

Rhythmanalysis in times of climate catastrophe: Dialogues between environmental education and adult education

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Abstract

This article explores the analytical and pedagogical potential of rhythmanalysis for interpreting contemporary socio-environmental crisis. Drawing primarily on Henri Lefebvre's conception of rhythmanalysis, the study examines how systemic acceleration, work precarisation, educational disruption, and climate catastrophes can be understood as expressions of broader arrhythmic conditions characteristic of late modernity. Focusing on the Brazilian context, including the long-term impacts of the COVID-19 pandemic and the 2024 floods in Rio Grande do Sul, the article highlights temporal asymmetries between rapid destruction and slow processes of reconstruction. By placing rhythmanalysis in dialogue with environmental education and adult education, it argues that education can cultivate critical rhythmic awareness capable of rendering crisis intelligible and fostering more just and sustainable forms of coexistence. Rather than proposing a closed model, the article advances a reflective approximation between these fields.

Keywords: adult education, catastrophes, crisis, environmental education, rhythmanalysis

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Introduction

In the context of intensifying socio-environmental crisis, marked by climatic catastrophes, work precarisation, educational disruptions, and deepening inequalities, (Lima & Torres, 2021; da Costa Lopes et al., 2025; Wallenhorst, 2025) the question of time has become unavoidable. The contemporary world is not only characterised by material transformations, but by profound reconfigurations of temporal experience. Acceleration, compression, and fragmentation of rhythms increasingly shape social life, often generating forms of dissonance between economic imperatives, ecological cycles, institutional structures, and lived experience.

Within this scenario, this article seeks to explore the analytical and pedagogical potential of rhythmanalysis as a framework for interpreting and engaging with contemporary crisis. Drawing primarily on Henri Lefebvre's *Éléments de Rythmanalyse* (Lefebvre, 1992, 2019), while acknowledging earlier contributions to the concept, we examine how rhythms can structure the relationships between individuals, society, and nature. Our central objective is to enabling rhythmanalysis, environmental education, and adult education, proposing that their articulation may offer a critical lens for understanding the arrhythmic conditions of late modernity and for rethinking educational practices in times of catastrophe.

The article is organized into four main sections. The first section, *Situating rhythmanalysis*, revisits the conceptual genealogy of rhythmanalysis, highlighting its philosophical development and its critical implications for understanding everyday life, power, and temporality. The second section, *Between polyrhythmia and arrhythmia: A rhythmic reading of contemporary crisis in Brazil*, applies this framework to analyse recent socio-environmental and educational crisis, emphasising the temporal asymmetries and structural inequalities that characterise them. The third section, *Rhythm, space, and learning: Towards a dialogue between environmental education and adult education*, explores convergences between these two fields, proposing rhythmanalysis as a mediating lens capable of illuminating their shared concerns with space-time, experience, and transformative praxis. The final section presents the conclusions, synthesising the central arguments and reaffirming the reflective character of this exercise.

Rather than offering a closed theoretical model, this article proposes a conceptual exploration. By bringing rhythmanalysis into dialogue with environmental education and adult education, we aim to open a space for critical reflection on how educational processes may engage with the rhythms that sustain, destabilise, and potentially reorganise collective life in an era defined by socio-ecological upheaval.

Situating rhythmanalysis

Although the objectives of this text do not include an exhaustive analysis of the origins of rhythmanalysis, we consider it important to acknowledge the originality of the professor and philosopher Lúcio Alberto Pinheiro dos Santos (Braga, Portugal, 1889 - Rio de Janeiro, Brazil, 1950). The analysis of rhythms at the complex intersections between society and nature was central to his reflections. He introduced the concept of as a means of understanding how natural and social rhythms influence and interact with one another, thereby offering an analytical framework capable of illuminating the structure and dynamics of social life.

Despite the pioneering nature of his proposal, little is known about the full scope of Pinheiro dos Santos' thought, as only fragmentary records of his work remain. As Dias

(2018) observes, ‘In Brazil, in the late 1990s, motivated by the biographical and editorial incidents surrounding Lúcio Pinheiro, Jorge Jaime attributed to him the epithet of the “ghost Brazilian” philosopher’ (p. 42). Nevertheless, traces of his theory appear in *La dialectique de la durée* by Gaston Bachelard (2013/1950), who explicitly references the Portuguese thinker’s correspondence and reflections. Further efforts to recover and contextualise his intellectual production were undertaken by Pedro Baptista in *O filósofo fantasma* (2010) and Rodrigo Sobral Cunha in *O Essencial sobre Ritmanálise* (2010). These works seek to reconstruct the trajectory of a philosopher who reportedly arrived in Brazil in the late 1920s, fleeing the dictatorship that would persist in Portugal until 1974.

While Pinheiro dos Santos introduced the concept, it was through Gaston Bachelard and, above all, Henri Lefebvre that rhythmanalysis gained broader philosophical and sociological resonance. Both thinkers recognise Pinheiro dos Santos as the originator of the term; however, their appropriations differ significantly. Bachelard engages rhythm primarily in relation to duration and the phenomenology of time, whereas Lefebvre develops rhythmanalysis as a socio-spatial method attentive to the organisation of everyday life. As Claire Revol (2021) notes, Lefebvre is concerned with ‘the arrangement of the rhythmic weave that separates and connects individuals within social times and spaces’ (p. 34). In this sense, rhythmanalysis becomes inseparable from Lefebvre’s broader project on everyday life, constituting what Revol (2019, 2021) describes as a continuation of his long-term reflection on lived temporality.

For Lefebvre (1992, 2019), rhythmanalysis is not limited to identifying temporal patterns; it implies the possibility of intervening within the rhythmic fabric of everyday life. Because individuals are always already immersed in lived time and space, analysing rhythms opens the possibility of appropriating social times and spaces differently. Rhythmanalysis thus emerges not only as a descriptive lens, but as a critical and potentially transformative practice.

This critical dimension becomes even more explicit when we consider rhythm as a technique of power. Roland Barthes (2002), in *Comment vivre ensemble*, revisits the ancient Greek understanding of rhythm and moves beyond its aesthetic meaning, framing it instead as a structuring principle of collective life. For Barthes (2002), power consolidates itself not only through visible coercion but through the disturbance and reorganisation of lived temporalities, a process he associates with dysrhythmia.

Power operates by imposing external temporal patterns that disrupt embodied rhythms, generating forms of heterorhythmia in which individuals are compelled to adjust to institutional or societal tempos. The governance of time thus becomes a subtle yet pervasive mechanism of domination.

In this sense, as Fadia Dakka (2024) argues, contemporary educational institutions exemplify how such imposed rhythms are internalised through regimes of acceleration, deadlines, and performance metrics, producing tensions between institutional temporalities and the lived, non-linear rhythms of learning. From this perspective, rhythmanalytical approaches reveal how these temporal impositions not only regulate practices but also shape subjectivities, while opening the possibility of resisting such dynamics through more flexible and relational forms of engagement.

This insight resonates with Lefebvre’s (1992) analysis of programmed everyday life, in which social existence is increasingly organised according to the imperatives of commodification and bureaucratic rationality. Domination does not operate solely at the level of ideology; it materialises in daily routines, spatial arrangements, and temporal coordination. Over recent decades, transformations in production, marked by financialisation, globalisation, and flexible accumulation (Harvey, 1991), have intensified this process. Economic rhythms accelerate, space is compressed through global market

interconnections, and everyday life becomes subordinated to abstract financial logics, widening the gap between lived material realities and speculative forms of value.

From a rhythm analytical standpoint, contemporary societies can therefore be understood as structured by dominant temporalities that increasingly shape both social relations and ecological processes. Although society and the natural environment develop according to their own rhythms, these temporalities are progressively subordinated to a system of production that privileges exchange value over other forms of relation.

Between polyrhythmia and arrhythmia: A rhythmic reading of contemporary crisis in Brazil

What if, instead of deluding ourselves by dreaming of a regained harmony with nature, we were to investigate the rhythms of life in order to care for them and strengthen them through their own pulses and cadences? What if rhythm were fundamental to the way collective and individual life are organized and animated? What if the intensity of common life or of interindividual relations depended upon a rhythmic attunement [...] (Revol, 2021, p. 37, our translation).

By recognising that both human and non-human nature operate according to their own diverse rhythms and temporalities, we understand that the imposition of the accelerated rhythm of the capitalist system has generated a series of adverse consequences. These natural rhythms, which sustain the health and balance of human beings and the environment, have been systematically subordinated to the logic of efficiency and incessant production. In this sense, we consider the incorporation of rhythm analysis as a relevant element for rethinking the relationship between society and nature.

Rhythm analysis would offer us pathways, perhaps incomplete, yet certainly open, to transfigure the present into presences - complex and coexisting. Through a sensitive apprehension, it would lead us to elaborate a critique of reification, undoing materiality in itself, as thing, as product, directed by the commodity as concrete abstraction, deepening the understanding of the complexity of space-time, which includes energy, woven by rhythms, polyrhythms, and arrhythmias (Martins & Moreaux, 2021, pp. 9-10, our translation).

According to Lefebvre (2021), the coexistence of diverse rhythms composes what he calls polyrhythmia. Thus, living bodies present multiple associated rhythms which, when healthy, configure what the author calls *eurhythmia*. From this perspective, illness would be accompanied by a disturbance of rhythms, or *arrhythmia*. These processes of health and illness can be observed both in individuals and in society, as exemplified by Martins and Moreaux (2021) when they state: 'The polyrhythmia that exists in our cities is frequently transformed into arrhythmia through various forms of control and the militarisation of urban spaces' (p. 11, our translation).

This dissonance between natural rhythms and the neoliberal capitalism rhythms, characterised by acceleration, productivity imperatives, flexibility, and the continuous optimisation of performance, results in diverse forms of illness. According to Safatle et al. (2021), in *Neoliberalism as the Management of Psychic Suffering*, we live in a context of excessive valorisation of merit aimed at extracting greater productivity from individuals. The authors affirm that neoliberalism creates new forms of suffering associated with contemporary mechanisms of control and power. Suffering and a series of disorders, such as depression and anxiety, result, in their view, from the constant effort

to adapt and perform within a social rhythm that often ignores people's emotional and physical needs.

These disturbances are not mere byproducts of work but symptoms of a deeper disconnection between individuals' natural rhythms and the demands of capitalism (Safatle et al., 2021). Dakka and Wade (2023) extend this diagnosis to postgraduate education, describing it as embedded within a 'sick society' structured by acceleration, insecurity, and performance pressure. In this sense, graduate education does not merely reflect individual vulnerability but reproduces systemic arrhythmias characteristic of neoliberal modernity.

Simultaneously, physical nature faces its own forms of illness. Environmental catastrophes, such as global warming, floods, pollution, and ecosystem degradation, are manifestations of the overload that the accelerated rhythm of production and consumption imposes upon the planet (da Silva Machado et al., 2024; da Costa Lopes & Pinheiro, 2025). These events are not isolated accidents but symptoms of a systemic crisis that deregulates natural cycles and compromises the socio-environmental dimension of the planet (Carvalho & Ortega, 2024; Acselrad, 2021). Such deregulation is not only ecological; it is profoundly temporal. It reflects a broader transformation in the organisation and experience of time in late modernity, in which dominant rhythms of accumulation increasingly override the regenerative cycles upon which both ecosystems and human communities depend.

Hartmut Rosa (2022), in *Alienation and Acceleration: Toward a Critical Theory of Late-Modern Temporality*, helps to clarify this temporal transformation by describing 'time compression' and the 'expansion of technology' as central characteristics of a world governed by the imperative of growth and speed. Acceleration reshapes not only the dynamics of production but also the fabric of social relations and the lived experience of time and space. In this sense, ecological deregulation and social destabilisation can be understood as expressions of a broader condition of late modernity marked by systemic acceleration.

The COVID-19 pandemic can be read as an intensification and revelation of this accelerated condition (Pinheiro & Pasquier, 2023). What initially appeared as a health crisis rapidly unfolded into a multidimensional disruption, exposing the interdependence of health, education, work, and the environment. Reports by the Economic Commission for Latin America and the Caribbean (ECLAC, 2021) highlight the magnitude of this impact, while Acselrad (2021) argues that the health crisis emerged in a context already marked by the imminence of a financial crisis, precipitating the collapse of various economic activities. The pandemic did not interrupt an otherwise stable order; rather, it amplified contradictions inherent to processes of capitalist reproduction and crisis.

Although the acute phase of the health emergency has passed, its socioeconomic and environmental repercussions continue to unfold unevenly. The pandemic exposed and intensified pre-existing inequalities, disproportionately affecting vulnerable groups and revealing how structural injustices amplify the impacts of global emergencies (da Costa Lopes et al., 2025). From a rhythmic perspective, what becomes visible is a striking temporal asymmetry: precarious conditions tend to be installed rapidly, while processes of repair and reconstruction unfold more slowly, unevenly, and often precariously. Crisis accelerates, recovery lags. This imbalance further entrenches patterns of inequality and instability.

Recent data on Brazilian education illustrates this temporal asymmetry in concrete terms. Even several years after the acute phase of the pandemic, its effects remain deeply entrenched. A hundred of thousands of children and adolescents remain out of school, and literacy levels among eight-year-olds have not returned to pre-pandemic standards,

with rates of non-literacy doubling compared to the period before the health crisis (Dawidman, 2025). The pandemic did not create inequalities; it accelerated and exposed structural vulnerabilities, demonstrating how disruptions occur at a much faster pace than educational systems are able to repair them.

A similar dynamic can be observed in the world of work. The precarisation of work in Brazil did not begin with the pandemic, but the health crisis significantly intensified pre-existing structural vulnerabilities. Even before 2020, more than 40% of the Brazilian working class was engaged in informal employment, a condition historically rooted in a peripheral and dependent insertion into global capitalism (Antunes, 2021; da Costa Lopes et al., 2025). With the collapse of economic activities and insufficient social protection, millions were pushed further into instability. The expansion of platform-based work often described as 'uberisation' deepened this process.

As Abílio (2017) and Abílio et al. (2021) argue, uberisation represents a new stage of work exploitation, marked by qualitative transformations in workers' status, corporate organisation, and mechanisms of algorithmic control and expropriation. Rather than generating new opportunities, digital platforms have reorganised survival strategies under a neoliberal logic, transferring risks to workers while intensifying surveillance and performance demands. Here again, dominant economic rhythms accelerate extraction and competition, while the temporal conditions necessary for social reproduction and dignified life are progressively undermined.

In this sense, Brazil, and more broadly the Global South, has functioned as laboratory for experimentation with new forms of algorithmic governance and the real subsumption of work to capital (Antunes, 2021). The pandemic made visible how technological acceleration, environmental degradation, and socio-economic inequality are structurally intertwined. The precarisation of work thus reflects not merely an economic adjustment, but a broader arrhythmic condition of contemporary capitalism, in which the rhythm of capital accumulation accelerates while the temporal conditions necessary for social reproduction and dignified life are progressively undermined. In doing so, it erodes rights internationally recognised as fundamental human rights, including the right to decent work, social protection, and an adequate standard of living, transforming guaranteed conditions of dignity into unstable and contingent possibilities (da Costa Lopes et al., 2025).

The extreme rainfall and flooding events that struck the state of Rio Grande do Sul in 2024 provide another emblematic illustration of these temporal asymmetries. Affecting nearly the entire territory, the disaster placed approximately 2.4 million people at risk and directly impacted more than 870,000, according to official estimates. Beyond material destruction and loss of life, the floods exposed both the environmental vulnerability of the region and the insufficiency of mitigation and adaptation policies (Fiocruz, 2026).

Reports by the Inter-American Commission on Human Rights (Redesca, 2025) emphasised that historically marginalised communities, including Afro-descendant, Quilombola, and Indigenous populations, were disproportionately affected, revealing persistent patterns of environmental racism. As with the COVID-19 pandemic, the disaster was not socially neutral; it amplified pre-existing inequalities.

From a rhythmic perspective, devastation unfolded with dramatic speed, overwhelming infrastructures and livelihoods within days, while the reconstruction of housing, income, public services, and territorial stability has advanced slowly and unevenly. As late as September 2025, nearly 20,000 individuals remained without permanent housing, displaced or dependent on temporary arrangements (Jornal Nacional, 2025). The time required to destroy proved far shorter than the time necessary to restore dignified living conditions, a disparity that underscores how climatic events are

inseparable from political decisions, historical neglect, and uneven structures of protection.

Taken together, the pandemic, work precarisation, and the floods in Rio Grande do Sul indicate that contemporary crisis are not isolated disruptions but expressions of a dominant temporal regime that privileges speed, extraction, and accumulation over care, regeneration, and social protection. These asymmetries reveal not only material vulnerabilities but also a crisis of collective orientation, a diminished capacity to perceive, interpret, and politically respond to the rhythms that sustain life.

If crisis can be understood as rhythmic disturbances, the challenge extends beyond institutional reform or technical adaptation. It requires cultivating the ability to critically read and reorganise the temporalities that structure everyday existence. From this perspective, crisis do not merely interrupt established orders; they mobilise processes of disorganisation and reorganisation that participate in broader transformative, and potentially evolutionary, dynamics (Alhadeff-Jones, 2021).

Every crisis leaves traces that appear both through the regressions and the advances that emerge from it. In many regards, when we refer to the lessons learned and the transformations associated with the experience of a crisis, we are referring to its most striking effects, what emerges from it. However, from an educational perspective, the experience of a crisis cannot be reduced to the explicit marks it leaves. The outcome of a crisis depends indeed on all the activities deployed to contain, regulate, and transcend it, before, during and after the occurrence of a specific perturbation (Alhadeff-Jones, 2021, pp. 310-311).

In this sense, education becomes central precisely at this juncture, not as a compensatory mechanism designed to repair what has been damaged, but as a space in which experiences of arrhythmia can be rendered intelligible, collectively interpreted, and possibly transformed.

Rhythm, space, and learning: Towards a dialogue between environmental education and adult education

If contemporary crisis can be interpreted as manifestations of systemic arrhythmias affecting both human and non-human life, the question that emerges is not only diagnostic, but pedagogical. How might education engage with these disturbances? How might it cultivate forms of rhythmic awareness capable of resisting acceleration and restoring conditions for eurhythmic coexistence? In this sense, environmental education and adult education do not appear as predefined solutions, but rather as fields in which the tension between polyrhythmia and arrhythmia becomes pedagogically perceptible and critically negotiable.

In this sense, our aim is to explore potential points of convergence between environmental education and adult education (Alhadeff-Jones, 2019, 2021) by mobilising rhythmanalysis (Lefebvre, 1992, 2021) as a mediating framework to interpret this historical moment marked by the time of catastrophes (Stengers, 2015) and by the dynamics of acceleration and alienation that characterise late modernity (Rosa, 2022).

Building on Dakka's (2024) reflections, rhythmanalysis is understood not only as an analytical lens for diagnosing collisions between institutional, social, and ecological temporalities, but also as an ethico-pedagogical orientation capable of illuminating the tension between processes of domination and possibilities of spatio-temporal appropriation within educational contexts. This perspective further resonates with the notion of idiorrhhythmic coexistence, emphasising the ethical imperative of fostering

educational environments that respect the plurality of human and more-than-human temporalities. In this sense, the historical emergence of environmental education can be interpreted as a pedagogical response to such socio-ecological and temporal tensions.

According to Reigota (2004), environmental education emerged as a response to environmental problems caused by a predatory and unsustainable capitalist economic model. The starting point for this discussion occurred at the First United Nations Conference on the Human Environment, held in Stockholm in 1972, which resulted in international agreements emphasising the importance of educating populations to address environmental challenges. From then on, environmental issues gained global relevance, with subsequent events, such as the conferences of Belgrade (1975), Tbilisi (1977), Moscow (1987), Rio (1992), and Rio+10 (2002), in Johannesburg, promoting public policies for environmental education at the international level.

Although environmental education emerged from ecological movements (Carvalho, 2001), the concerns that propelled it were, in some cases, conservationist in character, often functioning as a ‘manual of etiquette’ (Leite Lopes, 2004), with proposals focused more on individual behaviour than on critiquing the capitalist system. The debate within environmental education deepened over the years and works by authors such as Layrargues (2012) and Carvalho (2014) were essential in expanding discussions in the field, demonstrating that environmental education is a field continuously shaped and reshaped by socio-environmental issues.

This critical orientation is reflected in the Graduate Program in environmental education in which our research is situated. Structured around complementary research lines addressing foundational, pedagogical, and non-formal dimensions of environmental education, the Program approaches education as a lifelong, socially embedded, and territorially situated process. Rather than restricting its scope to formal schooling, it attends to cultural dynamics, work relations, professional practices, intergenerational knowledge, and the political conjunctures shaping socio-environmental realities. Within this framework, nature and society are not conceived as separate domains, but as relationally constituted through everyday practices, conflicts, and rhythms.

One illustrative example of the type of research developed within the Program is the master’s research conducted by one of the authors of this article (da Costa Lopes, 2017), which examined the potential socio-environmental impacts of the installation of a large-scale mining project in the coastal municipality of São José do Norte, located in the extreme south of Brazil. Historically marked by small-scale agriculture and artisanal fishing, the territory is structured around seasonal cycles, tidal rhythms, and intergenerational forms of knowledge intimately connected to land and water. The study analysed how the proposed mining enterprise threatened not only local ecosystems, but also the temporal organisation of everyday life, work practices, and community relations.

By engaging with residents’ narratives and territorial dynamics, the research problematised hegemonic notions of ‘development’ and ‘progress’, often translated through neoliberal promises of economic growth and modernisation. Rather than accepting these categories as neutral or universal, the investigation highlighted the plurality of ways of inhabiting the world, emphasising how different modes of life embody distinct rhythms, values, and conceptions of well-being that cannot be reduced to extractivist logics (da Costa Lopes, 2017).

This research dialogue can be further illuminated through Michel Alhadeff-Jones’ (2019, 2021) reflections on space and time in adult education. For Alhadeff-Jones (2019), adult learning does not occur in abstract or neutral environments; it is always situated within specific temporal and spatial configurations that shape experience, power relations, and possibilities for action. The case of São José do Norte makes this

particularly visible. The proposed mining project was not simply an economic intervention in space, but a reconfiguration of temporalities: it introduced the accelerated, extractivist time of global capital into a territory historically organised around seasonal cycles, artisanal work, and intergenerational knowledge sharing.

From an adult education perspective, such conflicts can reveal how learning emerges in moments of territorial tension, when communities are compelled to interpret, negotiate, and sometimes resist imposed rhythms (Alhadeff-Jones, 2021). In this sense, adult education becomes a space for critically reading socio-spatial transformations (Alhadeff-Jones, 2019), questioning hegemonic narratives of development, and fostering collective reflection on how different temporalities coexist, collide, or are hierarchised. The dispute over territory is therefore also a dispute over time, over which rhythms will organise life, work, and the future.

By examining the potential impacts of mining in São José do Norte, the study implicitly considered space as a social product structured through interrelated material, symbolic, and experiential dimensions. It analysed the built and ecological environment upon which everyday activities depended; it examined the discursive representations of 'development' mobilised by corporate and governmental actors; and it attended to the lived meanings attached to territory by local communities, including feelings of belonging, security, and continuity. In this sense, the research approached the territory through the interplay of the perceived (*perçu*), the conceived (*conçu*), and the lived (*vécu*), even without mobilising these categories explicitly (Lefebvre, 1991; Alhadeff-Jones, 2019).

What was at stake was not only land use, but the reconfiguration of socio-spatial relations and the temporal organisation of everyday life, elements that, retrospectively, can be read as deeply connected to a rhythmic understanding of space-time. From this perspective, the conflict observed in São José do Norte can be interpreted as a rhythmic collision between the accelerated temporalities of extractivist capitalism and the polyrhythmic organisation of local socio-ecological life, illustrating what Dakka (2024) describes as the temporal-diagnostic and ethico-pedagogical affordances of rhythmanalysis.

Thus, rhythmanalysis (Lefebvre, 1992, 2019) can emerge as a transdisciplinary concept for the foundations of environmental education. By attending to the multiple rhythms that shape both human and non-human life, it offers a lens through which the temporal and spatial dimensions of socio-environmental realities can be critically apprehended. Rather than viewing education as merely a tool for transmitting knowledge or promoting behavioural change, rhythmanalysis enables us to perceive the subtle interplay between polyrhythms and arrhythmias that structure everyday life, work, and ecological processes.

In this sense, environmental education is not simply about addressing environmental problems in isolation; it becomes a field capable of fostering sensitivity to the temporalities and interdependencies that constitute ecosystems and communities. By integrating rhythmanalysis into its conceptual foundation, environmental education can cultivate forms of awareness and pedagogical practice attuned to the dynamics of acceleration, alienation, and crisis, opening possibilities for more balanced, eurhythmic coexistence. At this point, the convergence between environmental education and adult education cannot be reduced to shared themes or overlapping concerns. It is grounded in a common epistemological sensitivity to situated experience, to learning processes embedded in socially produced space-time configurations, and to the ways in which subjects collectively make sense of socio-ecological transformations. In this sense, rhythmanalysis does not operate as a unifying theory, but as a relational lens through

which both fields can critically engage with the temporal conditions that shape contemporary life, learning, and coexistence.

Conclusions

Throughout this article, we have sought to articulate rhythmanalysis, environmental education, and adult education as complementary lenses for interpreting the socio-environmental crisis that characterise our historical moment. By revisiting the conceptual genealogy of rhythmanalysis and situating it within contemporary debates on acceleration, precarisation, and climate catastrophe, we argued that crisis can be understood not merely as isolated events, but as manifestations of systemic arrhythmias affecting both human and non-human life.

The Brazilian context examined in this study, marked by the intensification of work precarisation, the long-term educational impacts of the COVID-19 pandemic, and the devastating floods in Rio Grande do Sul, illustrates how temporal asymmetries structure contemporary inequalities. The rhythm of destruction is rapid, while the rhythms of repair, reconstruction, and social protection unfold slowly and unevenly. Such disparities reveal that environmental degradation, economic exploitation, and social vulnerability are not separate phenomena, but intertwined expressions of a broader arrhythmic condition.

The dialogue established between environmental education and adult education suggests that both fields are particularly well positioned to engage with these rhythmic disturbances. Environmental education contributes a critical examination of socio-ecological entanglements, exposing how extractivist and productivist logics destabilise the conditions of life. Adult education, in turn, foregrounds the situated, experiential, and political dimensions of learning, emphasising how adults interpret, negotiate, and sometimes resist imposed temporalities. When brought into conversation through the lens of rhythmanalysis, these fields converge in recognising education as a process embedded in space-time, inseparable from territorial conflicts, work dynamics, and ecological transformations.

The exercise undertaken here remains fundamentally reflective. It does not claim to provide a closed theoretical system or a definitive pedagogical model. Rather, it seeks to bring closer rhythmanalysis, environmental education, and adult education as mutually illuminating perspectives capable of deepening our understanding of the temporal structures that shape contemporary crises. By doing so, we hope to open a conceptual space in which education can be reimagined as a practice of rhythmic awareness, one that cultivates the capacity to perceive arrhythmias, to value polyrhythmic coexistence, and to experiment with more just and sustainable configurations of collective life.

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The authors declare no potential conflicts of interest with respect to the research, authorship or publication of this article.

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References

- Abílio, L. C. (2017, February 19). Uberização do trabalho: Subsunção real da viração [The uberisation of work: The real subsumption of 'getting by']. *Passa Palavra*.
<https://passapalavra.info/2017/02/110685/>
- Abílio, L. C., Amorim, H., & Grohmann, R. (2021). Uberização e plataforma do trabalho no Brasil: Conceitos, processos e formas [Uberisation and platform work in Brazil: Concepts, processes and forms]. *Sociologias*, 23(57), 26-56. <https://doi.org/10.1590/15174522-116484>
- Acsehrad, H. (2021). Os desastres e a ambientalidade crítica do capitalismo [Disasters and the critical environmentality of capitalism]. *Ciência & Trópico*, 45(2), 89-103.
<https://periodicos.fundaj.gov.br/CIC/article/view/2055>
- Alhadeff-Jones, M. (2019). Beyond space and time: Conceiving the rhythmic configurations of adult education through Lefebvre's rhythmanalysis. *Zeitschrift für Weiterbildungsforschung*, 42, 165-181. <https://doi.org/10.1007/s40955-019-0133-0>
- Alhadeff-Jones, M. (2021). Learning from the whirlpools of existence: Crises and transformative processes as complex and rhythmic phenomena. *European Journal for Research on the Education and Learning of Adults*, 12(3), 311-326. <https://doi.org/10.3384/rela.2000-7426.3914>
- Antunes, R. (2021). Capitalismo de plataforma e desantropomorfização do trabalho [Platform capitalism and the de-anthropomorphization of labor]. In R. Grohmann (Ed.), *Os laboratórios do trabalho digital: Entrevistas* (pp. 33-38). Boitempo Editorial.
- Bachelard, G. (2013 [1950]). *La dialectique de la durée* [The dialectic of duration]. Presses Universitaires Françaises.
- Baptista, P. (2010). *O filósofo fantasma – Lúcio Pinheiro dos Santos* [The phantom philosopher – Lúcio Pinheiro dos Santos]. Editora Zéfiro.
- Barthes, R. (2002). *Comment vivre ensemble: Notes de cours et de séminaires au Collège de France (1976-1977)* [How to live together: Lecture and seminar notes at the Collège de France (1976-1977)]. Seuil.
- Carvalho, I. C. M. (2001). Educação Ambiental e Movimentos Sociais: elementos para uma história política do campo ambiental [Environmental education and social movements: Elements for a political history of the environmental field]. *Educação: Teoria e prática*, 9(16-17), 46-56.
<https://www.periodicos.rc.biblioteca.unesp.br/index.php/educacao/article/view/1597>
- Carvalho, I. C. M. (2014). A perspectiva das pedras: considerações sobre os novos materialismos e as epistemologias ecológicas [The perspective of stones: Considerations on new materialisms and ecological epistemologies]. *Pesquisa em Educação Ambiental*, 9(1), 69-79.
<https://doi.org/10.18675/2177-580X.vol9.n1.p69-79>
- Carvalho, I. C. M., & Ortega, M. A. A. (2024). Aprendizagens em tempos de fim de um mundo e de abertura de múltiplos mundos: Reflexões desde a educação ambiental [Learning in times of the end of a world and the opening of multiple worlds. Reflections from environmental education]. *Revista Cocar*, 23, 1-23. <https://periodicos.uepa.br/index.php/cocar/article/view/7933>
- Cunha, R. S. (2010). *O essencial sobre ritmanálise* [The essentials about rhythmanalysis]. INCM.
- da Costa Lopes, R. (2017). *A mineração em São José do Norte, RS: Um estudo sobre controvérsias ambientais em torno do Projeto Retiro* [Mining in São José do Norte, Rio Grande do Sul: A study on environmental controversies surrounding the Retiro Project] (Master's thesis, Universidade Federal do Rio Grande [FURG]). Repositório Institucional da FURG.
<https://sistemas.furg.br/sistemas/sab/arquivos/bdtd/0000011707.pdf>
- da Costa Lopes, R., & Pinheiro, S. L. (2025). Ritmanálise e a crítica da aceleração: Pensar os ritmos com a educação ambiental [Rhythmanalysis and the critique of acceleration: Thinking rhythms through environmental education]. In Grupo Ritmanálise da Rede Internacional de Estudos da Produção do Espaço (RIEPE) (Ed.), *A ritmanálise de Henri Lefebvre e as revoltas do cotidiano* (pp. 35-48). Lutas Anticapital.
- da Costa Lopes, R., Pinheiro, S., & Pasquier, F. (2025). Technological acceleration and the precarisation of work: Reflections on social justice, the right to life, and environmental education. In T. Pajuste (Ed.), *Human rights in the digital domain: Core questions* (pp. 424-438). Cambridge University Press.
- da Silva Machado, C. R., da Costa Lopes, R., & Pinheiro, S. L. (2024). Contribuições ritmanalíticas aos tempos de catástrofes climáticas [Rhythmanalytic contributions to times of climate catastrophes]. In A. L. da Silva Ribeiro, H. R. de Souza Rodrigues, & T. F. Machado (Eds.), *Conflitos ambientais e urbanos: teorias e práticas contra-hegemônicas em educação ambiental* (pp. 154-182). IBRAJU Edições.

- https://observatorioconflitosextramosul.furg.br/images/LivrosObs/LivroV_Obsv_conflitos_finaliza_do_2024.pdf
- Dakka, F. (2024). Rhythm as form and forms of doctoral education. In D. R. Cole, M. M. Rafe, & G. Y. A. Yang-Heim (Eds.), *Educational research and the question(s) of time* (pp. 171-188). Springer. https://doi.org/10.1007/978-981-97-3418-4_10
- Dakka, F., & Wade, A. (2023). Postgraduate research in a sick society. *Research Papers in Education*, 38(5), 743-762. <https://doi.org/10.1080/02671522.2023.2234379>
- Dawidman, L. (2025, March 27). A educação ainda sofre com o impacto da pandemia em 2025, afirma estudo [Education is still experiencing the impact of the pandemic in 2025, a study finds]. *DSSBR/ENSP-Fiocruz*. <https://dssbr.ensp.fiocruz.br/a-educacao-ainda-sofre-com-o-impacto-da-pandemia-em-2025-afirma-estudo/>
- Dias, G. (2018). Nietzsche, precursor da ritmanálise? A recepção luso-brasileira do pensamento nietzschiano pelo Filósofo Fantasma Lúcio Pinheiro dos Santos [Nietzsche, precursor of rhythmanalysis? The Luso-Brazilian reception of Nietzschean thought by the phantom philosopher Lúcio Pinheiro dos Santos]. *Trágica: Estudos de Filosofia da Imanência*, 11(3), 41-58. <https://doi.org/10.59488/tragica.v1i3.27360>
- Economic Commission for Latin America and the Caribbean (ECLAC). (2021). *Digital technologies for a new future* (LC/TS.2021/43). United Nations. <https://repositorio.cepal.org/server/api/core/bitstreams/a356c4ed-4542-4ab2-aa40-73e1181a2427/content>
- Fiocruz. (2026). *Rio Grande do Sul no contexto da crise climática: Eventos extremos no Vale do Taquari e na Bacia do Lago Guaíba* [Rio Grande do Sul in the context of the climate crisis: Extreme events in the Taquari Valley and in the Guaíba Lake Basin]. <https://mapadeconflitos.ensp.fiocruz.br/conflito/rio-grande-do-sul-no-contexto-da-crise-climatica-eventos-climaticos-extremos-no-vale-do-taquari-e-na-bacia-do-lago-guaiba/#fontes>
- Harvey, D. (1991). *A condição pós-moderna* [The condition of postmodernity]. Edições Loyola.
- Jornal Nacional. (2025, September 27). *Quase 20 mil vítimas das enchentes do ano passado no RS continuam na fila por moradia* [Nearly 20,000 victims of last year's floods in Rio Grande do Sul are still on the waiting list for housing]. G1. <https://g1.globo.com/jornal-nacional/noticia/2025/09/27/quase-20-mil-vitimas-das-enchentes-do-ano-passado-no-rs-continuum-na-fila-por-moradia.ghtml>
- Layrargues, P. P. (2012). Para onde vai a educação ambiental? O cenário político-ideológico da educação ambiental brasileira e os desafios de uma agenda política crítica contra-hegemônica [Where is environmental education going? The political-ideological scenario of Brazilian environmental education and the challenges of a critical, counter-hegemonic political agenda]. *Revista Contemporânea de Educação*, 7(14), 388-411. <https://revistas.ufrj.br/index.php/rce/article/view/1677>
- Lefebvre, H. (1991). *The production of space*. Blackwell. (Original work published 1974)
- Lefebvre, H. (1992). *Éléments de rythmanalyse: Introduction à la connaissance des rythmes* [Elements of rhythmanalysis: Introduction to the knowledge of rhythms]. Éditions Syllepse.
- Lefebvre, H. (2019). *Éléments de rythmanalyse et autres essais sur les temporalités* [Elements of rhythmanalysis and other essays on temporalities]. Eterotopia.
- Lefebvre, H. (2021). *Elementos de ritmanálise e outros ensaios sobre temporalidades* [Elements of rhythmanalysis and other essays on temporalities]. Consequência.
- Leite Lopes, J. S. (2004). *A ambientalização dos conflitos sociais: Participação e controle público da poluição industrial* [The environmentalization of social conflicts: Participation and public control of industrial pollution]. Relume Dumará.
- Lima, G. F. D. C., & Torres, M. B. R. (2021). An education for the end of the world? Contemporary socioenvironmental challenges and the role of environmental education in school contexts. *Educar em revista*, 37, e77819. http://educa.fcc.org.br/scielo.php?pid=S0104-40602021000100802&script=sci_arttext&tlng=en
- Martins, F., & Moreaux, M. (2021). Prefácio à edição brasileira [Preface to the Brazilian edition]. In H. Lefebvre, *Elements of rhythmanalysis and other essays on temporalities*. Consequência. (Original work published 1992)
- Pinheiro, S., & Pasquier, F. (2023). Consciousness and environmental education: Transdisciplinary urgencies from the post-pandemic context. *Transdisciplinary Journal of Engineering & Science*, 14, 81-94. <https://doi.org/10.22545/2023/00223>
- Redesca. (2025). *Impactos das enchentes no Rio Grande do Sul: Observações e recomendações para a garantia dos direitos econômicos, sociais, culturais e ambientais* [Impacts of the floods in Rio Grande do Sul: Observations and recommendations for the protection of economic, social, cultural,

and environmental rights].

https://www.oas.org/pt/cidh/relatorios/pdfs/2025/INFORME_REDESCA_BRASIL_PT.pdf

- Reigota, M. (2004). *O que é educação ambiental* [What is environmental education]. Brasiliense.
- Revol, C. (2019). Prefácio [Preface]. In H. Lefebvre, *Elements of rhythmanalysis and other essays on temporalities* (pp 5-23). Eterotopia. (Original work published 1992)
- Revol, C. (2021). Prefácio à edição brasileira [Preface to the Brazilian edition]. In F. Martins & M. Moreaux (Eds.), *Elements of rhythmanalysis and other essays on temporalities* (pp. 25-47). Consequência.
- Rosa, H. (2022). *Alienação e aceleração: Por uma teoria crítica da temporalidade tarde-moderna* [Alienation and acceleration: Toward a critical theory of late-modern temporality]. Vozes.
- Safatle, V., da Silva Junior, N., & Dunker, C. (2021). (Eds.). *Neoliberalismo como gestão do sofrimento psíquico* [Neoliberalism as the management of psychic suffering]. Autêntica Editora.
- Stengers, I. (2015). *No tempo das catástrofes* [In the time of catastrophes]. Cosac Naify.
- Wallenhorst, N. (2025). *Ce que le climat va faire à l'Europe* [What climate will do to Europe]. Seuil.