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Bio-learning and intercultural education

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Abstract

The purpose of this paper is to present a theoretical overview of the relationship between bio-pedagogy and intercultural education. In order to achieve this objective, this research is limited to the scope of documentary research, and the principles of the paradigm of complexity - emergent paradigm - are taken as the epistemological basis, taking into account that there are assumed the conception of the biological basis of learning, the "bio-pedagogy" and its Implications for intercultural education. The results of this research allowed us to characterize how cognitive processes are processes that are biologically self-organized, highly complex, and permanently created and that are enriched in intercultural environments.

Keywords: learning, bio-pedagogy, inter-culturality and intercultural education

"The human being continuously tries to grasp the meaning of experience with objects and people; to organize progressively their mental processes; to give coherent reason of what happens and to solve the problems that arise."
Jean Piaget

Introduction

In the mechanistic perspective of modernity, once recognized in human beings as symbolic animals rather than rational ones (Cassirer, 1992), one can see, without much scandal, the compulsion to create substitute worlds, to procreate operant existences. For the rest, it is essential within the world of recognized objects that perpetual distancing of the *thing itself*; that is, of the existence of a reality independent of us and of our perceptions, and not without a little fear we find that the only reality that is given to us to argue is a simple imaginary, more or less ancient, more or less collective, but fatally indemonstrable.

From this logic, we start from a conception according to which epistemology is the reflexive mediation between knowledge and culture. This makes us think of the need to meditate on culture to interpret and change it. This concern is not directed to the epistemological question of how to know the truth, but rather to a more general question of how meaning is confined to experience, which is what concerns the narrator and the poet and, of course, the scientist, since it is recognized that the research comes from short stories (Bruner, 1986)

In this way, the birth of modern science was preceded and accompanied by a development of philosophical thought that led to an extreme formulation of the spirit-matter dualism. René Descartes based his vision of nature on two separate and independent worlds: that of the mind (*res cogitas*) and that of matter (*res extensas*). The Cartesian division allowed scientists to treat matter as (something) dead, and separate it from themselves; and see the material world as a multitude of different objects assembled within a huge machine.

The philosophy of Descartes had great influence on Western thought. The famous phrase - *cogito ergo sum*- has led Western man to reason his identity with his mind, instead of considering the totality of his organism. As a consequence of the Cartesian division, most individuals are aware of themselves as isolated "*egos*" existing within their bodies. The mind has been separated from the body and given the futile task of controlling it, thus causing an apparent conflict between the conscious will and the involuntary instincts. Each individual has been further divided into a large number of separate compartments according to their activities, talents, feelings, beliefs, etc.; which are arranged in endless conflicts.

This division strengthened the use of verbal language, since it allowed to organize the external world and even the interior, but fundamentally, it fortified that world of the rational because from it and with it (the language), images can be manipulated, as it happened with that great image of "*cogito ergo sum*." And in reference to the verbal, it is necessary to emphasize the influence that writing had in the culture of the West, since from what it is considered the anatomy of the writing, it would be advisable to point out that it became throughout the centuries in the most clear and more used way to access knowledge and, evidently, modeled the majority of cultural actions and practices. From this perspective, it is also pertinent to note that writing is not only a communication mechanism, but it is fundamentally (following Postman 1985) a metaphor

with a generative force capable of imposing itself in many fields of thought and culture.

What we want to show with all of the above, is that the Western and Westernized culture privileges the written word by putting it above the forms of knowledge production through learning. From this logic, the link between education and culture, we see a perspective of preserving diversity, guaranteeing the survival of the human, and with it guaranteeing the survival of all forms of life.

The biological implications of learning

The human social phenomenon is based on love, in any of its forms ... love is the opening of a space of existence for the other as a human being. **Humberto Maturana**

When we refer to learning in the mechanistic paradigm, we necessarily refer to ourselves or we locate (ourselves) from psychology, science from which it was identified as a capacity, almost exclusively human, and a change produced by experience. Now, the ways in which this experience is identified make it possible to opt for different epistemological conceptions about it. Therefore, there are various theoretical trends from which there has been attempted to explain learning.

The first tendency was known as associationism[1], a conception from which learning is considered to be an observable behavior change essentially caused by environmental events. Therefore, learning resides in the ability to collect and copy information. Consequently, it is considered that an individual learns if he has a large amount of information memorized along with his ability to remember it; consequently, knowledge is fixed in the mind from stimuli that come from outside.

At another extreme appears the cognitivist tendency, for which learning is thought of as a change in mental processes, and knowledge is just the result of the perception of stimuli, the recovery of appropriate knowledge, the anticipation of events and behavior.

Contrary to the above, the research conducted from the emerging paradigm configures a very different view on learning. From the concept of *autopoiesis*, the studies of Maturana and Varela (1980) refer to the ability of living beings to self-sustain themselves. That is, to organize themselves in such a way that the end result be itself, so that there is no separation between producer and product. Being and doing are inseparable in an *autopoietic* unit, and they constitute its specific mode of organization. In addition, the internal organization of organisms depends on the processes of interaction that the organism has with its environment. There, adaptive behavior, individual consciousness and cognition[2] are the factors that allow organisms to behave as self-reproducing and self-regulating systems. In this same order, the learning mechanisms allow an individual to modify some aspects of their internal or external structure as a result of the interaction with the environment[3]; this property is defined as epigenetics, and it refers to the adaptation process of an individual, through learning mechanisms to the environment in which they live.

This biological approach, on learning, is extended to social systems - constituted by living beings -, and within them, human societies; characterized because:

We exist as human beings only in a social world that, defined by our being in language, is the medium in which we perform as living beings, and in which we preserve our organization and adaptation. In other words, all of our human reality is social and we are individuals, people, only insofar as we are social beings in language "(Maturana, 1995: 13)

From there, from the dimension of self-consciousness, an exclusively human capacity, we recognize that the world is transformed into a complex web of learning systems; that is to say, of cognitive ecologies, of environments that propitiate knowledge experiences or, in Hugo Assmann's terms, (2002)[4] of vital niches -and there is no life without them- where life is basically a persistence of learning processes.

The aspects identified on learning, raised from the emerging paradigm, influenced the epistemological turn suffered by social sciences[5]. In this direction, the contribution that from the field of biosciences extended into pedagogy, a fact that made it possible to understand that learning is a specific property of life, a situation that triggered the emergence of the concept of *bio-pedagogy*, understood as the linkage of knowledge to life through the consciousness of the living being; that is, to feel, to perceive, to excite and to reason and to build a world[6] (Varela, 2002). Bio-pedagogy is "learning in life and to live learning. It is a dynamic and creative relationship between living and learning of people and communities in concrete contexts" (Maturana, 1996: 21). In other words, in the life-generating process, learning shapes the life activity of biological organisms; hence the existence of cognition is the existence of life. Thus, every living being has the need to learn in an authentic and genuine way, preserving, in a flexible and adaptive way, the dynamics of continuing to learn, so Assmann identifies that the vital processes and knowledge processes are the same instance.

Bio-pedagogy then proposes ways for human beings to know not only from the place of reason but from the place of emotion, of the soul - as the place of affection- and of self-consciousness - which can be understood as that quality that allows us to think about ourselves; in that sense, it can be affirmed that learning is a guarantee of enjoyment, tenderness and care for life (Boff, 2002), and it is housed somewhere between the brain and the culture of which we are part (Morin, 2001) .

Now, the educational space, as a space of coexistence in the biology of love, - proposed by Maturana- must be lived in the pleasure and joy of seeing, touching, hearing, smelling and reflecting, which make us capable of perceiving everything that becomes accessible to us when we are free to look, and we simultaneously look at the context and the peculiarity of the situation in which we are at any moment, and we do this, willing to relate situation and context without fear. (Maturana, 1999: 67).

Bio-pedagogy and bio-learning in intercultural education

"*Knowledge is an adventure for which education must provide the indispensable travel expenses*" **Edgar Morin**

The term 'intercultural' is grounded on communicational processes, social mediation and models of social coexistence; it is intimately related to the concept of pedagogy of diversity, since they share the fact of assuming difference, plurality[7], diversity and equality. However, when the concept of inter-culturality bursts into education, it establishes a dynamic perspective of cultural diversity in educational pedagogical processes, because the intercultural dimension[8] focuses on contact, exchange and mutual influence of multiple forms of sociocultural interaction, every time more intense, varied and complex, in a "discrete" and changing world where diverse simultaneous processes converge. In this way, they enrich the educational field together with the pedagogical processes by conceiving education as a cultural construction process boosted by communication and exchange between diverse cultural manifestations, typical of people who experience the educational process[9]. In this view, the educational communities will be able to generate processes of improvement and self-management from dynamics that give an account of a think-act organizer and creator that, in the words of David Bohm, would be systems/communities in "continuous flow", with the participation of the different social actors. (Bohm, 1998: 2)

In this sense, bio-pedagogy in intercultural education allows the educational process to be carried out through communication and activity that foster the educational experiences of actors *of* and *with* diverse cultures, constituting intercommunication in the basic and defining element to achieve the convergence of the relational sense of human coexistence; that is, intercultural communication establishes the bond of possibilities[10] for interaction from a socio-anthropological dimension (Colom, 1992). Based on this consideration, the activity in the processes that stimulate intercultural bio-learning is identified as educational practices where the socio-cultural areas that make up the processes of characterization and cultural differentiation are projected towards the achievement of *intercultural encounters* among the participants of the educational process; in this area, the spontaneous actions of the different actors together with the non-systematized and oriented interpersonal contacts become the best enablers of cultural exchange circumstances (Froufe and Sánchez 2001). Bio-learning is constituted in the living and experiential framework in which knowledge, practices - praxis- modes and means of comprehension, interpretation, explanation and reflection through language, languages, registration and symbolization systems in a constant fusion between human action, social action[11] and *biopsicoantroposo-ciocultural* interaction oriented towards participation, socialization and construction of knowledge. These elements allow, in the logic of bio-learning, that learners, as living beings, are beings that manage to maintain in a flexible and adaptive way the dynamics of continuing to learn" (Assmann, H.2002: 23), Which, in the context of the educational institutions evokes an ethical and transformative call for those who promote pedagogical processes.

Under such circumstances, the challenges of bio-pedagogy and bio-learning in intercultural education are inscribed in the ways of experiencing the socio-cultural interaction, of joint construction of knowledge and methodologies, in unique and diverse contexts of peer relations , in conventional or non-conventional educational structures (the school system, educational institutions, non-formal and informal education processes, community educational processes, among others) with diverse worldviews, linguistic and spiritual registers that abstract, represent and symbolize different realities[12], from values and diverse cognitive, ethical and aesthetic dimensions.

Intercultural education is articulated with the possibilities of systemic, multidimensional[13], holistic

intervention[14], open probabilistically in processes of increasing complexity[15] and they seek to deal with the educational system and the pedagogical processes related to multicultural societies, projecting to respond to the problem that arises from the socio-cultural relationships, because it addresses an existing correlation among cultures to achieve an intercultural society with the aim of strengthening cultural diversity and coexistence, generation and development of intercultural practices in all dimensions of human life.

That's the reason why bio-pedagogy "includes the learning of knowledge and skills necessary for the management of one's life in any circumstance, in order to continue learning and producing ..." (Asencio, 2004: 45). Therefore, for Trocmé-Fabre (1997), cited by Assmann, the word "learning" must leave room for a new word ("*aprendiencia*"), which expresses better, by its own form, this state of "being-in-the-process-of-learning," this function of the act of learning that builds and builds itself, and its category of existential act that effectively characterizes the act of learning, inseparable from the dynamics of living beings. (Assmann, 2002: 15)

Conclusions

It can be stated that bio-learning in intercultural education makes it possible to live and to experience, from a holographic conception[16], all the aspects that contain the highly conscious educational processes, in order to provide a broader understanding in the different contexts on which the educational processes are carried out.

In such a way that every practice of life or biological existence becomes a learning experience where the "other" is recognized, and the "other" as a biological relationship of living beings whose exchanges and interactions of cooperation and self-organization generate commitment and attention of ethical order. Under these circumstances, the subject generates experiences and learning experiences that, in the voice of Hugo Assmann (2002), consist of an emerging property of self-organization of life[17].

Therefore, for Francisco Varela, (1970) living systems are cognitive systems and life, as a process, is a process of cognition. Thus, knowledge is not an exclusiveness of human beings, on the contrary, it is extended to all living organisms because they have the capacity to learn and it is the mode of existence that determines the phenomenon of life; in this way, it can be affirmed that "living beings are beings that manage to maintain, in a flexible and adaptive way, the dynamics of continuing to learn," even affirming that vital processes and cognition processes are basically the same thing (Assmann, 2002 ; 23); therefore, today they constitute the property of bio-learning.

Bio-learning observes and defines learning and knowledge as a process of integrality of all living beings where the most appropriate way to learn is to learn to live and to live learning: "Learning is not a successive accumulation of things that come together, rather, it is a network or web of very complex and dynamic neuronal interactions that create *qualitatively new general states* in the human brain. This is called morphogenesis of knowledge; in this sense, learning consists of a complex chain of qualitative leaps of neuronal self-organization of living corporeity, whose operational clause (read: individual organism) self-organizes itself as long as it remains in a structural coupling with its environment. " (Assmann, 2002; 39).

It is then understood that each time a new learning is acquired and different knowledge is obtained, the knowledge morphology structure is rearranged, the same learning functioning as a feedback loop, such as the butterfly effect would lead to significant changes within the living being or the learning subject, changes that would modify the perception allowing different interpretations to the first ones. However, it is now worth noting that, as mentioned above, what happens in the environment influences the intra-biological and vice versa; that is to say, that interpretation of morphogenesis of knowledge also transforms and creates a social morphogenesis.

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Footer

1. The associationist theories identified two types of learning; the first, known as learning by classical or respondent conditioning, consists of the association between a neutral stimulus (conditioned stimulus) and a reflex (unconditioned stimulus). It establishes that whenever two sensations occur together again and again, they become associated. Later, when only one of these sensations takes place, the other will also be remembered. Since classical conditioning, several principles have been discovered, such as generalization, discrimination and extinction. The second one, learning by instrumental or operant conditioning, is the association between a response or behavior and the consequences that follow such behavior. It is based on the law of effect, the law of exercise and the law of disposition. Operant learning arises to explain learnings that are the product of deliberate actions carried out by a person (operant) and are conditioned by the consequences that follow from them. The consequences that follow a behavior can be positive or negative for the person, depending on the perception and the meaning that it attributes. Within this type of learning, there are emphasized the concepts of reinforcement, punishment and reinforcement programs.
2. Cognition is a self-organizing process through which the system is permanently reconstructed, with the purpose of maintaining its operational identity as a result of the moderation of mutual interactions between the environment and the system; in this regard, Maturana and Varela 1987 can be consulted.
3. In this regard, from the theory of systems, the concept of *epigenesis* refers to the process of adaptation of an individual through learning mechanisms.
4. Living beings are beings that manage to maintain, in a flexible and adaptive way, the dynamics of continuing to learn, because learning guarantees their existence. It is even affirmed that vital processes and knowledge processes are, in the end, the same thing (4) (Assmann, 2002: 23).
5. In the mechanistic paradigm, the role of the social sciences in the nineteenth and twentieth centuries consisted of securing the theoretical apparatus of the geo-culture of the modern world system, since in the nineteenth century science defined the achievement of progress and determined substantial changes in the system of dominant values in the world of knowledge. In this context, there occurs a separation between philosophy and science; and an epistemological debate emerges that is assumed in two different areas, in that of the structures of knowledge (assumed mainly in the university system) and in the field of the world of culture (assumed by the intellectuals of the time, scientists, philosophers and humanists). This debate revolved around the questions of "how we know what we know it," and caused a definitive break in the world of knowledge, between the "good" truth and the "beautiful", the scientists focused their studies on the knowledge of the material phenomena, while the humanists were engaged in the study of creative works. In this regard, Immanuel Wallerstein can be consulted.
6. In this regard, it is recommended to deepen this set of approaches in the Theory of Santiago, developed by Francisco Varela.
7. Plurality is a category that has a triple significance. First, the empirical confirmation of existence within society of diverse interests,

organizations, social structures, values and behaviors that converge in the game of political power with different capacities. Second, it gathers a normative approach that condescends this social reality, which gives it a democratic character in the sense that life in community is the product of the regulated concurrence of diverse visions about it. Third, it is a current of legal thought that gives rigorous and interdisciplinary answers to the discussions on the definition of law; that is, on what is their object of study for jurists.

8. The intercultural term appears in the educational field and it has been expanding to the field of communication processes, social mediation, models of social coexistence, etc. It appears in order to overcome the shortcomings of concepts such as multiculturalism, which does not sufficiently reflect social dynamics and new socio-cultural constructions. The multicultural (term) reflects, as in a still photo, a situation of social statics, it is limited to describing a situation in which different cultural groups coexist. The intercultural term, in turn, emphasizes the communication and exchange between different cultural forms (Jiménez and Malgesini, 2000).

9. Therefore, it is noteworthy that in the pedagogical field coexist diverse cultural references that go beyond: ethnicity, language, nationality, sexual option, religion, ideology, age, sex, displacement condition, disability or vulnerability, among others; which make it possible different ways of being, acting, remaining, seeing, thinking, dreaming, imagining and building the world, reality, and relationships with others.

10. Understanding with Carlos Maldonado (2012) that "the sciences of complexity" are sciences of possibilities, and not just "science of the current or the real;" the possibilities occur in crossed or parallel and non-linear or sequential scenarios.

11. Humberto Maturana states that social relationships are founded on mutual acceptance, and this is based on love and on recognizing the other as a legitimate other, in this relationship, the actions that are carried out will be of collaboration and sharing (Maturana, 1997).

12. For Morín (2004), complexity is a reality, as it is in all human manifestations, in which thoughts, emotions, language and corporality intervene simultaneously.

13. Multidimensional means that it has several dimensions, or that it involves several aspects (multidimensional space, problem, phenomenon, multidimensional characteristic). Its peculiarity is that for each dimension, it is considered a scope, and another scope for each metric or fact. The integral education performs the training of educators and learners in a process of interactive, non-linear, critical and creative development when considering human dimensions in a holistic perspective. There, human beings reveals themselves as multidimensional beings. Therefore, education must respond to a multiplicity of demands that result from human nature and spatial-temporal situations, in which each individual, group, society, or culture lives and develops. From the paradigm of complexity, a mode of construction is possible, in which knowledge is approached as a process that is at the same time biological, cerebral, spiritual, logical, linguistic, cultural, social and historical, among others; while the traditional deterministic epistemology assumes knowledge only from the cognitive point of view. From this new approach, enormous consequences are promoted in the approach of science, education, culture and society.

14. A concept assumed from holographic paradigms and complexity. Complex thought as an epistemic theory argues that "reality" can be explained and understood simultaneously from different possible perspectives. A specific phenomenon can be assumed through the most diverse areas of knowledge, through "the trans-disciplinarity of understanding", avoiding the usual reduction of the problem to an exclusive issue of the science/discipline that is professed. Therefore, cultural-educational possibilities or phenomena are studied in a complex way, given that reality, thought and knowledge are complex. The holistic refers to the approach from the whole, or all-multiple.

15. "The increasing complexity phenomena are precisely those that are open systems, which allow the existence of open systems or that demand to be seen as open systems - three different ways of referring to the same motive" (Maldonado, C. 2012: 26)

16. This implies a view from basic principles, such as the dialogical or dialectical, from recursion, hologrammatic and uncertainty is not to fragment reality or divide the complex and the relational, but to understand the multidimensionality of the processes involved in the phenomena, both in terms of what refers to the individual or as to the society.

17. For Hugo Assmann, coevolution is the change in genetic composition or in the behavior of one species (or group) in response or consonance with the genetic or behavioral change in another species (or group). In general, a strict definition of coevolution is concentrated on the idea that there are reciprocal evolutionary changes in the species that interact. The word is generally attributed to the study of Ehrlich and Raven on the wonderful morphological adaptations between butterflies and plants, including impressive details in the forms and colors. But the concept had already been used in many previous studies on the strange coincidences in the morphogenesis of insects, plants and life forms in general. The underlying idea is already at the origin of Darwin's species. There is no doubt, however, that the concept of coevolution passes into a new theoretical context when it appears inscribed in the theory

of complexity and the self-organization of the living. Everything, at first sight, would seem to be involved in co-evolutionary processes. But this assumption only acquires validity insofar as the concept of complex and adaptive systems is refined, which allows a complex plurality of simultaneous interactions to be included in the same process, without being imprisoned in the classical idea of finality (that is, cause and effect on a single determined line). Coevolution becomes a valuable concept insofar as it helps to exploit bipolarities, dualistic views of opposites; and it is situated in a perspective that admits as normal the plurality of strange attractors; without, therefore, excluding possible preponderances, changing one over another in the temporal trajectory of evolutionary processes. The important thing is to free the concept of a linear deterministic vision and completely place it in the perspective of complexity (cf.Adaptability, Multi-active Systems). (Assmann, H. 200; 140).