

The Triunitary Architecture of Learning Process: Proposal for A Critical Review for Environmental Education^{*}

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Abstract: Among the various possibilities of reversal of the events that the environmental crisis has brought to society, proposals such as that of Environmental Education aims to correct the problem by adopting behavioral changes and the attitudes of consumers, whose base is founded on the world of life and not in the system, as in the theoretical proposal of Habermas, or in the superstructure and not in the economic infrastructure that determines it, as Marx affirms. In addition, this text briefly considers the relationship of the cognitive process and environmental education to produce the expected effect of behavioral change and attitudes aimed at sustainability. In the cognitive framework, it is relevant to consider the interaction between three structuring elements of the human brain: the instances of the rational argument, of the instinctive reactions and dispositions and the emotional ones present in the cognitive understanding of the triune brain as an alternative to give rise to the population, civil society and the state, favorable attitudes towards sustainable development. Methodologically, the analysis is made from the succinct presentation of the path of the cognitive process and critical environmental education, exploring for it the theory of the triune brain of Paul MacLean, and the social and communicational theory of Niklas Luhmann. The discussion results suggest the communication process is one of the most important tools for the environmental education process, it is essential that there is understanding and understanding of the cognitive processes, of the structural and ideological determinations of the current economic production model.

Key words: cognitive Process, triune brain, environmental education

1. Introduction

On the cognitive processes related to the educational process and the development of a critic environmental education, in this article, the argumentation will have as guideline the two distinct logics that are both contradictory and operate in modern capitalist society. They can be, too, perceived theoretically from the concept of a dual society, proposed by Jurgen Habermas and of infrastructure and superstructure, proposed by Karl Marx.

In Habermas's dual society [1], the economy and the State, through the means of money and power, are systemic structures, made of strategic rationality, in which capitalist society mobilize mediatic resources and of social representation with the goal of channeling the feeling of belonging through consumerism. On the other face of this dual society, lies the world of life, which encompasses nature, culture and personality, which would be the result of a social and historic construct founded in communicative rationality and

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The Triunitary Architecture of Learning Process: Proposal for A Critical Review for Environmental Education

production of consent [2]. As a result, Habermas predicts the rationalization of the world of life by the system, that is, that people's behavior, individual or collectively taken, would show a tendency to orient themselves by consumerism ethics and values, in a consumer's society [3].

From Marx's perspective [4], on the social building of the economic production's infrastructure there's a superstructure socially correspondent, which comprehends the forms of consciousness, culture, philosophy, sciences, politics, arts, religions and points of view of the hegemonic class. In the same way, and as a historical consequence of the process metaphorically explained by Marx, in the capitalist society, consumerism becomes the value linked to the social building, because it fulfills the necessities of the economic ruling classes while at the same time, in a process called alienation, society as a whole becomes a society of consumerism.

Well, there is no consumerism without production. And there is no production without depleting natural and energetic resources utilized in the productive process; not even a consumerism that leave no waste and residues is possible. Obviously, with deep environmental and climatically consequences like the ones that are being reported in the last few years.

Among the many possibilities to reverse the environmental crisis landscape that is being brought to society, proposals like the Environmental Education aims to correct the environmental matter by adopting changes in the attitude and behavior of consumers, whose base lies in the world of life, not in the system, neither in the economic superstructure nor in the infrastructure that determines it.

In Brazil, the Environmental Education is sheltered by the Federal Constitution and by the Law n° 9.795/99, a legal text that talks about Environmental Education and establishes The National Politic of Environmental Education (PNEA), as well as by the legislation and other federal entities. In the first Article it says that the Environmental Education encompasses the processes through which the individual and the collective construct social values, knowledges, abilities, attitudes and competences oriented towards the conservation of the environment, good of common folk usage, essential to the healthy quality of life and sustainability. In the fifth Article it points out that among the fundamental goals of Environmental Education, the development of a comprehension integrated with the environment in its multiples complex relations, and and the individual encouragement to and collective participation, permanent and responsible, in the preservation of the environmental equilibrium, seeing the environment's protection as a value indivisible from the exercising of one's citizenship, and, especially, the stimulus and the straightening of a critic consciousness on the environmental and social crisis [5].

The environmental education did not show, however, the expected results in the last few decades, not even showed to be able to attend to the increasing complexity of the contemporary crisis. In synthesis, the experts say that environmental education has taken, in these contexts, reductionist's expressions in many aspects: in treating the environmental crisis as a entirely ecologic crisis; in confounding environment with nature or in despising its politic, ethic and cultural dimensions [6]; in showing a fragmented approach, acritical of the socioenvironmental [7]; in applying disciplinary methodologies that are not participative and of low creativity and in proposing behavioral and technological answers to problems of greater complexity [8].

The environmental education, in synthesis, prepares to the adoption of new behaviors and attitudes. In front of itself, however, it finds many practical difficulties to establish practices that aim to ascertain a correct demeanor regarding the environment, bearing in mind the complex relationship between man-societyenvironment, and that considers the collective cooperation as a principle of conservation of ecosystems and biodiversity, reflecting about the

The Triunitary Architecture of Learning Process: Proposal for A Critical Review for Environmental Education

relation between the cognitive mechanisms and processes with which men learn or modify behavior and insert themselves in the multitude of pedagogic practices that environmental education aims to achieve.

2. Material and Methods

2.1 Geral Objective

Made this correlation, this text intends to suggest that the inclusion of environmental educational methodologies, developed from the cognitive understanding of the triunitary brain, would be an alternative able to incite in the whole population, civil society and government, favorable attitudes to the sustainable development. Regarding this proposal, we intend to, in the short paper, through epistemological means, conceptual and methodological from the Social Sciences and from the Applied Social Sciences, analyze in an exploratory and reflexive way, the possible relationship between the cognitive mechanisms and processes with which men learn and/or modify behaviors with the pedagogic environmental education perspective.

2.2 Methodology

Methodologically, it is about a study of theorical reflection, of documental base, based upon reading documents selected by relevance and importance to the comprehension of the cognitive process and critic environmental trajectories, exploring, as such, the theory of the triunitary brain by Paul McLean, and the social/communicative theory by Niklas Luhmann. To gain a greater clarity in exposing the arguments the text was divided in three parts: a brief introduction about Paul McLean's triunitary brain proposal; consideration about Niklas Luhmann's systemic theory; and the last part is about how these two perspectives have an impact on an environmental education critically formulated in its pedagogic foundations.

3. Results and Discussion

3.1 Paul MacLean's Triunitary Brain

According to Paul MacLean [9], we (human beings/primates) have the brain divided in three functional unities that are distinct, and this is product of our evolutional heritage. The first one is the "paleocephalus", linked to our reptilian heritage, responsible by our simplest desires like hunger, angriness or the instinct of survival. The second if the "mesocephalus", present in the majority of mammals, responsible for our emotional dimension. The third and most complex, that exactly by the fact that is the most complex distinguishes us from the other animals, is the "neocortex", responsible for our faculty to reason and think.

The neocortex is made of five regions or "lobes", which are: Frontal Lobe - responsible for the execution of some of our functions like the elaboration of thought and planning, etc.; Parietal Lobe --responsible for our general sensations like pain, touch, taste, and our sensations of temperature, etc.; Temporal Lobe — responsible for the processing of smell and hearing; Occipital Lobe - responsible for the processing of vision; Insular Lobe - responsible for the processing of taste, of emotions, memory, as well as our sexual behavior [9]. As it was stated before, it is the existence of the neocortex that makes us different from the other animals. According to MacLean [9], it is due to it that Man has the ability to develop the abstract thought and create inventions, changing the nature around him. It is called neocortex ("new cortex") precisely because it is a brain region more recently developed throughout the process of human evolution, found uniquely in the Human Being of our days, the Homo Sapiens [9].

Despite this trinitarian division well defined in the human brain, there would not be, however, an overlap of one instance over the other. It would not happen, in fact, a hierarchy between the instances, but an instable activity, with complementarity and oppositions [10]. In a way that it is these three parts of our brain that play a role in the learning process, be it whatever it be. In this way, with the process of learning, the practice of environmental education involves fundamentally the cognitive process by which the human brain codifies and decodifies the information transforming it in meaningful content and justification for these practices. To understand something new, be it an abstract concept, or some mathematic of philosophic theory, or any mechanical action, like riding a bicycle, for example, the human being utilizes distinct capabilities that imply from rationally formulated arguments, answers to diverse emotional impact, as well as the mechanisms to instinctive reactions. That is what postulates the "triunitary brain theory" or "triune brain theory" from the doctor and neurologist Paul MacLean [11].

In the cognitive frame proposed by Paul MacLean [10] it is relevant to consider, in a structural way, the interaction between the three elements: argument, emotions and instinctive reactions present in the concept of the triunitary brain. Because it is with this cognitive base that it is possible to produce the wished effect of behavioral change in the attitudes that consider the protection of the environment and the sustainable activities. We can use an example to illustrate: the awakening against the risks of tobacco. A largely used strategy by the media in the campaigns against it is the usage of images of great impact that have appeal to the individual's emotional side. The picture of a necrotic lung can create unrest in a smoking person that sees it. However, the emotional impact of the threat to his life that makes him use his rational instance to convince himself that the best attitude to be taken is to quit smoking.

Bringing the discussion about the cognitive processes and behavioral changes in the field of Neurosciences to the field of Social Sciences, the singular systemic theory of Niklas Luhmann that is complementary is presented.

3.2 Niklas Luhmann Systemic Theory

Niklas Luhmann [12] formulates the theory of the living systems, psychic and social, characterized as autopoietic systems and operationally closed. In front of what postulated the other authors like Humberto Maturana and Francisco Varela, whom stated that only living organisms are autopoietic, because the produce their own cells and do not depend on an external being [13]; Luhmann [12] adds that this characteristic of the living systems repeats itself even in social systems or psychic systems. The structures that are formed in this environment do not determine the system's structure, neither can they reproduce faithfully the environment's elements. What could happen would be the environment cause an irritation in the system, what would encourage it to replicate (autopoiesis). To the word "irritation" Luhman adds and interprets as produced by communicative mechanisms [14].

The social system is closed in itself, but it does not determine that it does not open itself to capture elements around it, that it cannot make a different usage of it, leaving it clear that the environment has not total control over the system. In this way, in a communicative process the system gradually differentiates itself from the environment [15]. The system diminishes the complexity of its entourage, selecting elements, and doing that making a certain usage of these elements, remembering that it is not a matter of reproducing the elements exactly, highlighting the difference between the system and the environment, where one does not act over the other.

In the proposal of an autopoietic system by Luhman [16], communication happens only when information, the message and the understanding are absorbed. The communication can happen even when, between the last message and the received message there is not the same content. In the environment there are themes that will possibly be useful to communicate. As an example of this process we have consciousness (psychic system formed uniquely by thoughts) that will be the substrate for communication. In this way, we only have communication when the Ego (term utilized by Luhman meaning receptor) receives and comprehends (in its own way) the information issued by Alter, the subject which communicates. In this process, in

general, it happens sometimes that Ego does not understands what Alter wished to communicate. Subsequently, Ego constructs the information from what he understood, occurring a misunderstanding, that does not, however, implies that he did not interpret something that was transmitted. To deal with the communicative interference, to make it stop happening, one uses a language that facilitates comprehension, like the mass media increase the probability that the message arrives to who receives it, it is the mass media that will symbolically look for the acceptance of the communicative act.

3.3 Environmental Education

The sustainability speech, to which Environmental education is a privileged toll to form and spread a determined pattern of behavior, shows, as notices [17], а skillful operation politically-normative and diplomatic, engaged in tackle an ensemble of contradictions exposed and not yet answered by the previous models of development. Since the Stockholm Conference, in 1972, it was made clear that the preoccupation of the international entities regarding the environment was to create a management strategy. In a certain way, the sustainability speech strived to answer the solicitations and critics by the environmentalist international movement, in its diverse expressions, that demanded the inclusion of the environmental matter in the agenda of political and economic priorities of our age [18]. Its appeal was sustained, above all else, in a conciliatory style. Sustainable development's speech could only achieve success if it could show that environmental preservation promoted the growth of business and that of economy, not only that these antagonistic values could be conciliated [19].

To the sectors interested in a project of great change, this "market sustainability", that has oriented the actions and the debates recently, denounces the fallacy in the sustainability speech. Because the necessity for a harmonious synthesis between the diverse goals of sustainability, possible in rhetoric, but impossible when projected in the context of capitalism [17].

One can notice a disparity between the biophysical and economic time, and the conflicts of interest is another factor in the equation. A "market sustainability" does not answers equally to the social crisis, since rationality's inherent to the market is oriented towards concentration, not the spread of riches and opportunities. The market is an efficient allocation of resources tool, but an evil manager of social disparities. That being so, when the market's invisible hand is left free, without State and society's regulation, human and social development tends to be sacrificed [20].

To the development of the practice and a critical environmental education, under the light of the cognitive theories from MacLean and Luhmann and the models of society proposed by Jugen Habermas and Karl Marx, one asks if a sustainable society creates participative citizens, or if it participative citizens who create a sustainable society. To the sustainable development, with citizens, civil society and participative public politics in the process of sustainable development, it is necessary that in the formulation of this development, one realizes the role of the cognitive process mentioned in this text. Certainly, taking the risk of subverting the ideologic program that orients the ethic patterns of consumerism in a society of customers.

In this twentieth century the text National Curricular Guidelines of Basic Brazilian Education [5] shows a proposal to establish the National Environmental Education Curricular Guidelines (DCNEA), considering that environmental education surrounds the perception of education as civil, participative and critic. In front of this, the thesis defended is this: a revitalized and critic environmental education is only possible when people start to act as citizens in a participative way, communicating and having awareness of the cognitive processes that lie necessarily in this act.

The Triunitary Architecture of Learning Process: Proposal for A Critical Review for Environmental Education

4. Conclusion

Teaching is a complex task. It involves instrumentalization, abstraction and dialogue. Even more when one realizes that to build and change behavior many factors, like the ones that were explained here, contribute decisively. In this way, it is not enough an education that is entirely rationalist (usage of neocortex) or utilitarian, where it is postulated that one should take care of the environment just to avoid the consequences of a bad relationship with it, or one can imagine the situation where the capitalist production is maximized in ways that leave a weaker impact over the fauna and the flora. The process of environmental education also involves the emotional, it encompasses the affective relation that people nourish towards the place where they live. According to Luhmann, it is necessary that the environmental education be spread from the Alter to the Ego in the most adequate manner possible, keeping the message to be transmitted as untouched as possible.

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