

LEARNING, ENVIRONMENTAL EDUCATION AND SCHOOL: WAYS OF EN-ACTING IN THE EXPERIENCE OF STUDENTS AND TEACHERS

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Introduction

In this study we seek to analyze how students and teachers produce understandings about environmental education in the school and how they transform it. In indicating “understandings,” we want to bring a dimension present in the studies on cognition in which we consider the understanding process broader than the knowledge process because it refers to doing. We seek to observe and analyze wisdom and knowledge in the experience of environmental education in the school.

Studies in environmental education emphasize the need to consider the interconnection between the elements of nature, the inseparability and interdependence between living systems. Reigota (2009, p.11) warns us that “the contemporary human being lives deep dichotomies. Hardly consider themselves as an element of nature, but a being apart, as an observer and / or an explorer of it. “

Environmental education projects in the school are carried out so that we can observe a separation between knowing and living. We have a school that insists on persisting with its attachment to quantitative notes and the works are based in methodologies of content transmission and accomplishment of tasks. We understand that this way of doing in school does not take in account promotion of environmental education experiences capable of enabling subjects to make changes in the experiences of themselves and of knowing.

It is important to note that despite the growing environmental crisis that affects all continents on planet Earth, we observe in daily life that we do not operate with information heard and seen daily in order to implement the cognitive and affective processes that constitute us as human beings. Varela et al. (1988) distinguish the concept of “en-action” that favors the understanding of an “embodied mind”, in which wisdom and knowledge are inscribed in the being that is coupled to the world and from this coupling emerge the phenomena of knowing. What we perceive in school is that concepts, events, serious

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problems related to the environment are treated as information, not necessarily involving the subjects in their actions, in the ways of acting upon the environment. Baptista, (2011, p.8) warns us that “there is no use having content and projects that deal with the defense of life if life is not defended in school dynamics itself”. The perspective of enaction advances the debate in cognitive sciences and intends to preserve the relation between the actions and the actor. For Varela, the action is incarnated, embodied, linked to a subject that does not exist outside of it (being = doing). In this direction, we understand that knowing in Environmental Education implies not only interacting with contents, information coming from outside, the environment, because all knowing emerges in the actions of a body through different modes of language. Every moment we are building the realities that we want to live with our ways of acting in the world.

Our study is based on this perspective of an inventive cognition and we analyze how teachers and students conceive the environmental education and how these conceptions become the route of realizing workshops in the school. We look for ways of approach, ways of research. We invite teachers and students to an experience of photographic production workshops on environmental education. The workshops allowed the observation and analysis of the doing proper and the networks details on conversations about the ways of coordinating actions in the experiences of environmental education in the school.

Mindful observation of how we coordinate behaviors in the environment, how we act and do things, from the smallest to the biggest, tells us how much we feel as an integral part of the environment and how we understand the interdependence between living beings.

The studies in environmental education and the experience at school

We have noticed that we have many ways of conceiving and practicing environmental education in school. We use to our reflection some works in which the researchers emphasize the interrelations between living beings, modes of conceiving and ways of acting in the care of the environment.

Loureiro (2004) problematizes the experience in environmental education considering the relationship between education, participation and transformation of the reality of life. Pedro Jacobi brings a reflection on the challenges posed to develop an education that advances in the way of offering alternatives for the formation of the subjects. According to the author:

[...] current reality demands less and less linear reflection, and this occurs in the interrelation between collective knowledge and practices that create common identities and values and solidarity actions in the face of the reappropriation of nature, in a perspective that privileges dialogue between knowledge (JACOBI, 2004, p.28).

The author clarifies the necessary dialogue between knowledge so that we can build solidarity practices in environmental education. Keitel, Pereira and Berticelli

(2012) corroborate this position and indicate the need to overcome linear models so that we can construct concepts capable of contributing to the promotion of care with the environment.

The papers help to understand that environmental education can be a privileged space for building knowledge about what is produced in the human-society-nature interaction and, thus, creating conditions for a new relationship between living beings.

Catalão (2011, p.74), in developing research in the area of Environmental Education and Human Ecology, states that “all learning of the living being results in an individual transformation, co-evolution and environmental change.” The understanding of environmental education is amplified when we consider that as observers we are part of the system we observe.

Francisco Varela and collaborators highlight the notion of experience as necessary for our understanding of how cognitive changes occur that refer to how to coordinate behaviors - ideas, gestures, emotions - in the processes of living and knowing. The author considers the corporal inscription of the ways of think-do-feel, the enaction that allows us to distinguish modes of interaction and care with the environment.

Francisco Varela and collaborators developed the concept of *en-action* to deal with the phenomenon of knowing in which we do not situate in the brain the understanding about the cognitive changes that we experience in the course of living. Cognitive transformations involve a process of body inscription of the mind, which means that the human configures life and knowledge acting in language and these actions mobilize the different dimensions of the body immersed in the world. We understand that the observation of modes of en-action favors the analysis of how wisdom and knowledge in environmental education are produced, when referring to the experience of teachers and students in the school. For Varela, wisdom is understood as the way we act in everyday life and knowledge refers to the explanations that make a phenomenon emerge from experience, from the look and explanations of the observers. (VARELA et al., 2004). And how are these wisdom and knowledge articulated in Environmental Education practices at school?

The theme of environmental education is placed in the school as a possibility of a work in which the subjects connect with crucial problems of our time.

We know that historically, the sciences have undergone a process of fragmentation, a perspective that has been extended to our human society. In the words of Nize Pellanda, when studying the relations between suffering and education:

Contemporary education, despite all the initiatives to make it more humanizing, ended up constituting a set of practices foreign to the needs of human beings and, therefore, causing impediment of coupling with reality. These difficulties bring suffering to those involved in educational processes because they reach the core of the process of building knowledge, understood here as inseparable from living itself. (PELLANDA; ARAUJO, SCHNEIDER, 2007, p.54).

Fortunately, advances in the understanding of phenomena in the most different fields of science have allowed the questioning of what we distinguish as Cartesian thought.

At present, the number of scientists and educators from different areas of the sciences who interact with studies that favor world views far from the separations proposed by classical modern science.

As we work in Environmental Education we begin to interact with a new language aimed at understanding and comprehension of life, complex and integrated studies of living systems, as Fritjof Capra explains in the book "The Point of Mutation", a "[...] systemic conception of life" (CAPRA, 1982, pp. 244-284).

This new paradigm conceives of the world as an integrated whole and opens the way for the understanding of a complex and inclusive perspective in doing in Environmental Education.

For Environmental Education, the contribution of complexity is given as one of the pillars of transdisciplinary thinking and practice that I believe is a way of exchanging between disciplines, overcoming the boundaries among them. In this way, the reduction and fragmentation of knowledge will be overcome. (RIBEIRO, 2010, p.85).

The acceptance of this new way of perceiving the interactions and relations between living beings requires an update in our way of thinking and acting. We can understand that the complexification in the analysis of one question means that we need to go around with the other, to interact with explanations that allow us to expand understanding, that is, to produce explanations that favor the production of realities considering their multiple dimensions.

In our study, we directed looking and attention to the cognitive processes that emerge in the experiences of environmental education in the school.

Learning environmental education at school

On the school universe and thinking about the challenges of environmental education, Loureiro (2007) provokes us with this reflection:

We often find that a social group recognizes the importance of preservation and the quest for sustainability and is sensitive to environmental issues, but acts in a seemingly contradictory way. [...] the question is not only to know to be aware of something, but to be part of the world in order to have a critical awareness of the set of relations that condition certain cultural practices and, in this movement, surpass ourselves and the conditions initially configured. (LOUREIRO, 2007 p.69)

This means that learning involves a process of formation and constitution of the human way of living and caring for the environment.

For Maturana (1998, p.29):

Education is constituted in the process in which the child or the adult lives with the other, and in living with the other, s(he) spontaneously transforms itself, so that its way of living becomes progressively more congruent with that of the other in the space of coexistence.

We agree with the authors that allow us to think that learning Environmental Education implies understanding that when transformations in the way of conceiving something take place effectively, we have changes in the way the subjects get involved with the environment in their everyday circumstances. From this perspective, the way we know is the way we keep the life we want to live.

From this new way of understanding how knowledge happens, the experience of environmental education research in schools turns to observations of the interactions between students and teachers in the relationships they establish with each other and with other living beings in the environment.

The path that we built during the research involves the experience of workshoping with students and teachers, as this allows the observation and analysis of ways of making-feel-know in environmental education. The methodology considers the inventive processes of photographic production workshops in which participating subjects begin to observe their own making and to make distinctions, changes in coordinations of coordinations of actions, coordinations of ideas, coordinations of gestures and coordinations of emotions. Teachers and students come to experience a learning that builds from changes in the ways they perceive the world and invent their realities, changes in coordinations of actions that we discuss in the intervention research experience.

Workshopping an inventive production path

The methodology chosen for the study is the research-intervention of a qualitative nature in which we seek to observe changes in a knowledge course. As a research method, we are inspired by the cartography that, for Passos and Barros (2009), is an intervention research method that presupposes an orientation of the researcher's work, which is not done in a prescriptive way, with rules already in place, established and closed. These are built in the course of research and can be transformed on spot.

We invite teachers and students to participate in a research-intervention in the form of workshops that we construct as devices that favor the follow-up of knowledge paths. According to Kastrup and Barros (2009, p.90):

What characterizes a device is its capacity for irruption in what is blocked for creation, it is its content of freedom in discarding the codes that gives the same meaning to all. Device stresses, moves, displaces to another local, causes other assemblages.

But how can workshop-device help us observe the functioning of cognitive and subjective processes, ways of en-acting in an Environmental Education experience? We think of the workshop as social technology that fosters the exercise of authorship, in a

process where the researcher makes the triggering of inventive cognition around themes relevant to the subjects involved in the experience. Working with teacher training, Chagas, Demoly and Mendes Neto, (2015, p.280) state that:

One of the characteristics of the intervention research, which uses the workshop as social technology, is precisely the emphasis on procedures that open spaces for processes of self-construction, processes and possible changes in teacher forming percouse.

We understand that workshops are proposed as an invitation to experience that triggers processes that we seek to observe and analyze in the research intervention in environmental education.

Eight students and eight teachers engaged in environmental education projects at the school participated in this intervention research experience. The study had a close look by one of the authors of this text about the events, composing the logbook, analyzing photographs and narratives in the course that involves each one and the collective.

Along the way, we challenge ourselves in constructing inventive strategies for the workshops and set some clues to guide the doing. We have chosen as modes of language the production of photographs and the reading of these compositions in networks of conversations, when students and teachers can observe their own doing interacting on the images. We also chose to create shots, in the form of questions, capable of potentializing processes of knowledge construction in the interaction between the subjects, because to ask puts the cognition in action, favors the attitude of the reflection that means to suspend the thought to be able to think if what we judged valid until the present moment, is still valid in another moment of the experience.

During the meetings, we launched questions that involve concepts and the experience in Environmental Education at school. At the workshops we have moments of production - photographs and narratives - images and groups of conversations where questions, questions, ideas about the theme of Environmental Education emerge in the school.

We have paths to produce photographic images and moments of conversation about the images produced by the participants. The photographic productions of the students are resumed, usually in the next workshop, so that they can talk and thus make observable ways of conceiving Environmental Education.

The moments of the workshops were organized in a cyclical structure, in which there is no closed chronological order or definition, but an interconnection between research efforts throughout the process of its realization. We agree with Kastrup when she states that learning “takes the form of a circle, in which the movement is to repeat, to return, to renew, to reinvent, to reiterate, to recommence” (Kastrup, 2004, p.13).

From the thoughtful clues and firing questions, we build the themes addressed in the workshops. The following chart summarizes these issues where we briefly describe each workshop.

Table 1 - Workshops as inventive processes of learning shots

WORKSHOPS	SHOTS	DESCRIPTION
Self-portrait	Who am I? How does my "being in the world" happen?	The subjects construct their self-portraits.
Ways of seeing the Environment	What is environment? How far do we recognize ourselves as belonging to nature?	Construction of concepts about the environment from the production and reading of images when weaving conversation networks.
Observing projects of Environmental Education of the school	What changes and transformations can these projects trigger in our ways of relating to the environment?	Observation and analysis of the own actions in environmental education in the school through diaries and reports of projects / actions carried out in the school.
Living under my gaze	What is life? How do we live? How do we know?	Subjects produce glimpses about living.
Watching the percouse	What are the contributions of these workshops? How do we see environmental education today?	Students and teachers stand to observe what was produced in workshops and rethink environmental education.

Source: Framework prepared by the authors, 2015.

Workshops open a space so that the subjects can say - in the form of photography, and networks of conversations that precede and / or occur after the production of the images - about how they conceive of Environmental Education and how modes of design become the production path.

We believe that photography in Environmental Education research acts as a trigger for the production process of knowledge, ways of exercising authorship and explaining the realities that we are constructing directly in this being or in-acting in the environment.

Thus, photography can have different meanings, depending on the context, on how to understand it in the conversation network in which it is produced. Producing and reading, talking about captured images potentiate the construction, transformational movements in the way of explaining phenomena of knowledge.

As empirical material for the analysis, we have the set of images produced, conversations about these images, filming and audio recordings of different moments in the course of the workshops and written in the logbook.

In the analysis of what happens in the networks of conversations, we observe the recurrences and the transformational movements referred to the way in which the subjects conceive the Environmental Education. In this process we are tracking, punctuating displacements and transformations, movements of differentiation and recurrences that emerge and make visible ways of conceiving Environmental Education.

Attention to yourself as a way to remember subject to the environment you want to keep

The process of attention to self in knowing implies understanding the attention beyond a reductionist logic that considers that someone is paying attention or not. We agree with the presence of the observer in the system that observes, so when we analyze cognitive changes, we know that there are not only transformations in the experience of the subjects that we observe in workshops, but also in the experience of the researcher himself when he is conducting the intervention research.

A workshop course as social technology allows the participants to experience themselves in the knowledge, an experience that is often not taken into account in the daily activities of environmental education in school. Sade and Kastrup have an important contribution to this understanding by explaining that:

Familiarity with our experience (as if it were obvious to us) makes us blind to many of its pre-reflected aspects. These aspects are not noticed by our immediate day-to-day consciousness, but are targeted by first-person investigations. (SADE & KASTRUP, 2011, p.141).

We have adopted a way of observing that is reaffirmed by Aguiar and Lima (2012, p. 164), stating that we can “observe participating as a way of disturbing other realities”. Thus we begin to observe and analyze processes and transformations that occur in the interaction between the subjects.

In the course of the workshops, several moments show us how there are shifts of perceptions, ways of enacting and conceiving environmental education. We marked the tracks, the clues that students and teachers left in the form of emotions, gestures, actions, and understandings. This set of markers that emerge in the doing allow to explain the movements of the inventive cognition, ways of en-act in the relation with the environment, what we will discuss next with cuts of the workshops that we emphasize for the composition of this writing.

During the first Workshop we titled “Self-portrait” it was already possible to verify the power of the method of production and reading of images as a device for authoring processes. We were able to experience moments where we observed subjects producing different readings, explanations around the same image, because different ways of looking and perceiving in the fabric of the networks of conversations that take place in the workshops.

In this first encounter, when we shoot like: **Who am I? As is my “being in the world”?** We could observe, at the beginning, the difficulty demonstrated and reported by some subjects to be involved in authoring processes. When we asked them to construct their self-portraits, in a search for (re-) knowledge of themselves in the relationship with the environment, there were worries, looks, gestures and speeches that make visible the emotions that emerge in doing. “It’s difficult to talk about us [...] But I put it this way: we are all subjects in the world. I made one person, myself in the world [...]” (Excerpt nº 1, professor El, March, 2015).

Other moments are happening, in which it is possible to cut scenes in which subjects express how challenging an experience of (re-) knowing themselves and the other in the process of knowledge production is.

Continuing with our conversations, some students were making uneasy moves again. A moment of silence took over the atmosphere interspersed with small smiles between their eyes, which insinuated that the other began to speak. The workshop goes on with half-timid phrases that reveal themselves.

Student D: [Laughs shy] It's because I actually asked A to speak about me and he knew more than I did.

Student M: Because talking about others is easier.

(Excerpt nº 2, Logbook, March, 2015)

The emotion that sustains the ways we act as human beings in language shapes different worlds that we hold in our lives. Knowledge and wisdom emerge from projects, human dreams and these are driven by different emotions. Modes of en-action arise intertwined with the emotions that sustain them. These can be emotions of care with one another, with the environment in a relationship of interdependence between living systems.

In the first workshop, in the midst of manifest emotions, such as insecurity and fear of doing in processes of authorship and sharing of their experiences, subjects initiate processes of self-production - by experimenting as authors and observers of self-portrait drawings that they perform. The exercise of drawing themselves and talking allowed the subjects to observe and share their own experiences, experiencing a movement of acceptance of themselves and the other as legitimate in the coexistence.

In this sense, one of the implications of this conception of authorship is that in our way of living we can produce different realities, equally legitimate, realities that emerge in the explanations about the phenomena of knowing.

I drew myself and a tree because during the day I like to take a moment to think about who I am. And the place I like to be quiet and isolate myself is this.

(Excerpt nº 3, student A, March, 2015).

It makes you want to measure as you listen as you go increasing your design. Each one has a little bit of you.

(Excerpt nº 4, teacher V, March, 2015).

These movements that we observe in the networks of conversations are seen as different ways of acting in language, for Maturana and Varela (1995, 67), "an act of turning to ourselves." At the same time that we consider this "returning to itself" a challenging process, we perceive that in the workshops the subjects present movements of involvement and satisfaction with the experience.

I think these workshops should be done with everyone. We have to make these reflections. We have to stop, talk about living.
(Excerpt nº 5, professor E, April, 2015).

This issue of opening up is very important. Every person here has their faults, their qualities and their experiences. I have to think like a capable person of what I want because my present and my future I am building from what I think and from what I do.
(Excerpt nº 6, teacher C, April, 2015).

These narratives remind us of a teaching by Francisco Varela, when he states that:

We have the freedom to understand that this world is ours, our own dance that we dance together. It's not a projection of mine, that would be absolute solipsism. It's something we do together. And everything we do is changing the world. (Varela et al., 2004, our translation).

From Biology we know that "living beings are characterized by continually producing themselves, literally." (MATURANA, VARELA, 1985, pp. 84-85). At the same time, reflection on environmental education allows us to connect the experience of care and production of oneself with the distinction of the world we want to preserve.

The second workshop was called "Modes of seeing the environment" and was guided by two questions: - **What is the environment?** And in the course of the conversation network emerged the question: - **How far do we recognize ourselves as belonging to nature?** During the workshop, we asked the subjects to go to school and produce some photographs about what they consider relevant to an environmental conversation.

The photographs pointed to socio-environmental issues in school daily life. Images emerge that trigger reflections on ways of coordinating actions in the relationship of subjects with the physical environment, with natural resources. At this meeting, the subjects comment on ideas for reuse of water used in school, talk about the importance of reactivating the school garden and the need to improve spaces and afforestation of the school.

The analysis of the conversations and the reading of images allow to identify concepts about the environment as initial constructions in the experience of the participants of the research, they are: space, means of conviviality and life. We invite students and professors to reconstruct the concept of the environment by searching the question of how they understand the environment, when new explanations emerge: "Interaction of life in the spaces that it manifests" (Excerpt No. 7, professor E1, April, 2015).

Explanations begin to consider the interdependence between living beings. Thus, the relation of environmental education with human processes of knowledge allows the implication, the involvement in processes that invite a reflection on knowing and living in the experience in environmental education.

The course follows with inventive processes and for the third workshop we proposed to the students and teachers to observe their experiences in environmental education

in the school, through the diaries of projects already carried out. Many of these works at school happened with the participation of the research subjects themselves. In this workshop we use as a trigger the question: - **What changes and transformations can these projects trigger in our ways of establishing relationships with the environment?** Through the transcripts of the workshops we were able to highlight statements that follow in the quest to build understandings:

I think it's different for those who are doing it. The others do not, they just pass, sometimes they are not even paying attention.

(Excerpt nº 8, teacher R, May, 2015).

It's kind of superficial, it will not get you anywhere in the future. Only those who work effectively in the process give more importance, now the others who are there just to listen to us introduce, they do not even care.

(Excerpt nº 9, student M, May, 2015).

We realized during this workshop that the school is involved in projects / actions focused on the environmental issue, however, the realization of these activities is still directed to presentations in science fairs. These works are still guided by methods that value the representation of a knowledge already constructed as truth and the fulfillment of tasks by students and teachers. There are almost no spaces that provide the movements of the inventive cognition, the experience of knowing oneself in Environmental Education.

This is further elaborated by Soares (2003), when he talks about the importance of choosing methodologies that involve the subjects in their own formation process when we are engaged in the accomplishment of works in the area of environmental education.

Environmental education [...] in daily school life still leaves much to be desired and, in many cases, has been limited to isolated actions and / or biased understandings on the environmental issue, without the necessary contextualization and without the internalization on the real understanding of the environmental problem in the daily life of the school communities. (SOARES, et al., 2003, p.9).

In this context, it is of great importance to understand that the real meaning of learning environmental education is based on the relationships we produce between us, other living beings and with everything that surrounds us in the environment.

Continuing with the conversation in this workshop, we observe movements that indicate displacements in the perception of the subjects referred to the cut in the question: - there are changes, from these projects, in our relations with the environment?

Theoretically it has, in practice it has to have too. The projects exist for this. The point is that a project, it has beginning, middle and end, but the result is permanent. So if a project aims to make the school

community aware of such an attitude, for example, to do selective collection, the project will start, middle and end, now the goal of it, the product of it has to continue in the community.
(Excerpt nº 10, professor El, May, 2015).

I think you have to unlink the idea you have. No one ever sees such a project. You only see a project like that building, that whole stage, and it ends there.

(Excerpt nº 11, teacher V, May 2015).

The workshop follows when we take another reflection: thinking about the people who carried out the project: - Thinking about these people, who are we, are there changes in the way I live, in my actions? At that moment, a silence permeates the space of the workshop, the moment it is accepted and that we consider important, a silence that emerges when the question interacts with the experience of knowing itself. In this context, we observed a constant disturbance between the subjects involved in the research and the resources available, used by them during the experiment. So, we continue to throw up questions: - What could we do to make these projects have more changes, more transformations in this interaction with the environment? A network of conversations is woven by the subjects:

Prof. El: __ Have to keep acting. Do not put the action together with the project itself. In the case of the garden, finished, shelved the project, also shelved the action. He has to have this continuous action.

Student A: __ Our last year's DPS project was all shelved, nor was the action thought out.

Prof. El: __ Yes! As there is no change of attitude of the people who create the project ... Because if you continue, the project continues.

(Excerpt nº 12, transcript of logbook, May, 2015).

Again the concepts of enunciation and bodily inscription are essential when we want to understand ways of coordinating actions in an experience. Looks, gestures, emotions and attitudes point to enactive processes, according to Varela (2000), the enaction consists not of representation, but of embodied actions. In this sense, learning in environmental education requires a complex approach, the opening of new windows in school, the widening of the gaze in which modes of exercise of authorship and sensitivity are intersected. We are pointing to movements in which subjects are placed, as observers of being-do-feel-know themselves in the actions of environmental education in the school, allowing them to become processes of attention to themselves in the invention of the world that we want to preserve.

At the next meeting of the third workshop, we made room for the subjects and asked the questions: - **What is life? How do we live? How do we know?** For this meeting, the participants were able to produce photographs or to bring photographs that had been taken in previous moments of their lives, moments that portrayed their looks

on the subject “To live under my glance”. The subjects brought photos of their families, friends, homes, childhood moments, their emotions. During the workshop, students and teachers observe their own photographs displayed on a multimedia projector and begin to talk.

Interesting that I was walking there by our site and found this nest there, I took a photo. I found it too interesting. It represents the birth of a new life, a new being who is being prepared for this world.
(Excerpt nº 13, Professor C, June, 2015).

I put the photo of my mother and my aunt to represent that for me not to live, the family is the basis of everything [...].
(Excerpt nº 14, Student J, June, 2015).

From the interactions that have emerged, students and teachers are still involved in a reflection guided by the shots: What is life? How do we live? How we do? At that moment, we observed attentive eyes and the triggering of another conversation, from where we cut some excerpts.

[...] the way we live today, the way we act with each other, the respect we have for each other, the coexistence with our family members, with our friends at school, will reflect on their history.
(Excerpt nº 15, teacher C, June, 2015).

Every person is what he does.
(Excerpt nº 16, student Ed, June, 2015).

We observe a process of knowledge production that follows through movements and disturbances that potentiate the knowledge. “A system only self-organizes if there is maladaptation. It is the disturbance (the imbalance) that generates the driving force of development” (MORAES 1997: 143).

The last workshop was called “Observing the course”. When we asked about what they found in the workshops, the participants were enthusiastic:

I think it should be expanded here, it should not be just between us. Cover a larger audience these workshops.
(Excerpt nº 17, teacher C, June).

It helps to stop to think, to really see how we live. In the rush you end up not realizing.
(Excerpt nº 18, teacher R, June, 2015).

In the conversation emerges the question: - **How do we see environmental education today?** and the subjects put:

I see this way: starting from the word knowledge, when I start to know myself, to see myself, to understand the self, I will certainly understand the other, I will know how to act in the correct way in society.

(Excerpt n^o 19, teacher C, June, 2015)

Still in this last meeting we made the following question: **And in the school, about environmental education, what could be thought from this change of perspective?** In the speech of one of the teachers:

We do not treat environmental education in this personal way, seeking the essence. It was clear that this union, this junction, the same thing in fact, the environment and us. I think a good part of the students separate. They do not see each other like we see today that we are part of it, we are part of the environment.

(Excerpt n^o 20, professor E, June, 2015).

These excerpts allow us to perceive that the subjects have been complicating the understanding of Environmental Education, making it a broader issue than just dealing with actions such as not throwing garbage on the street or not clearing.

We have constructed a framework that seeks to synthesize and make visible the changes observed in the way students and teachers coordinate actions and conceive Environmental Education in school.

The table above presents cognitive and affective shifts and transformations in a research-intervention experience in environmental education.

The workshops as social technologies make visible the movements and transformations in the ways of making, feeling, understanding and caring for the environment, enhancing the experience of environmental education in the school. This perspective is challenging and opens space for research subjects, including researchers, to become the experience in Environmental Education.

Educating in a broad and complex perspective implies that we no longer delude ourselves with the emphasis on the transmission of contents about the environment that often marks the doing in school. In analyzing ways of en-acting in caring for the environment, we had the opportunity to learn about how students, teachers and us researchers are taking care of ourselves, others and the world we keep with everyday actions. The autopoietic and enactive perspectives indicate that as subjects we are able to observe our own doing and producing transformations in living.

During the experiment, we could observe displacements, such as: initial feelings of insecurity and fear that became emotions of acceptance of integration and acceptance of oneself and of the other, gestures that indicated anxieties, distrust of the very making of the photographs gave rise to firm gestures of power recognition in the making itself and in the collective experience and, finally, ideas of environmental education associated to natural resources and supported in Cartesian methods of reproduction were transformed into learning processes supported in the movements of invention and care with the life.

Table 2 – Displacements in ways of enactment and design of Environmental Education

	Beginning of Experience	Displacements in the course
emotions	Insecurity and fear to connect in processes of authorship and sharing of experiences.	Process of integration and acceptance of self and of the other, through the sharing of singularities.
	Excitement in the production of photographs.	Recognition of success in the method of producing images as a device for authoring processes.
gestures	Restlessness, tense looks and difficulty interacting during the first workshop.	Comfortable subjects in the inventive production flows. Welcoming each new experience.
ideas	Environmental Education based on the logic of content transmission, task completion and counseling.	Environmental Education as a process of learning connected with the emotions, ideas and actions, in which the subjects involved can do together and reflect.
	Environmental Education based on the logic of content transmission, task completion and counseling.	Environmental Education experience anchored in movements of inventions, disruption and imbalance, allowing subjects to reinvent themselves and transform themselves.
	Linear methods of teaching and learning	Learning methods in cyclic structure of recursion, movements of recidivism and reinvent in a continuous process of production of oneself.
	Environmental education projects aimed at the presentation at science fairs.	Search of sense in environmental education works.
	Idea of Environment and Environmental Education focused on space and natural resources.	Approach with the feeling of belonging to the environment; Environmental education as care and promotion to life;
	Photograph idea as record or reproduction of the world.	Photography as an enlargement device to look at producing knowledge.
	Research is understood as the processing of information from a world outside the experience intervention in environmental education.	Research experience in which researcher and researched are both observant and observed, allowing them to become the invention of worlds.
	School as a teaching-learning space where concepts are transmitted as consolidated truths	School as a space for coexistence that can enable students and teachers to disfigure and reconfigure concepts in learning processes.

Source: Table prepared by the authors based on research data, 2015

Cognitive and affective processes we could distinguish in the photographic productions of students and teachers about environmental education in the school and in the networks of conversations woven in the experience of the intervention research. Thinking about environmental education at school in the perspective of inventive cognition implies welcoming and attentive to the daily practices with which we are shaping the reality that we want to preserve in our lives.

Final considerations

During the construction of the research, we try to answer the question How do teachers and students conceive environmental education and how do these modes of conceiving become visible and become the ways of acting in relation to the environment?

The methodological path we have built for this intervention research is inspired by the cartography method because we seek to put our attention on the singularities in the subjects' experiences. In this space we had a series of inventive production workshops organized in a cyclical way, integrating production of images, wheels of conversations with readings of the produced images and the observation and analysis of writings that refer to the experiences of environmental education in the school.

During the course, we could observe subjects involved in an experience of learning environmental education operating with processes of self-organization of knowledge. The participation of the subjects flowed in each workshop in a weave of acts of language that emerged in the experience. Emotions, gestures, ideas in cognition the inventive were the way of knowing. We were able to follow changes in knowledge paths of students and teachers that in interaction with each other, configure knowledge and knowledge. This experience gave us opportunities to produce knowledge about environmental education from the perspective of care and promotion of life.

As a result of the work, we were able to distinguish cognitive transformations in the process of attention to itself involved in an experience of Environmental Education. During the course, we mapped several moments, already transcribed in this text, that indicate to us displacements of perception in the way of conceiving the environmental education of the subjects, from a search of senses to what is learned.

In this perspective, environmental education can enhance an education aimed at the construction of transdisciplinary knowledge, by distinguishing the observers in education, students and teachers, as subjects that transform ways of doing / feeling / living in a course of individual construction and, at the same time, collective.

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Original Article

LEARNING, ENVIRONMENTAL EDUCATION AND SCHOOL: WAYS OF EN-ACTING IN THE EXPERIENCE OF STUDENTS AND TEACHER

Abstract: This article analyzes how teachers and students conceive of environmental education and how these modes of perception become workshops held at school. We believe that knowing in Environmental Education implies not only interacting with information about the environmental problem, because it involves the inventive cognition, ways of enacting and conserving what we want to live. The methodology we used was intervention research, where we followed changes in a course of photographic image production and networks of conversations built with students and teachers. As a result, we could observe ways of conceiving the environmental education and displacements that occur during the course. The subjects, when acting in the workshops, transform gestures, ideas and emotions that allow an opening for the understanding of Environmental Education as care and promotion of life.

Keywords: learn, knowing, environmental education, cognitive processes, understandings.

Resumo: Este artigo analisa como professores e estudantes concebem a educação ambiental e como estes modos de percepção se transformam em oficinas realizadas na escola. Acreditamos que conhecer em Educação Ambiental implica não apenas interagir com informações sobre a problemática ambiental, pois envolve a cognição inventiva, modos de en-agir e conservar o que queremos viver. A metodologia que utilizamos foi a pesquisa-intervenção, onde acompanhamos mudanças em um percurso de produção de imagens fotográficas e redes de conversações construídas com estudantes e professores. Como resultado, pudemos observar modos de conceber a educação ambiental e deslocamentos que ocorrem durante o percurso. Os sujeitos, ao en-agirem nas oficinas, transformam gestos, ideias e emoções que permitem uma abertura para o entendimento da Educação Ambiental como cuidado e promoção da vida.

Palavras-chave: aprender, conhecer, educação ambiental, processos cognitivos, entendimentos.

Resumen: Este artículo examina cómo los profesores y estudiantes conciben la educación ambiental y la forma en que estos modos de percepción se convierten en talleres en la escuela. Creemos que el conocimiento de la Educación Ambiental no sólo implica interactuar con información sobre cuestiones ambientales, ya que implica la cognición inventiva, cuarto

de actuar de maneras y mantener lo que queremos vivir. La metodología utilizada fue la investigación de la intervención, que sigue los cambios en una ruta de imágenes fotográficas redes y conversaciones construidas con los estudiantes y profesores. Como resultado, hemos visto formas de pensar sobre la educación ambiental y los desplazamientos que se producen a lo largo del camino. Los sujetos, los talleres en-acto nasas, transformando gestos, ideas y emociones que permiten una apertura a la comprensión de la educación ambiental como la atención y promoción de la vida.

Palabras clave: aprender, conocer, la educación ambiental, los procesos cognitivos, entendimientos
