

## 4.1 Coming to age - Experiences in (environmental) education

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### Abstract

In this time of ours we definitely need to multiply the approaches, linkages, connect- edness, cross-boundaries gatherings and holistic views as soon as we talk about environmental education. Environmental education came to age integrating diversity and complexity, promoting meetings in multilevel ways, namely with other species, weaving bonds of communication and pushing thought in direct experience with the natural world. Replying to that challenges, the ID-NATURA project encourages multi-meetings between pupils of all school levels (kindergarten, elementary, sec- ondary), teachers and researchers from different disciplinary areas and among those and the natural world, specifically the “river of my village...”. This paper is inspired by J. W. Goethe’s methodology of knowing nature, the delicate empiricism; Goethe’s approach to nature is valued, as a way to educate for sustainability, and some impor- tant results this project are presented through pupils’ voices.

Key words: nature connectedness, education for sustainability, delicate empiricism

### 1. Introduction

We live in times, in Western society, “characterized by a striving for outer independ- ence, for emancipation in the broadest sense but also by symptoms of loneliness - and of increasing inability to live with others and with nature” (G. Maier, 1986, p. 117). Modern Science and the Industrial Revolution may have contributed to our finding ourselves in this separation. The senses, sensations, experiences have become dis- qualified by modern science. However, “if one wants to become meaningfully in- volved with the world, one will have no choice but to base one’s efforts on what we can experience through one’s senses” (id. p.116). Only thus will we be less lonely be- ings, beings conscious of the connections in which we are immersed and which we have forgotten, beings more aware of the problems of the world, beings inhabited by reverence and consequently by responsibility.

We live in times in which information is dispersed and no longer concentrated in “temples of knowledge”. It is at our fingertips, of rapid and easy access, making modi- fications in processes of learning possible. Therefore, we have time to linger on the things themselves, and we have time for the narratives that surge from the direct experience of things (M. Serres, 2012). Time to be Zenon; At dawn, Zenon passes through the fields, in search of unknown wisdom that comes “from things them- selves”. He reflects on past times, and pictures the workings of this nature, always

in motion. The moment he lives there and then, has been shaped over centuries (M. Yourcenar, 1968). The moment Zenon lives there and then is movement, is constant creation. The time has come to learn how to revere those moments that are shaped over centuries, it is time to experience the ever-ongoing transformations of the natu- ral world, always in a state of becoming. It is time to pay attention to the ways of being of the earth.

These various times configure needs and possibilities for a school system that shapes human beings less separated from the natural world. A school that promotes time dedicated to sensorial experience, to the development of connections with the natu- ral world, time for the development of awareness that we are nature, time for the emergence of a caring attitude based on experience and on emerging narratives about places and other species, subject to our active observation.

It’s urgent to develop an education and environmental culture in which nature is a matter of concern (in the sense of Bruno Latour), in which humans are connected to the natural world in a relationship of intimacy that overcomes the sense of separate- ness from nature.

It is urgent to look upon the natural/cultural world as a place of valuable learning, as a place of inspiration for the inculcation of values basic to the formation of a person and of communities; the values of diversity, of creation, of multiple solutions, of in- tegration.

It is from this sense of urgency that the project ID-NATURA, presented further on, has been created and implemented. In this paper, we introduce some of the ideas that have guided the activities included in this project, more in particular that of delicate empiricism, and we present some of the results in an uncommon narrative composed of 4 acts.

### 2. Questions and concepts

“How can we understand the relationship between phenomena in a manner that is in accordance with our humanity,” and joining this to analytical comprehension? “Certainly we can’t go wrong if we try to understand them in the same way that we encounter them. Goethe was able to draw attention to this approach” (G. Maier, 1986, p.116). The approach to which Maier refers is the “delicate empiricism” of J. W. Goe- the (1748-1832). Delicate empiricism can be a path towards meaningful education in sustainability, in which environmental education can play a determinant role. Deli- cate empiricism is a phenomenological way of knowing nature, that is to say, know- ing in a holistic way committed with an intuitive mind, that allows us to become one with and to grow with nature. “The Goethean approach seeks to participate in the objects investigation (learning) to such a degree that the mind makes itself one with

the object, thereby overcoming the sense of separateness that characterizes our normal experience with the world" (Naydler, p.71).

As Goethe himself states in his writings, delicate empiricism is a path that has to be lived out; only then can we reach its potential value and understanding. It is not easy to speak about it, but we postulate in advance, metaphorically turning to Zenon's words, that "every moment requires centuries". We refer to the moments of relationship and knowledge in the experience of the natural world. A time for prolonged and enduring moments.

Why turn to a 19th century concept? This concept has been recovered and elaborated in the life sciences and those of landscape, ecology, and philosophy (such as, B. Melanie, 2012, I. Brook, 1998, D. Seamon, 2015, H. Bortoft, 1996, J. Cameron, 2005, D. Wahl, 2005, amongst others), proving itself very fertile for knowing nature, a concept until now undervalued in our culture. Scottish biologist Margaret Colquhoun (1947-2017) elaborated, taught and practiced Goethe's methodology for the construction of the relationship between human beings and nature, through art and science, influencing many of the authors who nowadays are interested in delicate empiricism. In our point of view, introducing this concept in an educational context has great potential, especially in helping to develop capacities for intimate connections, in conjunction with analytical capacities.

D. Seamon (2005, p.8) expresses this intimate connection in a poetic manner that characterizes this path. He argues that "Goethe's way of science, understood as a phenomenology of nature, might be one valuable means for fostering [the] openness toward the living presence of the natural world, including its animals but also its plants, its terrestrial forms, its ecological regions, its formations of earth, sky and water, its sensual presence as expressed, for example, through light, darkness, and color".

Goethe's way of science "uses rigorous attention to direct experience, empathy, intuition and imagination as a path towards meaningful insights into nature's creative process. This artist's approach to science allows for a more appreciative, qualitative, meaningful and participatory engagement with nature" (D. Wahl, 2005, p.60). The practice of this "rigorous attention" forms the fundamental pillar for the emergence of an ecological conscience, essential to the construction of subjects ethically engaged with the world. This is the underlying supposition of the project ID-NATURA.

### **2.1. The project ID-NATURA "the river of my village"**

The project ID-NATURA is carried out in a network composed of researchers, teachers, children and pupils from different institutions, the University of Évora, the Gabriel Pereira High School and Manuel Ferreira Patrício Basic School, in Évora. The ul-

timate goal of this project is to develop a sense of connectdness with nature and an awareness of the interdependence of all systems and living beings on the earth. The participants become involved with the natural world through direct, sensorial experience, through wonder(ment), adventure, reflexion, and imagination, in empathy with life itself. That is to say, they are engaged in a way of knowing that favour holistic approaches. The project integrates all levels of education, from pre-school to high school (children and pupils between 4 and 18 years old) and from various disciplines (Natural Sciences, Physics and Chemistry, Languages, Physical Training, Visual Arts, etc...), thus linking the cycle of learning with the cycle of life and bringing environmental education into the very heart of the school.

The program is based on a set of field visits to local streams (given the name "the river of my village"), nearby Évora in southern Portugal, designed to lead the participants to freely explore what surrounds them, with full attention, imagination and creativity, cultivating wonderment and a sense of adventure. Those moments fertilize the pupils' minds and promote the emergence of connections and the desire to learn more and new things about nature. Pupils are encouraged to express their perceptive experience of nature through different idioms: narratives, visual arts and drama. All the experiences lived in the streams are relived in the classroom through memories and imagination, at different moments and in different disciplines, promoting knowledge in a meaningful and integrated way.

There have been outings to two streams, one relatively well preserved, located in a rural area, and other in an urban context under degraded conditions. In this article we present brief narratives constructed by the pupils which were shared with the teachers.

### **2.2. On the form of presentation, the activities and the resulting narratives**

We decided to present in progress results of the project in an unusual form that is accordingly with the way the whole process is constructed; a process inhabited by multiple voices and by a poetics of connectedness.

"Wandering ... towards delicate empiricism" is developed over the course of 4 acts. On the stage will be the Voices of the pupils who participated in Project ID-NATURA, as well as our own voices designed as the echos (Delicate Chorus) of various authors that have valued delicate empiricism. The scheme of these voices is inspired by Greek drama, but they are happy voices, those of the pupils, in their field experiences, in their discoveries and learning. The chorus underscore the significant parts of the drama (narrative). The scenes will be spatially and temporally defined. The voices of the pupils narrate emotions, actions, connections and are the result of a connection and learning process that has been gained "in the direct experience of things" in a "natural/cultural framework". A synoptic description of the place context is present. .

### 3. Wandering... Towards the delicate empiricism

#### Act I (4 hours)

A spring afternoon at Valverde Stream (wondering...)  
17.05.2017 | 38°31'44,89'' W, 8° 01'06,96'' N | 5,2 km, 3 stops  
70 students, 7 teachers and 4 researchers

Water flowing, drifting, riffles, runs, pools, stones and boulders around. Shadows of tree canopies, helophytes, macrophytes, filamentous algae. Evidence of fish, crayfish and otters. Sounds of different bird species, frogs and insects. Sound of the waterfalls. Explosion of scents. Water illuminating and water-sky mirror.

J., 11 years old:

"Going to the river was amazing, I felt free. Usually we are not allowed to thoroughly explore the reality. They never let us watch the waterfalls and the lakes ... it was nice to have seen so much biodiversity."

F., 14 years old:

"I really liked the water and the stones... If I had to grade this field trip, I would rate it beautiful. I felt wonderful. I indeed, was welcomed by nature."

R., 12 years old:

"I enjoyed to observe the rocks in its place; I felt like an observer; I felt different. I learned that we also belong to nature. I felt happy for being able to know more about nature."

Delicate Chorus:

Wondering, knowing with one's senses. Freedom and beauty fruition. That is the first stage of knowing in a goethean way. They are preparing for active observation, active seeing instead of the passive reception of visual impressions. They value to see the rocks in their place.

They are becoming closer to the phenomena, to nature!

J., 15 years old:

"We felt the smell, I was keeping attention; sometimes I was a little distracted but... (that is also good), I was always looking everywhere, I can memorize the things in my head. I lost my grandfather, we always went to the field and he would explain me everything. And here that happened too."

D., 16 years old:

"The contact with nature during this field trip did something to awaken me, to open my perception of this world and what is beyond. I had a special moment, in the first stop, during the silent minutes we spent

looking at everything around us. In that moment of silence, I realized that everything was connected; the water that feeds the vegetation, the water that flows between the stones, wearing them... and what stood out from it all was that... everything is intertwined, even the knowledge of men is connected with everything, what we see, what we do. Even outside of this planet, in the stars, even in Uranium, there are elements that connect us."

Delicate Chorus:

They approach the surroundings, they exercise their full attention, they exercise sensorial imagination. They are searching for deeper encounters with the phenomena and attempting to think the phenomena with the imagination. They are attending to connections between phenomena. How many moments of glimmering of consciousness (using a Whitehead's expression). They are preparing for the second stage of delicate empiricism, the exact sensorial imagination!

S., 16 years old:

"I've made great observations, great in the sense that they fulfilled me because they were made in relation to small details."

J., 13 years old:

"The river was what I liked the most, what made me feel happy, and made me re-live the past where I was happy. I liked the sound of nature, of the living beings, of plants that I didn't know and started knowing (I brought plants, ferns). I learned new things and I hope that people, like me, go to the field to value nature."

Delicate Chorus:

The glimmering of a sense of wholeness. The reversal of perception: not from the part to the whole but from the whole to the parts. The whole comes to presence within the parts. An ethical dimension is growing in them from their experiences. They are happy to discover a way of valuing nature.

#### Act II (5 hours)

A winter morning with autumn colours, back to Valverde stream  
23.01.2018 | 38° 31'34,11'' W, 8° 01'30,63'' | 6,2 km, 4 stops  
56 students, 5 teachers and 5 researchers

Freezing air, iced waterlogging along the way. Low water level, no flow. A long drought, that year. Enormous granitic boulders highlighted. Sound of the wind through the tree leaves, sounds of some bird's species. Water illuminating and water-sky mirror.

F., 10 years old:

"It was a sunny day, but it was very cold; the landscapes were very beautiful. When we got there, I was really touched by coming back to the beautiful Valverde stream".

M., 14 years old:

"My body was aching, but it was a bearable pain, it had to be. It was not a mere pain that would discourage me from continuing the adventure. The water was shallow and turbid, there were no other signs of life besides the vegetation. It was cold and a bit windy but by being around the others I forgot the cold that I felt. It was beautiful to see several types of trees, shrubs, flowers, the sun, the rocks, all these things that make me love nature even more. It was fun, and it will always be every time I remember it."

Delicate Chorus:

They are feeling the attachment to the place, the awareness of its importance, the growing of the emotional connectedness with nature, through beauty and joy.

L., 13 years old:

"I felt sad to see the stream so dry...The drought destroyed a part of the stream beauty, but I found how the lack of water affects the earth. I decided that I can no longer waste much water."

C., 11 years old:

"When we get there, we noticed that the plants withered due to the lack of water... we heard a bird singing, a beautiful sound, we saw the green and brown leaves (the autumn colours), endless oleasters, many plants, but almost no water."

Delicate Chorus (voices from Goethe's way of Science):

An emotional empathy with the stream, the contrary of alienation; the confront with the environmental impact of drought in a meaningful way.

**Act III** (4 hours)

A spring day, back to Valverde stream

18.04.2018 | 38° 31' 06,12'' W, 8° 01' 38,36'' | 5,9 km, 3 stops

56 students, 6 teachers and 5 researchers

Water flowing again, drifting, riffles, runs, pools, stones and boulders around, dancing shadows of tree canopies, helophytes, macrophytes, fungi. Many forms of life awaken, reproduction, metamorphosis.... Fish, crayfish, amphibious, insects, otters and others.

Sounds of different bird species, frogs' waterfalls. Great explosions of scents. Light effects on water and water-sky mirror.

F., 11 years old:

"There was plenty of water and we could see that we were finally in Spring. We saw several tree species, such as the ash tree and the holm oak. We went to a very beautiful place in the river: it looked like we were in the Amazon and I felt happy. I loved this day. I realize that I like to be in touch with nature; we must protect her. I hope to return to the river again."

T., 17 years old:

"By visiting the river I was able to see its true beauty, both visual and audible, and by drawing it I saw some things that would probably go unnoticed otherwise, like the complexity of a leaf or the beauty of a rock".

Delicate Chorus:

They are experiencing esthetical and ethical dimensions, and this is driven by nature. They are learning in a meaningful way! The complexity of a leaf! The beauty of a rock! They are familiar with the ash trees and the holm oaks! They remember how they are so happy near the Valverde stream!

**Act IV** (5 hours)

A spring day, in Torregela stream

09.05.2018 | 38° 34' 14,72'' N, 7° 55' 38,54'' | 4,6 km, 3 stops

56 students, 6 teachers and 5 researchers

Very low water level with shy flowing. Narrow stream with helophytes invasions. Turbid water with high sediment loads. Presence of effluent pipe lines with smell. Abundance of Chironomidae (insects larvae), blooms of green algae. Planted trees with big canopy along the stream margins. Catch sight of a small pond turtle. Sounds of bird's, cars and people. Some solid domestic residues; plastic bags, wells, human clothes, tyres.

C., 12 years old:

"I didn't know that the Torregela stream existed, but now that I met it, it seems like I've known it for years."

S., 17 years old:

"I was surprised that even though the river was very neglected and mistreated, it was very beautiful and strongly present in the place."

B., 18 year old:

"It surprised me that despite we mistreat the world, it still fights for us."

Delicate Chorus:

The stream is in trouble and they feel, from the beginning, an affective connection

with it! How impressive it is! They are feeding this actual experience by their experiences with Valverde stream; they find beauty and they feel empathy besides all the degradation. The value of a stream is already inside them!

J., 12 years old:

"The river is part of nature and so am I, we are all connected; people, animals, plants. I feel connected."

B., 17 years old:

"I think that we all felt a connection to the river, simply by following it from the place it is born to the place where it almost leaves the city; always following the flowing water, making us feel like it, and therefore calm and happy, despite the sun and the heat."

Delicate Chorus:

By plunging into seeing flowing they find that their attention expands to experience, this movement as one whole that is its own present moment (Bortoft, 1996 p. 64). That's the attunement with nature. That's a sense of wholeness driven by the flowing water! They are definitely connected with nature!

A., 17 years old:

"I don't know if I am able to say what I mean, but what I want to say is that we should think more about nature. In my opinion, by thinking about it, we would end up taking care of it."

N., 12 years old:

"My message to the people is to care about the Torregela river as if it was a member of your family. Take care of the river and, above all, value the river because it exists."

Delicate Chorus:

At the student's eyes, this stream is no longer a mere place, polluted and invisible for most of the city population. The connection with nature developed throughout the field trips experiences are now feeding the awareness to the earth care. And because they care about it, they take the time to figure out what it is and what they should do with it, for it, or because of it, they are learning to make kin with all the streams (following Donna Haraway words), even if the streams are apparently ugly!

J., 16 years old:

"I felt that being outdoor, interacting with the environment, is a great way of understanding the world."

J., 16 years old:

"This experience was very unusual, we went to nature, to the middle of its sounds and everything it contains; it opened my mind to new thoughts and ideas and made me realize all the beauty and charm that can reside in the smallest things, in the smallest corner of that small

river. I say it this way because I was really stunned by something I had never witnessed, and beyond the experience as I describe it, I can still say that what has been taught there, given the different form of learning, became much clearer in my mind."

Delicate Chorus:

So many beautiful and meaningful learnings! They are opening their minds to the world, they are glimmering ecological consciousness, they are opening their minds to become beings of a sustainable world!

#### 4. Coming to age. Short final considerations

The students' wonderful narratives are echoes of Goethe's delicate empiricism that reveal that this way of knowing nature is a meaningful path for gaining knowledge about nature, which re-enforces the connectedness with the natural world, a connectedness that is a source of joy, nurturing ecological ways of being and creates sensitive, imaginative and less solitary human beings. The fragments of the pupils' voices, that are presented, testify to the incorporation of the poetics of this process and include parts of the various phases of delicate empiricism: "observing with patience and rigour; deepening a sense of wonder to the world; using sensual and emotional awareness to experience phenomena as fully as possible; attending to connections between phenomena; acknowledging an ethical dimension to the practice of science" (Isis Brook (1998, p.52). The freedom, the joy of discovering other beings, other structures, persistent movement, the joy of participating in a whole without hierarchy, the attention that is taking root, the attunement with the beauty of the natural world, all this contributes to an affective perception regarding the streams in such degraded conditions, that is to say a perception that sees the potential of such streams, boasting a caring attitude. The emergence of the desire to care for, comes from within these experiencing human beings. We believe that if (environmental) education would be in this way, we would inhabit a more sustainable world today!

We dare to say that we are learning to "make kin" (concept coined by Donna Haraway) with the whole of the streams, whether they are of pleasing appearance or not. The sharing of stories and narratives that we are creating during this process, aims at reinforcing the conscience of cooperative connections between all beings and ways of being, be they stones, animals (human and non-human), plants, light, shadows, land, sky and movement.

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## 4.2 Desenvolvimento escolar: um desvio urbano pelo programa Minha casa minha vida em Maceió-AL, Brasil

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### Abstract

Economics and policies are spatial dimensions naturally embedded in city structures in many Brazilian capitals, where the social pattern of communities has contrasted over time. The case of the city of Maceió is highlighted by its linear urban structure and expansion on what we call grotas (urban cliffs). We discuss the impact of the Federal Housing Program popularly known in Brazil as My Home My Life Program. Established to provide accommodation facilities for many Brazilians with low financial condition. Many people's homes are structures of the historic city, locating the building along several valleys; however, the new policy has increased evasion and difficulties for the poor to attend schools. We argue that the Housing Program is not a planning made up of the same Ministry of Cities created earlier. Urban deviations involve residences and colleges, usually educational admissions are not recommended after the start of the period. Urban and school development must be interconnected for proper planning. The oath of some social rights has to be more effective, while useful and applicable. Strong interdisciplinary understandings are needed to integrate human and social development through complementary programs or procedures.

Keywords: Spatial dimension, Maceió, My Home My Life Program, Integrated planning.

### 1. Introdução

É notório observar que o processo de urbanização das cidades vem ocasionando diversas mudanças nas rotinas dos cidadãos, a exemplo das ampliações das malhas viárias que impulsionam um desenvolvimento vertical ao longo das suas margens, desenvolvendo novos comércios e habitações ocasionadas por este crescimento. Fato que traz consequências e problemas socioambientais de caráter logístico, pois, com a condensação das áreas urbanas os problemas sociais se emergem no instante que iniciam-se os processos de transformações paisagísticas de caráter antrópico, principalmente com os agravamentos ambientais ocasionados pelas proliferações de aglomerados subnormais e assentamentos precários em áreas de conurbação, que para o Brasil aplica-se de acordo com o conceito previsto pela Meta 11 dos Objetivos de Desenvolvimento do Milênio, em que segundo o IPEA (2016), se buscará ter alcançado até 2020 uma melhora significativa na vida dos habitantes de assentamentos precários.

Esse quadro pode ser explicado pelo crescimento da mancha urbana metropolitana, que acontece principalmente fora do município-núcleo. Isto é, a periferização 187