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Contributions of Cultural-Historical Theory to the Pedagogical Roboticss in Early Childhood Education[1]

Contribuições da Teoria Histórico-Cultural para a Robótica Pedagógica na Educação Infantil

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ABSTRACT

Pedagogical robotics is part of contemporary culture. The scientific research into this area, which uses educational technologies such as robots and robotic kits, has been highlighted and expanded at all stages of education. This paper has as goal to show contributions of the Cultural-Historical Theory, through its principles and concepts, so that to enable the discussion about the use of the Pedagogical robotics in the Early Childhood Education and its possible influences on the children's teaching and learning processes. For that was carried out the bibliographical research. The methodology leaned on the literature review about the concepts such as mediating activity and higher psychic functions from Cultural Historical Theory. The results indicated that the Pedagogical roboticss in the Early Childhood Education coud contribute to educational purposes, being that mediating activity intentionally planned is essential for that it could enhance the children's learnings.

Keywords: Pedagogical robotics. Cultural-Historical Theory. Early Chidhood Education.

RESUMO

A Robótica Pedagógica faz parte da cultura contemporânea. As investigações científicas sobre esta área, que usa tecnologias educacionais, tais como: robôs e *kits* robóticos, têm se destacado e ampliado em todas as etapas de ensino. Este artigo tem como objetivo apontar contribuições da Teoria Histórico-Cultural, por intermédio de seus princípios e conceitos, de modo a possibilitar a discussão do uso da Robótica Pedagógica na Educação Infantil e suas possíveis influências nos processos de ensino e aprendizagem das crianças. Para tanto foi realizada uma pesquisa bibliográfica. A metodologia foi apoiada na revisão da literatura sobre conceitos, tais como: atividade mediadora e funções psíquicas superiores, advindos da Teoria Histórico-Cultural. Os resultados indicaram que a Robótica Pedagógica na Educação Infantil pode contribuir para fins educacionais, sendo que a atividade mediadora intencionalmente planejada é imprescindível para que ela possa potencializar as aprendizagens das crianças.

Palavras-chave: Robótica Pedagógica. Teoria Histórico-Cultural. Educação Infantil.

1 Introduction

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As a social institution, the schools are influenced by the transformations taking place in society. The technological innovations are part of that, once the teachers use them with the aim of helping the teaching and learning process. One of the current educational technologies is Pedagogical roboticss (PR), an area that uses robots and robotic kits, for example, and which has been highlighted in scientific research into its use at all stages of education, including with young children.

Seymour Papert (1997), considered to be the father of robotics, supports int clinical method no método clínico piagetian to carry out his researchs with children in the computer programming activity. Although his belongs to other methodologic-theoric basis/ we undestand that his questions about the – role of the school and of the teachers front of the technologies – provoke us to advance about the possibilities of the pedagogical robotics use in the Early Childhood Education.

The goal of this work is to show the contributions of the Cultural-Historical Theory, in front of possibility of the Pedagogical robotics use in the Early Childhood Education, so that enhance the children's learning. For that, we use theorical-methodological contribuitions of the bibliographical research (Salvador, 1970), through realization of the successive readings of select text from: theorists from THC and from Dialetical-Historical Materialism (Vigotsky, 1995, 2000, 2006; Leontiev, 1960, 1978, 2004; Petrovsky, 1980; Marx, 1985; Engels, 1961); authors who study that theory (Mello, 2020; Garay, 2012, 2016; Aquino, 2015; Schúkina, 1978), as well as autohors who study the Pedagogical robotics (Miranda-Pinto, Moreira e Osório, 2017; Rosário, 2017),and technologies int the education (Almeida, 2001; Almeida, Valente, 2014; Lévy, 1999; Sorj, 2018). The steps of the reflexive reading and interpretative ones mays the organization of a integrator synthesis around of three axes which correspond to the sections of this paper, such as Considerations about the Cultural–Historical Theory; Mediating Activity and Higher Psiquic Functions in the schoolar context and and Contribuitons from THC to the Pedagogical robotics in the Early

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Childhood Education. We used for the development of the two first axes text from the Works of THC theorics and researches this theory and for to produce the third axe we putted on dialogue the different authors.

2 Considerations about Cultural-Historical Theory

Historical-Cultural Theory is based on Dialectical-Historical Materialism, with critical contributions to theoretical currents that focus only on biological processes or only on psychological processes. The essence of the dialectical method lies in historically studying the object, its movement and its relationships (Vigotsky, 2000).

The Dialectical-Historical Materialism highlights the existence of the dialectic of nature and culture, and the unity of particular laws with general laws, without isolating historical facts, considering them to be processual. This is the process of humanization, in which man becomes the result of circumstances and education (Marx, 1985).

Consequently, the individual is constituted by the relationships and use of the technologies he creates, which are modified and expanded in the social and cultural sectors in which he lives. Therefore, the distinction between animal (considered irrational) and man is perceived from the need for the act of production. By modifying nature according to his needs and for his survival, he modifies himself.

Vygotsky (2000) analyzes and criticizes Old Psychology, pointing out problems with its unilateral approach, with conceptions that the individual's development depends on biological maturation. However, the belarusian psychologist relies on Historical-Dialectical Materialism to affirm that man is an omnilateral and non-fragmented being, understanding that by acting in the world he promotes his emancipation and liberation, revolutionizing his practice.

In order to bring about transformation it is essential, according to Dialectical-Historical Materialism (Marx, 1985), to think about contradictions, since man doesn't just think, he acts in the environment according to his needs,

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a constant movement. In addition, the alienation that work, school, the family or any social space can provide is also the necessary lever for the struggle to transform reality collectively.

Faced with the reflections of the theoretical-methodological assumptions of Old Psychology, Vygotsky (2000) sought to understand how the natural and artificial process, the Elementary and Higher Psychic Functions, and the cultural development of the child's behavior took place. The vision of THC was to overcome the biological with the conception of man as a socio-historical being, in a development that is not linear and has qualitative leaps.

In this way, the relationships between biological and historical issues are included in the investigations, as well as the development of Higher Psychic Functions, studying history in movement, and moving away from a superficial study and looking for the essence of the object. Therefore, the theory in question always presupposes going to the genesis of the problem, which in order to reach the totality, not only particular characteristics are taken into account, but the entire historical and dialectical process that involves the matter.

The view of the Historical-Cultural Theory, created by Vigostsky (2000), on the Higher Psychic Functions is that they can be mediated and developed throughout the individual's history and culture. In addition, there is a critique of determinism, which compares man to a non-rational animal, such as the chimpanzee. For THC, the individual has their own subjectivity, whose work is responsible for their development, constituted from their historical and social experiences.

Garay (2012, p. 127) states that "biological psychic processes are subordinate to the higher processes of the historical-cultural order", since consciousness represents the apex of an individual's development. From there, Leontiev (1960) stresses the importance of relationships in the formation of the child's personality, and that the quality of their psychic development depends on adult mediation.

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> The psychic processes and qualities of the personality are formed during childhood and continue to change and improve throughout the individual's life. Their formation is an authentic process of development of the psyche, and not a simple manifestation of what apparently already exists at birth in a hidden form. This development takes place under the determining influence of the conditions of life and education, in correspondence with the environment and under the guiding influence of adults (Leontiev, 1960, p. 493).

It's clear to see how important interactions and external media are for children's development. Therefore, mediating activities must have the clear intention of contributing to the development of the individual's personality and conscience.

When dealing with children's relationships with objects/toys from birth to adolescence, Leontiev (1960) discusses how children's behavior changes as the years go by. One example given by the scholar is that in the case of toys, the child gives them functions as they interact with the environment, i.e. nothing is natural from a socio-historical perspective. Everything is learned and, therefore, all development depends on social relations, that is, on lifelong learning (Leontiev, 1960).

Dialectical-Historical Materialism, the theoretical basis of THC, consists of fundamentals that help to culminate in the concrete and objective reality of the object. Furthermore, we can mention the passage from quantity to quality, the unity and struggle of opposites and the negation of negation (Garay, 2012). So, development takes place in the midst of a dialectical movement through an upward spiral. For example, through the contradictions that arose from the division of labor, men became slaves to a system created by those who own the means of production.

> But the most essential and closest foundation of human thought is precisely the transformation of nature by man and not just nature as such; human intelligence has been growing in the same proportion as man has been learning to transform nature (Engels, 1961, p. 196).

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Scientific and technological evolution is proof of this in the school context. By using educational robotics, the teacher expands the possibilities of mediating scientific and non-scientific knowledge for students. From an early age, children acquire skills and abilities that are relevant to their development, based on their cultural needs.

Some authors such as Lévy (1999), due to the presence of digital technologies and the consequent changes, call this period cyberculture or digital culture, an integral part of human culture. In this current technological scenario, in which man is considered to be the result of circumstances and education, it is essential that the individual's education is geared towards the concept of the e- citizen (Sorj, 2018), in other words, an individual who is aware of their duties and rights, critical and transformative in the spaces and times in which they coexist and participate. Teachers, in turn, when planning their didactic-pedagogical practice, must first have this transformative awareness.

Garay (2012) provokes the search for an understanding of concepts considered fundamental in Historical-Cultural Theory.

> [...] we will only be able to understand all of Vygotsky's theory and thought if we come to have a philosophical notion and a pedagogical explanation of Marxist thought, in the categories of Vygotsky's theory, such as: method and microgenetics and historical-dialectical materialism, mediation process, zone of proximal development, higher psychological functions, scientific and spontaneous concepts, language, instruments, tools, signs, activities, culture, etc (Garay, 2012, p. 28).

For the author, there is a need to deepen theoretical assumptions in order not to distort theory and better to understand social and educational problems, as is currently the case with the use of educational robotics.

3 Mediating Activity and Higher Psychic Functions in the school context

This section seeks to understand the Historical-Cultural Theory also through Mediated Activity and Higher Psychic Functions, one of the main concepts

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of the THC,which helps us to reflect on the use of Pedagogical roboticss for the development of children in Early Childhood Education.

The development of consciousness through mediated activities and social relations was a qualitative change of the utmost importance for man and his essence. "Activity mediated by signs and tools and consciousness constituted the factors of the radical change that began to differentiate between the irrational animal and the human being" (Garay, 2012, p. 66).

For this reason, overcoming the understanding that the development of the individual is only biological is one of the main pillars of Cultural-Historical Theory. It is in the dialectic movement between man and nature that the transformation of human reality takes place, and the cultural/artificial environment acts as a mediator in this process. This two-way street happens through mediated activity, which creates needs.

The “humanizing” work of man who produces culture, which is dynamic and objective. In this process, discussed by Dialectical-Historical Materialism, insofar as the results of man's activity emerge through the creation of instruments, the appropriation of nature occurs. The Pedagogical robotics is a example of the cultural product of this humanizing process its had been arrived as educational purposes in the classroom.

Garay (2012) reinforces the importance of activity mediated with instruments and tools created by man for the emergence of a higher structure that is not innate, such as the individual's thinking. Therefore, it is understood that there is always a way to develop, everything will always depend on the environment around you and how mediation takes place.

Another point to highlight is the qualitative leaps that socialization promotes in development and learning. According to Garay (2012, p. 107), "The individual is formed as a human being in this dialectical relationship within society, together with other subjects through mediated activities, such as signs and tools".

The Historical-Cultural Theory emphasizes that the individual is by nature a social being, because it is in the collective that man carries out his activity. At

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school, children appropriate the culture around them, which can be promoted by interacting with their peers through signs and tools, according to the teacher's organization and planning. Collective activities are a hallmark of the vygotskian conception, however, there is often erroneous execution, that is, without adequate planning for the learning objectives.

In this sense, the teacher carries out a diagnostic observation according to the child's learning and development needs, that is, analyzing the Zone of Proximal Development, respecting the child's level and promoting a diversity of collaboration (Vigotsky, 1995). Thus, the teacher intentionally plans their practice according to the diagnosis made, organizing their mediations and aligning strategies and activities and auxiliary means (Mello, 2018).

The genetic method, according Vygotsky (2000) is basead on understanding about of the human development since his historical and social origins prioritizing the analysis of the process. This method allows understand the transformations of the human being over time, because the time is an important concept from this theory. Go to the origins of the study object is essential to be able explain it, because for this theory is not enough describe the phenomenon must be explained for transform it. In the context stands out the concept of the Zone of Proximal Development (ZDP) that represent what the child can does today with help, she will does by herself tomorrow. The current development level (CDL) is what the child already does in a manner independent (Vygotsky, 2006). Other importante concept is of mediating activity that is an intentional and conscious activity that envolves the relation betwen the tool and sign. This activity is essencial in the education to be developped in the children's proximal development zone through them needs of learnings. In this way the genetic method enables na undertanding more in-depth about the human devolpment.

The need is linked to the child's level of learning and development at the time. For this reason, the school is a space for intentional practices of symbolic expansion and experiences directly linked to the ZDP. This intentional pedagogical mediation enables the development of the Higher Functions.

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For Leontiev (1978), activity is guided and regulated by needs in a non-fragmented and non-stagnant process of internalization and externalization, which change as the child grows and the context in which they are inserted.

Thus, if the needs change, the mediators must accompany this transformation, which is why continuous diagnostic observation is crucial for carrying out intentional mediating activities, and consequently the individual's psychological development. Furthermore, Vigotsky (1984, p. 105) points out that "[...] every advance is connected with a marked change in motivations, tendencies and incentives", and needs are related to children's main activities.

Garay (2012, p. 70) cites the psychic modification of the individual:

> Human mediations transform the human being, the child, in their internal form. The child appropriates the culture produced by humanity and this appropriation causes the child to modify their thinking, their psyche and their way of relating to the world. When the child struggles to walk and overcomes this phase, the child achieves a transformation that takes place in its external form.

Intentional mediation is fundamental for the development of Higher Psychic Functions, since the teacher is able to plan activities and avoid spontaneity. Consciousness is also developed through mediation with tools and signs, and through interactions with subjects, as Vigotsky (2000) points out below.

> Through the tool, man influences the object of his activity; the tool is directed outwards: it must bring about one or other change in the object. It is the means of man's external activity, with the aim of modifying nature. The sign does not modify anything in the object of the psychological operation: it is the means by which man uses to psychologically influence both his own conduct and that of others; it is a means for his inner activity, directed towards the domain of the human being himself: the sign is directed inwards. The two activities are so different that the nature of the means used cannot be the same in both cases (Vigotsky, 2000, p. 94).

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The two concepts, signs and tools that are related, have different meanings, and are linked to mediated activity. This relational triangle helps us to understand how the individual's behavioral conduct develops. Vigotsky (2000, p. 85) also points out that "man introduces artificial stimuli, gives meaning to his behavior and creates, with the help of signs, acting from the outside, new connections in the brain".

According to Vygotsky (2000, p. 77), "it is man himself who creates an artificial situation by introducing two additional stimuli. He determines his behavior and his choices in advance, with the help of the medium-stimulus introduced by him." In this process, the Higher Psychic Functions (cultural order) emerge, helping in psychic development, without leaving aside the Elementary Psychic Functions (biological order).

Language, voluntary attention, logical memory, imagination, concept formation and the formation and development of thought are formed by culture and make up the special Higher Psychic Functions. In this context, Pedagogical roboticss is considered a catalyst for the development of SPFs and the mastery of behavior.

According to Vygotsky (2000, p. 67),

> The Elementary and Higher Functions are the extreme poles of the same behavioral system, its lower and upper points, which mark the limits within which all the degrees and forms of the Higher Psychic Functions are located. Both points, taken together, determine the section of the historical axis of the individual's entire behavioral system.

Leontiev (1960) states the importance of activity for the development of behavioral mastery. The teacher in the educational process is able to mediate activities that stimulate self-mastery. According to Vygotsky (2000), the psyche is modified by the use of aids and tools, which are considered cultural artifacts because the individual attributes meaning to their use.

Leontiev (1960) understands that psychic changes occur as relationships occur with the child.

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> All of this leads to fundamental changes in the child's situation among the people around them. From the moment of birth, the child develops as a member of society. However, during the entire period of development there are important changes in the situation he occupies among other people and in his mutual relations with them; this plays a very important role in his psychic development (Leontiev, 1960, p. 500).

It is important for children to be socially immersed from an early age in order to enhance the Higher (cultural) Functions, to the detriment of the inadequacy of the Elementary (biological) Functions for the integral development of the individual (Garay, 2016). In the school context, children should have contact, from the moment they enter school, with intentional interactions and mediations for their psychological development. The teacher is the adult responsible for this mediation in the classroom, and should be aware of the objectives of their work and their target audience.

It is necessary to move away from biologizing teaching and spontaneity, rethinking the meaning given to teaching and learning, in which the teacher does not facilitate, but mediates the process and problematizes situations in an educational space that should provide adequate conditions for this mediation to take place.

Leontiev (1960) discusses the relationship between psychic development and objective reality.

> The vital importance of the human psyche is due to the fact that it faithfully reflects objective reality. This allows man to orient himself in the environment around him and to create science, art and technology as the most perfect instruments for orienting himself in reality and transforming nature for the benefit of humanity (Leontiev, 1960, p. 78).

In school reality, the instruments created are also present, which have been transformed by nature and by humans themselves who assign social functions to each one. Therefore, Pedagogical roboticss also has a social function, but which one can be given by teachers and children in Early Childhood Education?

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4. Pedagogical roboticss in Early Childhood Education

Culture contributes substantially to the development of man. "The movement of history is therefore only possible with the transmission, to new Generations, of the acquisitions of human culture, that is, education" (Leontiev, 2004, p. 291). The education mentioned by Leontiev (2004) can also be understood as school education, corresponding to an artificial culture that can be learned and appropriated by children through the mediation of activities organized by an adult, in this case, the teacher.

Robotics has tools that are products of social practice, therefore, Pedagogical roboticss, which is part of today's culture, cannot be used without awareness, criticality and must be aimed at transforming reality. This vision comes from the Historical-Cultural Theory, especially with regard to the needs of children in Early Childhood Education and the educational objectives of this stage of education.

According to Aquino (2015), it is at Early Childhood Education that we find the essential space/time for children's development, which from the perspective of THC requires specific practices in order to have significant learning.

Children's learning is not natural, they need support, resources and mediation for constant and gradual learning and development. In this way, planned mediated activities contribute to the reflection of pedagogical practice and what is learned.

Aquino (2015, p. 42) quotes:

> What characterizes children's thinking is not an absence of knowledge that must be corrected through the inculcation of pertinent information. Children's ideas are peculiar readings of the world, inferred from the relationships established with the physical and social world, mediated by culture.

The author demarcates how the interaction of the environment interferes in the development of children's thinking, which includes perceptions and sensations that collaborate in reaching the essence of matter, when through activity they appropriate culture.

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In school education, teachers need to understand the interrelationship between the processes of learning and development, which according to Vygotsky (2012) do not coincide, but that learning occurs to the extent that there is development, resulting in the student's potential development. With this in mind, activities mediated through the use of educational robotics in early childhood education should be aligned with educational objectives to help, motivate, engage and enrich the child's development and learning, so that they can also take better ownership of the world and act on it. Vygotsky (1926) understands the functioning of the biological organism through the existence of reflexes, motives and "causes".

The planning of activities involves thinking of a school as a place of historical and social experiences, analyzing the current needs of children and allowing them to be subjects of the teaching and learning activity (Mello, 2018).

It's important that the teacher, by observing the needs of their students, mediates collective and collaborative activities, contributing to the development of conscience and self-control of behavior. Thus, robots and kits are also a means of understanding children's needs and focusing on the development of Higher Psychic Functions and behavioral conduct. According to Cultural-Historical Theory, children's needs reveal development potential that, with the teacher's mediation, can be expanded. By sensitively observing these needs, educators are able to plan mediating activities that respond to children's interests and challenges. In this process, the use of robots and kits, when incorporated into collective and intentional proposals, acts as a cultural tool that promotes the development of conscious behavior and Higher Psychic Functions.

According to Vygotsky (2000, p. 80), "[...] it is man himself who determines his behavior with the help of artificially created stimuli-means of stimulation". The robot can be a playful instrument that enables play and games in Early Childhood Education, knowing the potential and weaknesses that this technology tends to present, from technical aspects, programming modes, design to pedagogical requirements (Miranda-Pinto; Monteiro; Osório, 2017).

Cultural-Historical Theory helps us to reflect on the importance of

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Pedagogical roboticss moving towards the social function of the school and the Early Childhood Education stage. Garay (2012, p. 98) states that "instruments that do not acquire a use value, a social function, are inert, dead, and therefore are not elements that characterize the development of the human being". This is only possible with the awareness that the existence of concrete, objective activity is essential for the development of PSF.

Currently in Brazil, education for children in Early Childhood Education considers interactions and play as the guiding axis of pedagogical practices in order to collaborate in the teaching and learning processes (Brasil, 2010). However, Mello (2018) points to the need for methodological tools that take cultural aspects into account and support the intentional practices of teachers at this stage of education.

> In the case of teaching in Early Childhood Education, we cannot conceive of the child today as being the same child as ten years ago. It is essential to investigate which child we are educating, how they are appropriating the experiences they have in society, what their learning needs are, etc. To do this, as teachers, we need to know how to position ourselves in relation to the society in which we live; follow its movements; break paradigms and crystallized conceptions; look between the "lines" that make up social relations, and we also need to focus on the social face of culture (Mello, 2018, p. 40).

Pedagogical roboticss can be discussed as a current technology that contributes to thinking about a favorable methodological instrument for children to appropriate culture, as teachers need subsidies to plan and act intentionally in the child's development, respecting their entire process.

Therefore, in pedagogical practice, the child's cultural needs must be taken into account so that they can give meaning and sense to the given proposal. According to Leontiev (1978), "the internal relations of activity involve the psychic reflex, motives, actions and conscious ends", so in order for the activity to take place, the child must have autonomy in the face of their objective needs.

Schúkina (1978) presents cognitive interest as an activity with satisfactory results for both the teacher and the student throughout their lives.

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> Cognitive interest, like interest in general, is not a concrete and isolated psychological process like, for example, thought, perception and memory. In this complex relationship between man and the world of things, intellectual, emotional and volitional processes are organically linked. This is the basis for the stimulating influence of cognitive interest on the development of various psychological processes (memory, imagination, attention) (Schúkina, 1978, p. 15).

Motivation is the central point for learning, and the teacher can act according to the interests of the children, challenging them and seeking to carry out collaborative work between them. Garay (2016) points out that the creation of tools and means to satisfy needs is not an individual activity. While the teacher raises the possibilities of voluntary development and *volitionality* with mediated activity aimed at the child's interest and individual effort (Schúkina, 1978). The teacher must also realize that thesenses and meanings inherent in human behavior (Vigotsky, 2001) differ from those possessed by adults and children, and even vary from individual to individual according to their historical and social context.

According to Petrovisky (1980, p. 362), "the motivational sphere is directly related to volitional activity, because in the motivational sphere are the inducing forces that determine the character and psychological conditions for the realization of the volitional act." *Volitionality* can be considered as a higher level of development that the Higher Psychic Functions can reach, as well as being related to the child's mastery of conduct. The qualities acquired with *volition*, after its stabilization, such as independence, decisiveness, perseverance and the ability to control oneself are essential for the individual's life (Petrovisky, 1980).

According to Schúkina (1978), interests depend on the individual's relationship with the environment, the activity they carry out and the community. Regarding motivation, Petrovisky (1980) says that it is linked to emotions and feelings that change and become more or less significant

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according to the individual's growth and the situations they encounter throughout their life.

From this perspective, Pedagogical roboticss is characterized by being an area that provides challenges that can motivate learning, involving children in meaningful and enjoyable experiences. Therefore, PR activities for children in Early Childhood Education should be planned for a more affectionate approach to the proposed task with robots and other materials.

In this process, language emerges in the work that has an impact on the development of human consciousness (Leontiev, 1960). Language is considered by Leontiev (1960) as fundamental, especially in the first three years of life, a period of manipulation and appropriation of everything that comes into contact with and has around it. In this way, language is considered an initial mediating instrument that, through collective activities, contributes to the process of internalization of the individual, and also to the appropriation and development of skills.

Depending on the reality of the school context, teachers can take advantage of the conditions to explore language with children and robotics activities. In the case of Early Childhood Education, Rosário (2017) states that "technology presents new tools that can enable children to have contact with different languages and with a diversity of forms of interaction, favoring their development".

Almeida and Valente (2014, p. 116) state that "Learning does not only occur in a given context, it integrates with other contexts as well as generating new contexts through the continuous interaction that occurs with the use of technologies". Therefore, the curricular integration of the use of Pedagogical roboticss in Early Childhood Education may be possible through a reformulation of the curriculum and pedagogical practice, overcoming the hierarchization of knowledge. For Almeida (2001, p. 27) this curricular conception "[...] indicates new possibilities for opening up and making the curriculum more flexible, and for bringing it closer to a dialogical, constructive, cultural and historical-social approach".

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Mello (2018) shows the concern with the appropriation of skills according to the social and cultural context, without neglecting the teacher's role in continuing to collaborate in the development of Special Higher Psychic Functions.

> Schools in the 21st century cannot shirk the task of developing the skills necessary for students to appropriate and master the technologies produced by society in the form of scientific knowledge. Access to this knowledge is necessary, but it is not enough to promote learning that profoundly develops higher psychic functions and special higher psychic functions. Students need to learn to select them, internalize them and apply them in different situations, while at the same time being able to develop a critique of society as a whole. However, how can we train students with these skills if the teachers themselves are not trained in this way at university (Mello, 2018, p. 52).

Mello (2018) reinforces the discussion about the need to develop meaningful activities, not mere actions. The unintentional use of psychic development and determined, pre-prepared or totally ready-made products easily found on the market is a path that deviates from the proposal of Historical- Cultural Theory.

Thinking about Pedagogical roboticss in Education requires challenges that provoke true learning. Children cannot simply relate to robots or kits without giving meaning and sense to what they are doing. Assembling a robot, for example, must be conscious so that they know what they are doing and solve problems such as disassembling, disconnecting or discharging. Therefore, activities can be directed towards the development of higher psychic functions, behavioral conduct and also learning about world knowledge and not just technological knowledge.

Therefore, it is essential that activities mediated with Pedagogical roboticss in Early Childhood Education are planned with theoretical backing for effective pedagogical practice. Furthermore, we must not forget children's needs, learning objectives and level of development when proposing robotic activities for the development of specific activities, such as logical reasoning, laterality, thinking, language, cooperation and knowing how to wait.

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However, Mello (2018) points out the existence of gaps in teacher training, since it is essential that teachers master the technologies and critically reflect on the pedagogical possibilities (Almeida, 2001) in order to understand the use of robots, prototypes, kits and/or programming activities in school, questioning where they come from, how and why to use these tools in school practice, including in the Early Childhood Education stage.

5. Final considerations

The aim of this research was to point out considerations from the Historical-Cultural Theory (HCT) regarding the use of Pedagogical roboticss in Early Childhood Education. In summary, Pedagogical roboticss as a reality for children must be used by the teacher with a critical and creative eye, in addition to taking ownership to transpose the PR from something that can be considered just as a toy or game, to an experience in which the child can, through mediated and intentional activity, understand, investigate and have meaningful and transformative experiences.

From a THC perspective, we understand that Pedagogical roboticss can help to intensify the development of Higher Psychic Functions, by enabling playful and contextualized activities, motivating children to learn and showing them the cultural diversity that science can provide. Playfulness provokes children's interest, which makes them try to participate more in the meaningful activities proposed by the teacher.

From this, we understand that in the school context of the Early Childhood Education stage, the teacher is the mediator of this process which is not linear. The teacher collaborates in preparing a stimulating environment, creating aids and communicating with the students through intentionally planned activities that can help develop the child's Higher Psychic Functions.

We understand that PR can be an important cultural tool for collaborating in the process of child development, mediated by teachers. Teachers can better understand children's interests and plan meaningful activities to meet their cognitive interests. To help the teacher, it is essential

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that the use of PR is integrated into the curriculum, so that the school community gets involved and collaborates in the challenges and affective, motivational support in the development of conduct and the higher psyche so necessary at the Early Childhood Education stage.

Finally, the theoretical considerations put forward here need to continue with scientific experiments in the school context, considering the root of the issue in order to deepen and advance the theoretical-practical reflections raised in relation to child development and children's learning, being taken up by teachers, who must remain in permanent training.

Contribuciones de la teoría histórico-cultural a la robótica pedagógica en la educación infantil

RESUMEN
La robótica pedagógica forma parte de la cultura contemporánea. Las investigaciones científicas en este ámbito, que utiliza tecnologías educativas como robots y kits robóticos, han cobrado importancia y se han ampliado en todas las etapas de la enseñanza. El objetivo de este artículo es señalar las contribuciones de la Teoría Histórico-Cultural, a través de sus principios y conceptos, con el fin de posibilitar la discusión sobre el uso de la robótica pedagógica en la educación infantil y sus posibles influencias en los procesos de enseñanza y aprendizaje de los niños. Para ello, se llevó a cabo una investigación bibliográfica y una revisión de la literatura. La metodología se basó en la revisión de la literatura sobre conceptos tales como: actividad mediadora y funciones psíquicas superiores, derivados de la THC. Los resultados indican que la robótica pedagógica en la educación infantil puede contribuir a fines educativos, siendo la actividad mediadora intencionalmente planificada imprescindible para que pueda potenciar el aprendizaje de los niños.

Palabras clave: Robótica Pedagógica. Educación Infantil. Teoría Histórico-Cultural.

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