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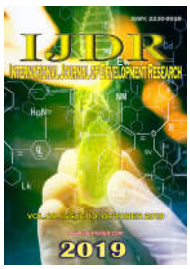

RESEARCH ARTICLE OPEN ACCESS

INFERENCES ON THE CONSTRUCTION OF THE CRITICAL SENSE FROM ENVIRONMENTAL EDUCATION IN SCIENCE EDUCATION

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ABSTRACT

The Environmental Education is a theme that allows reflections that directly interfere and in our lives and in the formation of critical sense in the process of teaching and learning, in addition, contributing to the change of behavior and attitudes towards the Environment. It is classified as a bibliographic study which was carried out from the teaching and learning process, with Environmental Education as an instrument in Science Teaching for the identification and analysis of the dichotomy between acriticity and criticality, the transition from common sense to critical thinking, and the elucidation of the critical sense in the educational process. This study establishes the importance of the interaction and interrelation of learning and the role of the teacher in the manifestation of the critical thinking of the students, in which educators play the strategic and decisive role in the insertion of Environmental Education in the school daily life, students for a critical position in the face of social and environmental crisis, having as horizon the transformation of habits and social practices and the formation of environmental citizenship that mobilizes them to the question of preservation and care with the environment in its more comprehensive meaning.

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INTRODUCTION

This study presents a discussion about the importance of Environmental Education for Scientific Literacy in Science Teaching considering the heterogeneities of themes that can be contextualized from the relationship between society, man and nature, and in this context, as well as their relevance to the formation the critical sense within the complexity of thinking and the perspective of teaching and learning in the school context. The reflections on the formation of critical sense are explored from discussions developed in the Master of Science Teaching at the Federal Technological University of Paraná, the Graduate Program and the Scientific, Educational and Technological Formation - PPGFCET, which led to the expansion. Of the debate around themes related to Environmental Education in the Science Teaching and contributed to the Master's dissertation entitled "Ecological Waste Footprint: Critical, Analytical and Scientific Development in the Environmental Education of 6th Grade Elementary School Students". When referring to the contextualization in the teaching and learning process, it is intrinsic to be able to establish a connection with the environmental theme. The school environment is an extremely significant environmental socialization, awareness and training of citizenship, promoting the dissemination of knowledge idealizing the formation of citizens critical and active on the environment be it local, regional or global, as the school environment has with the function social to enable students to develop their skills and core competencies that ensure its autonomy and future decision-making capacity (BUSQUETS, 1998). Thus, by raising awareness and providing opportunities in the teaching and learning process, the development of students' critical and scientific sense of concern for the environment aims at improving environmental quality and raising the quality of life for present and future generations. Thus, the present text is organized in four sections: in the first, we discuss the relevance of Environmental Education in Science Teaching urging to break with isolated practices, punctual and with mechanistic and conservative education, since the contextualization of related themes. The Environment allows the development of integrated and participatory actions enhancing the discussions that emerge from the relations between human beings, society and nature; In the second, we deal with the considerations and considerations about the characteristics between the dichotomy of (a) criticality and criticality; the third is a discussion on the transition of common sense to critical thinking and fourth section, we present the development of critical thinking in the educational process. In this sense this study has the objective has r foundation for the formation of critical

thinking from the process of teaching and learning in science education making connections on the importance of EA - Environmental Education from the socio-cultural dimensions, environmental, political and economic . Given that the discussions enable reflections and adoption of personal attitudes and constructive social behaviors, contributing to the construction of a socially and environmentally fair society in a healthy environment. We hope that the dialogues throughout the text help you stop discussions about the Environmental Education in Science Education as a possibility of a teaching that Faculte the formation of subjects CRI typical and working in reality to minimize d environmental impacts negative from the actions anthropic.

METHODOLOGY

The objective of this research was to seek fundamentals from the literature review on the political-pedagogical, philosophical and epistemological orientations of Environmental Education as an instrument of formation of critical sense in the teaching of elementary school, starting from the assumption of the incessant concern with complex dynamics of educational practices in the school context regarding the teaching and learning process where it becomes evident the wear and tear of teaching based on traditional, mechanistic and conservative models in the teaching and learning process. So the research has its,

> Taken broadly, research is every problem-solving activity; As an activity of search, inquiry, inquiry of reality, it is the activity that will allow us, within the scope of science, to elaborate a knowledge, or a set of knowledge, that will help us to understand this reality and guide us in our actions (PÁDUA, 1997, p. 29).

To achieve the proposed objective, a qualitative methodological strategy was adopted, using the documentary survey and analysis technique (CALADO; F ERRERA, 2015). Qualitative research, according to Higgs; Cherry (2009) refers to critical and qualitative, ie, non-mathematical evaluations and interpretations. For Ludke and André (2015), the researcher's procedure in the qualitative approach is to be aware of the multiplicity of dimensions of a given situation or problem and after analyzing the data, he launches possibilities of explanation of reality, trying to find principles underlying the studied phenomenon. and situate their findings in a broader context; It is an effort to construct or structure a theoretical framework within which the phenomenon can be interpreted and understood.

RESULTS AND DISCUSSION

Environmental Education in Science Teaching

The alteration and diversification of the environment demanded from man a greater knowledge about nature, its structure and the mechanism that regulates its functioning, at the same time, the causes and effects of anthropic action on the environment. Teaching Sciences is to provide students with learning situations in which they can build knowledge about different natural phenomena (GUIMARÃES, 2009). Fracalanza *et al.* (1986) state that science teaching, in addition to the knowledge, experiences and skills inherent in this subject, should develop logical thinking and the experience of research moments, converging to the development of observation, reflection, creation, discrimination of values, judgment, communication, conviviality, cooperation, decision and action, seen as objectives of the educational process. These skills described are extremely important tools for the student's life, because in many situations of their existence these skills will be present and it is at the elementary level that these skills can be initiated, allowing the student to discuss and analyze the knowledge that is being built. The Sciences is defined by the National Curriculum Parameters (PCN) as a human elaboration for the understanding of the world (BRAZIL, 1998b). Their procedures can stimulate a reflective and investigative posture about the phenomena of nature and how society intervenes in it, using its resources and creating a new social and technological reality. The National Curriculum Parameters of Natural Sciences (PCN) are aimed at educators aiming to guide the pedagogical practice of Natural Sciences in elementary school, contributing to the planning of their work and to the pedagogical project of their school staff and the education system. which is part of. Thematic axis content selections are also useful for the teacher to organize the curriculum and teaching plan in deciding which perspectives, approaches and content to work in the classroom. The thematic axes Earth and Universe, Life and Environment, Human Being and Health, Technology and Society represent an articulated organization of different concepts, procedures, attitudes and values for each of the education cycles, compatible with the selection criteria mentioned above. Cross-cutting themes highlight the need to give practical meaning to the theories and scientific concepts worked at school and to favor the analysis of current problems. In the Curriculum Guidelines for Science for Elementary Education in the State of Paraná, the objective of Sciences is explained as follows: "(...) its object of study is the scientific knowledge that results from the investigation of Nature. (...) By nature is meant the set of integrating elements that constitutes the universe in all its complexity"(MAIA, 1997).

> The DCE conceptualize Science as: (...) a set of descriptions, interpretations, theory, laws, models, etc., aiming at the knowledge of a part of reality, in continuous expansion and renewal, which results from the deliberate application of a methodology. special: scientific methodology (MAIA, 1997, p. 24).

Starting from a positive evaluation of scientific knowledge, it can be understood as Fourez (1987), that such knowledge can enable an active and critical sense participation in a society like the present one, in which scientific fact is at the base of great part of the personal choices that social practice demands. Science Teaching according to the book "Science Teaching and Citizenship" byKrasilchik and Marandino (2004) in their book "Science Teaching and Citizenship" brings elements to support and as a source of inspiration for educators willing to create activities committed to criticism and to the reflection of complex problems such as those currently involving Science and technology. On the one hand, it can show how it is possible to recognize and define current themes of analysis - needs or problems - rich in social implications and within the reach of students. On the other hand, it presents in a simple way how the teacher can discuss in depth the role of science in the contemporary world using an interdisciplinary view.

> The integration of elements of science teaching with other elements of the curriculum, besides leading to the analysis of their social implications, gives meaning to the concepts presented, the values discussed and the skills required for rigorous and productive work (KRASILCHIK and MARANDINO, 2004, p 43).

In this sense, when considering current and contemporary themes in the process of science teaching and learning, the scientific formation of children and young people should contribute to the formation of future citizens who are responsible for their individual and collective acts, aware and aware of the risks, but active and supportive to achieve the well-being of society and critical and demanding before those who make decisions and thus oppose linear thinking seeking the potentiation of systemic thinking for a balance between society, man and nature. It is constantly seen that negative environmental impacts generate health risks, deaths, use and irresponsible destruction of natural resources, motivating the formation of groups to question the advances of Science and Technology (AULER, 2002). Amid the challenges of today's capitalist society, in which the production and consumption of goods has become a status, education emerges as an instrument of change, making children and youth aware of the promotion of new environmental attitudes, as commented by Loureiro (2006a):

> The educational institution has the task of leading the individual to intervene in reality, relating the content of the subjects to daily life and the historical context in which they are situated, and experiencing the moral values consistent with democratic coexistence and social and planetary sustainability (LOUREIRO, 2006a, p. 87).

Environmental Education in this often inauthentic scenario seeks to intervene with alternative educational tools for conflict resolution and to promote articulation for a reorientation of educational experiences that facilitate the integrated perception of the Environment, making possible a more rational and responsive action. social needs, which is based on the fundamental objectives of Environmental Education set out at the first Intergovernmental Conference on Environmental Education in Tbilisi, Georgia, in 1977, such as:

> that individuals and the community understand the complex nature of the natural and man-made environment resulting from the integration of their biological, physical, social, economic and cultural aspects, and acquire the knowledge, values, behaviors and practical skills to participate responsibly and effectively in preventing and solving environmental problems, and managing the issue of environmental quality (Tibilisi Georgia Conference *apud* MEDEIROS; MERCES 2001, p. 10).

In this sense, education must be decisively oriented to form present generations, not only to accept uncertainty and the future, but to form a thought open to indetermination, change, diversity, the possibility of building and rebuilding in a continuous process. of new readings and interpretations, configuring new possibilities for action. Thus we have Environmental Education in this context as a strategic activity, as it is the most viable option for the neglect of new generations (SOUZA, 2000).

Given this, we highlight the constant interactions that exist between economy, nature, society, science and technology, as well as their problems and solutions that emerge over the years. N the World Conference on Science for the twenty-first century highlighted the importance of science education for the promotion of citizenship ensuring the information, with the consolidation and participation in a pluralist perspective able to create a change of attitude and habits in society, proposing thus new practices. For a country to be able to meet the fundamental needs of its population, science and technology education is a strategic imperative […] Today, it is necessary to foster and spread scientific literacy in all cultures and in all sectors. Society in order to improve citizen participation in the adoption of decisions on the application of new knowledge (BUDAPEST DECLARATION, 1999). The restricted presence of the environmental debate as an articulating axis in the subjects of Elementary and High School (GUIMARÃES, 2000), is a good indicator of the challenge of internalization of Environmental Education in educational spaces; Today it is still often treated in isolation or in a fragmented manner. Today's school is being challenged to be more than a place for the appropriation of recognized and accepted knowledge as socially relevant, it should become a place where "educational ecosystems" are installed and maintained, according to Candau (2000, p. 11). This school should therefore be the privileged locus for the dialogue between different knowledge (scientific, social, school) and languages; where the articulation between equality and difference is provided and also, where the issue of citizenship is fundamental as a daily social practice that progressively broadens its horizons, aiming for a different society and humanity within the framework of social and environmental issues. To encourage the implementation of Environmental Education by education systems was created in 1999 the National Environmental Education Policy with Law no. 9,795, of April 27, which made it mandatory to include Environmental Education in the curriculum across the board, at all levels and modalities of education. In its article 1 we have the definition of Environmental Education: [...]

> Environmental Education means the processes through which the individual and the community build social values, knowledge, skills, attitudes and competences aimed at the conservation of the environment, a common good of the people, essential to the healthy quality of life and its sustainability (BRAZIL, 1999).

The Environment theme, according to the National Curriculum Parameters (PCN) of Environment, "can be a refreshing space for school life, pedagogical practice". In addition, "it can revive the debate between students of various ages and classes, among the entire school community, between school and neighborhood, and even between larger instances of public administration" (BRASIL, 1998a, p. 191). Working on environmental education in schools is an arduous task, since it involves a series of variables such as the teacher's conception, the context in which the school is inserted, the problematization that may arise from it and the available teaching resources that will serve as a basis. Reference to students. Science teaching is one of the ways to help in the construction of knowledge using resources and teaching materials that allow students to exercise their ability to think, reflect and make decisions, thus starting a maturation process. The teacher has an extremely important role, because he must guide the students, making the students participate in

this construction, learning to argue and to exercise the reason; he should question and suggest rather than give them definite answers or impose their own views on them (CARVALHO, 2004b). For Loureiro (2006b) the act of educating is a necessity of our species and a phenomenon that must be understood and analyzed in order to be efficiently performed. It is a primordial dimension that can generate changes when articulated with the students' socio-historical and socio-cultural reality. In this scenario, the Environmental Education proposal stands out as a possibility of building this new thinking, as it is, according to Carvalho (2006), an educational proposal that aims at the formation of values and attitudes necessary for a new attitude towards environmental issues through an emancipatory educational process. To Loureiro:

> Emancipatory action is the continuous reflexive, critical and self-critical means by which we can break with the barbarism of the prevailing pattern of society and civilization, in a process that starts from the societal context in which we move from the "place" occupied by the subject, establishing formative experiences in which the problematizing reflection of the totality, supported by a conscious and political action, propitiate the construction of its dynamics (LOUREIRO 2006a, p. 32).

The proposal of Environmental Education has relations with some perspectives that emerge in the area of Science Education. Chassot (2006) states that Scientific Literacy represents "the set of knowledge that would make it easier for men and women to read the world in which they live", consolidating itself in a timely manner in Environmental Education to leverage alternatives that favor more committed education. With the environment. These relationships become important considering that environmental education in schools is often incorporated into the teaching of science and geography. Regarding Science Teaching, Cachapuz; First; Jorge (2002) consider the importance of environmental issues in teaching so that the student has the clarity of his role as an active citizen who has to play roles and share responsibilities to change the current environmental crisis picture. For this it is necessary that, more than information and concepts, the school proposes to work with attitudes, with formation of values, as indicated by the National Curriculum Parameters (BRASIL, 1998a), and the new orientations for Science Teaching (BRAZIL, 2004). By situating environmental education in a broad context, that of education for citizenship; it is a determining element for the consolidation of citizen subjects (JACOBI, 2000). Above all, the main focus should be solidarity, equality and respect for difference through democratic forms of action based on interactive and dialogical practices. However, reality is not treated as given, but constructed by social subjects, in a contradictory and conflicting relationship between interests and classes. "(...) in the historical experience of which I participate, tomorrow is not something pre-given, but a challenge, a problem" (FREIRE, 1998). It stands out within this reflection that:

> This equates critical thinking in Environmental Education and, therefore, the definition of an ethical-political position where Environmental Education can seek its foundation as an educational project that intends to transform society (CARVALHO, 2004a, p. 18).

Environmental Education as part of Science thus increasingly assumes the form of an active intellectual process as a social learning, based on dialogue and interaction in a constant process of recreating and reinterpreting information, concepts and meanings, which originate from learning in classroom or personal experience of the student. Thus, considering science as "a language to facilitate our reading of the natural world" (CHASSOT, 2006, p. 37), knowing it as a description of the natural world helps us to understand ourselves and the environment around us. The approach to the environment at school has an articulating role of knowledge, in a context in which the contents are re- signified. For Jacobi:

> By interfering in the learning process and in the perceptions and representations about the relationship between individuals and environment in daily behaviors that affect the quality of life, Environmental Education promotes the tools for the construction of a critical view, reinforcing practices that explain the need for problematize and act in relation to social and environmental problems, having as a horizon, based on an understanding of conflicts, sharing an ethics concerned with environmental justice (JACOBI, 2005, p. 245).

A major theoretical-pedagogical transformation is needed for the area of Environmental Education, Leff (2003, p. 9) asserts that: "Environmental pedagogy is based on the fusion between critical pedagogy and the thought of complexity"; Therefore, the socialization of environmental knowledge is of vital importance, always bearing in mind the old "buzzword" that this learning does not occur only at school and that school is not always the best place for the development and understanding of this knowledge, through a dialogic, self-reflective and emancipatory process that will provide us with environmental knowledge built on each other in the context of interculturality. Therefore it is necessary to think of environmental complexity as the expression that indicates a crisis of civilization punctually centered on the question of sustainability, which permeates the question of alterity, power and the political sphere. The relationship between environment and education takes on an increasingly challenging role, requiring the emergence of new knowledge to understand the intensifying social processes and environmental risks. In its multiple possibilities, it opens a stimulating space for a rethink of social practices and the formation of an "ecological subject" (CARVALHO, 2006). The environmental crisis and education have been a focus of ongoing interest today, pointing to the educational process as a source that would contribute to the search for answers and possible solutions to the social and environmental problems that are manifesting themselves and are increasingly intense and frequent.

Thus, Loureiro states that:

> To educate is to deny the common sense that we have a 'conscious minority'. [...] It is to understand that we cannot think for the other, for the other and without the other. Education is made with the other who is also subject, who has their identity and individuality to be respected in the process of questioning, behaviors and reality (LOUREIRO 2006a, p. 28).

Therefore, it is necessary to emphasize and experience the certainty that Environmental Education does not only act in the field of ideas, ideals or utopias and will not even be established solely in the field of information transmission, because it works directly with existence, with life and, therefore, the process of awareness and emancipation should be shown through action with knowledge and the ability to choose the commitment to the other, to their subjectivity and, above all, to their way of being in the world and to establish in it its experiential mediations that make it a social being and a cultural being.

The dichotomy between the characteristics of (a) criticality and criticality

Every human being needs to interact with the environment in which he is inserted, and today, this interaction has become even more important since society has undergone numerous transformations that require the subjects not only to adapt to this process of change, but to take positions and speak critically against the facts that permeate our reality. For the individual to be able to develop their knowledge and improve their ideas, it is necessary to articulate the reflections on the knowledge they already have to the new, in a permanent process that favors the critical apprehension of reality. Considered in its broadest dimension, critical thinking is one of the mechanisms through which it is possible to better understand the world, positioning itself in front of it, contributing significantly to the review and construction of new knowledge. Critically thinking involves knowledge about one's own knowledge, because the critical thinker must understand that there are several types and styles of thoughts, reflections, inferences and communication, depending on the context in which they are inserted. Today's society is characterized by being constantly thought of. We, as active subjects in our social interactions, act, we think, by questioning ourselves; we do not take for granted the reality around us, but we do know of the existence of other contexts and other practices that "quote" our normality. Constantly, we must filter information and engage in society to survive due to the plurality of life forms and ways of doing. We must decide on the plurality of possible options, knowing that “for life” is something that happens neither at work nor at marriage (FLECHA; TORTAJADA, 2000, p. 26). For this, the formation of the critical, autonomous subject, with the development of his subjectivity becomes even more evident, because every critical being can rationalize and better understand everything he does, experiences and feels the facts that are part of his daily life. Therefore, critical reflection should be considered as an internal movement, as growth of each individual who needs to play their role in the context in which they live. For Castanho (2000), the subject who does not think critically is justified by his own beliefs and considers them obvious and natural, that is, a matter of personal philosophy. It often defends beliefs in irrelevant evidence and cannot base ideas on solid evidence. It turns out that, to the great call for criticism, it was sometimes answered as not knowing the possibilities and the limits of the critical sense, as well as with a certain lack of self-criticism that predisposed to the arrogance of imagining that one can criticize everything, all the time, with or without the proper knowledge of what would be criticized (CASTANHO, 2006, p. 54). Studies reveal that most subjects who cannot critically position themselves because they do not master the subjects that place them in the world, do not have knowledge that can support the development of an argument, reflection or even a critical position. Thus, being critical means being able to discern, distinguish, interpret, judge facts and matters by using some pre-established criteria. Making use of such criteria gives the possibility to analyze a given situation and, through criticality, to demonstrate a positive or negative position in relation to such situation. Thus, it can be seen that the criticality will serve to mediate the position on a given subject, since through the criticality can be pointed out the reasons that prompted to take this or that position. In any case, critical evaluations cannot be permeated with arrogance; on the contrary, they must present a certain vision, a possible reading not merely based on subjectivity. I cannot say that a situation is wrong or unacceptable because it is not in tune with my personal values, as it goes so far as to make me a reference in the world. However, I can only say - yes - that we live the values that I live and cultivating the criteria that I cultivate, I have a negative personal reading in relation to the mentioned situation (REGIS MORAIS, 2000, p. 56). Criticality is not permeated by tensions or conflicts, but is based on the serenity of mature arguments, because when the subject is critically positioned his individuality must be respected and the individuality of other people as well, since the sense The critic needs to ensure harmonious coexistence between the different subjects. Criticizing means evaluating situations, pronouncements, through well-defined and well-defined criteria, so that the critical exercise does not lose its dimension of relativity.

> [...] Criticality is something that needs comprehensiveness, because first of all, we need to critique existence as a whole: in its historicity, its politicity, its affectivity and its production of intellectual goods. After all, we cannot resign from the only thing that differs us from the other animals on the zoological scale: in the condition of thinking beings (REGIS MORAIS, 2000, p. 57).

Criticality cannot be conceived as a process of thought without guidance; on the contrary, it must have a very well-defined purpose in the face of problems that must be analyzed beyond our own personal intentions and actions. Being critical, according to Carraher (2011), involves an intellectual curiosity that is based not only on satisfying and solving problems through social conversations. Intellectual curiosity depends on an investment of the individual for a long time in order to understand phenomena deeply. The person with a critical sense raises doubts about what they believe in, rigorously explores alternatives through reflection and evaluation of evidence, with the curiosity of those who are never content with their current state of knowledge. It tends to be a producer of knowledge rather than a consumer of previously ready knowledge, so it does not passively accept the ideas of others. Most of the time his curiosity is so keen that he finds issues of interest in phenomena that others do not think are necessary to explain. In addition to this attitude of intellectual curiosity mentioned by Carraher (2011), the critical thinker, according to the author, needs to have a tolerance and even predilection for cognitive states of conflict, where the problem is not yet fully understood. Thus, the critical subject,

> [...] cannot be distressed when you do not know the correct answer, this anxiety can prevent the fuller exploration of the problem. Second, intellectual curiosity implies intellectual honesty, which is not

> simply a matter of one's character. The less demanding thinker with himself tends to see the interpretations he wants or that meet the minimum requirements (what the teacher wanted). Intellectual honesty means being willing to reshape positions in the face of new information, to question our opinions, and to question positions that constitute intellectual fashions - the most powerful form of dogmatism. Third, an attitude of intellectual curiosity involves adopting multiple perspectives to examine issues from various perspectives (CARRAHER, 2011, p. 21).

Critical awareness of how ideas are produced and constructed characterizes the critical sense, as Carraher (2011) mentions, as being not only a set of cognitive skills and attitudes, but rather a type of social awareness of communication, where facts are really discussed, questioned, analyzed and even influenced by the critical view of the subject who analyzes it. When there is a concern to verify how the ideas were constructed and produced, it is verified that the subject acts on what is being observed, questioned and does not show impartiality to the questions presented to him. The critical thinker is not a multipurpose thinker who enters any field to elucidate his fundamental questions. Each field has its own premises, its own "common sense", its own perspectives. Thus, while there are certain general characteristics in the development of critical sense, the exercise of critical sense in a given field requires intimate knowledge of conceptual issues, traditions, current conflicts, paradoxes, and communicative styles - ultimately a knowledge of practices and the network. of meanings in that field. Therefore, critical sense requires, in addition to certain cognitive processes and attitudes, a broad experience in the specific field of knowledge in which it operates (CARRAHER, 2011, p. 21). The uncritical individual does not create or evaluate the appropriate evidence to develop his or her knowledge, tends to accept everything passively and only holds points of view that have been previously held by others. By taking a critical stance, the individual also takes on the role of creator of knowledge, conducts his searches and begins to study the evidence that can clarify certain doubts. He starts from a humble position regarding his knowledge, and presents his own opinion and justifies his expectations during the reflective process.

Carraher(2011) mentions that the critical thinker demands the coherence that logic provides, but recognizes its limits. First, it recognizes that many ideas devoid of rigorous logic have value and considers the appropriateness of the ideas it accepts as premises. Critical sense requires the recognition that our ideas are not facts, for facts are not considered problematic, they are not questioned, that is what is arguably stated. It is not surprising, then, to note the tendency among less critical individuals to regard ideas and opinions as facts. Perhaps there is nothing that protects our ideas and opinions as facts. Perhaps there is nothing that protects our ideas from reflection more than the belief that they are 'natural', evident and real. By presenting our ideas as facts, we put them above any discussion. Precisely for this reason we need to reflect on the nature of the facts and their distinction from other types of ideas (CARRAHER, 2011, p. 119). The need for questioning ideas is a characteristic of the critical thinker, who often finds it difficult to know which opinions are most valid in a debate on some subject. It is noticed that the individual who performs a critical reading notes the different positions presented before any problem and critically evaluates them and verifies which is the most appropriate. Undoubtedly, the critical thinker is not free of values and does not intend to be, because he can have convictions and make strong commitments. It values coherence, clarity of thought, reflection and careful observation because it wants to better understand social reality. The critical individual contributes significantly to the construction of new knowledge and, consequently, to the development of science. To do this, however, he needs clarity and rigor in his thinking, the courage to take a broad perspective on the problems he studies, to establish associations, to use his intuition, to formulate new ideas, to see similarities between events and seemingly unrelated areas of knowledge., explore implications, suggest new investigations, look at phenomena in new ways.

Transition from Common Sense to Critical Thinking

It is known that in reality the critical capacity of the subject does not develop so quickly, even because everyone has their own conception of the world, with social elements that share the same way of thinking and acting. In fact we are conformists, we accept the facts, and we are part of a "mass-man" reality, which according to Gramsci (1981) does not have a critical and coherent conception of the world, but rather a conception of common sense, transmitted from generation to generation. in a generation that often turns into religious belief, into doctrines that are not forgotten.

> When the conception of the world is not critical and coherent but occasional and disaggregated, we belong simultaneously to a multitude of mass-men, our own personality is composed in a bizarre way: in it are elements of the cavemen and principles of the most modern science. and progressive; prejudices of all past grossly localist historical phases, and institutions of a future philosophy that will be proper to the worldly unified human race (GRAMSCI, 1981, p. 12).

According to Gramsci (1981), the knowledge acquired by tradition, inherited from ancestors and to which are added the results of the experience lived in the collective, is called common sense and can be classified as a set of ideas that allows the subject to interpret the reality of non-reflective way as it confuses with beliefs and values. It is a naive, rather non-critical, fragmentary and conservative knowledge, as it resists change. Common sense is often subjective, expressing individual or group feelings and opinions, varying from one person to another or from one group to another depending on the conditions in which we live. Therefore it becomes heterogeneous and individualizing, in which each thing or fact appears to us as an individual or as an autonomous being. Most of the time, common sense is limited to solving practical problems. Therefore, if knowledge works by giving the desired response to a given situation, the same knowledge will continue to be used without much questioning. Common knowledge, or common sense, is limited in describing the appearances of phenomena, not examining their root causes and effects. This does not mean, however, that common knowledge cannot solve certain problems successfully, but in many cases their applicability, marked by beliefs, can have disastrous effects. For Gramsci (1981), common sense usually brings together in one opinion or idea similar things and facts deemed to be similar and tends to establish cause and effect relationships between them. It is not surprising and no wonder at the regularity, constancy, repetition and difference of things,

but, on the contrary, admiration and amazement are directed towards what is imagined as unique and extraordinary. This insufficiency of common sense is a consequence of the attachment to immediate consequences and the fact that it remains at the level of appearances rather than seeking deeper explanations for non-directly observable phenomena. In common sense, according to Badaró (2005, p. 22), "there is a thinking, a knowledge that is used and reproduced mechanically, without having this awareness. These are conceptions that are often imposed by the external environment or by tradition. In this sense, common sense can be defined as a set of opinions and beliefs admitted in a particular society, associated with everyday life, where a naive consciousness of person, world and science prevails. It is noticed that the common sense attitude, unlike the critical attitude, as stated by Badaró (2005), is usual, since it does not suspect the truth of the certainties, the immediate adhesion of things and generates an absence of criticism and lack of curiosity.

> Common knowledge observes a fact in a generic way (immediate), without making the proper debugging (this is what we often learn in school). Science, on the contrary, analyzes it, drawing from its questions, its objectivity and its verifiability, through a rigorous language, whose concepts are defined in order to avoid ambiguities (BADARÓ, 2005, p. 29).

It is somewhat evident why individuals have a certain natural resistance to abandon the common sense view and take a new stance with a critical, reflective and scientific perspective of reality, considering that, when thinking critically, security and certainty about a given fact or issue no longer prevails. There is room for new ways of thinking, no longer based on subjectivity and one's own opinion, but on opinions that are built on the scientificity of historically constructed knowledge. However, an individual's common thinking should not be overlooked but must be overcome. According to Gramsci (1981), common sense is the healthy core of common sense. Anyone who is stimulated in the exercise of critical understanding becomes capable of making wise judgments that contribute to the formation of new reflections. Often, when common sense moves to common sense, the individual is excluded from the decision-making of the community in which he is inserted. In undemocratic societies, for example, information does not circulate equally in all social strata, so not everyone has an equal right to consume and produce culture. It is believed that any individual who has a certain freedom will be able to develop self-awareness, to critically elaborate his own thinking and to critically analyze the situation in which he lives.

> Criticizing the very conception of the world, therefore, means making it utilitarian and coherent and raising it to the point reached by the most developed world thinking. It means, therefore, to criticize, as well, all the philosophy that exists until today, in so far as it has left consolidated stratifications in what we really are, that is, a "know thyself", as a product of the historical process developed until today, which left in you a multitude of traces received without benefit in the inventory (GRAMSCI, 1981, p. 12).

Creating a new culture, leaving the common sense view to adopt a critically coherent worldview, does not mean making individual discoveries, but spreading critically discovered truths and socializing them. As Gramsci (1981, p. 13) states, "to transform them into the basis of vital actions, into an element that leads man to think coherently and in a unified way about present reality". Critical knowledge allows the individual, as mentioned by Badaró (2005, p. 34), "a process of mental appropriation in relation to the world in which he is part, in an attempt to elaborate different explanations and reflections of the different facts and phenomena that surround him. "The concept of criticality is thus associated with the act of turning to oneself in search of reflections that lead the individual to better understand what he does, experiences and feels. According to Badaró (2005), the formation of critical sense is linked to a qualitative change in the way of thinking and understanding the world. This change causes a reinterpretation and enrichment of existing knowledge.

> The purpose of this new knowledge demonstrates that the world is knowable by man. The true world of theory, as opposed to the apparent world of common knowledge and naive realism, changes the way we learn reality. The knowing subject must critically analyze reality, an analysis of scientific concepts, in order to highlight dialectical growth by approximations with the object. Reality is therefore irreducible to the subject, the possibility of approximations between subject and object are inexhaustible (BADARÓ, 2005, p. 35).

The opinion that is situated in the mind as an obstacle needs to be deconstructed in order to give way to the construction of knowledge, which will require the individual to have a critical, objective and systematic posture that will lead him to detach himself from the sense view. reality and intuitive opinions. In order for this common sense to be overcome, education must play a significant role in contributing to learning that develops the development of critical sense in learners. Education needs to foster training based on the acquisition and enhancement of knowledge and enable the development of skills needed for today's society, such as information selection and processing, autonomy, decision-making skills, teamwork, flexibility, critical thinking. are indispensable in the different social contexts.

The formation of the Critical Sense in the educational process

Several studies reveal that education, especially the systematized school, has and assumes a primordial role in the formation of students as acting subjects of the social reality in which they are inserted. School institutions have been urged to rethink their role in the face of the changes that are revealed in today's society. In this sense, it is understood that it is necessary to overcome the education that is characterized and based on the mere transmission of values and knowledge and provide a participatory and interactive education, which aims the integral formation of the student.

> These attitudes should be linked to others such as understanding scientific concepts and theories, acquiring cognitive skills associated with the practice of science, as well as fostering a scientific attitude of looking at the world and, finally, developing skills to use scientific knowledge to solve problems . problems (BADARÓ, 2005, p. 108).

It may be added that the school should be concerned with the cultural and scientific formation of all its students and thus offer them cultural, scientific, technical, aesthetic and ethical contact, highlighting the concern and development of critical thinking. In this process, certain skills are fundamental, among which the following can be highlighted: the development of creativity, sensitivity, imagination; the preparation for the productive, technological and communicational process, as well as the formation of critical citizenship, which offers conditions for every individual to be able to critically interfere in reality to transform it and not just to form to integrate the labor market. Education, in turn, will only favor critical thinking when it plays a significant role in sociopolitical processes because it is related to the development of critical self-awareness. This critique would imply a break with the old discourse, either theoretically or practically, to recreate a new cultural process. The criticality perspective must be able to neutralize the old theory by showing its inconsistency. However, in order for this old theory to be neutralized and the common sense view overcome, the school and its actors must assume the central role of the teaching-learning process in favor of the construction of a unitary worldview, which free men from common sense and their spontaneous philosophy.

> The elaboration of an organized worldview is not arbitrarily done around any ideology, will of any personality, fanatical, philosophical or religious groups. The non-adherence or adherence of the mass to an ideology demonstrates the critique of the historical rationality of ways of thinking. Arbitrary constructions are the first to be eliminated in historical competition; whereas constructions that meet the demands of a complex and organic historical period always end up prevailing and prevailing, even though they pass through many intermediate phases in which their statement occurs only in combination with more or less bizarre and heterocyclists (GRAMSCI, 1999, p. 111).

The school, in its broadest sense, contributes significantly to reinforce an autonomous conscience, to educate students to think clearly, freeing them from a simple chaotic vision, collaborating, according to Gramsci (1999), to an education that is not It is limited to the simple theoretical enunciation of principles and methods, but to the articulation of educational work with induction, deduction, formal logic and dialectic. Thus, education would actually assume an emancipatory character, contributing to the formation of the individual who acts and reflects on his own history. With this view of school, as Gramsci (1999) mentions, the old school would be abolished and replaced by a school that, by what it teaches, fights against all the traditional sedimentations of world conceptions in order to spread a more modern conception, which aims at the full and collective development of the individual, enabling him to actively participate in the reality to which he is inserted, with a view to transforming and socializing it. Gramsci (1999) states that criticality can and should be built daily, in a slow and continuous formation process, in which the subject will enter a magnificent world of values of aesthetic and technological relevance and with these values will be able to identify new techniques. and constructions that will allow you to take different points of view before any and all facts or subjects that may be put on the agenda. The formation of critical sense depends on a certain intellectual maturation, the formalization of thought, and a critical education that is linked to the different and possible roles that education could and can play within a particular socio-political context. However, studies reveal that to favor the construction of this critical thinking it is not enough for the teacher to master the art of teaching, it is necessary to master it and put it into practice using the knowledge that he has, so that the content to be taught can be full of meaning for the student.

> [...] critical sense depends on a certain intellectual maturation and formalization of thought not found in children, even the most intelligent. Critical sense refers to skills already developed (not just potential), presumably through reading, reflection, and practice itself. (CARRAHER, 2011, p. 20).

Therefore, the teaching-learning process should enable the development of skills that lead the individual to a critical and reflective formation and the teacher offers subsidies for the student to raise their level of information that is fundamental to the problematization and apprehension of reality. The teacher cannot assume a practice devoid of reflection, nor be impartial in the face of historically constructed knowledge, because this attitude will portray his disengagement with the social, cultural and intellectual formation of his student. It should be noted that the teacher needs to be committed to investigating and verifying critical analysis of certain theories and practices. It needs to favor the enrichment of the intellectual repertoire of its student and this will only be built through the practice of different readings and related to the content worked in class or the facts and daily events. The teacher must at all times urge his student to read, research, experience situations so that this cognitive universe can be expanded daily. It is from these cognitive experiences that the student will be able to express ideas expressively, to argue to defend them or to deny them, using their creativity, giving a different approach from the already known. In this sense, "the intellectual authority" cited by Carraher (2011) needs to be set aside and human coexistence will be constituted through the struggle of intelligences, that is, the confrontation between the various ways of reading and understanding reality. Education in the information society should be based on the use of communicative skills such that,

> "Let us participate more actively and more critically and reflexively in society. If we want to overcome the inequality that generates the recognition of certain skills and the exclusion of those who do not have access to information processing, we must think about what kind of skills is being enhanced in the formative contexts and if this is facilitated the interpretation of reality. from a transformative perspective" (FLECHA; TORTAJADA, 2000, p. 31).

Education needs to break with the traditional discourse based on conservative theories, which advocate a reproduction-based education, and adhere to an integrative, participatory and permanent process, based on the joint action of all those involved in the process, without any kind of exclusion., providing answers to student needs. The formation of a critical subject must cease to be the privilege of a portion of our society, and it is necessary for more people to enjoy this infinite wealth of subjects and areas of information. The educational reality must contemplate the human experience, enabling at all times a meaningful learning that takes into account the specific characteristics of each student,

compensating for the differences, not harming the individuality nor the formation of the critical sense. Education needs to change its culture, surpassing the culture of individualism, which is so present within educational institutions, by a culture based on shared work, through the development of open activities that contribute to the formation of democratic citizens and, above of everything critics.

> Finally, changing people is not enough to transform education and its consequences. Yes, we have to change the people and the educational and social contexts (the people in their contexts). In this way, we will begin to change many things, including valuing and making humanity truly appreciate what it is: a cluster of cultural differences, ethnicities, religions, knowledge, skills, rhythms of learning, etc., which is precisely one of the characteristics that define us as human beings (IMBERNÓN, 2000, p. 86).

For these purposes to be achieved and changes to occur gradually, the institution must generate an attitude of self-control, enabling the exchange of ideas, experiences and proposals. The principles of coexistence based on freedom, exchange of experiences, dialogue, reflection and responsibility, stimulating human dignity based on solidarity and mutual respect, social and political awareness, must be recovered within the institution. Regrettably, what happens in school spaces is that content is still being transmitted in a fragmented, disjointed, neutral, meaningless way and the processes of construction and reconstruction are far from being part of this educational process. The inconsistency presented between theory and practice is very large, since there is an overvaluation of activities that are concerned only with repetition and memorization and not with understanding and understanding. This educational process, as stated by Gebran (2002), contributes to the paralysis of the student's critical attitude and increasingly reinforces the inability to establish relationships between acquired knowledge, without highlighting the socioeconomic, cultural and historical conditions of social reality. Teaching becomes alienating because it does not allow the effective participation of the student in this educational process and in the process of knowledge construction, nor does it question, problematize or criticize the knowledge that is transmitted to it. Thus, what would be the main objective of education is lost, favoring a creative and innovative process for the student, where the construction, organization and transmission of knowledge would be intrinsically linked to the transformation and development of the critical sense.

> Knowledge, while merely informative, has become its own commodity and science has become something that is actively developed by capital itself for its incorporation as a productive force. What is defined as school knowledge becomes a particular and arbitrary selection of a much wider universe of possibilities and the great educator becomes capital (GEBRAN, 2002, p. 59).

Garrido (2001) points to the teacher's role to articulate the construction and formation of critical thinking in the teaching and learning process,

> The mediating role of the teacher can contribute significantly to this learning. Skills are required to: create a climate of seeking and mutual respect; stimulate student expression and closely follow their thinking by helping them to verbalize it; encourage the class to examine and clarify the partner's point of view or doubts; to pose compelling, destabilizing and meaningful questions that stimulate the re-examination of ideas and promote the relevance of dialogue; to evaluate the debate, returning to the paths taken, providing the group with a vision of synthesis and a feeling of intellectual achievement (GARRIDO, 2001, p. 131).

Therefore, the educators, subject-actors of this process, should prepare the student for apprehension and conscious analysis of reality, in a practice of permanent and continuous reflection. Thus, the analysis and reflection of current educational practices that involve a process of reorganization of the pedagogical action present in school environments becomes fundamental.

> Hence the importance of recovering a pedagogy of the question and not only of the answer, which favors a learning based more on dialogue than on monologue. We talk about imagination, ability, stimulation, etc. something we learned from the new school of the century. XXI (IMBERNON, 2000, p. 89).

The role of education would then be to review its entire structure, its agents, its forms of administration and, above all, to facilitate and favor the participation of all those directly or indirectly involved in this process. It is necessary to review the role of the school institution and its role in the education of citizens and, for this, it is necessary to make use of the imagination in the search for alternatives. It is evident that the school urgently needs to revise its educational practice with a view to adopting educational propositions that consider the notions of freedom, equality, human dignity, democracy, morality, social responsibility and thus value the importance of the formation of the teacher. individual knowledgeable of his rights, critical, active and reality-transforming. School institutions urgently need to adhere to new social transformations and prepare students to face the conflicts that are part of everyday life. For this confrontation, however, they need to be equipped with skills that are important, such as critical awareness, debate, working together and flexibility, which will allow the construction of a thought capable of selecting relevant information, arguing and questioning, making decisions, etc.

Final Considerations

The elaboration of this study involving the theme of Environmental Education as an instrument for the formation and development of the critical sense consolidates itself with the contextualization of themes involving the relationship between man, society and nature, bringing students and teachers closer to their own reality, contributing significantly. for the formation and development of critical sense and its criticality in relation to problems related to the environment. Thus, research seek to conceptualize the critical subject, depicting the importance of environmental education in literacy cientific in Science Education for favors the formation of the critical subject, still pointing to the need for educational practices that encourage more and more this

training, and make acting subjects on social and environmental issues . We understand that the criticality is based on convincing arguments, the precise assessment of facts, events, issues, finally the critical subject pronounces and makes use of thinking, explores and reflects. All critical consciousness is based on curiosity, search, critical analysis and verification of what is being observed. It is remarkable that this critical formation has not been provided many times in school environments, because the formation present today in the ambit of our society is conformist, homogeneous, traditional and favorable to passivity. It is found that educational institutions urgently need to review current educational practices and prepare our students for life to face the present social, educational, political and cultural reality. Thus, it is emphasized that there should be a concern to establish, in the educational context, the understanding of respect for society with a focus on the perspective of social transformation and the formation of critical, humanized and emancipated students and thus foster a new model in the process. teaching and learning and a new posture, which seeks the critical and scientific construction of the knowledge produced, that is concerned with their socialization in an equal way and that students can be guided in the construction of knowledge that will be provided through daily exchanges. Among the subjects involved in the process. In this sense, the teacher assumes an indispensable role in the process of knowledge construction and critical sense formation, because he is the responsible, the facilitator and the mediator, who will offer the students conditions for their human, intellectual, reflexive, critical, autonomous growth. By acting as a mediator of the educational process, they let their experiences emerge, ask about the knowledge to be transmitted, its value and its importance. It teaches the students that education is a human process, participatory, permeated by discoveries, contributes to the formation of the subject, its transformation and for the humanization of the students in a perspective of critical and transformative social insertion. In this sense, this process will become possible when educational environments organize their space in order to transform the classroom into a space in which students can experience situations that lead them to search, compare, critique thought and actions.

In addition, it is necessary and fundamental to reflect on the teaching process and on personal and collective choices as well as on our responsibilities to present and future generations, as there are many uncertainties and insecurities causing reluctance and divisions. Thus, these discussions around the formation of the critical sense having Environmental Education as a teaching instrument have to go beyond the bureaucratic walls and quickly reach the classrooms, and this cannot happen only by the work of a teacher or a group, or school or network, these discussions have to break out of state policy and reach the whole education system. It is necessary that the school is no longer seen as a simple space for the transmission of concepts, but as a place of knowledge construction for the teaching-learning process to make sense. Environmental Education is today the effective instrument for understanding the interaction between man and nature. It is the way for each individual to assume their responsibilities in search of a better quality of life and reduction of environmental impacts. It is necessary to restructure the teaching and learning process as well as the continuing education of teachers so that there are changes in the methodological strategies that favor the critical, participatory, autonomous, creative formation of the students. For most of the classes do not promote situations to think about values and decision criteria in front of the world, in front of human relations, the facts that permeate reality. Knowledge often becomes static, decontextualized and the teacher ceases to assume his role in the critical formation of the student, who becomes a mere spectator of the teaching-learning process. In this sense, school education to contribute significantly to the formation of critical and participatory citizens needs to put into practice situations that promote the development of autonomy of thought, initiative, participation in decisions. Thus teachers need to rethink their practice and worry about the intellectual emancipation of their students. With diverse procedures, strategies and attitudes, this culture of criticality may become part of the educational process more broadly. For this, educators, collectively, must enable the development of critical sense from the theme in Environmental Education: reflective and dialogued classes, readings and discussions of texts in a reflective and critical manner, coordinated debates, guided research, video projections and films with scripts for reflection and debates, field practices, always articulating with the reality in which the student is inserted and with the reality in which he will act. Highlighting for an interdisciplinary theme. The documents that guide the pedagogical practice of all teachers, not only natural science teachers. Pedagogical proposals in the school context, Parameters, References, Specific projects require this task from the school. It now remains to turn theory into practice, to get out of discourse and into effective realization.

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