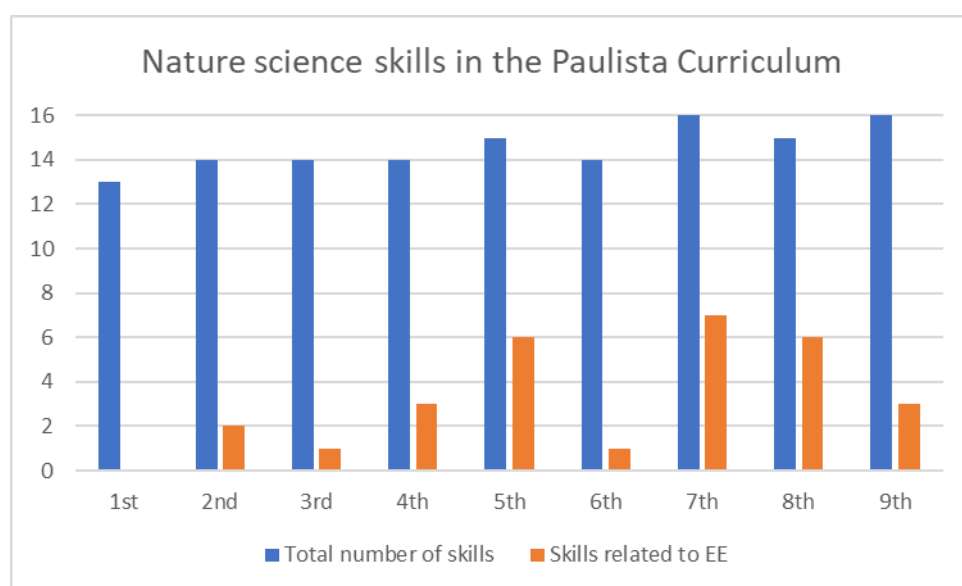
Of the 140 Nature Sciences skills, the term Environmental Education does not appear once. Variations of the word environment are expressed 15 times, such as environmental problems, socio-environmental, environmental balance, among others. Other terms related to EE also appear, but only a few times in the text of the skills, such as ecosystem, mentioned 4 times, sustainability which appears 2 times, and conservation with 3 mentions throughout the document in the Nature Sciences section.

In addition to searching for terms related to environmental education, so that no science skill would be overlooked, all the skills that make up this area of knowledge in the Paulista Curriculum were read and analysed in order to select those that were directly associated with environmental topics. Of the 140 science skills, 30 of them can be directly related to issues pertinent to environmental education, i.e. an average of 21.4 per cent of all skills. In order to analyse the skills that actually work with environmental education, it was necessary to separate them from the other natural sciences skills. After reading the document, all the skills that included topics such as sustainability, conservation, maintenance of natural resources, environmental impacts and relationships between living beings and the environment were included as part of the field of environmental education. Skills that did not contain content associated with the environment were not counted as belonging to environmental education. As environmental education is an interdisciplinary subject that involves other areas of knowledge, it

is expected that this area will also appear in the skills of other disciplines, 'because it should be considered that the study of the environment refers to broad issues and working on environmental education in an interdisciplinary way favours understanding the subject in its most diverse manifestations' (Sousa; Neto, 2020, p. 6). However, due to its relevance in today's environmental context, it would be pertinent for the subject to be given a greater role in the skills of the Natural Sciences. The graph with the overall number of students per year is shown below (Table 2):

Table 2

Graph listing the total number of skills in the Paulista Curriculum for Primary Education (1st to 9th grade) in the area of Natural Sciences, compared to the skills focused on environmental education.



Source: Own authorship (2025).

Firstly, it's important to emphasise the asymmetrical distribution of skills related to environmental education throughout the school years in the science subject in primary school. In 1st grade, for example, there are no skills directly associated with environmental education. In other years, such as 3rd and 6th, only one skill was observed to be worked on throughout the school year in relation to environmental education. The lack of frequency of skills on the environmental theme in all the years and the regularity of these throughout each year shows, at the very least, a low level of interest in highlighting it on the part of those who drew up the document, given the relevance of environmental education.

Next, it is necessary to reinforce the importance of **dialogue** for effective education under Freirean precepts, in order to really make an EACT-TG a reality. It is through dialogue that it will be possible to find out what kind of understanding about the world the students already possess, establishing the generating themes for the subsequent selection of systematised content from the different areas of knowledge, with the aim of overcoming the students' naive view of the generating theme - which presupposes educational work based on scientific knowledge to build critical awareness of the generating theme.

In the case of the 30 skills that deal more directly with EE, 16 of them expressly suggest a conversation with students in order to develop ideas or investigate their prior knowledge of certain content. This analysis was carried out by searching for keywords such as 'discuss, interpret, analyse, argue and investigate', which encourage the teacher to have a previous debate with the students before introducing the content of the lesson.

Although it is important to consider that more than half of the skills that work with environmental education end up recommending investigating students' prior knowledge of certain content, it is important to mention that this conception of contextualisation distances itself from the perspective of dialogue in Freire (1987) and the EACT-TG (Torres, 2010), since this revolves around previously established content and not on obtaining possible limit-situations and their generating themes that represent the reality of the students. Furthermore, we believe it would be necessary for the other skills to also present possibilities for contextualising the local environmental reality.

An example of these skills that includes a part that can be dedicated to dialogue in the teaching-learning process is skill EF05CI04, from 5th grade, which talks about the uses of water, according to the text: 'Identify the uses of water in everyday activities, in the countryside, in transport, in industry, in leisure and in energy generation, in order to discuss and propose sustainable ways of using this resource' (São Paulo, 2019, p. 283).

It can be seen that the passage 'discuss and propose sustainable ways' opens up a space for the educator, in the classroom, to work dialogically with the students, listening to what they think about the subject and what ideas they have for minimising environmental problems related to water use. Even so, it is important to note that none of the skills described above correspond to the moment of dialogue, according to Freire (1987) and Torres (2010).

For the purposes of the research in this paper, the presence of the term 'discuss' can initially be considered an indication of an approach to dialogue in EACT-TG, even though this moment already has a defined topic to be addressed, and is not based on the Freirean dialogue itself with the students to define the topics to be addressed. However, it's worth noting that identifying what the students have as prior knowledge is a fundamental step in a pedagogical practice that comes close to liberating education, and that problematisation and initial discussion are fundamental to ascertaining how the students understand human-world relations, i.e. human beings and the lived/perceived environment, from the perspective of EACT-TG. Furthermore, we would like to point out that there is no clear description of any EE skill in the document that allows us to identify the stages of preliminary research, analysis of limiting-situations, decoding dialogues, thematic reduction and work in the classroom, considering this praxeological movement. To this end, the teaching of systematised content in educational contexts should be proposed as a means, selected on the basis of the generating themes arising from thematic research, and not as the starting point of the teaching-learning process for students.

Next, the possibility of working with **generating themes** is investigated, and based on these, the collective elaboration of **transformative actions** in the reality experienced/perceived by the students. The generating theme must be the result

of the work carried out in the stages that make up the moment of thematic investigation, which implies dialogue, according to Paulo Freire, 'because it needs to be apprehended and reflected upon so that the subjects can become [critically] aware of it' (Paniz; Muenchen, 2020, p. 2). Transformative action, on the other hand, is a prerequisite for leading students towards their humanisation via the educational process, aimed at transforming the concrete reality in which they live. 'Without an analysis of what the qualities of a particular object or phenomenon studied mean, there is no possibility of promoting qualitative changes in that studied reality' (Oliveira, 2020, p. 43). In the aforementioned skills related to EE, 17 of the 30 found indicate the possibility of developing transformative proposals in the students' environmental reality, regarding the use of terms such as 'proposing initiatives or strategies, discussing initiatives, creating proposals, and verbs such as discuss, communicate and propose'. The use of these terms in the skills related to environmental education indicates possible links with the organisational moment 'Transformative action in concrete reality' of the EACT-TG (Torres; Oliveira, 2024).

When we talk about the practice of an EACT-TG, it is essential to propose a plan of transformative actions based on generating themes, which in turn express environmental contradictions, aimed at raising awareness among students from a praxeological perspective that transforms concrete reality. It's worth noting that only 5 of the 17 skills that encourage the development of sustainable intervention proposals include the possibility of putting interventions into practice with the students beyond the field of theoretical planning discussions. Of these, only two have open proposals regarding practical activities carried out by the students, either at school or in the community where they live. These are: EF08CI05, which talks about implementing collective actions at school or in the community for the conscious use of electricity, and EF05CI05, which talks about building proposals for the proper disposal or recycling of materials consumed at school. The others only propose that students communicate the proposals discussed in class to the community. Despite the importance of scientific dissemination, which is the effect of communicating certain science-based actions to the school community, the other skills, in addition to the two mentioned above, lack the possibility of real applicability, because in addition to proposing interventions, it is really necessary to put them into practice, generating viable innovations in the students' reality, which, to a certain extent, although they do not start from a generating theme, allow some kind of approximation to the perspective with the moment of 'Transformative action in concrete reality', within the framework of EACT-TG.

It is important to remember that the Paulista Curriculum, as a document drawn up in its historical context, "meets the federal and state political-educational agenda, currently under a neoliberal bias. It follows that the document is aligned with this worldview in terms of what kind of education should be offered by the public authorities" (Freitas, 2018, p. 31). Another important point to highlight is the **critical viewpoint** present in the elaboration of the environmental education skills found in the Paulista Curriculum for Natural Sciences. Of the 30 environmental education skills out of a total of 140 in natural sciences, only two include the word criticality: skills EF08CI18 and EF05CI15. The first talks about 'arguing critically about the process of production and consumption of electronic equipment, relating it to collective health'. The second

talks about ‘critically discussing the social aspects involved in food shortages’. Even so, the first text describes the possibility of proposing more sustainable modes of consumption, with a bias towards individual responsibility, since it talks about modes of consumption without mentioning the capitalist production system that produces this model, without making it clear whether the proposals would be applicable. The second doesn’t have the idea of drawing up intervention proposals with the students, although it makes it clear in its text that human action, again the responsibility of the individual, is one of those responsible for the lack of food. These practices are in line with a conservative macro-trend in environmental education, as described by Layrargues and Lima (2014, p. 29), whose educational methodology consists of ‘individual and behavioural actions in the domestic and private spheres, in a way that does not include the historical and political context, but rather the content and norms, placing the human being in the simple role of degrading agent of the environment, disregarding any social aspect’.

Having made such considerations, it is essential to assess whether environmental education, which is present in 30 per cent of the natural sciences skills in the Paulista Curriculum, corresponds to the foundations of EACT-TG. Based on the detailed analysis above of the skills in the Paulista Curriculum for Natural Sciences that deal with environmental issues, it can be said that these are not in line with the foundations of EACT-TG. It is worth noting that, although there are skills in the curriculum that, in theory, are close to EACT-TG, with regard to dialogue and the proposal of transformative actions, these tend towards individual responsibility when it comes to environmental problems, as can be seen in the example below, from skill EF09CI13: ‘Propose individual and collective initiatives to solve environmental problems in the community and/or city, based on the analysis of successful conscious consumption and sustainability actions’ (São Paulo, 2019, p. 293).

The text talks about proposing initiatives, both individual and collective, regarding environmental problems present in the local community or city. The initiative to seek collective solutions to environmental issues is positive, but the rest of the text portrayed in the skill above talks about drawing up such initiatives based on analysing successful conscious consumption and sustainability actions, which shows a bias towards individual responsibility, since it talks about modes of consumption without mentioning the capitalist production system that underpins this model. Therefore, the proposals are not fundamentally critical-transformative and the correspondence is only apparent. In reality, they indicate the opposite of what EACT-TG advocates, which proposes the implementation of critical school programmes based on generating themes that represent socio-cultural and material environmental contradictions experienced/perceived, which, in turn, ‘characterise local environmental problems that are related to global ones, serving as criteria for the selection of systematised content that will make up critical interdisciplinary curricula’ (Torres, 2018, p. 5).

As a possibility for overcoming this approach to environmental education in an official curriculum document from the state of São Paulo, it is proposed that the skills present in the Paulista Curriculum should be significantly increased in terms of content relating to environmental issues, since even subjects from the natural sciences that may not seem to have much to do with environmental

education can be worked on in an interdisciplinary way. Among all the skills, but especially those related to the environmental field, it is proposed that **dialogue** be included as an initial stage for gathering the students' previous knowledge about their concrete environmental reality, for a better understanding of how these students see their own reality, so that the scientific content can then be selected and taught in the classroom, with a view to the students' apprehension of it, based on the environmental contradictions of the lived/perceived reality, expressed in the generating themes.

In addition, official documents, such as the Paulista Curriculum, should take into account **the moment when students come up with ideas and proposals** that effectively generate a practical activity that transforms the school environment and/or the community in which they live, not just the debate. In conclusion, it is proposed that the environmental education present in these skills should not only blame the individual for environmental degradation and the scarcity of natural resources, but that it should enable students to take a critical and broad view of the capitalist system that is primarily responsible for the environmental problems we face today, which in turn require proposals for tackling material and socio-cultural issues that are collective as well as individual.

CONCLUSION

This research sought to identify the presence of environmental education in the Paulista Curriculum in the area of natural sciences in primary schools and to investigate the extent to which it is or is not in line with the fundamentals of EACT-TG, such as dialogue, generating themes and proposals for transformative actions constructed in debate with the students. This is justified by the fact that the Paulista Curriculum is the document that prescribes what content should be developed with students throughout their school life in Basic Education, as well as underpinning a vision of education and society that aims to guide citizen education in the São Paulo state education network. That's why it's essential that we look at this document, because it is the basis on which various aspects of state education are developed, such as foundations, methodology and methods, didactic-pedagogical materials and content, evaluation processes, among others, with a view to locating theoretical-methodological gaps, in order to make informed criticisms and suggest changes.

The results indicate that of the 140 skills in the document in the area of Nature Sciences in Primary Education, 30 of them (around 21%) have content that is relevant to environmental education. Regarding the 'dialogue' approach in the context of EACT-TG, 16 of the skills describe the prospect of a prior 'dialogue' with the students in order to recognise their knowledge of a given content. Of the 30 EE skills, 17 allow for apparent approximations to the perspective of obtaining generating themes and developing transformative actions. After analysis, it can be seen that none of the skills include the moments that show that the EACT-TG is actually effective, because even in the few examples that seem to contain what would be the moments of dialogue, obtaining generating themes and proposing transformative actions, the organisational moments of investigation and thematic reduction of Freire (1987) are missing, as well as the critical-transformative

approach to problematising and overcoming environmental contradictions, which in turn go beyond individual responsibility.

Thus, when analysing the Paulista Curriculum in the area of Natural Sciences, what emerges is a tendency to ignore the real reasons that lead to the environmental crisis faced by humanity, by not giving much space to environmental education in the skills, and the fact that it does not include in the skills that permeate environmental education a truly critical and emancipatory pedagogy for students, with a preference for proposing ideas of behavioural changes in the face of environmental problems and a distancing from criticality in the face of the hegemonic factors that really affect the management of environmental resources.

As far as environmental education is concerned, if treated as advocated in this study, it would become a mechanism that runs counter to the dominant (neo)liberal ideology adopted in the development of the Paulista Curriculum. In this curricular conception, educators can contribute to combating the hegemonic ideology, thus contributing to the formation of critical citizens who transform their own concrete reality.

To sum up, it is worth highlighting the urgency of changing the wording of the skills in the Paulista Curriculum so that they actually include an education aimed at training critical citizens with an emancipatory and liberating view of knowledge, so that they truly include an EE that contributes to raising awareness among students and enables better relationships, not only between nature and human beings, but also between nature, society and culture, i.e. between the material, social and cultural dimensions of the concrete dehumanising reality, with a view to humanising these relationships and consequently tackling global and local environmental problems.

NOTES

1. Translated from the original Portuguese into English by Bianca Bonora.

REFERENCES

- Barbosa, P. P. L.; & Lastória, A. C. (2021). Saber histórico no currículo paulista. *Imagens da Educação*, 11(4), 171-190.
https://www.researchgate.net/publication/357125396_saber_historico_no_curriculo_paulista
- Brasil. (1999). Lei nº 9.795, de 27 de abril de 1999. Dispõe sobre a educação ambiental, institui a Política Nacional de Educação Ambiental e dá outras providências. *Diário Oficial da União*.
https://planalto.gov.br/ccivil_03/leis/l9795.htm
- Brasil. Ministério da Educação. (2018). *Base Nacional Comum Curricular*. Brasília, DF: Ministério da Educação.
- Carvalho, I. C. (2001). Educação ambiental e movimentos sociais: Elementos para uma história política do campo ambiental. *Educação: Teoria e prática*, 46-46.
<https://www.periodicos.rc.biblioteca.unesp.br/index.php/educacao/article/view/1597/1358>
- Cechinel, A. (2016). Estudo/análise documental: Uma revisão teórica e metodológica. *Criar Educação*, 5(1). <https://doi.org/10.18616/ce.v5i1.2446>
- Dias, G. F., & Salgado, S. (2023). *Educação ambiental, princípios e práticas*. Editora Gaia.
- Dickmann, I., & Carneiro, S. M. M. (2021). *Educação ambiental freiriana*. Livrologia.
- Forner, R., & Malheiros, A. P. S. (2019). Modelagem e o currículo paulista: Entre imposições, cobranças veladas e insubordinações criativas. *Revista Paranaense de Educação Matemática*, 8(17), 519-545.
<https://doi.org/10.33871/22385800.2019.8.17.519-545>
- Freire, P. (1987). *Pedagogia do oprimido*. 23. ed. Rio de Janeiro, RJ: Paz e Terra.
- Freitas, L. C. de. (2018). *A reforma empresarial da educação: nova direita, velhas ideias*. Expressão Popular. <https://ifg.edu.br/attachments/article/31542/a-reforma-empresarial-da-educacao-nova-direita-velhas-ideias.pdf>
- Gomide, D. C. (2019). *A política educacional para o ensino médio da Secretaria da Educação do Estado de São Paulo e o alinhamento com o projeto neoliberal através de ciclos progressivos de adequação (1995-2018)* (Tese de doutorado). Faculdade de Educação, Universidade Estadual de Campinas.
<https://hdl.handle.net/20.500.12733/1637698>
- Guimarães, M. (2004). Educação ambiental crítica. Identidades da educação ambiental brasileira. *Ministério do Meio Ambiente*, 25-34.

- Henning, P. C. (2019). Resistir ao presente: Tensionando heranças modernas para pensar a educação ambiental. *Ciência & Educação (Bauru)*, 25, 763-781. <https://doi.org/10.1590/1516-731320190030011>
- Hypolito, Á. M. (2021). Padronização curricular, padronização da formação docente: desafios da formação pós-BNCC. *Revista práxis educacional*, 17(46), 35-52.
- Layrargues, P. P., & Lima, G. F. da C. (2014). As macro tendências político-pedagógicas da educação ambiental brasileira. *Ambiente & Sociedade*, 17(1), 1–20. <https://www.scielo.br/j/asoc/a/8FP6nynhjdZ4hYdqVFdYRtx/?format=pdf&lang=pt>
- Lopes, T., & Abílio, F. J. P. (2021). Educação ambiental crítica: (Re)pensar a formação inicial de professores/as. *Revista Brasileira de Educação Ambiental (RevBEA)*, 16(3), 38-58. <https://doi.org/10.34024/revbea.2021.v16.11518>
- Lüdke, M., & André, M. (1986). Pesquisa em educação: Abordagens qualitativas. *Em Aberto*, 5(31).
- Narcizo, K. R. (2009). Uma análise sobre a importância de trabalhar educação ambiental nas escolas. *REMEA-Revista Eletrônica do Mestrado em Educação Ambiental*, 22. <https://doi.org/10.14295/remea.v22i0.2807>
- Oliveira, W. P. (2020). *Educação ambiental crítica e teoria crítica: Uma análise das práticas educativas de pesquisa-ação à luz da categoria práxis transformadora* (Dissertação de mestrado). Universidade Federal de São Carlos. <https://repositorio.ufscar.br/handle/ufscar/13207>
- Oliveira, W. P., & Torres, J. R. (2023). Articulações entre Sociedades Sustentáveis e Educação Ambiental Crítico-Transformadora via Temas Geradores: em busca de inéditos-viáveis contra-hegemônicos. *Pesquisa em Educação Ambiental*, 18(1), 1-14.
- Paniz, C. M., & Muenchen, C. (2020). O estudo da realidade e os temas geradores no ensino de ciências: Reflexões sobre um processo vivenciado no contexto do PIBID. *Revista ENCITEC*, 10(1), 56-72. <http://dx.doi.org/10.31512/encitec.v10>
- Pereira, A. A., & Santos, J. R. (2019). Educação ambiental na Base Nacional Comum Curricular: Inferências e apontamentos. In *X EPEA - Encontro Pesquisa em Educação Ambiental*. http://epea.tmp.br/epea2019_anais/pdfs/plenary/0219-1-B-01.pdf
- Proetti, S. (2018). As pesquisas qualitativa e quantitativa como métodos de investigação científica: Um estudo comparativo e objetivo. *Revista Lumen*, 2(4). <https://doi.org/10.32459/revistalumen.v2i4.60>
- São Paulo. (2007). *Lei nº 12.780, de 30 de novembro de 2007. Institui a Política Estadual de Educação Ambiental*. Diário Oficial do Estado de São Paulo. <https://www.al.sp.gov.br/repositorio/legislacao/lei/2007/lei-12780-30.11.2007.html>

- São Paulo (Estado). Secretaria de Educação do Estado de São Paulo. (2019). *Currículo Paulista, SEDUC/Undime SP*. SEDUC/SP.
- Silva, A. V. M. (2016). A pedagogia tecnicista e a organização do sistema de ensino brasileiro. *Revista HISTEDBR On-line*, 16(70), 197-209.
<https://doi.org/10.20396/rho.v16i70.8644737>
- Silva, F. T., & Paula, A. V. (2021). O grau de adesão dos currículos subnacionais à BNCC. *Interfaces da educação*, 12(35), 686-718.
- Silva, I. L.; Lhamas, A. P. B; & Maia, J. S. S.. (2025). Questões socioambientais no contexto político e educacional brasileiro: uma análise a partir do fundamento histórico-crítico. *ACTIO: Docência em Ciências*, 10(2), 1-21.
<https://doi.org/10.3895/actio.v10n2.19489>
- Sousa, M. L. D. S. L., & Neto, J. M. (2020). Práticas interdisciplinares em educação ambiental na educação básica: o que indicam as pesquisas acadêmicas brasileiras de 1981 à 2012. *ACTIO: Docência em Ciências*, 5(2), 1-21.
- Tannous, S., & Garcia, A. (2008). Histórico e evolução da educação ambiental, através dos tratados internacionais sobre o meio ambiente. *Nucleus*, 5(2), 1-14. <https://doi.org/10.3738/nucleus.v5i2.131>
- Torres, J. R. (2010). *Educação ambiental crítico-transformadora e abordagem temática freireana* (Tese de doutorado). Universidade Federal de Santa Catarina. <http://repositorio.ufsc.br/xmlui/handle/123456789/93568>
- Torres, J. R. (2018). Educação ambiental crítico-transformadora no contexto escolar: Um exemplar. In Dickmann, I., Battestin, C. (orgs). *Educação Ambiental na América Latina*. Plataforma Acadêmica.
- Torres, J. R., & Oliveira, W. P. (2024). Princípios da Teoria Crítica organizativos de práticas educativas ambientais via tema gerador. *Revista Brasileira de Educação Ambiental, São Paulo*, 19(3), 266-294. <https://periodicos.unifesp.br/index.php/revbea/article/view/16005>
- Tozoni-Reis, M. F. de C. (2001). Educação ambiental: Referências teóricas no ensino superior. *Interface-Comunicação, Saúde, Educação*, 5(9), 33-50.
<https://doi.org/10.1590/S1414-32832001000200003>

Received: Nov. 30, 2024
Approved: May 26, 2025
DOI: <https://doi.org/10.3895/actio.v10n2.19564>

How to cite:

Lobo, R. P. & Torres, J. R. (2025). The approach to environmental education in the area of natural sciences in the currículo paulista: an analysis in light of the foundations of critical-transformative environmental education through generative themes. *ACTIO*, 10(2), 1-20. <https://doi.org/10.3895/actio.v10n2.19564>

Address:

Rafael Pereira Lobo

Rua Santa Maria, n. 231, Bloco 8, ap. 62, Vila Hortência, Sorocaba, São Paulo, Brasil.

Copyright: This article is licensed under the terms of the Creative Commons Attribution 4.0 International Licence.



Recebido: 30 nov. 2024
Aprovado: 26 maio 2025
DOI: <https://doi.org/10.3895/actio.v10n2.19564>

Como citar:

Lobo, R. P. & Torres, J. R.. (2025). A abordagem de educação ambiental na área de ciências da natureza do currículo paulista: uma análise à luz de fundamentos da educação ambiental crítico-transformadora via tema gerador. *ACTIO*, 10(2), 1-20. <https://doi.org/10.3895/actio.v10n2.19564>

Correspondência:

Rafael Pereira Lobo

Rua Santa Maria, n. 231, Bloco 8, ap. 62, Vila Hortência, Sorocaba, São Paulo, Brasil.

Direito autoral: Este artigo está licenciado sob os termos da Licença Creative Commons-Atribuição 4.0 Internacional.

