D E L T A

Articles

How inclusion students learn: a comparative analysis of three concepts as viewed by the sociohistorical and autopoiesis conceptual frameworks

Aprendizagem de estudantes de inclusão: Análise comparativa de três conceitos nas teorias Sócio histórica e autopoiese

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ABSTRACT

Drawing on Brazilian educational inclusion policy from the past two decades, the aim of this study is to provide a theoretical and methodological discussion of two conceptual frameworks on disabled students´s learning: Vygotsky´s sociohistorical approach, and Maturana and Varela´s autopoiesis approach, which is based on an analysis of human biology. The focus of our analysis will be how those theories address the learning and development of students with disabilities. Lastly, we will compare and

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contrast Vygotsky´s and Maturana´s ideas with the purpose of suggesting improvements for teacher education in Brazil.

Keywords: *learning; cognition; emotions; autopoiesis; socio-historical theory.*

RESUMO

Contextualizados em políticas públicas educacionais brasileiras de inclusão (dos últimos 20 anos) discutiremos teórica e metodologicamente a abordagem sócio-histórica de Vygostky, comparando-a com uma abordagem teórico-metodológica da Autopoiese, de Maturana e Varela que também partem da análise biológica humana na aprendizagem. Discutiremos os conceitos de ambos os autores, focando-nos na análise sobre o desenvolvimento e a aprendizagem. Por fim, relacionamos esses dois autores a partir de suas aproximações e suas diferenças, com vistas a cotejar possibilidades de atuação na formação de professores no Brasil.

Palavras-chave: *aprendizagem; biologia; sócio-interacionismo; educação inclusiva.*

1. Introduction

Article no. 58 of Brazil's Guidelines and Foundations for National Education (GFNE) Bill defines special needs education as school education for learners with disabilities and/or global development disorders, as well as gifted students, preferably to take place at mainstream schools.

Disabled persons are considered the beneficiaries of social policy actions. According to Arelaro (2017), this happens for three reasons: a) disabled persons require actions aimed at accommodating their (permanent or temporary) disabilities in one or more areas, such as education and health; b) the majority of disabled individuals are lower-class; and c) policy for this social group tends to be formulated according to medical and assistentialist principles.

The 1991, 2000, and 2010 Brazilian population census respectively record the following percentages of disabled persons in the country: 1.14%, 14.48%, and 23%. Arelaro (2017) explains this considerable

variation by changes in the definition of disability – and, consequently, in how it is identified: in the 2000 and 2010 census, the Brazilian Institute of Geography and Statistics considered interviewees' self-identification as valid.

The goal of this paper is to discuss two conceptual frameworks on learning: Vygotsky's sociohistorical approach, and Maturana's autopoiesis approach. To that end, we will focus on three psychic processes: attention, affectivity, and language, and on their role on the pedagogical mediation that is instrumental to disabled learners. Lastly, we will compare and contrast Vygotsky's and Maturana's ideas with the purpose of discussing teaching possibilities for inclusive education in Brazil.

2. Short history of inclusion policy in Brazil

According to Arelaro (2017), education indicators provide data on the sort of service provided to disabled persons but not necessarily on schooling itself. There are several bills and guidelines regulating inclusion actions and processes, such as the Federal Constitution, the Guidelines and Foundations for National Education Bill, and CNE/CEB [National Education Council / K-12 Education Chamber] Resolution no. 2, passed on September 11th, 2001. The National Policy on Special Needs Education from an Inclusive Perspective (2018) is also worth mentioning; however, in this analysis we will focus on the Brazilian Inclusion Bill – BIB (2015) for it is the most recent legal instrument and congregates the progress made by its predecessors. According to BIB Article no. 28, the government must ensure, create, develop, implement, promote, observe, and evaluate the various existing educational mechanisms so that disabled learners can develop their full potential. Among other duties, the government is bound to provide Sign Language interpreters and translators, Braille learning, supporting staff for schools, and professional development training to prepare teachers to provide specialized educational attention. This means that, according to the law, having an educational agent to enable mediation is of paramount importance to the learning process, as is the learning mediated by said educational agents. BIB Art. no. 27 states that inclusive education must be offered across all education levels,

so as to ensure that disabled persons can fully develop their talents and physical, sensory, intellectual, and social abilities in accordance with their personal characteristics, interests, and learning needs (LBI, 13.146/2015).

Vygotsky's (2001) theory holds that children should not be confined to specific groups but should instead have the chance to interact with as many different children and teachers as possible; thus, schools must urgently be adapted to allow this interactive coexistence, for they must provide learners the chance to form the necessary bonds. Referring to disabilities, Vygotsky (1924) writes that any disability is infinitesimal compared to the colossal potential of children with special needs.

Consistent with this perspective, we will discuss three key concepts in the sociohistorical understanding of human psychic functions. A disabled child is no less developed than their peers, they just develop differently. From this standpoint, the specificities of disabled children's learning may be ascertained by understanding how learning happens.

Vygotsky argues that voluntary attention – a higher mental function – is developed through mediated interaction and that it is based on an individual's school experiences, which contribute to the learner's humanization. In Vygotsky's conceptual framework, this phenomenon originates in the confluence of sociocultural determinants that help disabled children coexist with their peers. When we examine the role of teaching on the human psyche, *voluntary attention* stands out as something that requires an educator's intentional and planned intervention, as well as the student's protagonism and active engagement.

On the other hand, absent an educational relationship that promotes the appropriation of culture, human development is conditioned by biological processes, demoting those people to a condition not entirely dissimilar to that of animals. Given that nature alone does not provide us with everything we need for social development, the lack of interaction can play a pivotal role, since our biological apparatus does not, by itself, ensure neither our humanity nor the sophisticated potential of human development. On this basis, the historical-cultural approach stresses the importance of having adequate conditions for life in general and education in particular. Individuals are active protagonists of both their

development and learning as they appropriate culture historically and socially, using objects and instruments to learn the ways of thinking and acting characteristic of their socio-historical context (Franco, Freire & Niero, 2019).

Comprised in our ontological potential as human beings, there are certain abilities that enable us to learn in a significant manner: memory, logic, planning, creativity, imagination, reasoning, abstract thinking, and focused attention; in this study, we will focus on attention, language, and affectivity. These abilities are higher mental functions, developed through collective learning and the use of auxiliary tools: signs and other instruments. Strategic conditions and educational procedures promote the development of focused attention, a key skill that allows learners to gain knowledges built throughout history, rethinking its continuity and driving man's constitution as part of the process of forming one's personality (Coelho, Sanches, Zoia et al., 2019). The development of the aforementioned higher mental functions can only be achieved through social interaction.

In Luria's (1979) eyes, attention, or control over one's actions, allows us to organize the amount of informational input and makes conscious activity feasible, all while acting upon unchecked social inhibition. On the other hand, attention allows us to organize our thoughts, thereby giving us the chance to solve great problems faced by mankind. This also ensures selectivity in the general development of psychic processes.

Luria (1979) also stresses the influential role of a subject's need, interest, and goal on their perception of an activity and on its process, all of which promote attention stability. Motivation-conditioned human activity materializes in conscious objects and goals.

In order to facilitate child development, an educator must be aware of children's biological maturation and interconnect different educational practices and theories. According to Vygotsky (1984, 1987), good instruction must foster development: it must rouse and activate mental functions that are still maturing, or in the Zone of Proximal Development. To that end, instruction, transmission, and action/interaction with one's environment play a key role in development by

helping enhance biological maturation, social abilities, and interaction with one's environment and peers.

School environment studies conducted from a sociohistorical perspective highlight structural and functional aspects, as well as the school's internal dynamics, regarded as a key *locus* for an individual's cultural transformation and the construction of their humanity. Higher mental functions are a product of the cultural transformation one undergoes during the process of constructing their humanity. Signs such as idiom, writing, calculus, and drawing are essential to the process of mastering external means for cultural thought development. To that end, communication and all that is processed through an adult's speech, actions, and gestures, also influence the organization of children's psychic processes. Therefore, the development of language causes a radical transformation in children's attention and intelligence, and affectivity must be mediated if the relationship is to reach its full potential.

Luria (1979) posits that a child's language relates to their intellectual structures, and thus to attention: an internal, controllable intellectual process. To him, a child's involuntary attention, at first a simple, oriented reflex, goes through an unstable stage before growing more complex. During a child's first months, external influences exert a tiring and momentary influence on their attention; later on, children can be influenced by the words of an adult, who may guide and regulate them. On the following stage, the child's selective ability grows stabler as a result of verbal instructions given by adults. These verbal instructions play a part in children's active participation, helping stabilize their attention and singling out the necessary orders. Therefore, the process of developing voluntary attention requires external auxiliary means to direct one's internal psychic organization; this extremely complex process involves the very origins of development and the communication between children and adults. These internal mechanisms of conscious human activity that influence one's psyche are promoted by affectivity and through social interaction.

Mediation happens through affectivity, both good and bad. Ranging from teacher attitude to teacher language, positive emotions encourage students to learn. Language, physical contact, and proximity can

facilitate mediation. When it comes to disabled children, it is important to free their experience from the narrow confines of their disability and connect it as broadly as possible to mankind's social experience. Regarding higher mental functions, it is of the utmost importance that, rather than being confined into specific groups, disabled children be afforded as much peer-interaction with different children as possible. Current legislation states that new pedagogical methods and techniques, learning materials, equipment, and assistive technology resources must be adapted to children's disabilities.

The autopoiesis framework offers important contributions to understand these phenomena – emotions, language, and attention – by theorizing the relationship between emotions, language, and learning. Maturana *apud* Kastrup (2011) regards cognition as the invention of oneself and of the world; he examines the potentialities that exist in the flux between these two margins – the individual and the environment, neither of which can be effectuated without the other. According to Maturana, rather than happening in a deterministic or automatic manner, cognition is based on environment-compliant invention and creation.

In this study, we discuss two conceptual frameworks on learning: Vygotsky's sociohistorical approach, and Maturana's autopoiesis approach. To that end, we focus on three psychic processes: attention, affectivity, and language, and on their role on the pedagogical mediation that is instrumental to disabled learners. The similarities and differences in those frameworks subside our discussion of teaching possibilities for inclusive education in Brazil.

3. Maturana: languages, languaging, cognition, and emotion

According to Maturana (1995), the considerable human difficulty to achieve harmonic and stable social development (anywhere in the world) can be explained by the gap on human knowledge about human beings, which encompasses biological aspects, socio-relational ones and also our relationship with nature. Although our civilization has conquered every environment on Earth (and even space), it faces a real threat of extinction because human beings have yet to achieve

understanding about themselves, their affections and languages, their nature. This fact has been compounded by the current COVID-19 pandemic.

The debate on affectivity, cognition, and languaging is not new; in the 1950's, the wide-ranging Cognitive Sciences project kicked off a productive academic and intellectual debate that eventually expanded beyond academia and influenced other spheres, such as art and business (Morin, 1991; Maturana & Varela, 2021). A defining trait of this project was its strong disciplinary unification inspired by natural laws, and on this basis, it seemed necessary that the study object be idealized and abstracted. However, those studies bore a strong Cartesian bias – a tendency towards dichotomization and fragmentation.

Around the same period, Chilean biologist Humberto Maturana and his teacher Francisco Varela began studying cognitive biology. "How" and "what" we know is more than a cognitive movement: it is always the action of consensual coordinations constantly enmeshed in both languaging and emotions. Thus, emotions, cognition, languages, and affectivity go hand-in-hand.

Along with his team, Maturana (1999) champions the theoretical commitment of accepting that, in order to understand the human mind, especially cognition and language, it was necessary and sufficient to posit abstract analysis levels separated from both the biological and the cultural domains, and also independent from each other, which would eventually unravel the essence of those phenomena.

French philosopher and sociologist Edgar Morin (1991) corroborates Maturana's conjectures and ideas in his vast work by proposing that man's ability to learn is enhanced when we reinsert objects in their contexts. This calls for a reevaluation of the learning process: the cognizant subject must be reintroduced in the act of learning; we must be on guard against the mistake and illusions of the mind.

According to both Maturana and Morin, a human being does not innately love nor hate anyone in particular. If that is so, how are those feelings learned? How can the human being hate so violently as to destroy others, even at the cost of his own destruction in the process?

Aside from being instinctive and primitive feelings, competition, anger, and hatred are fostered by certain cultures. If we can learn to hate, we can also learn to love; that will depend on our cultural, relational languaging and emoting. In Alves´ (2016) words, the human being makes themselves human by casting a loving and embracing regard upon another human being.

Maturana and Varela's approach to the human universe shows us that the very same concept of ethics that makes us ponder the human condition reveals the existence of a nature whose evolution and accomplishment lie in the encounter of the individual being with his ultimate nature: the social being. Therefore, if individual development depends on social interaction, then formation itself, and the very world of meanings that we inhabit is a result of living – of learning to coexist with others.

To Maturana and Varela, accepting the other is the cornerstone upon which the self-observant or self-conscious being builds their ability to fully accept themselves as part of the network of social beings' existential nature. Acknowledging one's own existence as legitimate (even when we do not find its current expression desirable) is how the individual becomes free to also legitimately accept every dimension of themselves that may occur in their being, all of which originate in the whole.

Thus, love for our neighbors begins by understanding the processes that engender the existential phenomenon of self-consciousness, an expansion of the natural impulses towards communitarian altruism which, rather than an imposition, is revealed as the necessary condition for sociability. Understanding this is a requisite corollary of understanding the human being's constitutive processes. If mutual social cooperation is a primary social condition, sharing this knowledge cannot but expand our areas of mutual cooperation and accomplishment.

For this reason, mankind's socioeconomic development is not dissociable (ethically or operationally) from the development of each individual life, and therefore the first cannot happen at the expense of the latter without becoming an inherently antisocial mechanism.

4. Autonomy and autopoiesis

Acknowledging that living beings are characterized by their autopoietic organization allows us to relate large amounts of empirical data on cellular functioning and its biochemical processes. Thus, rather than contradicting those data, the concept of autopoiesis (self-producing) uses them and explicitly sets out to interpret them from a specific standpoint, emphasizing the fact that living beings are autonomous units. For the purposes of this study, an autonomous system is a system that has its own laws, its own properties.

Whilst autonomy is one of the most evident characteristics of living beings, we do not mean to imply that they are the only autonomous entities; rather, what we propose is that the manner, the mechanism that makes living beings autonomous systems is autopoiesis. For its turn, the structural coupling between organism and environment involves operationally independent systems. An organism's chances to keep being a dynamic system in their environment depends on the compatibility between organism and environment, also referred to as adaptation. On the other hand, when a being's interactions with their environment become destructive and end up disintegrative by interrupting their autopoiesis, that being has lost their adaptation and, therefore, their coupling (Maturana & Yanez, 2009).

Thus, according to Maturana (1997), adaptation is a necessary consequence of the unit's structural coupling with the environment and should not be surprising. In other words, an individual's ontogeny combines structural changes and the conservation of both organization and adaptation. We call conduct a living being's changes in attitude or position that may be described by an observer as movements or actions in relation to a given environment, or an action formulated by us based on the observation of the organism's movements in the chosen environment. For this reason, the conduct, as a particular configuration of movements, will or will not be considered adequate depending on the environment in which it is described.

A conduct's success or failure is always defined by the expectations set by the observer. Therefore, a living being's conduct is not a creation of the nervous system nor is it exclusively associated with it, since

the observer will observe the conducts of any living being in his/her environment. The nervous system expands the domain of possible conducts by providing the organism with a tremendously versatile and plastic structure.

According to Maturana and Varela (2001), behavioral configurations ontogenically acquired through the communicative dynamic of a social environment are kept stable through cultural conducts, in a set of ontogenically-determined communicative interactions that allow a group's history to remain unchanged despite each individual's particular history. Imitation and constant intergroup behavioral selection play a key role in this process by enabling the cultural coupling between young people and adults – thus specifying an ontogeny that is expressed as a cultural phenomenon.

Everything we share as human beings is but biological tradition that dates back from the beginning of life and still exists today, in the various histories of each human being on the planet. It is our shared biological heritage that provides the foundations of a shared world, and thus it does not seem strange to us that, to all human beings, the sky is blue, and the sun rises every morning.

From our linguistic heritages spring the wealth of different cultural worlds we may inhabit as human beings and which, observing certain biological boundaries, can be as diverse as we wish and are always experienced within a cultural tradition. Even though the explanation of cognitive phenomena is consistent with scientific tradition and validated by scientific criteria, its singularity consists of demonstrating how, in our attempts to know the process of knowing, we end up finding that which constitutes our very being (Moraes, 2003).

It is not knowledge, but the knowledge of our knowledge that compromises us. Whether or not we use a bomb is not determined by the knowledge that the bomb kills, but instead by our intentions. People generally overlook this or feign ignorance in order to avoid the responsibility that we have for each and all everyday action, seen as absolutely all of our actions contribute to shape the world we live in and which we legitimize. It is precisely through these actions, in a process that shapes our becoming and blind to the transcendence of our actions, that we pretend the world has its own becoming, independent

of our own, thus justifying our irresponsibility and mistaking the image we try to project, the role we play, for the true being that results from the choices of our daily existence (Maturana, 2001).

To Maturana (2001, p. 56) "emotions found and constitute action domains". In his eyes, there is an underlying emotion to all human activity, even rational systems. That happens because rational systems are constituted as systems of operational coherences supported by a set of premises whose *a priori* acceptance is precisely the system's emotional domain – and when emotions change, rationales and systems change as well.

Based on the biological history of human beings, Maturana also claims that love is the cornerstone emotion of sociability. This particular emotion is also the domain of concern for another being. One being's attentiveness towards another can never exceed their acceptance of that other. That is why concern for the other does not exceed its native social domain. However, the term 'love' refers to the cornerstone emotion of sociability. In other words: sociability consists of human relationship dynamics founded on mutual acceptance.

There can be no concern for the other if this other is not within one's acceptation domain, one's social domain. Thus, Maturana's claim is that ethical concerns are not dependent on reason. Ethics is believed to be the province of philosophy, justice, and political sciences, as though either of those were directly related to reason. Although rational thought does happen in those fields, ethical reflection can only flourish when there is concern for the other. Such reflections never exceed the social domain in which they emerge. This is why arguments about respect, ethics, and human rights fail to convince anyone who is not predisposed to agree with them in the first place: concern for others is justified by emotion, not reason.

To Barcelos (2006), the indissociability between human cognitive processes and environment is not new; it can be inferred, for example, from the following words by Arthur Schopenhauer (1788-1860): "The world is my representation". Opening oneself up for an ecological learning that involves both human beings and the world can happen through listening and conversation since, as Maturana (1988, 2000,

2004) argues, it is through language that human beings exist and attribute meaning to their own existence.

Maturana (1999b) proposes a second condition for language: aside from the fact that we are not just rational, but also emotional, it is also a fact that assuming one's rationality must not and cannot cancel out or overshadow one's emotionality, nor make it any less relevant. If that does come to pass, we are turning our backs on the chance to understand a key aspect of the historical-cultural learning process: the fact that our capacity for emotion is a much more relevant factor in human history than our needs.

As Maturana (2001, p. 13) writes: "The task of school education is to facilitate children's development as human beings that respect themselves and others, so that they can be responsible actors in the community to which they belong". Based on the idea that each and every one of us is capable of learning (Freire, 1997) and that learning happens through interaction with other people (if we wish so), Maturana's statement seems irrefutably simple.

However, its simplicity does not ensure that it has been fully incorporated into our educative actions nor into the legal parameters and guidelines that organize times and spaces at school. The refusal to listen compromises a key factor in Maturana's framework for learning: conversation.

The necessary and constant conversations between society and school have no other purpose than promoting opportunities to break away from the hegemonic dualist and mechanistic ideas on the production of knowledge and on learning that prevail in modern society. That worldview operates by separations such as body/mind, individual/society, culture/nature, spirit/matter, emotion/reason, past/present/future, and has at its core the idea that science is infallible and establishes truth (Morin, 1991; Boaventura Santos, 2000).

To Maturana (2004), the exercise of love as a possibility of being emotionally moved is conditioned by the human languaging process: as we live in communities, we draw on emotional relationships to produce convivial spaces. The enmeshment that results from the experience of these loving relationships provides the foundations for conversation.

Maturana argues that human existence happens entirely in conversation networks, since our actions are ultimately defined by emotions.

It is the emotion with which one does something / is the recipient of a certain action that turns that action into another action or qualifies it as a behavior belonging to one class or another. As humans, we exist in language and therefore all that we are, everything that we do happens in conversations – the result of the enmeshment of emotions and languaging. Due to the structure of human existence, any and all human occupations happen as a specific network of conversations whose specificity is defined by emotions which, in turn, define the coordinating actions in that network (Maturana, 2004).

As an emotion coordination, love is constituted in the spontaneous acceptance of one living organism by another, thus enabling their coexistence. Consistent with this perspective, a learning relationship that happens in a loving environment has great potential to flourish into a relationship of acceptance and, in consequence, to foster an ecological embracing of the other.

The socialization process that is inherent to learning has a much greater chance of occurring when love is involved. In fact, in the absence of love, socialization will certainly not occur. In other words: learning to live in solidarity, cooperation, and embracing can only be achieved on the basis of a conversation with loving languaging.

According to Maturana, the full hegemony of rationality sets up ecological conditions that promote the development of an antisocial relationship. The supremacy of reason stifles the possibility for that which makes us human: our unique, special way to live together in conversation, a conversation that makes us social beings who are able to create a solidaric, loving coexistence through shared languaging.

5. Conclusion

We have examined how attention, affectivity, and language are viewed by two theoretical frameworks on learning, Vygotsky's socio historical and Maturana's autopoiesis, and their role on the pedagogical mediation that is instrumental to learners in general, as well as disabled

ones. Those frameworks have similarities (both deal with the biological origins of knowledge) and propose different understandings of the relationship between cognition and affectivity when it comes to psychic processes. In our day and age, people often complain about exclusion, tyranny, social, economic, and ideological injustice, as well as the ecological catastrophes that jeopardize not just humans, but the entire planet. Therefore, the integral understanding proposed by Vygotsky and Maturana can connect cognition and emotions/affectivity in such a manner as to exponentially enhance learning relationships, and thereby contribute to shape a world where coordinations are more consensual and founded on loving languaging and emotions (Maturana, 1997; Moraes, 2003; Morin, 1991).

Conflict of interests

The authors declare they have no conflict of interest.

Credit Author Statement

We, Maria Dolores Fortes Alves, Cristina Miyuki Hashizume, Arlete R.S.S. Rosa, hereby declare that we do not have any potential conflict of interest in this study. Briefly describe, maximum five lines, how the participation was. For example, we have all participated in study conceptualization, methodology, study design, formal data analysis, statistical data analysis, fund-raising, project administration, project supervision, data collection, data generation, data validation and editing. All authors approve the final version of the manuscript and are responsible for all aspects, including the guarantee of its veracity and integrity.

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