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Education of Attention in environmental education practices

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ABSTRACT: This paper was written by several hands, with the aim to conceptualize and report on different experiences of environmental education practices from the perspective of Education of Attention. Hence, we describe three undergraduate theses carried out by students from the Biological Sciences Program at the Federal University of Paraná. The first thesis, authored by Bruna Caroline Buss in 2018, focused on Arthropods as its theme. The second one, authored by Vanessa Aparecido Qualho in 2020, described a professional development workshop on fungi for basic education teachers from Palotina, state of Paraná, Southern Brazil. The third thesis, authored by Vanessa Mohr Fülber in 2023, analyzed the relationship between children and soil microorganisms. We concluded that the concept of Education of Attention can be adopted into the field of environmental education research and its practices.

KEYWORDS: Attentionalities. Correspondence. Eco-phenomenology.

1 INTRODUCTION

Historically, the Social Sciences and the Humanities have been focused on interpreting human culture and its meaning. As of late, I have been considering perspectives that argue for the existence of materialities that are not necessarily human interpretations. Recognizing that certain aspects of life and things cannot be accurately represented allows for alternative forms of learning and sharing worlds. We argue that alternative forms of learning may broaden our understanding of the world and our ability to share it. The plural is used to illustrate the idea that there are multiple worlds. After all, everyone interprets and experiences life differently. In environmental education, one possible path to follow is embracing diverse co-functionalities and co-existences—a theoretical perspective that can be employed is eco-phenomenology. According to Sato (2016, p. 14), eco-phenomenology "has emphasized the importance of transcending the human dimension, including other forms of life, without the need to reinvigorate naturalism devoid of humanity" (author's translation).

Authors from various fields have been adopting a less anthropocentric stance. As a result, several movements have emerged, such as posthumanism, new materialism, and ecofeminism. Despite their different origins, these movements converge on the principle of decentralizing the human being. Steil and Carvalho (2014, p. 165) have referred to this convergence as ecological epistemologies, which claim "symmetry between things and thought, human and non-human beings, historical and natural processes" (author's translation).

Within this context, I have focused on reading Ailton Krenak, Anna Tsing, Bruno Latour, Donna Haraway and Tim Ingold. Regarding environmental education, I have adopted a concept proposed by Tim Ingold: the Education of Attention. Therefore, this theme was chosen to tell the stories – as Donna Haraway would say – in this work. The paper was collaboratively written and, besides this introduction (written by the first author and supervisor of the present work), it includes a section focused on developing some of Tim Ingold's formulations. Below, we describe three undergraduate theses carried out by three students from the Biological Sciences degree course at the Federal University of Paraná.

The first thesis, authored by Bruna Caroline Buss in 2018, focused on Arthropods. The second, authored by Vanessa Aparecido Qualho in 2020, described a professional workshop on fungi for basic education teachers from Palotina, state of Paraná, and region. The third thesis,

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authored by Vanessa Mohr Fülber in 2023, examined the relationship between children and soil microorganisms.

2 EDUCATION OF ATTENTION

We cannot establish a definition for Education of Attention without providing context regarding Tim Ingold. The author, born in 1948, is an anthropologist, and is currently a professor at the University of Aberdeen. Throughout his studies, Ingold opposed conventional models of cognitive science that placed little emphasis on embodied experiences. With a more relational approach, Ingold (2010; 2017) challenges the concept of mental representation transmission, specifically the notions of competence and ability.

For Ingold (2012), the relational approach posits that bodies lack wrappings, meaning that the interior and exterior binarity is dissolved, since objects overflow "from the surfaces that form around them" (author's translation) (INGOLD, 2012, p. 29). The author argues that life unfolds in a parliamentary mesh of threads—the relationships we establish along the mesh are more significant than the knots. This theme leads to another concept that Ingold (2020) values highly: the idea of correspondence, which occurs when we respond to each other, as opposed to simply receiving information that has been transmitted.

> If, today, our world is in crisis, it is because we have forgotten how to correspond. We have engaged, instead, in campaigns of interaction. Parties to interaction face each other with their identities and objectives already in place, and transact in ways that serve, but do nothing to transform, their separate interests. Their difference is given from the start, and remains afterwards. Interaction is thus a between relation. Correspondence, however, goes along. The trouble is that we have been so wrapped up in our interactions with others that we have failed to notice how both we and they go along together in the current of time. As I've tried to show, correspondence is about the ways along which lives, in their perpetual unfolding or becoming, simultaneously join together and differentiate themselves, one from another. This shift from interaction to correspondence entails a fundamental reorientation, from the between-ness of beings and things to their in-between-ness. (INGOLD, 2020, p. 9).

Particularly in the field of environmental education, the concept of correspondence places us in meaningful relationships with everything that exists, whether living or non-living. Our bodies react to everything: other living beings, the chirp of a bird, the death of a dog, the growth of a seed, the passing of time, the wind, solar radiation, and the scent of sewage. In this relationship, we cannot sense or experience others' emotions. Doing so would place us in a position of ventriloquism, as pointed out by Isabel Carvalho (2014) in *The perspective of stones: considerations on new materialisms and ecological epistemologies*. In correspondence, we can appreciate the activity of beetles and the sound of rustling treetops, and mourn the deforestation of the environment. We share both the joys and the sorrows (HARAWAY, 2011).

We develop our skills through correspondence, as they are the result of our attentiveness to multisensorialities and the dynamics of the world. When novices observe and follow the movements of more experienced individuals, attention is brought upon the movements of other bodies. This attention is based on the fine refinement between sensory perception and the environment (INGOLD, 2010; 2017), e.g. a child who learns to replicate letter

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shapes while becoming literate, or an elderly individual who learns to utilize a cell phone with their grandchild. Being a novice or an expert is not age-dependent; in turn, it depends on the level of developed skills by the individual.

For Ingold (2010, p. 21), skill acquisition is a "directed rediscovery" that depends on ongoing copying, improvisation, and creation:

> The process of learning by directed rediscovery is best conveyed by the notion of showing. To present something to someone is to provide a direct means for them to comprehend it, whether by looking, hearing or feeling. Here, the instructor's role is to create situations in which the novice is instructed to pay special attention to various aspects of what can be seen, touched or heard, in order to grasp the concept. Learning in this context is equivalent to an "education of attention" (author's translation).

The practices of attentionality focusing on the world's materialities (in this case, arthropods, fungi, and soil microorganisms) appears to be a means of establishing environments that are habitable and able to be shared. This paper has been written bearing this in mind.

3 EDUCATION OF ATTENTION IN ENVIRONMENTAL EDUCATION

3.1 The case of Arthropods

The first project was carried out at the Gasparzinho Arts School, in the municipality of Palotina, state of Paraná, Southern Brazil. The school is targeted for children between ages 4 and 13, and is situated in an urban green area. The project was held in five meetings (Chart 1) during the months of August, September, and October 2018, with a group of five students between ages 9 and 12.

Chart 1 – Activities carried out in the five meetings

Meeting	Activity performed	Didactic resources
1	Project presentation. Theme: "Who are arthropods?".	Biological material, such as spiders, scorpions, centipedes, shrimps, and an entomological collection. Presentation on a multimedia projector.
2	Review of the previous meeting. Searching the forest for arthropods to photograph. Theme: "Habitat and abundance". Image analysis.	Presentation on a multimedia projector. Videos about ecdysis. Photographs.
3	Theme: "Importance of arthropods: effects of population reduction and prevention measures".	Fruit and honey tasting. Landscape fragmentation models. Presentation on a multimedia projector.

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4	Theme: "Venomous arthropods".	Modelling with playdough. Presentation on a multimedia projector.
5	Project closure. Overview of previous concepts from all meetings. Evaluation activity.	Excerpt from the movie "A Bug's Life". Presentation on a multimedia projector. Drawings and texts.

Source: Buss and Iared (2020)

We aimed to raise awareness among the students about the theme addressed during the meetings by using various resources and tools, such as photographs, biological material, visual aids, and modelling dough. The use of biological material and didactic models as resources in educational practices tends to bring individuals closer to the organisms being studied, and is considered an excellent educational tool when the aim is to engage the signification and awareness process (BUSS; IARED, 2020). In addition, according to Rodrigues et al. (2008), this is a pleasurable activity linked to affection.

During the meetings, we also developed strategies to raise awareness through the senses. Fruit salad and honey were provided to the students to stimulate taste, touch, and sight. The use of these foods, that are produced through faunistic processes such as pollination, contributed to addressing the ecological, economic, and social roles of these animals. According to Hoeffel and Fadini (2007), environmental perception, involving both the organism and the environment, is constructed by sensory organs as well as mental elaborations stemming from individual experiences. In this sense, sensation is apprehended simultaneously as cognitive elaboration influences how we activate sensations, making these aspects inseparable (BUSS; IARED, 2020).

Games, videos, animations, molds, models, and walks in the green area were examples of other didactic resources applied in the meetings. According to Moran (2005), these resources can serve as a means to arouse students' attention and curiosity about new topics. The project results emerged from re-reading the field diary and other records, from which four aspects called our attention: (1) curiosity; (2) perception of presence; (3) local biodiversity; and (4) sensitization through the senses. We do not consider these aspects as isolated categories; they are complementary and interchangeable.

Throughout the meetings, we observed the children's curiosity regarding arthropods being aroused mainly through questions about the ecology of these animals – "how ants reproduce", "camouflage of some animals", "behavior of bees", "body characteristics", among others. Paulo Freire (1996) states that reflection is the movement that takes place between doing and thinking, and between thinking and doing. Therefore, curiosity leads to reflection and, according to the author, the pursuit of knowledge demonstrates the transcendence from naive curiosity to a problematizing systematization (Critical Curiosity).

Curiosity often leads individuals to (re)signify the fear of the unknown (FERRARIS, 2009). This process was observed in another activity conducted in the project. When we showed some arthropods preserved in alcohol, such as spiders, scorpions, centipedes, and shrimp, the children

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initially showed fear and repulsion. However, after a conversation and handling of the didactic materials, they asked for permission to hold the spider (Figure 1). In this, we perceived an emotional response from the students due to their interaction with the animals.

Figure 1 – Students holding a spider in their hands

Source: Buss and Iared (2020)

Through the children's comments, we were able to identify a (re)signification regarding the perception of these animals' presence in their everyday lives. For example, one student mentioned that she started to "see more insects in her house after the meetings"; and another one started to notice "which animals inhabited her home". The development of this educational intervention allowed individuals to become aware of animals that often went unnoticed (BUSS; IARED, 2020).

By asking the students to take photos of arthropods they encountered in their everyday lives (Figure 2), we noticed a sensory response in terms of perception, which encouraged the search for arthropods in their surroundings. The same occurred during a walk through the woods, aimed at further emphasizing the activity of searching for these animals. Ingold (2010) refers to this process as Education of Attention, that is, considers perception as an activity of the entire organism within an environment, promoting the development of an ecological psychology.

Figure 2 – Images of arthropods taken by the students

Source: Buss and Iared, 2020

Furthermore, we sought to develop the theme of biodiversity in the municipality with the students, enabling discussions about the main threats that could affect local species. In this sense, the issue of the "disappearance" of some bee species, particularly the one that pollinates passion fruit (carpenter bee, commonly known as *mamangava*), was raised. After the dialogue, the children expressed concern about the importance of insects for fruits and food production, raising various questions about how to prevent the extinction of these animals. They also recalled the importance of arthropods, highlighting their role in the environment: "I didn't know that without arthropods there would be no life [...] that without them, there would be no life on

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the planet".

During the meetings, we intentionally addressed sensitization strategies regarding the theme being discussed. One of the strategies employed was stimulating the senses. Our aim was to sensitize the children to these animals from the perspective of an engaged body in the world, by stimulating the students' taste through fruit and honey tasting, working on touch through modelling, and engaging sight and hearing through searching for arthropods. According to Goldschmidt et al. (2008), the perception of the world occurs through sensory senses (hearing, touch, taste, smell, and sight) in a synesthetic process, which is directly related to the attribution of meaning and learning.

Therefore, through this project, we highlight that arthropods, despite being less commonly used in educational work, can be excellent in generating themes for environmental education practices. They hold significance in education when the aim is to raise awareness of local or regional biodiversity (BUSS; IARED, 2020). Furthermore, we observed that Timothy Ingold's concepts of Education of Attention and Paulo Freire's Naive Curiosity/Epistemological Curiosity (2003) contributed to understanding the phenomenon studied, revealing how these practices are not simple and should be incorporated into the institutional curricula of institutions, whether in the formal or non-formal sphere.

3.2 The case of fungi

In this project, we relied on Carvalho and Mhule's (2016) proposal for an "out of the box" environmental education. In the aforementioned study, the authors aimed to encourage Pedagogy course teachers to seek a new perspective on the environment around them, that is, to become sensitized to the hidden biodiversity (THIEMANN; OLIVEIRA, 2013). According to Ingold (2010), Education of Attention aims to provoke human awareness of the details of everyday life, in contrast to a model of science with an objective character, meaning subject and object.

In order to structure the project, in 2019 we held a meeting with Palotina's Municipal Department of Education (state of Paraná) to present the project and obtain permission to develop it. Upon receiving approval, a diagnostic questionnaire and an introduction letter were distributed to teachers in the municipal network. This strategy aimed to familiarize the teachers' prior knowledge about fungi and to establish an initial connection between the researcher and the participants.

The project was then conceived as an online course for elementary school teachers. To display the tasks and support materials to the course participants, we created a website using a WebQuest format, enabling organized and guided investigation, as per Pereira's (2008) guidelines.

The course's promotion was facilitated by the Palotina Municipal Department of Education, and informative materials were shared in WhatsApp groups. After registering, participants received the activity schedule via e-mail.

Seven teachers enrolled in the course, but only five completed it. The outcome of the course was the creation of a portfolio on fungi. For this production, participants relied on guidelines prepared by the instructors, who guided the entire research process. The guideline

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included instructions for gathering: data (common and/or scientific name of the fungus); location where it was found (logs, grassy soil, etc.); perception of the location (whether it had been seen in that environment before); external morphology (informal description); and the importance of that specimen for the environment. In the portfolio, we proposed a photographic record to promote sensitization and to educate attention to fungi, allowing a fresh perception of these living organisms.

The course evaluation was conducted through an assessment questionnaire (Google Forms), containing questions that revealed the course's quality and significance, as well as how it could contribute to the environmental education practices with the students. Both questionnaires (diagnostic and evaluation) and the portfolios were analyzed in the light of the theory of Education of Attention. The results indicated how deeply rooted teachers' reliance on scientific knowledge is. In the portfolio, somaesthetic elements of the self~fungus~environment relationship were not recorded, except for one participant's entry. This student, through a sensitive approach, turned to poetry as a crucial educational path for reflecting on our interrelation with nature (QUALHO; IARED, 2021). Figure 3 shows two pages from this portfolio.

Figure 3 – Portfolio showcasing somaesthetic aspects[1]

Source: Qualho and Iared (2021)

[1] Here we are, seeing that you have changed.
In the morning bread, on the lawn, in the trees.
But what are you?
Are you a plant? Are you an animal?
Vanish, appear, pretend you never existed.
It's the fungus that has resurfaced.
In food, in poison.
But how long do we wait to see it again?
Just wait for a little rain.
And there it returns, and everything changes in a hurry.
This material was photographed in 2018, at Iguaçu National Park - Céu Azul - PR, during a course in my undergraduate studies. This photo is very significant to me because it changed the way I observe biodiversity, not as an individual being, but as an integral and essential part of it.

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When analyzing the portfolios, we noticed that the participants had difficulty approaching environmental education more sensibly. Morphological aspects and ecological importance (QUALHO; IARED, 2021) were recurrent themes in the questionnaires and portfolios. These difficulties have been reported by authors such as Carvalho and Mhule (2016), Payne and Wattchow (2009), and Payne (2005), as education is geared towards a Cartesian hegemony, which "values scientific knowledge to the detriment of other dimensions of life, such as ethical and aesthetic values" (author's translation) (QUALHO; IARED, 2021, p. 512).

The evaluation questionnaire showed that teachers enjoyed the course satisfactorily. However, regarding their perceptions during the course, we observed that most of the answers were restricted to scientific knowledge and few reported an attentional perspective. It is noteworthy to emphasize that scientific knowledge is essential — our proposal is not to replace it, but to add other perspectives, such as somaesthetics.

3.3 The soil microorganisms' case

This course was carried out in 2022 at the Gasparzinho Arts School, in the municipality of Palotina, state of Paraná. Ran by the Municipal Department of Education and Culture, the school is designed for children and young people in the municipality, including students from both public and private schools; it is also located in a green urban area known as *Praça do Vovô*.

The space aims to instigate the children's curiosity, imagination, and interdisciplinary work. Activities that involve painting, reading, storytelling, and drawing are developed. The school's location not only allowed for an integration and perception of the environment instigated by curiosity, but also favored pedagogical practices that thematize the soil and the environment through drawings and paintings—resources that the children already use at school.

To start, we met the teacher responsible for the School of Arts to present the project's objectives. Once the didactic (professional development) workshops were defined, we drew up a lesson plan and a meeting schedule in collaboration with a teacher. The workshops were held in five meetings, with a maximum duration of an hour and a half. During the meetings, we used participant observation, a logbook, and drawings to produce data. Chart 2 details the day, duration, and activities of each meeting.

Chart 2 – Didactic Workshops' Lesson Plans

Meeting	**Activities**	**Teaching Resources**
1st November 09, 2022	Importance of the soil and its relationship with the environment	Slide show presentation. Conversation round. Drawing activity for a better understanding of the soil and the environment.
2nd November 16, 2022	Presentation of the different soil types	Slide show presentation. Experience with different types of soil.

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3rd November 23, 2022	Geological soil formation	Talk about soil formation. Drawing and painting on cardboard.
4th November 29, 2022	1st stage of the Mini-laboratory	Slide show presentation. Identification of glassware and equipment. Practical activity: homemade culture medium, decanted soil.
5th November 30, 2022	2nd stage of the Mini-laboratory	Scratching petri dishes. Drawing.
6th December 07, 2022	Closing and socializing	Conversation round. Step-by-step from the previous activity. Fraternization.

Source: Fulber (2023)

At the beginning of each meeting, we would recall concepts from the previous meeting and then introduce new ones. Since, according to Rubinstein (2019), asking participants questions not only generates a sense of belonging and autonomy, but also enables a better understanding of the activity, we instigated the participants through questions that correlated with their everyday lives, allowing them to share their personal experiences. The workshops and in-depth theoretical study based on Ingold's (2010) Education of Attention, were significant in this process. Figure 4 shows the experiences shared during the meetings.

Figure 4 – Experiences shared during the meetings[2]

Source: Fulber, 2023

[2] Conversation
Curiosity
Enthusiasm
Experience
Joy -- Livingness (?)
Proximity -- Memories
Affection
Flow of life in the soil
Environmental perception

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After analyzing the logbook and the drawings, we observed four main dimensions: curiosity, joy, affection, and the flow of life in the soil. It is important to note that, despite being presented individually, these spheres are interchangeable.

a. Curiosity: during the activity of handling different soil types (Figure 5), we noticed how the temperature, color, smell, and texture of the soils instigated the children's curiosity, imagination, and zeal.

Figure 5 – Participants handling different soil types

Source: Fulber, 2022

b. Joy: the children's enthusiasm for the practical activity—the mini-laboratory—was noticeable. We started this activity by talking about the researcher's role in society, the importance of scientific research, as well as the activities that take place in a laboratory. We also presented the main equipment used in this kind of environment. Each child's participation and worldview were unique and we shared mutual contentment (Figure 6).

Figure 6 – Interaction with laboratory materials

Source: Fulber, 2022

c. Affection: we sought to relate the children's everyday life to the environment they live in to provide more meaningful moments. Thus, the proposal of the first meeting was to address a subject that involved the participants.

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As many of the students were children of farmers, the conversation regarding soil and conservation was coherent with the context, which allowed them to broaden their views on environmental conservation and the soil's microbiological life. As a suggested activity, I instructed them to express the environment through free painting (Figure 7). Gomes, Silva and Iared (2020, p. 247) understand that "the creation of heartfelt, impactful and disturbing educational experiences can be the basis for truly transformative learning" (author's translation). So, in this sense, the aesthetic experience is fundamental in the search for a transformative education, since it gives primacy to the field of affection with and in nature (GOMES; SILVA; IARED, 2020). The authors discuss the concept of ontological turn, which advocates for humans and non-humans in a relationship of reciprocity and horizontality (GOMES; SILVA; IARED, 2020, p. 247).

Figure 7 – The environment from a child's perspective

Source: Fulber, 2022

We notice that there is a strong focus on green areas, with the participants' gaze being directed by their own experiences with biodiversity. The attentionalities conceptualized here are related to Ingold's Education of Attention, i.e. "an education for simplicity, for mindfulness, for deceleration that substantively promotes openness to experience" (author's translation) (MUHLE; CARVALHO 2016, p. 38). Qualho and Iared (2021) also adopted "out of the box" environmental education for a professional development workshop. The authors state that "Education of Attention and 'out of the box' Environmental Education converge in advocating experience as a process that revitalizes creativity, reflexivity and autonomy" (author's translation) (QUALHO; IARED, 2021, p. 503).

d. Flow of life in the soil: we identified the expressive presence of soil microbiota in the children's drawings, which indicates that the children conceive an intrinsic relationship between human life and microorganisms (Figure 8). This activity was designed to get participants to express their perception of life in the soil.

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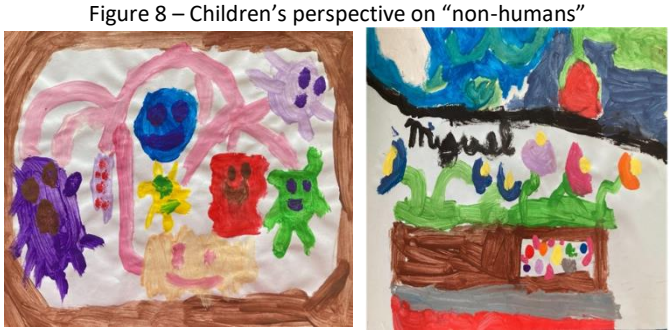
Figure 8 – Children's perspective on "non-humans"



Source: Fulber (2022)

The children therefore show that life is not restricted to the soil, and that there is a co-functionality between the action of soil microorganisms, presence of light and plant growth (Figure 9). During the activities, we did not go into detail about the photosynthetic action of living beings, but we did notice that the students had an understanding of the subject, probably from their science lessons at school.

Figure 9 – Expression of the presence of light

Source: Fulber (2022)

Taking into account what has been built up over the course of this project, we believe that the children understood the presence of life in the soil. Ingold's (2010) Education of Attention was essential for this project to be carried out, giving primacy to attention rather than intention, to the body rather than the mind, and to affectivity rather than cognitivity. Following this idea, we understand the importance of the school in allowing experiences regardless of the subject matter. As the mediator of the activities, I was able to witness the children's experiences and, in this sense, sharpen their curiosity, instigate joy and affection for the flow of life.

4 FINAL REMARKS

In this paper, our intention was to argue for an environmental education that focuses more on sensitivities and body practices and movements, based on ecophenomenology. To this end, we brought in Tim Ingold's concept of Education of Attention. Tim Ingold, by bringing attention (body~mind) to the fore rather than intellect, contributes to the field of practice and research in environmental education. This concept has helped us to work from a perspective of revealing possibilities for enchantment with the more-than-human world. Working from this

perspective requires us to rethink how we conceive the world, particularly because we are immersed in a logic that values thought and trivializes sensibilities.

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