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The construction of knowledge from Piaget's perspective

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ABSTRACT
This article has as its theme the construction of knowledge from the perspective of Piaget and aims to recognize the process of knowledge construction and learning in people's daily lives. It was sought to highlight, in the theory of Jean Piaget, the functioning of the mind and the stages of development that contribute to the construction of knowledge. Identifying the learning difficulties and the factors that interfere in this process are the object of reflection of this writing. Although learning is a natural process, the identification of school learning problems and their causes by the teacher requires special attention and continuous and efficient intervention, as it is usually the result of a complex mental activity, in which aspects related to thought, perception, emotion, memory, motor skills, mediation, and previous knowledge are involved.

Keywords: Knowledge; Learning Disability; School.

1 INTRODUCTION

In the relationships that permeate the school, one can no longer accept the simple reproduction of knowledge. The school has been looking for changes in contexts that expand and innovate its pedagogical proposals, to offer the student an education that proposes the understanding of the world in which he lives, acting as a subject that actively participates in society. In this way it is important to obtain knowledge. Initially, we seek to understand what knowledge is and how it happens in social interactions.

The function of knowledge in the field of Pedagogy is to make the learner have more speed when understanding a certain subject, be able to fix concepts and information that people have already

learned. As for the types of knowledge, scientific knowledge stands out, which refers to information and data that can be proven through scientific methods. It is necessary, for this knowledge to become possible, the realization of tests and research in order to prove theories under study, so that one can reach the "truth about something" (MARQUÊS, 2017).

What we think from the experience is the empirical knowledge, which is the popular, the common sense, the observation and experience of the human being related to the environment, to other people and to the world as a whole. This type of knowledge is more focused on valuing traditions, so it does not worry about collecting information on a scientific basis, which can increase the chances of errors.

Another knowledge is the philosophical, which focuses on the relationship between individual and routine, based on subjective reflections, not taking into account material things. It is through this form of knowledge that concepts about the world and the human being are constructed. Theological knowledge is knowledge based on religion, without scientific proof, because its explanations are guided by faith and it is considered incontestable (MARQUÊS, 2017).

The subject when seeking knowledge begins to acquire information empirically, learning to do, but without understanding well where this knowledge comes from. Knowledge can be acquired by experience, such as the way a car is driven without understanding the mechanical process that its action begins.

People seek to find knowledge in school, in formal education, but at all times they are confronted with new knowledge, because the current society, seen as a "knowledge society", is directly related to the current lifestyle, cultural manifestations, information through technology.

Thus, it seeks to work the reality of the student and the knowledge that he brings with him to the school, through an innovative methodology that can intervene in the individual and collective reality, so that student and teacher work together in the construction of knowledge.

2 KNOWLEDGE CONSTRUCTION PROCESSES

The ideal school is one in which the student is the researcher and the teacher occupies a space of mediator, that is, it has no place for the simple reproduction of knowledge, but rather the (re)construction by the teacher and students developing skills together. In this sense, research is the best strategy for building meaningful knowledge for those involved, making them critical and reflective citizens in relation to the real world. In this process it is understood that in the perspective of Freire's pedagogy, knowledge is the action through which the subject makes the movement of taking for himself the reality in which he is inserted. For Piaget apud Delgado (2003, p. 44), "[...] One of the functions of the teacher is to understand how the student passes from a state of less knowledge to another of greater knowledge, which is closely related to the personal development of

the individual, whose main goal of education is the formation of autonomous people."

Intellectual development, according to Piaget's constructivist theory, happens when there is a relationship between the subject and the environment and thus constructs knowledge. Knowledge is also related to education. Education is understood as the production of knowledge, because it gives man the ability to elaborate ideas, possible attitudes and a range of concepts.

Thus, in the current search for knowledge, the importance of education for today's society is perceived, as well as the performance of its agents: teachers and students, such as those who provide knowledge and those who seek it respectively. In this sense, education should be understood as a process of construction of knowledge to which, students and teachers and, on the other hand, the current social problems and the knowledge already built, become the memory of humanity (MARQUES, 2014).

Thus, the construction of knowledge consists of enabling the student to establish relationships with the object, in order to apprehend it in its internal and external relations. Such a procedure should allow the student to establish cause and effect relationships and understand the essentials. The more comprehensive these relationships are, the better the student will understand them (MARQUES, 2014).

For Piaget (apud Delgado, 2003, p.55), learning has to do with the acquisition of knowledge. Therefore, "when building knowledge, there is what can be called learning, that is, learning is the result of the construction of knowledge that the subject makes in interactions with the environment." This is the understanding of this term for the author.

3 KNOWLEDGE AND LEARNING IN TEACHING PRACTICE

The teacher is constantly in training and this is fundamental for the good development of student learning. All agree that continuing education by the school is a resource widely used by public agencies in general, because it keeps teachers updated on content and new technologies through research.

With Piaget began the research of genetic psychology, which later gave rise to the so-called constructivism-interactionism, which had the objective of studying the process of acquisition of human knowledge. No longer believing in innate intelligence, it was considered that the genesis of reason, affectivity and morality making progressive stages all so that logical thinking is organized, and thus the student acquires the capacity for judgment and the moral life.

Jean Piaget (2004, p. 17) says that "[...] The period from birth to language acquisition is marked by extraordinary mental development." The author mentions that because it is a period of absence of words, its importance was often not suspected. It is a decisive period for the psychic evolution of the child, because it represents the conquest through the perception of the movements of

the entire practical universe that surrounds the child at this stage.

For Piaget, questions such as what knowledge is, how it develops, how we know what we know and how scientific knowledge is distinguished from other knowledge, only have an answer through genetic epistemology.

4 PHASES OF LEARNING DEVELOPMENT ACCORDING TO PIAGET

Initially, you need to understand what learning means to Piaget. This author does not use the term learning to refer to the construction of knowledge, he prefers the term "acquisition of knowledge". The meaning of learning is quite broad and is related to the conception that each educator adopts. Campos apud Delgado (2003, p. 55) mentions that learning can be considered as "[...] a systematic modification of behavior or conduct, by exercise or repetition according to environmental conditions and organic conditions." In the author's opinion, in coherence with Piaget's theory, learning results from the breakdown of balance, forcing the subject to seek to adapt to the new situation, through assimilation and accommodation.

Learning can be understood as the result of the interrelation of various structures, it is present throughout the course of life and the subject learns at all times. Jean Piaget, analyzing for more than fifty years the child psyche concluded that each child builds throughout his development his own model of the world.

For Oliveira-Formosinho (2007, p. 213) "Piaget's genetic epistemology clearly has as its object to show and describe the various varieties of knowledge, from its most elementary to its most elementary forms." For Piaget, according to the author, questions such as what is knowledge, how does it develop, how we know what we know and how scientific knowledge is distinguished from other knowledge, only has an answer through genetic epistemology.

In this way, Piaget gave credence to historical-critical and genetic methods to study the child's thinking and understand how this thinking integrates with already existing mental structures. For Delgado (2003, p. 28) "the concept of cognitive structure is central to his entire theory and are patterns of physical and mental action underlying specific acts of intelligence, corresponding to the stages of child development." Piaget's theory has two complementary aspects which are understanding the workings of the mind and the stages of development. It highlights three processes of development which are: assimilation, accommodation and adaptation.

It is understood that from birth, the child is responsible for the construction of his knowledge. Initially they are simple schemes, reflexes and that gradually turn into more sophisticated schemes. The child uses his body through physical knowledge, accompanies with the gaze the objects, releases, grabs, pushes, explores with the eyes and hands. These experiences are products of her own activity and are integrated into schemes elaborated by her. To this process of absorption that is offered by the

world, Piaget (2004), calls assimilation. The child absorbs something and incorporates it into his mental structure, absorbing the reality that surrounds him. Regarding the assimilation process, Delgado (2003, p. 49) points out that:

> [...] is the incorporation of elements of the environment into the structure of the subject. In other words, in interaction with the environment, the subject is faced with new information at all times, incorporating it into the knowledge he already has. The term assimilation, understood according to Piaget, comprises the activity of integrating new elements into existing structures through action schemes.

The assimilation process refers to the attempt made by the subject to solve a certain situation, using a mental structure already formed. According to Oliveira-Formosinho (2007, p. 214) assimilation refers to "[...] the ability to interpret and construct the outside world, objects and actions, according to a mental framework available at a given moment."

When the assimilated schemes begin to be organized, accommodation occurs. According to Oliveira-Formosinho (2007, p. 215) "[...] accommodation implies the alteration of the stage of cognitive processing of the subject at a given moment, in order to incorporate the new experiences". To accommodate, the child must be led to think, to reflect, to perceive the difference between things.

The logical-mathematical knowledge is built once and will never be forgotten, it is not acquired from reading or from someone's account, but from the actions of children on objects. Social knowledge is built at the same time with physical knowledge and with logical-mathematical knowledge, accompanying both knowledges. The child learns to socialize and to have notions of values. According to Wadsworth (1998, p. 29) "[...] The child's actions on objects and interactions with other people are of fundamental importance in the construction of knowledge."

The four factors that lead the subject to build knowledge according to Piaget, are maturation and heredity, active experience with objects, social interaction and balance. All these factors explain the cognitive development of the child. For Piaget apud Wadsworth (1998, p. 36) "[...] Parallel to cognitive development is affective development. Affection includes feelings, interests, desires, tendencies, values, and emotions in general." In the Piagetian perspective, affect develops and has a profound influence on intellectual development, and can accelerate or slow down the pace of development. Thus, the affective and cognitive aspects develop in parallel, in the same sense as cognition and intelligence.

The construction of intelligence occurs in successive stages, called stages of development, with increasing complexibilities, chained to each other. The stages are stages of development and take place in sequence. Oliveira-Formosinho (2007, p. 206) understands that "each of these stages is characterized by a particular cognitive structure that determines the type of intellectual approach that the subject performs with the environment that surrounds him". For the author, the different set structures are neither innate nor finished. They are built progressively and result from a balance and

an assimilating and accommodating activity. Therefore, Piaget (1975) separates the intelligent cognitive process into two words: learning and development. According to Macedo (1994) for Piaget, learning refers to the acquisition of a particular response, which was learned through experiences obtained repetitively or not. While development is recognized as learning in fact, being responsible for the formation of knowledge.

5 STAGES OF DEVELOPMENT FOR PIAGET

In his theory of child development, Piaget (1975) describes four stages that he calls transitional phases. These four phases are Sensorimotor Stage (0 – 2 years); Preoperative stage (2 – 6 years); Concrete Operative Stage (from 6/7 to 11/12 years) and Stage of Formal Operations (from 11/12 to adulthood).

5.1 SENSORIMOTOR STAGE (0-18 MONTHS): THE NEWBORN TO THE LACTATING

The first stage begins in the sensorimotor period, in which the development of coordination and relations of order between actions is verified, in the evolution of perception and motricity, extending from birth to the appearance of language, around two years. This period is divided into six substages, which are: exercise and reflex, in which the activity is purely reflex; perception and habits, where the first differentiations occur; development of practical and motor intelligence, with the reproduction of interesting events; coordination of schemes, invention of new means and the period of representation.

The sensorimotor stage is essentially based on the immediate experience of the senses. At birth the baby presents simple reflex behavior, which will

broadening to make way for action schemes. For Wadsworth (1997, p. 38),"[...] the adaptation of babies to the environment and their organizations of the environment that surround them occur initially, through sensory and motor relationships. Therefore, the roots of all intellectual development lie in primitive sensorimotor behavior.

In his writings Piaget (1968), explains that affective and cognitive development happens during the first two years of life. In this period the child makes his first differentiations, builds the notion of object and acts on them, structuring notions of time and space. The discovery of the notion of permanent object is fundamental to the formation of space, time and causality, understanding the effect and cause of things. Initially the child realizes that the object continues to exist, but does not understand the displacements. Then it follows the simple displacements and finally follows the more complex displacements (WADSWORTH, 1997).

These notions will be built by the child throughout their development in daycare. As with the notion of permanent object and other developments, the notion of causality is considered one of the

most important indicators of the affective and intellectual development of this phase. Questions that require explanations when children are presented and that lead them to give answers, show the notion of causality.

Causality is present at different age levels. The idea of causality is present when the child realizes that he can interact with other objects and that these other objects interact and cause effects on him.

As the child develops, changes occur, such as the coordination of vision and touch. It develops the permanence of the object and the notion that objects other than itself can cause events. Intelligent behavior begins to manifest itself at the beginning of the second year, as the child builds new means to solve problems through experimentation. It subsequently becomes able to represent objects and events internally, allowing the invention of new means to solve problems through mental activity.

In this phase, intelligence works through perceptions and actions, through the displacement of the body itself. According to Goulart (2003, p.75) "[...] to the

As intelligence develops and the notion of permanent object is formed, causality becomes objective and specialized." Their causes are no longer located in the proper action and in the relations of cause and effect, at this moment they take into account the physical and spatial spaces. The child becomes aware of the self and distinguishes the external reality and his own self. But because achieving objectivity is a time-consuming process, she still uses the non-objective explanations.

This stage is also characterized by other cognitive constructions such as the differentiation between means and ends, where the child acquires knowledge about the nature of objects and their possibility of action on them. Also, the construction of time, space, intentionality and affection are characteristic of this moment.

For Piaget (1968), the sensorimotor stage that covers the first 18 months of life is a decisive period, because the child, even if he does not present thought or affectivity linked to the representations through the symbolic function, elaborates at this level, cognitive structures that will serve as a starting point for the later perceptual and intellectual constructions, as well as a large number of affective reactions that will determine in part his subsequent affectivity.

5.2 PREOPERATIVE STAGE (2-6 YEARS): EARLY CHILDHOOD

The stage of preoperative development occurs from two years to about seven years and is characterized by the preparation and organization of concrete operations. At this moment, the child's thinking is characterized by the appearance of new capacities, such as socialization and representational skills. The characteristics of this period are egocentrism, centeredness, absence of reversibility and the inability to keep up with transformations. The ability to represent objects and events is the main development of the preoperative (WADSWORTH, 1997).

Among the types of representations are the deferred image, which is the child's ability to mentally represent images of objects and events that have been distant for some time. The symbolic or make-believe game happens when the child makes representations of the objects, giving them another attribution. In symbolic play there is no need for communication with others. It is a form of self-expression, having only oneself as an audience. Through drawing grows in the child the effort to represent things and his efforts become more realistic. Mental images are the internal representations of objects, are imitations of perceptions, keep a similarity with them and are conceived as symbols (WADSWORTH, 1997).

The development of spoken language happens around the age of two, when the child begins to employ spoken words as symbols instead of objects and thus, a sound begins to represent an object. During preoperative, Piaget sees language as a gradual transition from egocentric speech, a collective monologue, to intercommunicative socialized speech. Children acquire spoken language in the social knowledge that is constructed as they interact with adults and other children (WADSWORTH, 1997).

In the conception of Wadsworth (1997, p. 71) "the child constructs language. At first the child misunderstands the code and learns the rules of language by his experience and the childish constructions become refined." They acquire spoken language in the same way they acquire another knowledge. The child's thinking in the preoperative period represents an advance over the sensorimotor child's thinking, but it does not reach the advance of the logical operations of the following levels. Cognitive behavior is further influenced by perceptual activities.

The obstacles that hinder the child's logic are self-centeredness, centeredness, lack of reversibility, inability to keep up with transformations, and inability to solve conservation problems. As the child is egocentric, unable to put his point of view, centered on a single focus to the detriment of the others, does not follow the transformations, so his thinking is slow and very concrete, it is not reversible. Their thinking is still under immediate and perceptual control (WADSWORTH, 1997).

5.3 CONCRETE OPERATIVE STAGE (FROM 6/7 TO 11/12 YEARS)

In the concrete operative the subject reaches the use of logical operations for the first time. Wadsworth (1997, p. 103) says that "unlike the pre-operational child, the child of the stage of concrete operations does not present difficulties in solving conservation problems and presents correct arguments for their answers." In this sense, thought ceases to be dominated by perceptions and the child becomes able to solve problems in his experience. The child is no longer egocentric in thought, he can take the point of view of others and his language is communicative and social. Decentralizes your perception and attentive to the transformations, the reversibility of thought is developed. Serialization and classification are developed and important intellectual capacities to form the concept of number.

In this period, they develop affectively, the sense of obligation to the norms of values and the regulation of affective judgment is perceived. There is a progress of moral concepts such as the understanding of rules, lies, justice, accidents. The emergence of autonomous feelings and cooperation become a real possibility.

5.4 STAGE OF FORMAL OPERATIONS (FROM 11/12 TO ADULTHOOD)

The last stage of mental development, according to Piaget (1975), is the stage of formal operations. The formal surgery happens when the reasoning is independent of the content and what is concrete. Reasoning becomes hypothetical-deductive (ability to think about the hypothetical, imaginary) as much as about the real, as well as the ability to deduce conclusions from hypotheses.

At this stage the propositional or combinatorial operations and the operational schemes of proportion and probability are developed. Moral autonomy and rules are understood as necessary for cooperation. Lying is seen as wrong behavior because it breaks trust. Personality reflects individual efforts to adapt to the adult's social world. In this period scientific reasoning and the construction of hypotheses are characterized, using the logic of argument. According to Piaget (2004, p. 64), this is the mental development, because it is verified,

> [...] the profound unity of the processes that, from the construction of the practical universe, due to the sensory-motor intelligence of the infant, reaches the reconstruction of the world by the hypothetical-deductive thought of the adolescent, passing through the knowledge of the concrete universe due to the system of operations of the second childhood. It was seen how these successive constructions consist in decentralization of the immediate and egocentric point of view, to situate it in broader coordination of relations and notions, so that each new terminal grouping integrates its own activity, adapting to a more global reality.

Piaget (2004), studied the process of adaptation of man to the environment and therefore gave much importance to the process of interaction of the individual to the environment, which results in logical structures, produced by the individual, which allow acting on the world in an increasingly human and flexible way. His propositions are based on interactionism, the idea of sequential constructivism and the factors that interfere with development. For Piaget (2004), learning is the result of the construction of knowledge that the child makes in interactions with the environment and is present throughout the course of life. But learning depends on factors internal and external to the subject and this brings influences to the success of learners, as well as learning difficulties. This is the subject of the next chapter.

6 FACTORS THAT HINDER LEARNING

According to Delgado (2003, p. 57), "the external conditions are more varied than the internal ones and likewise responsible for learning". The conditions that influence learning are the cultural, socio-political and economic environment. Some schools, in order to remedy deficiencies of this

nature, make available to students' audiovisual resources and teaching methods that facilitate learning.

Because of these factors, some children do not learn and do not have the same performance and ability as others. Each child has their own learning characteristic and different interests. Thus, each student may present satisfactory skills for a certain type of learning and fail in other types.

Some factors need to be considered to understand success and failure in learning. These factors consider the difficulty to learn as a symptom, which fulfills the positive function as integrative as learning, and which can be determined by organic factors (health, nutrition, glandular functioning, shelter, comfort for sleep) and the neurological issue. They are related to aspects of the functioning of the sense organs and the central nervous system. Specific factors (articulation of words, graphic inaptitude, difficulty in writing and reading words), are related to some difficulties that are specific to the individual, which manifest themselves in the area of language or in the spatial and temporal organization, among others (DELGADO, 2003).

Psychogenic factors (sexuality, compulsion or failure in the face of success, punishment, fear, ambition, rejection, anxiety, trauma and phobias), and it is necessary to differentiate between learning difficulties of origin of a symptom or an inhibition. When related to a symptom, not learning has a significant unconscious; When related to an inhibition, it is an intellectual retraction of the ego, occurring from a decrease in cognitive functions that eventually leads to problems to learn. And finally, the environmental factor (quality, frequency and abundance of stimuli, aspects of housing, availability of leisure and sport, availability of culture channels, vocational and professional openness), which are related to the objective environmental conditions that may or may not favor the learning of the individual (DELGADO, 2003).

These are some of the factors that influence learning, according to Piaget. Others may also be considered when it is stated that a child does not learn due to disability and lack of interest. According to Delgado (2003, p. 59) "learning is related, therefore, to the understanding of what the child is wanting to learn and it is not by repeating or making him repeat rules and formulas that he will learn". Learning is the result of the construction of knowledge by the subject himself.

Therefore, there are many factors that interfere with learning. The educator, the school, the family and society involve sociocultural aspects that are important for a child's learning. In school, the teacher plays an important role in identifying learning problems.

Children with learning disabilities are a challenge for educators. Many regard them as disinterested and lazy students. This attitude of the teacher, in addition to labeling the student, hides the teaching practice of the teacher, because it attributes to the student's certain adjectives for lack of knowledge on the subject.

It should be noted that there are teachers who do not identify learning problems of an organic,

psychological and social order that students may present. It is up to the teacher to know the most common problems in the teaching-learning process, so he will expand his knowledge and can reflect his practice, his perception and vision of the whole, of what happens in the classroom (DOMINGOS, 2009).

The teacher must also differentiate between learning disability and learning disability. Learning difficulties occur at any time in the teaching-learning process and are transient. The word disorder can be translated as a pathological abnormality by violent alteration in the natural order. It refers to a problem or disease that affects the student on an individual and organic level. For Domingos (2009, p. 06) "the excessive use of the expression learning disorder in everyday school life would be more a reflection of pathologization of learning or the biologization of social issues". The use of this term draws attention to children who attend school and have learning difficulties.

It should be noted that this label caused children to be ignored for years, misdiagnosed or mistreated. The difficulties they presented for years were designated as hyperactivity, hyperkinetic syndrome, brain dysfunction, learning dysfunction, learning disability. Learning disorders would be the result of medical thinking, with the character of neurological diseases. That is why it is important for educators to know how to differentiate these two concepts and their implications in the classroom.

7 FINAL CONSIDERATIONS

It is understood that people try to find knowledge in school, in formal education, but at all times they are confronted with new knowledge, because the current society, seen as a knowledge society, is directly related to the current lifestyle, to cultural manifestations, to information through technology.

In the explanation of the investigation, the phases of the development of knowledge and learning for Piaget were addressed. This author studied the process of adaptation of man to the environment and therefore gave much importance to the process of interaction of the individual to the environment, which results in logical structures, produced by the individual, that allow acting on the world in an increasingly human and flexible way.

For Piaget, learning is the result of the construction of knowledge that the child makes in the interactions with the environment and is present throughout the course of life. However, learning depends on factors internal and external to the subject and this brings influences to the success of learners, as well as learning difficulties. Because of these factors, some children do not learn and do not have the same performance and ability as others. We understand that each child has their own learning characteristic and different interests. Thus, each student may present satisfactory skills for a certain type of learning and fail in other types.

I conclude, through this research that the problems in education have always existed and the

school has been suffering the evils of an unequal society that reflects on the teaching-learning process. Many teachers are unaware that students may present learning problems of an organic, psychological and social nature. Therefore, it is up to the teacher to know the most common problems in the teaching-learning process, because he will expand his knowledge and can reflect on his practice, his perception and vision of the whole, of what happens in the classroom.

The causes of learning disabilities are many, and are not always detected at school or in the family. Often, children suffer discrimination in the classroom or at home, for having difficulties to understand information, a task requested at school, often activities, which most of the class solves without the help of the teacher.

It should be noted that awareness is fundamental about the learning disability and this goes through many paths and a specific and detailed look is necessary to be able to help this child, referring him to the diagnosis of a specialist, to together find ways to motivate him in the classroom.

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