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Environmental education: Interweaving knowledge for the ecology of knowledges

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ABSTRACT
The environmental crisis reveals the crisis of ocidental civilization, of its nature project and its project of mankind. Such project is externalized in the fragmentation of knowledge and in the teaching practice which separates teachers and students from nature problems and matters of everyday life. This work discusses the importance for the construction of a curriculum model, based on the relation between nature-man and an interdiciplinary conception of this relation. The Environmental Education does not have to be seen as another discipline (obrigatory by law), but it should be assumed as knowledge, which unifies contents and give the school a new sense, a new reason for existing, reintroducing teachers and students in a harmonic relationship with the Earth.

Keywords: Nature, Society, School, Interdisciplinarity, Curriculum.

1 INTRODUCTION

At the end of the eighteenth century, the advent of the industrial revolution inaugurated a cycle of technological innovations that left as a legacy a violent impact on biomass, natural goods and the atmosphere. These effects, ignored in the "golden years" of development, would only be presented in the last decades of the twentieth century as the environmental problem, an amorphous set of factors that encompass pollution and degradation of the environment, the crisis of natural resources, energy and food.

At that moment, "the promise of the domination of nature, and its use for the common benefit of humanity" was revealed to be a fraud, at the same time that its lead to "an excessive and carefree exploitation of natural resources, to ecological catastrophe, to the nuclear threat, to the destruction of the ozone layer", as pointed out by Boaventura de Souza Santos (2001, p. 56).

This environmental problem arose "as a crisis of civilization, questioning the dominant economic and technological rationality." This crisis was "perceived as a result of the pressure exerted by population growth on the planet's limited resources", when it was a "consequence of the accumulation of capital and the maximization of the rate of profit in the short term", responsible for "technological patterns of use and rhythms of exploitation of nature, as well as form of consumption", that deplete nature reserves, "degrading soil fertility and affecting the regeneration conditions of natural ecosystems." (LEFF, 2002, p. 59)

This degradation of the natural has not affected (and does not) affect all men without distinction. In fact, as Theodor Adorno (1982) reminds us, humanity, taken in its generic character, is nothing more than an ideological construction that conceals the glaring differences in social power between men. Such degradation is not linear, simple and continuous, involving contradictory elements linked to the power game between the dominant and the dominated throughout human history.

In fact, the consideration of the environmental problem requires the illumination of the social and political spheres, since it is fundamentally the result of a crisis of Western urban-industrial civilization. As early as 1975, the United Nations Educational, Scientific and Cultural Organization (UNESCO) expressed itself, through the Belgrade Charter, in favor of "a new global ethic, capable of promoting the eradication of poverty, hunger, illiteracy, pollution, exploitation and human domination", censuring "the development of one nation at the expense of another, emphasizing the urgency of forms of development that would benefit all of humanity" (DIAS, 1992, p.26). The tone in which the *official speeches on the subject* would be delivered a posteriori was set.

Such discourses work, ambiguously, with the fact that the environment, stage and motivation of conflicts, has perceptible and "imperceptible" elements. The first concerns natural ecosystems and those modified by the action of the "subject" (man) on the "object" (nature): biotic and abiotic elements, natural ecosystems and their fragile balance, urban space, the concentration of capital, the various forms of pollution, the expansion of the agricultural frontier, among others. The "imperceptible" elements of nature are the result of disputes over territories: the supremacy of the dominant over the dominated; the widening of the gulf between rich and poor; the concentration of material wealth in the northern hemisphere; socio-spatial segregation and the disastrous consequences of technical and scientific rationality.

Santos (2001, p. 58) reminds us:

> How is it that modern science, instead of eradicating the risks, opacities, violence and ignorance that were once associated with pre-modernity, is actually recreating them in a hypermodern form? The risk today is that of massive destruction through war or ecological disaster; Opacity is currently the opacity of the causal links between actions and their consequences; Violence continues to be the old violence of war, of hunger, of injustice, now associated with the new violence of Hubris Industrial in relation to ecological systems and the symbolic violence that the world's networks of mass communication exert on their captive audiences. Finally, ignorance is currently the ignorance of a necessity (the automatic utopianism of technology) that manifests itself with the culmination of the free exercise of the will (the opportunity to create potentially infinite choices).

It is in this context of the emergence of questions – demanding urgent answers – that, in the mid-1970s, Environmental Education (hereinafter referred to as EE) emerged as a "response to the crisis in education itself; [...] that prioritizes the rational, that compartmentalizes knowledge and that stimulates competition between individuals and groups" (PÁDUA, 2002, p. 55), in an initiative that *a fortiori* demands interdisciplinary work and the overcoming of the fragmentation of knowledge.

2 THE FRAGMENTED TRANSMISSION OF KNOWLEDGE

The environmental crisis has been attributed to the historical process that built the industrial revolution and modern science at the same time. A prominent place in this evolution is the distinction between the sciences, with the concomitant fractionation of knowledge and the compartmentalization of reality in confined disciplinary fields, with the aim of optimizing the effectiveness of science in favor of production. At this juncture, as Enrique Leff (2002, p. 60) informs us, "the search for a method capable of reintegrating this dispersed knowledge into a unified field of knowledge" began, and the analysis of the environmental issue emerged as a theme demanding "a systemic view and holistic thinking".

Technicism, which emerged as a requirement of the industrial revolutions, gained the hegemony of formal education. The transmission and reproduction of knowledge isolate/isolate educators and learners from their concrete problems, exempting them from participating in the man-nature relationship. The compartmentalization of contents, the verticalization of the curriculum and the increasingly elitist teaching have also placed them increasingly distant from their environment.

Disciplinary fragmentation and the difficulties of pedagogical practice are currently the main obstacles to addressing environmental issues in a transversal and interdisciplinary way. Working on the interdisciplinarity of the environmental theme implies revealing the network of conflicts and interests that created it, starting from the local reality to then deal with broader environmental issues. It is necessary to understand that the sciences, each one of them, have constituted their own methodological processes of scientific investigation and that the environment cannot constitute another segment of science, but must fill the cracks in the compartmentalization of disciplinary contents.

The environmental problem is a direct heir to the conception that man, because he is capable of reasoning, acquiring, producing and organizing knowledge, is above nature and the laws that govern the planet and keep it in balance. "Most people, especially those who have not studied the biological sciences," almost always manifest "a tendency to place man in confrontation with nature, or even in opposition to it. Depending on whether these people are optimistic or pessimistic, they see man as the king of nature or its victim" (FRIEDEL, 1921 *apud* BRANCO, 1988, p. 6).

This way of thinking and understanding the relationship between man and nature, expressed by the French philosopher, feeds the belief that human beings can reign over all natural resources, exploiting them in a disorderly manner, without worrying about the consequences of their exploitation. Henri Lefebvre (1979, p.233-234) shares this assessment:

> The subject—man—separates himself from nature thanks to his power over it, his instruments, his understanding, and his power of abstraction. But the more it separates itself from nature, the more it penetrates deeply into nature through its knowledge and action. The "subjective," the human being, thus contains – at the heart of its own movement – the lack, the necessity of nature. In productive action and knowledge, he incessantly resolves this conflict, which is always reborn, between the subject and the object (between man and nature). It tends towards

> absolute identity (the knowledge and complete possession of nature). Here, from this angle, the idea appears as the unity of subject and object (with the accent placed on the object), that is, of the concrete and living man with material nature. Consequently, the idea is at the same time the idea of man and the idea of nature (with the emphasis placed on nature, i.e., insisting on the reality and priority of nature).

Incorporated into science, this behavior implies a distancing of man from the nature in which he participates. Each branch of knowledge comes to be thought of separately, as disjointed fragments, disregarding the whole and the relationship with nature. It is worth remembering, as Leff (2002, p.66) does:

> The sciences do not live in an ideological vacuum. Both because of their constitution based on the theoretical ideologies and worldviews that shape the conflicting terrain of men's social practices, as well as because of the technological transformations that open up from the economic conditions of knowledge application, the sciences are inserted within ideological and discursive processes where they struggle in a contradictory process of knowledge/development. from which derive their cognitive capacity and their potential to transform reality. The articulation of these knowledge processes with the institutional, economic and political processes that condition the technological potential and the ideological legitimacy of their applications is governed by the confrontation of opposing interests of classes, social groups, cultures and nations.

If the scientific knowledge produced by the scientists and that conveyed in the school represent "different patterns of knowledge production", it is certain that the school performs "a kind of translation of this [scientific] knowledge when it is disseminated in society", says Graça Aparecida Cicillini (2002, p. 39-40), who continues:

> The knowledge disseminated in school is a peculiar type of knowledge. In addition to the characteristics of its production in the classroom environment, it is also a product of interaction with other forms of knowledge produced in different instances. There is biological knowledge produced by the scientific community. Currently, this production occurs frequently in university institutions, research institutes, and industries. However, the mastery of this knowledge is the privilege of a few, that is, of the community that produces it and of those who use this production. It should be noted, however, that some of this knowledge is appropriated by society. But this appropriation does not occur in the same way in which this knowledge was produced.

By appropriating social knowledge, the groups with political and economic power seek to guide the school according to their interests. They do not wish to discuss knowledge, from the perspective of a harmonious relationship between man and nature, contrary to the idea of "development at any cost" that they defend. Luís Rigal (2000, p. 175) comments on the implementation of this school model in Latin America:

> The school of modernity in Latin America was marked by this tradition: the formation of a citizenship capable of adding to the social process of the moment constituted the fundamental goal of the school institution. Transmitting par excellence a homogeneous culture, without gaps or differences, it thus aspired to produce a type of subject capable of adapting to the political and social demands that the ruling class pursued.

However, as Ciccilini (2002, p. 45) warns, "the school should be considered as a representative institution of society [...] Not only does it reproduce ideologies, but it also presents forms of resistance to ideological inculcation."

The school is then confronted with the challenge launched by educators and students who defend a new pedagogical practice and a curriculum that expresses the abandonment of ideology and the practical action of knowledge production based on reality and "everyday" problems. Given the recurrence of the term "everyday" in the EE literature, it is appropriate here to make a parenthesis about the pitfalls that its use entails.

The Theory of Everyday Life, expounded by Agnes Heller (1989), states that everyday life, despite its apparent richness, when it invades other spheres of reality, such as the school, does so because it has already become a space of alienation. Thus, the work carried out by formal school education must participate in the non-daily life of individuals, since everyday life, due to its characteristics of spontaneity, pragmatism, economism, analogy, precedents, provisional judgment and ultra-generalization, does not allow the full appropriation of human culture. The alienation of everyday life prevents its own explicitness. The overcoming of spontaneous consciousness, of common sense, in favor of a critical consciousness, presupposes the unity of theory and practice.

Such pitfalls do not only have theoretical implications, but very precise practical-pedagogical implications, which result in the impoverishment of teaching. Conscious insertion in social life depends on the degree of understanding and criticism of the mechanisms that govern social relations, which is mediated by intellectual knowledge and the "socialization of knowledge" provided by the school. The development of critical consciousness cannot be done without a theoretical foundation that allows the analysis of social practices and vice versa, in a dialectic of action-reflection-action. Thus, the school commitment to the full interaction between educator and student and nature, which requires a new school model and a new curriculum, requires a theoretical-methodological robustness to sustain it.

So, at the outset, we need to know what EE actually is and what kind of education we want.

3 WHAT IS ENVIRONMENTAL EDUCATION? WHAT ENVIRONMENTAL EDUCATION?

The concept of EE was initially defined at the Intergovernmental Conference on Environmental Education, held in Tbilisi, Georgia, former Soviet republic in 1977. The Tbilisi Conference proposed a pedagogical action oriented towards the solution of concrete environmental problems through interdisciplinary approaches and the active participation of each individual and the community (UNESCO, 1980). Thus, this education was defined as the result of a reorientation and articulation of various disciplines and experiences.

At the Tbilisi Conference, an attempt was made to achieve a minimum of uniformity of procedures through the conceptualization of the environment and the definition of the objectives, characteristics, recommendations and strategies of the EA. The environment, according to Tbilisi's definitions, encompasses both our planet's natural resources and historically constructed institutions and values. This conceptualization made explicit the need to incorporate the social, ethical, cultural, political and economic dimensions, in an interdisciplinary/transversal way, both in the resolution of environmental problems and in teaching/research activities in EE. As can be seen, in order to combat the environmental crisis, this education was recognized as a critical element and the need for man to recompose his priorities was highlighted.

In this context, teacher training and the development of new instructional resources and methods proved to be pressing needs for the development of EE. This was the meaning of the concept of EE, established by the National Council for the Environment – CONAMA: "a process of training and information, oriented towards the development of critical awareness about environmental issues, and activities that lead to the participation of communities in the preservation of environmental balance" (CONAMA, n.d. *apud* DIAS, 1992, p.31).

Advancing in the different conceptualizations, Nana Medina (1998, p. 69) elaborates a conceptualization of EE that reconciles the environmental issue with the elimination of extreme poverty and the improvement of the quality of life.

> Environmental Education is the process that consists of providing people with a critical and global understanding of the environment, to elucidate values and develop attitudes that allow them to adopt a conscious and participatory position on issues related to the conservation and proper use of natural resources, to improve the quality of life and the elimination of extreme poverty and unbridled consumption. (MEDINA, 1998, p. 69)

The various definitions of EE coincide in the affirmation of the need for a holistic view of reality and in the integrative approach that this necessarily demands. In fact, its introduction in the curriculum promises to "lead citizens/learners to a constructed awareness, in addition to enabling their broadening of the worldview, the overcoming of narrow anthropocentrism and the education of man in his integrity", through "an interdisciplinary and transdisciplinary pedagogical practice" (PONTES JUNIOR et al., 2002, p. 88).

This educational innovation aims to form conscious citizens, capable of making decisions about the socio-environmental reality, in a way that is committed to the life of the planet. Due to its intrinsically interdisciplinary character, it values pedagogical action. By dealing with lived problems, and not abstract ones, it promotes creativity and innovation, in a permanent dialogue between teaching and learning, which occurs in both formal and informal spaces.

Formal EE has the school as *its locus*, taking place in the education network, through curricular action, having as pedagogical reference the National Curriculum Parameters – PCNs (BRASIL, 1998).

Informal EE, on the other hand, takes place through campaigns in the mass media that aim to change patterns of behavior that are harmful to nature, disseminating attitudes that lead to knowledge and understanding of environmental problems and the consequent awareness of nature preservation.

School EE is characterized as an educational innovation that involves the entire school community and cannot be configured as a new discipline. Leff (2002, p.72) comments:

> The environmental aspect appears as a field of problematization of knowledge, which induces an unequal process of 'internalization' of certain 'environmental' principles, values and knowledge within the traditional paradigms of the sciences. This process tends to generate environmental specialties or disciplines, methods of analysis and diagnosis, as well as new practical instruments to standardize and plan the process of economic development on environmental bases. However, this 'interdisciplinary' orientation regarding environmental objectives does not authorize the constitution of a new scientific object – the environment – as a generalized domain of society-nature relations.

The inclusion of EE in the curriculum inaugurates a process of rupture with the historical characterization of the school.

> Traditionally, education encourages, in addition to acceptance, obedience to what is transmitted by the older and more experienced master or individual. The common result is the development of rebellious postures, which usually manifest themselves aggressively. Passivity is another frequent posture: The individual accepts what is taught, without question. The respect expected by the traditional teacher ignores the individuality, diversity and richness that every individual already brings, no matter how simple their origin may be. The teacher should encourage continuous exchanges so that the student feels valued in his or her individuality, which would facilitate the construction of collective processes of empathy, respect and collaboration (PÁDUA, 2002, p. 54).

The contestation of the *modus operandi of the* traditional school occurs because the understanding of EE does not occur only in the theoretical field, but presupposes the openness to new ideas, the ability of the teacher-educator to place himself at the level of the student, experiencing his problems and providing him with the means for the construction of knowledge. This means breaking with the dogmas and "truths" rooted in the traditional school, opening horizons for respect for individual freedoms, inventiveness and the potential of students, most of the time, suffocated by the school. It is not possible to respect the students, their dignity, their being formed, their identity being made, if one does not take into account the conditions in which they have been existing, if one does not recognize the importance of the "knowledge of experience made" with which they arrive at school (FREIRE, 1997, p. 71).

By incorporating the environmental dimension into formal teaching, one moves towards interdisciplinary practices that deepen the knowledge of environmental issues, which does not need to be formalized in one discipline, as it is based on interaction with all other disciplines. The PCNs (BRASIL, 1998) introduced the environmental theme in the Elementary School curriculum, as a

transversal theme, which should permeate all school subjects, and the subsequent National Policy on Environmental Education – PNEA (BRASIL, 1999) – extended this policy to all levels of education.

The PCNs point out, as one of the general objectives of elementary school, that students are able to perceive themselves as members, dependents and transforming agents of the environment, identifying their elements and the interactions between them, actively contributing to the improvement of the environment. In the PNEA, the principles, objectives, obligations of the government, companies, institutions in general, the modalities, and the role of formal and non-formal education in EE were defined.

Pedagogical work in a transversal way makes learning more dynamic, explaining (and changing) values and including procedures linked to the routine of educators and students. Although the Natural Sciences, History and Geography emerge as traditional partners of the environmental theme, the latter can and should encompass almost all other disciplines through the discussion of the theme and the generation of texts and programs of related activities.

Whether formal or not, EE demands an interdisciplinary approach, a global and balanced perspective, which is found in the cooperation/interaction between all disciplines or fields of action of the theme, being important the approach to its social, mathematical, historical, geographical, language, arts and philosophy aspects. Different pedagogical strategies allow the development of teaching methods and techniques capable of endowing it with a multiplying character.

The practice of EE demands a multiple view of the phenomena and a catalyzing action of the knowledge of environmental issues. However, in order to work at this level, this praxis needs to incorporate a critique of society's relations with nature, focusing on complexity, absorbing differences in a collective search for advances in global environmental problems.

After analyzing the different conceptualizations of EE, it is worth highlighting the different conceptions of the environment that permeate its projects and/or activities. These differences can characterize EE as an "environmental training", as an education for democracy or even as a "subversive education, which seeks to attempt to implement a transformative project, translated by the insertion of ecological rationality in the ideological core of our society" (LAYRARGUES, 1999, p. 141).

Paula Brügger (1994), when emphasizing that EE is not the same as the teaching of ecology, defines the preservationist perspective as "environmental training", since it aims only at a change in individual behavior and not in societal values.

A significant part of EE projects/activities in Brazil favors a reductionist perspective of the environmental theme, based on the biological aspects of the environment and a preservationist conception, which ignores man and social relations. The preponderance of these approaches is accompanied by practices devoid of theoretical-methodological references and a questioning of their determinants. It is worth asking, as Victor Novicki and Maria Maccariello (2007, p. 1) do:

> Who is interested in advocating a reductionist (naturalistic) approach to the environmental question? Which interests seek to conceal the social, political, ethical, cultural and economic determinants of environmental degradation? If each and every environmental problem is caused by our way of producing and consuming commodities (including nature) and, dialectically, if the environmental effects or costs of this degradation affect human beings unequally and combined, according to their place in the capitalist mode of production, what ideology strives to artificially separate society and nature?

In addition to preservationist naturalism, which is regulated by the man-nature dichotomy, we find other proposals demarcated by technicality, which point to technical solutions, management and management of natural resources, as the solution to the current crisis, ignoring its political and economic aspects. The privileging of technical reason repeats the schemes of reproduction of capital that are the driving forces of this crisis. In fact, it is a question of implementing a wasteful mode of consumption, but with a vague environmental concern, expressed in the manufacture of less polluting automobiles (as opposed to the creation of bike lanes or the improvement of public transport) or in recycling methods (not of more durable products).

Another theoretical current seeks to sacralize the environment, disregarding natural dynamics and anthropic action. The approach of "archaism-naturalistic" is based on nostalgia for the past, on the valorization of lost ideals, on the discourse of returning to nature. For the adherents of this theoretical current, human production only makes sense if it guarantees and develops biodiversity, hence its emphasis on "traditional cultures".

On the other hand, the socio-environmental approach, according to the indications of the Tbilisi Conference, presents "a very critical view of reality, demonstrating that the origins of the current environmental crisis are in the cultural system of society", a society that "is guided by the competitive market as the regulatory instance of society, it provides a one-dimensional, utilitarian, economic and short-term vision of reality" (LAYRARGUES, 1999, p.132).

These different conceptions of the world, education and man imply distinct and antagonistic educational projects. If there is a consensus on the seriousness of the socio-environmental crisis and the need to intervene in it, the objectives, principles and guidelines for EE action are quite different in each of these theoretical perspectives. The homogenization and superficialization of the discourse, disregarding such contradictions, point in the direction of the "quotidianization" of this Education and the concomitant loss of its critical character.

Against the preservationist tendency, which treats humanity as the trigger and victim of the environmental crisis, the socio-environmental strand identifies specific social subjects with different levels of responsibility for it. At the same time, it defends a transformative/critical pedagogical action, conducive to the exercise of citizenship. At this point, the interdisciplinary pedagogical action in EE is transmuted into political action, which triggers a dynamic of action-reflection of social subjects who,

in their practices, in the interaction with their fellow human beings, transform nature through work and are transformed by it.

4 ENVIRONMENTAL EDUCATION IN TRANS/INTER/MULTIDISCIPLINARITY

Like all innovations, EA takes time and preparation to use. It requires the permanent training of those responsible for the changes, the analysis of the school institution and the knowledge of intra-school relations and of the various social subjects involved. In this context, the school emerges as a space of mediation between the internal and the external, the known and the unknown.

The introduction of EE in the curriculum involves economic, political and ideological interests and demands in-depth debates to unify the reasons, consequences and objectives of this pedagogical practice. Medina (2002, p. 73) states: "The school manages and enables complex relationships between people, both internal and external, with diverse interests and expectations, power groups that define institutional micropolitics and conflicting personal relationships, various types of tensions and differentiated pressure groups that produce the culture of the educational center as a whole."

Here it is worth emphasizing that the disciplinarization and fragmentation of knowledge are at the service of maintaining the *establishment* by denying students and educators the connection of knowledge and the production of new knowledge. In this sense, Oliveira (2002, p.

61-62) states:

> Modern pedagogy, cradled by the context of scientificity, allowed the specialization of education professionals, the division of the workload, the specificity of teaching materials, etc. In the subject curriculum, everything can be controlled: what the student learns, how he learns, how fast the process happens, and so on. [...] And it is in this context that, once again, pedagogy appropriates the thinking of the exact sciences, which sought to reconnect the boundaries of the sciences.

To overcome this deforming picture, EE practice requires the understanding of four fundamental parameters: transversality, transdisciplinarity, interdisciplinarity and multidisciplinarity.

Transversality turns against the formality of the contents, making the school rethink values and attitudes, in order to guarantee a political-social dimension of the pedagogical work. Thus, the confinement of the formal performance of educators is broken and their responsibilities with the formation of students are expanded, through continuous work throughout schooling.

The environment is only one of the important themes for the formation of the student, but, worked in a transversal way, it can articulate a greater integration of the school community, collaborating so that the pedagogical process becomes more pleasurable and results in practical actions that meet the needs of the school, the neighborhood, the planet. To this end, it is necessary to set well-defined goals, define action strategies and establish the role of each one, because, as the PCNs emphasize, the theme Environment [...] can be more broadly worked on when the research of

knowledge and the construction of the collective path of work are more diversified and intensified, if possible with diverse interactions within the school and between the school and other sectors of society (BRASIL, 1998, p 192).

Interdisciplinarity argues the compartmentalized division of contents. Transversality and interdisciplinarity are complementary terms: while transversality refers to the dimension and the possibility of didactics to establish a relationship between assimilating systematized knowledge (learning in and from reality), interdisciplinarity constructs an epistemological approach to the objects of knowledge, which is necessary because

> [...] In order for students to construct a vision of the globality of environmental issues, it is necessary that each teaching professional, even a specialist in a certain area of knowledge, be one of the agents of interdisciplinarity that the theme requires. The richness of the work will be greater if the teachers of all disciplines discuss and, despite all kinds of difficulties, find links to develop a joint work. This interdisciplinarity can be sought through an institutional structuring of the school, or through the curricular organization, but it necessarily requires the search for overcoming the fragmented view of knowledge by specialist teachers (BRASIL, 1998, p 193).

Transdisciplinarity, on the other hand, implies that the fundamental themes for the construction of knowledge are inherent to all knowledge from a multidisciplinary perspective. The transdisciplinary vision is open to the extent that it goes beyond the domain of the exact sciences through its dialogue and reconciliation not only with the human sciences, but also with art, literature, poetry and spiritual experience.

From this perspective, the environment can constitute a cross-cutting theme that cements all disciplines and fills the cracks in the fragmentation of curricular contents. Considering that an authentic education cannot privilege abstraction in knowledge, but contextualize, concretize, and globalize knowledge, transdisciplinary education reevaluates the role of intuition, imagination, sensitivity, and the body in the transmission of knowledge.

If, in interdisciplinarity, the interests of each discipline are preserved, the principles of transversality and transdisciplinarity seek to overcome the concept of discipline, through a common (transversal) theme/objective. Leff (2002, p.72), however, warns us that, "however, it is not easy to abandon the tendency to think of the environment as a field of attraction and convergence in knowledge, of submission of the sciences to an integrative project". In other words, "the environment, in the end, is a network of relationships capable of grouping all knowledge in search of its object, it is the plasma where that surplus of knowledge that goes beyond the field of scientific knowledge dissolves or coagulates."

The environmental theme emerges as an important tool for the revitalization of the school, at a time when education faces a series of debates about the gaps created by the "global society". Finn *et*

al. (1980, p. 187) comment on some of the aspects of these debates, which, by hitting education hard, spread the idea of the "crisis":

> In educational systems analysis, it is useful to distinguish two aspects. In the available literature, these aspects are often divorced, but in fact they should be seen together. The first aspect is the work of the schools and colleges themselves; their institutional structures, their disposition of knowledge, their pedagogical relations, their informal cultures and organization. We call this aspect the ideological work of the school itself. But, secondly, these primary aspects are also the subject of broader definitions and practices. This debate on education is often constructed at some distance from the processes it purports to describe. This debate, however, through policies**,** has a real effect on the education system itself. It is also part of a general political discourse. In developed forms of the democratic state (which presupposes equal citizenship), debates about education are part of a history of hegemony; they are a regional instance of the process of requesting the consent of the governed (FINN et al., 1980, p. 187).

In this context, the school, which spread predatory industrialism and segmented knowledge, adopts the environmental theme as a virtual filling of the void in the production of new knowledge, based on the creation of a channel of dialogue with the external community. Penteado (2000, in this sense, asserts:

> The formation of the environmental awareness of our youth and the development of the exercise of their citizenship goes through the transformation of the training school. This will be the one that we are able to build from the environmental awareness that we have and the school participation that we are able to coordinate in the day-to-day of our school work, organizing the teaching process in a broad process of school communication (PENTEADO, 2000, .p 164).

Oliveira (2002, p. 66) states that, for this to occur, [...] the relationship between the school and the space in which it is inserted must be taken into account. It must be connected with the broader issues of society and with the movements for the defense of the quality of the environment, incorporating them with their practices, relating them to their objectives.

EE emerges as a response to the positivist and homogenizing epistemological project of the world, inserting itself among the demands for democracy, equity, justice, participation and autonomy, which question the concentration of state and market power. Thus, it emerges as another social rationality, oriented towards new values and knowledge, as well as modes of production on ecological bases and with cultural meanings, guided by new forms of democratic organization.

Citizen engagement and awareness of local environmental problems are the first step towards the success of EE activities, in accordance with the principles of

Tbilisi Conference (UNESCO, 1980):

- **Awareness -** to assist individuals and social groups in the pursuit of the progressive assimilation of the necessary awareness of the problems of the •· **Knowledge -** to acquire a diversity of experiences and the global environment;

Fundamental understanding of the environment and the problems that affect it; • **Behavior -** commitment to ethical values, such that individuals feel interested in the environment, thus participating in environmental protection and improvement;

- **Skills** - to acquire the skills necessary for the correct identification and resolution of environmental problems;
- **Participation** - aiming to provide active participation in tasks that seek to solve environmental problems.

In this approach, it is essential to tune in to the different political, economic, social, cultural and ecological realities of the locality. EE should aim at building new social, economic and cultural relations, relations of respect for ethnic minorities and traditional populations, women and the freedom to build alternatives for sustainable development, respecting the limits of ecosystems.

It is necessary to define the focus of the subjects to be addressed in EE, so that the pedagogical action is based on contextualized teaching, addressing the issue of the distribution and use of natural resources. It is necessary to integrate systematized knowledge and the reality of the social subjects involved, leading to sensitization, commitment and environmental awareness, as well as developing skills, such as analysis, decision, planning and research, bases for the full exercise of citizenship.

The constitution of a cadre of teachers trained to train multipliers in EE is of paramount importance for the creation of theoretical and methodological subsidies for their curricular insertion. Thus, it aims at a matrix of socio-environmental problems in its region, in order to promote their transversal insertion in the curricula.

It is common for environmental problems to be attributed to the "lack of education" of the poor. By focusing on isolated cases, an attempt is made to place the burden of the environmental crisis, generated by the capitalist production model, on the shoulders of this population. It is essential to change this view of the reality that prevails, especially in public schools in the periphery. Such a vision is produced by the logic of the reproduction of capital, by its political, economic and social aspects, in which both educators and students are immersed. In this way, the contradictions of the capitalist mode of production must be taken into account.

> Ideological formations appear in the terrain of environmental problems as processes of signification that tend to "naturalize" the political processes of domination and hide the economic processes of exploitation arising from the social relations of production and the forms of power that govern the process of capital expansion. In this way, it is intended to explain and solve the environmental problem through a functional analysis of society, inserted as a subsystem within the global ecosystem of the planet (LEFF, 2002, p. 67).

No commitment to the environmental problem can be demanded from a population that does not see a solution to much more serious problems, which even affect the relationship between teaching and learning. Penteado (1997) also casts his gaze on these issues:

> In this version, the common citizen passes as the polluting and destructive agent, as can be seen, for example, from summer television campaigns aimed at maintaining the cleanliness of beaches, or from advertising campaigns, throughout the year, for the sale of products supposedly not aggressive to nature, such as biodegradable ones. Without considering what is true in each of these perspectives, they suffer from an epistemological view: the scientific, sticking to a naturalistic approach to the question, and the cultural, limiting itself to an industrialist approach. [...] Thus, once the information process is triggered, the resolution of environmental degradation would be a 'natural consequence'. [...] Who are the most significant polluting agents, due to the extent and scope of the damage? What behaviors and/or actions need to be developed, and by whom, by which social agents, to reverse this situation? (PENTEADO, 1997, p. 9-10)

In this context, it is necessary to resume an affective practice in which the subjects of the educational practice assume themselves in their fullness. "One of the most important tasks of the educational-critical practice is to provide the conditions in which the students in their relationships with each other and all with the teacher rehearse the profound experience of *assuming themselves", that is,* "assuming themselves as a social and historical being, as a thinking, communicating, transforming, creative, dream-fulfilling, capable of being angry because they are capable of loving. To assume oneself as a subject because one is capable of recognizing oneself as an object." (FREIRE, 1997, p. 46).

The critical-educational practice, proposed by Paulo Freire (1997), allows us to innovate the teaching-learning dynamics, inserting them in the daily lives of the students and of the community itself, in which the school is inserted. The critical analysis of the (environmental) reality, which moves between the scales of the global and the local, must involve the whole practice in EE.

> The environmental perspective should lead students to reflect on the problems that affect their lives, their community, their country, and the planet. In order for this information to sensitize them and provoke the beginning of a process of behavior change, it is necessary that the learning is meaningful, that is, the students can establish connections between what they learn and their daily reality, and what they already know (PONTES JUNIOR et al., 2002, p. 88).

It is necessary to point out that "every living being occupies a niche within the web of life", despite the fact that human beings have long distanced themselves "from nature and its biological origins", forgetting that "we do not live without nature because it is part of, or rather, it is at the core of our being" (PÁDUA, 2002, p. 53).

The resumption of an integrative vision of the world represents a fundamental step towards breaking with the fragmentation and compartmentalization of contents. To this end, EE must be worked on in a dialogical relationship between educators/learners and the reality of the school and the surrounding communities.

> Why not discuss with the students the concrete reality to which the discipline whose content is taught should be associated, the aggressive reality in which violence is the constant and people's coexistence is much greater with death than with life? Why not establish a necessary, let's say, "intimacy" between the curricular knowledge that is fundamental to students and the

> social experience that they have as individuals? Why not discuss the political and ideological implications of such a neglect of the dominant for the poor areas of the city? The built-in class ethic in this case? Because, a reactionarily pragmatic educator will say, school has nothing to do with it. The school is not party. She has to teach the contents, transfer them to the students. Learned, these operate by themselves. (FREIRE, 1997, p. 33-34)

The teacher-researcher must be open to the learning/teaching and teaching/learning relationships that involve the knowledge acquired and produced by the students, based on the reality, customs, contradictions, feelings and emotions of their communities, which leads to the establishment of priorities, selection and adaptation of the knowledge produced in the academy to the school reality.

5 NOT TO CONCLUDE: PARTIAL CONSIDERATIONS!

In the mid-twentieth century, the impacts of human action on the environment are undeniable, causing an unprecedented imbalance in the forces that keep terrestrial ecosystems in balance and putting at risk the existence of species and, among them, that of man himself.

The environmental crisis is progressively revealing the collapse of Western urban-industrial civilization. At one of the ends of this civilizational bankruptcy are modern science, positivism, the traditional school and the fragmentation/compartmentalization of curricular contents adopted by it. Therefore, the importance and need to incorporate EE into the school curriculum arises from this genesis.

The school needs to be alert to the in-depth study of environmental issues, contributing information, proposing research in the classroom or outside of it, in such a way that students can work with existing documents and produce new ones that help them in the reflection and solution of certain issues.

The purpose is not to add a new subject, but to offer information within each of the school subjects or in interdisciplinary projects, with the intention of raising the awareness of students and teachers to an issue that depends on each one of us, on public, institutional and private actions.

In this sense, the role of educators is relevant, in the sense of developing a didactic-pedagogical project that encompasses EE in a transversal, interdisciplinary and multidisciplinary perspective of curricular contents. In this way, it is possible to take a big step in the construction of a school that transforms, solidarizes and creates subjects who construct knowledge. This education can serve as an important instrument that enables a greater integration between school and community, thus building the dialogic link between educators, students and the community.

EA must be able to break through the straitjacket that keeps it imprisoned by old and false concepts, which ultimately aim at reforms within the framework of capital. Today, there is a range of official bodies, environmental non-governmental organizations, ecologists and pedagogical currents

that claim to be part of the environmental debate. The "specialists" of the complex field of investigation of environmental issues repeat, in different ways, the same discourses.

On the other hand, EE guided by a socio-environmental/critical approach aims at the political education of citizens, their active participation in the formulation and implementation of public policies, aimed at reversing the situation of socio-environmental degradation. It is about changing the relationship between society and natural resources, opposing the authoritarian political grammar dominant in Brazil and assuming the role of "Environmental Education for Democracy".

To think about environmental degradation in a coherent and serious way is to think about environmental complexity, it is to discard the superficial discourses of "political correctness", of "preservation of the hyacinth macaw, the golden lion tamarin or the pink dolphin", of the "ecologically correct" of "becoming aware of", on the contrary, it is to assume the epistemological (re)inflection on the nature-society relationship, it is to take this debate to its ultimate consequences. The environmental problem is a political issue and must be dealt with as such.

It is in social practice that individuals develop their consciousness. Acceptance, resistance, alienation, and interaction are products of this action in the world and of historical-social determinations. Thus, environmental analysis must incorporate methodological "collectivism" and "individualism", considering the articulation of individual phenomena (intimate beliefs, choices, etc.) and collective phenomena ("interest groups", "classes", society, etc.). From this perspective, at the same time, we seek to recognize the specificity of the individual and not to make consensus the result of an interaction in which the distinctions between them disappear.

It is the articulation between theory and the lived world that prevents the invasion of the school by everyday life, which is the alienation of its own explicitness. It is necessary to overcome the spontaneous consciousness, built in daily life, in favor of a critical consciousness. The school must appropriate the daily routine, but not be absorbed by it, which presupposes the unity of theory-practice and theoretical-methodological robustness.

On the other hand, an EE guided by a socio-environmental/critical approach cannot demand from those placed on the margins of the use of natural resources, the acceptance of pre-established standards by those who use, at their pleasure, the resources of nature, as a way of commodifying it, placing it at the service of the reproduction of capital and generating well-being for a small portion of the world's population.

Environmental awareness presupposes democracy and social participation, and this also involves the work of building a just and egalitarian society. Environmental issues are part of the social achievements for the right to quality of life for all and not for a small portion of the population. In the critical theoretical approach, which we have assumed, EA means political action. In this sense, the

construction of the dialogical relationship between the school and the community is more than necessary, it is indispensable.

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