

Between River Waves and the Rainforest: immersive science education in the Amazon¹

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ABSTRACT

This paper proposes a Science Education grounded in the body-nature, in affect, and in the sensitive entanglements of the Amazon Rainforest. Inspired by concepts such as transversality, becoming, *natura naturans-naturata*, and a pedagogy of listening, the text draws on experiences with research groups and experimental encounters to advocate for a teaching practice that pulses with life, in communion with humans and more-than-humans. The river waves—a life of movement and transformation—guide a form of writing that is also a form of re-existence, one that escapes traditional teaching and engages with an aesthetics and ethics of feeling. In the forest, among sounds, scents, and touches, the teacher bio-instrumentalizes and becomes a vibratile, contaminated, hybrid, and rhizomatic body. Thus, a “we-forest” emerges in an educational practice that does not teach about nature, but with it, in the constant creation of possible, affective, and interconnected worlds.

KEYWORDS: Teaching. Life. Science Education.

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Feito de banzeiros e floresteios: educação em ciências imersiva na Amazônia

RESUMO

Este artigo propõe uma Educação em Ciências ancorada no corpo-natureza, nos afetos e nos atravessamentos sensíveis da Floresta Amazônica. Inspirado por conceitos como transversalidade, devir, natureza naturante-naturada e pedagogia da escuta, o escrito parte de vivências com grupos de pesquisa e encontros-experimentações para defender uma docência que pulsa com a vida, em comunhão com humanos e mais-que-humanos. O banzeiro, como vida de movimento e transformação, guia uma escrita que é, também, reexistência, que foge do ensino tradicional e se engaja em uma estética e ética do sentir. Na floresta, entre sons, cheiros e toques, o docente se bioinstrumentaliza e se torna um corpo vibrátil, contaminado, híbrido, rizomático. Assim, emerge um “nós-floresta”, uma prática educativa que não ensina sobre a natureza, mas com ela, em uma constante criação de mundos possíveis, afetivos e interligados.

PALAVRAS-CHAVE: Docência. Vida. Educação em Ciências.

Hecho de banzeiros y floresteos: educación en ciencias inmersiva en la Amazonía

RESUMEN

Este artículo propone una Educación en Ciencias anclada en el cuerpo-naturaleza, en los afectos y en los atravesamientos sensibles de la Selva Amazónica. Inspirado en conceptos como transversalidad, devenir, naturaleza naturante-naturada y pedagogía de la escucha, el escrito parte de vivencias con grupos de investigación y de encuentros-experimentaciones para defender una docencia que pulsa con la vida, en comunión con humanos y más-que-humanos. El *banzeiro*, como vida en movimiento y transformación, guía una escritura que es también reexistencia, que escapa de la enseñanza tradicional y se compromete con una estética y una ética del sentir. En la selva, entre sonidos, aromas y texturas, el/la docente se bioinstrumentaliza y se convierte en un cuerpo vibrátil, contaminado, híbrido y rizomático. Así, emerge un “nosotros-selva”, una práctica educativa que no enseña sobre la naturaleza, sino con ella, en una constante creación de mundos posibles, afectivos e interconectados.

PALABRAS CLAVE: Docencia. Vida. Educación en Ciencias.

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*I throw the net into the river
But it's not fish I want to catch
Standing in the canoe
I keep my eye on it
Searching in the water to find me
Since the fish and the river
They are neither animal nor place
They are part of one
Of what surrounds me
Of what I live around
In a dive, I feel the emptiness
Of which I am also a part
Beyond the net, the fish and the river
Beyond the beyond.
A Rede – Batuc Banzeiro
(our translation)*

Introduction⁵

The writing that makes up this text is an attempt to transversalize, to poetize more than to promote new “discoveries”. A quest for fluidity, for movement, for encounters:

Transversality is a dimension that aims to overcome the two impasses, which are that of a pure verticality and a simple horizontality; transversality tends to occur when there is maximum communication between the different levels and, above all, in the different directions (Guattari, 2004, p. 111, our translation).

Like *Batuc Banzeiro*, it reminds us of the gesture of casting the net into the river not with the primary intention of capturing fish, but of establishing a symbiotic connection: an attentive body that moves between prudence, boldness, and courage in the face of the charms and mysteries of nature—of the river, of life, of food—affirming the inseparability between body and nature. Speaking of Nature, Art, Life,

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and the Human, or of a composition that integrates all of this, however, is to think about which relationship or path would be viable. If we think about what we experience or our schooling and society's philosophy, the path will be more about distancing and dissociating ourselves from our body-life than about trails, shortcuts, openings, moving passages, bridges, encounters, or powers that can help us on this vital path.

The net of our life that we want to cast into play is intense and powerful, like a *Batuc Banzeiro*. It is the drum, hoof, body, sound, sonority, skin to skin, movement, contact, vibration, timbre, intensity, duration, time, memory, thinking, feeling, echoing, listening, color, flavor, smell, fluidity, strength, intensity, movement, variation, lightness, passage, coming and going, high and low, wave, fear, courage, joy, sadness, abstraction, reverie, fantasy, enchantment, life, death, infinity, like the song itself, beyond the beyond. Composing with sound waves and water waves in this *banzeiro*.

In our Amazonian region, *banzeiro* is more than the balance of the waters; it is a moving body, a warning sign of boiling life. In the Amazon's rivers, *banzeiro* names the phenomenon of agitated waves, a shudder of the water when something passes by, a canoe, a motor, a life. It is also a way of feeling, as "*banzeiro* is the tremor of the world, the warning that something has passed and left its mark" (Brum, 2021, p. 30, our translation). The *banzeiro* inhabits us, moves us. It becomes, then, an existence that never settles down, that pulsates in tension between calm and rupture.

This spirit of movement, sensitive and mysterious, takes us back to the first waters, to the belly, to the amniotic fluid that lulls us at the beginning of every crossing. Brum speaks of a "*banzeiro òkòtò*", a movement that rotates in a spiral and that "does not point forward, but inwards" (Brum, 2021, p. 37, our translation). In this intimate dive, every disturbance in the water evokes a listening to oneself, like a call that (re)places us on the axis of memories, traumas, and fables. Here, writing is letting oneself be crossed by this *banzeiro*, to register the tremor, to sculpt in the body-word the trace of what passes.

We place ourselves, then, as writers of the self, supported by Foucault (2006), who conceives this act as an ethical and aesthetic exercise of existence, since

the care for the self is a kind of thorn that must be stuck in the flesh of men, embedded in their existence, and [which] is the principle of restlessness, a principle of movement, a principle of permanent concern throughout existence (Foucault, 2006, p. 11, our translation).

Just as the *banzeiro*, which stirs the waters and announces presences, we write this text as a gesture of reexistence, a way of moving around, of recreating ourselves as teachers of Science Education. We are *banzeiro* in flesh and word because in the Amazon flourishing in teaching means writing with water, with the forest, with loss, and with hope. Every wave that crosses us carries a piece of the world, a call to listen to what insists on living. It is a constant reforest(be)ing, a vital gesture that becomes a *banzeiro*, a movement that witnesses the world and creates possibilities.

In view of this, at crossroads with the Vidar em Intensões Research Groups of the University of the State of Amazonas, AMPLIA, of the Federal University of Uberlândia, and the Art & School in the Forest Collective, we aim to experience, for three days, a deep and living immersion in the Agroecological Training Center of the Museum of the Amazon, in the Ramal do Brasileirinho, in Manaus/AM, through a series of encounters that enabled sensitive, artistic and nutritious experiments, in exchanges with farmers, Science Education master's students, artists and professors from five Brazilian and European universities, namely: University of Porto, in Portugal, and University of Murcia, in Spain.

We place ourselves in reforest(be)ing, a gesture of intensive experimentation between body-nature in teaching. We walk in reflective approaches that cross body-thought, writing ourselves in the narratives of

oneself and of the ‘discoveries and conceptions’ that hover over the Amazon region as layers that overlap and entangle: society, culture, education, spirituality, ancestry, and humanity.

With the idea that “memory is rhizomatic, non-linear, procedural, subjective, corporeal, and performative” (Martins, 2022, p. 82, our translation), we realize that, when we recognize ourselves as Amazonians, the memory of our region is in conflict, and our faculty is also a territory tensioned by knowledge, pain, and struggles. Reexisting in the Amazon requires us to listen attentively to the repetitions surrounding us, those that, even disguised as progress, continue to exploit the forest, the people, music, and life. We refuse to cast nets in these waters. We join Deleuze in understanding that “repetition is what differentiates and not what reproduces” (1991, p. 23, our translation). Thus, we seek to find the differences that vibrate in the repetitions, the gaps through which other forms of life can germinate, other possibilities of Science Education.

Therefore, we may not be able to tie all the trails of this moving path, but we keep searching, becoming. These are passages that are rehearsed with listening, with the sounds of the world, with the body that feels, with imagination. We believe that thinking about the body-nature in teaching is to affirm a “politics of feeling”, a body that “is neither object nor subject, but vibrating field, the power to affect and be affected” (Rolnik, 2006, p. 23, our translation). A teaching that pulsates and remakes itself with the force of the waters and forests. Our body is not only biological; it is also made of forces, powers, and joys, a living curriculum as an “aesthetic practice of existence” (Paraíso, 2004, p. 124, our translation). What moves us is the possibility of reinventing teaching as life in art, as life in crossing. Our body is also a forest, which is written on the ground with the leaves, with the rivers, and which reexists, like a *banzeiro*, in the desire for other worlds. A nature of life. A relationship between *natura naturans* and *natura naturata*, because:

By *natura naturans* I mean that which is in itself and conceives itself, that is, the attributes of substance which express an eternal and infinite essence; by *natura naturata* I mean all that follows from the necessity of God's nature (Spinoza, 2009, p. 35, our translation).

We can understand "*naturans*" as an expression of the infinite and eternal essence. "*Naturata*" is everything that needs the *naturans*. From this, we can reflect that it is not about nature that we learn in school. We do not speak of this nature that is outside us in fauna and flora, and we use it unilaterally to make it useful and utilitarian in the hegemonic context of capital. On the contrary, we speak of a nature *naturans-naturata*, inseparable, and immanent. A nature that makes us and that is made by us, bodies in becoming, singular expressions of the same common power. This way, thinking about nature is also thinking about ourselves, in a vital interrelationship with everything that lives and affects us.

In this text, we will specify these body-nature links from one encounter-experimentation of bio-instrumentalization in the Amazon Forest, an experience and experimentation in body-sonority and in enfolding oneself in being-seed, a hybridization with other more-than-human beings. From the sounds and our bodies, we establish an aesthetic and an ethics of existence in union. A movement to territorialize, deterritorialize, and reterritorialize (Deleuze; Guattari, 2011). So, we continue in sounds... compositions... touches... bio-instrumentalizations... smells (breath)... forest...

Amalgamated teaching as a forest: for a Science Education in (de)compositions

Flooded by the humidity of the forest, sitting on pieces of logs... moist soil. Sound that calls for lives. Lives enchanted by sounds, smells, and touches, lives that stand out in human relationships; it is beyond; it is for life in the immanence of bodies that intersect and intertwine between trunks,

leaves, earth, ants, thorns, bird sounds, and so many others more-than-humans that the eyes cannot follow. In the beating of the trunks, life is called; In the crackle of branches and leaves, secrets are whispered. Beams of light pass through the mysteries of the forest. From the earth, the vitality of (de)composition is born (Figure 1).

FIGURE 1: Crosses of lives



Source: Personal collection (2024).

The Amazon and its forest floor teach this: lives created by others. It is acidic and (in)fertile land that is enhanced by the confluence of fungi, plants, and many others. An echo, the repetition that differs and manifests different ways of life. Here, we feel and vibrate that life is never alone, because it is always symbiosis, composition. We are many forms of life, not because we are many, but because we are with many other forms of life, in de-compositions and composed by death itself that feeds beginnings and other possible worlds (Haraway, 2022). This way, the idea of (in)fertility of the Amazonian land is not about lack, but about a power of interaction, a bio-interaction in forests. It is there, where it seems to be lacking, that it is created by connection.

“What sustains being is disuse. What lightens the ground is decomposition” (Barros, 2003, p. 41, our translation). What enlivens the Amazon Rainforest is the (de)composition; it is what sustains the ground of the beings inhabiting it. Thus, decomposition is a politics of the ground, an aesthetics of fertility hidden in the invisible, an ethics of the common, a sonority of life. It is in the cracking of broken branches, in bodies given over to disuse, and in the confluence with ants, fungi, and fallen leaves that the possibility of worlds to come is announced. To feel the body in (de)com-positions is to be with and in other positions; it is to be in places, since “places are not things, they are living entities” (Couto, 2011, p. 14, our translation). In view of this, it is about connections that give possibilities of existences marked by being in a We.

By bio-instrumentalizing ourselves in the face of all this, in We-forest, in We-banzeiro, we materialize the charms of the Amazon from our bodies, from our experiments, and our deviations that touch and add sound to fluid ideas of existences. We erased the constitutive ideas based on the domain of the mind and created, in the immanence of bodies, a new body that forested in compositions (Figure 2).

FIGURE 2: Em-body in sound *floresteios*



Source: Personal collection (2024).

We inhabit the We and create sounds by “conjugating the we: we-river, we-mountains, we-earth” (Krenak, 2020, our translation). A bodily sound of a We-forest requires lives as we cross ancestral elements. Are we circularizing intersections? Maybe, yes. Perhaps this is what we do when we allow ourselves to be crossed by leaves and branches, by thorns and smells, by bird songs and the silences of vines. Circularizing intersections is not about drawing closed circles, but about letting the times curl up like vines in the forest. These times are not directed towards progress, but they spiral, return, bend, intersect, and displace.

Martins (2022) offers us this permission when he proposes time as a crossroads, as a poetic-political gesture that carries memory and fabulation in layers that do not succeed each other, but intersect in a spiraling time, which “does not move forward or backward, but [that] rotates permanently in the spiral movement of remembrance” (Martins, 2022, p. 43, our translation). Therefore, circularizing intersections is to inhabit this spiral of time and life, where knowledge is not separated from experience and ancestry is not in the past, but surrounds us like wind, like smell, like song. In the forest, there are also intersections between species, between visible and invisible presences, between the living and the enchanted, between sounds and silences. Circularizing is about flowing with the river, with the rhythm of the forest, it is embodying what crosses us, it is *banzeiro*. It is teaching and learning in the fold of time, in the deviations of rationality, in the corners of a knowledge that flows through the cracks of what’s instituted. Thus, we intersect: we-forest, we-time, knots-ancestry.

In the midst of the sound that pulsates from the damp forest floor, the experimentation of the body-sound and the being-seed emerges, enfolded in a layer about to create life. This state also summons us to becoming-animal, not as a metaphor, but as a passage, as a zone of indiscernibility between bodies, between species, between worlds. A

becoming that does not seek to represent the animal, but to become with it, to vibrate in its frequency, to listen with the skin, to sniff with the pores, to move among the trees as if feeling the world in other ways. It is that “becoming is not progress, but a crossing” (Deleuze; Guattari, 2011, p. 13, our translation). It is in this crossing that the human gets rid of his civilizational armor and allows oneself to be a seed, a bush, an animal, a fungus, one among many in the tapestry of life woven on the forest floor.

Enfolding oneself and feeling the courage to break the integument and, from there, entering the moment of passage between the world’s potential before the sprout and to feel one’s own life in motion: all this is becoming-with. It is being a seed; it is potential life. Coccia (2020, p. 222) encourages us to learn from plants in “an intertwined living together of cohabitations” (our translation). Plants invite us to think about a life that is not based on hostility or segregation, but on creating with. To be sounds, to wind in rhythmic pulsations, a body that vibrates. Connecting to the vibrating body, as Rolnik (2011, p. 12) said, is to be able to integrate the other into our sensibility so that there is no separation between the self and the other, subject and object. It is to be a contaminated body. The seed and its potency teach us movements of existence in resistance and the forest as well. As stated by Manoel de Barros (2006, p. 33, our translation), “the leaves of the trees teach us to fall without fanfare” (Figure 3).

FIGURE 3: Teachings-leaves

Source: Beto Oliveira (@betoclick) (2024).

This body-nature, then, is no longer a body that is separate from the world, but a porous, composite, rhizomatic body. A body that flows, that germinates, that throbs with the heat of the earth and the smells of humidity. A body that feels the wind as an ancestral breath, that recognizes in the cracked branches a call, and that understands, in the sound of the *banzeiro*, a memory of waters and lives in motion. Krenak (2019, p. 1, our translation) criticizes the idea of Ecology as a “set of references from a given place” and the process of individualization. For him, these discourses result in us being disconnected from nature, because Ecology, for those who live in the forest, it is the material and spiritual support of existence. We think, therefore, from becoming-with, hybridizations, and metamorphoses with other lives that permeate us. In body-nature experiments, we blur the barriers that have been placed on us and the limits between the self and the other in order to form an organic fabric within us.

We long for a body that does not imitate nature, but that is nature in action, as Spinoza (2009) says when he distinguishes between *naturans* and *naturata*: a body that not only lives in nature, but as nature. In these

crossings and mixtures, there is no subject that dominates, nor a nature that submits. There are meetings. There is what is heard with the whole body. There are bodies that allow themselves to be touched and that learn from silence, humidity, and the invisible. There is also what Krenak (2020, p. 9, our translation) calls “life as an elementary crossing of ancestry”, when the becoming-animal is not about regressing, but about expanding itself, a rupture with the human-narcissist who believes themselves outside the forest, and reconnecting with the multispecies common.

The teacher who bio-instrumentalizes themselves in the forest and enfolds themselves as a seed also becomes a body in becoming: becoming-bird, becoming-wind, becoming-moisture. In this becoming-other, a pedagogy of listening, of expanded perception, of teaching without words unfolds, in which the touch, the smell, the sound, and the pulse of the leaves are the most important lessons; they are ancestors. In this movement, Science Education is no longer based on transmission but on sensitive contamination, affecting and being affected. Therefore, becoming-animal is also becoming-teacher. What other way of teaching is there, after all, if not with and in the midst of life? Now, it is the capacity of a body to be affected and to contaminate itself that enhances our movement and our hybridization with the other. Approaching the multiple forms of existence is a teaching duty; not just learning about them, but from them. Being attentive and alive to the world that opens up and is born under our active perception can create multiple avenues of sensory participation and involve us with the world, not distancing ourselves from it (Sales; Rigue; Dalmaso, 2023)

In the midst of being alive, we engage in a We-forest walking to a water hole—the source of a river. Between ascents and descents of a moist soil after the rain, of a porous and slippery soil, we step anchored in a web supported by roots, branches, and everything that inhabits the bio-interaction on the forest floor. Listening to the sounds of water, our bodies saw a river path that was created. A river spring is the point of origin of the watercourse, where

groundwater becomes seed and breaks the soil to start a We-River. Here, the teaching-forest-seed bodies open and are born as river-births (Figure 4).

FIGURE 4: Teaching-bodies as river-births



Source: Personal collection (2024).

Thus, between the riverbanks and the banks of the body, a forest-We, a Banzeiro-We, a River-Springs is formed. We who are rivers are also leaves and dreams. We who intertwine like vines and narrate ourselves in spirals. We who do not teach about the forest, but with it, like it, in becoming -with its rhythms, pauses, floods, and droughts. This becoming-animal of the body-nature is more than an image: it is an ethical, aesthetic, and political choice of being in the world. A bet on life as a continuous creation, as listening, as a dance of the living in its most multiple forms. It is a becoming-teacher made of *banzeiros* and *floresteios*, made of an Education in Sciences that is an immersion in life.

Considerations in invitations

FIGURE 5: Invitations to bio-instrumentalize oneself⁶



Source: Personal collection, 2024.

There are times when it is necessary to enfold oneself, to retreat in fertile silence, like a seed in suspension. “Being a seed” is the permission to care for what has not yet manifested, for what is still in bud, but still pulsates under the skin of the earth, as a way of nursing worlds in the dark between the stuffy heat and the humidity of waiting. It is in teaching that immersion in the forest happens. This enfolding does not mean absence, but vibrating preparation.

There is listening in enfolding the seed. It is not only the embryo that rests, but an ancestral listening attuned to life. By listening, we experience and bio-instrumentalize ourselves: the teaching body is tuned as a natural tool of a We that is also a body-sonority. A body that vibrates with the riverbanks and the forests of the forest, that learns how to teach by listening to the cracking of the branches, the sloshing of the waters, the silence of the leaves. We leave the link to

⁶ For a sensory reading, access: Bio-instrumentalize in the Amazon forest.

a sensory reading of *banzeiros* and *floresteios* beds in a footnote (Figure 5). May you close your eyes and listen with your skin. Feel it!

In these considerations, one is invited to an Education in Sciences that does not impose itself as a technique of control but gets rid of the ties of neutrality to reforest themselves in affectation and become a rhizome of listening. The teacher's body becomes a porous medium, because Science gets into the cracks of the sensible. It is Science that is enchanted by fungi, that learns from the humus of the earth, that bows before the intelligence of seeds and becomes LIFE happening in births. "To be a seed" is also "to be a forest". Thus, instead of isolating ourselves in enfolded didactics, we experience a pedagogy of decomposition that occurs in immersing in the life given in the *banzeiros* and *floresteios*.

It is with this invitation that we connect to a science teaching that calls on us to be less about nature and more about listening to it, composing oneself in a body that vibrates with others, in vegetable, fungal, human and more-than-human compositions. It is about allowing ourselves to be (bio)instrumentalized by a forest bordered by river waters that cross it, by holes and ebbs, and by the mastery that teaches by presence.

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