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The cognitive sciences: preamble to understand the operation of the schemes of the human being

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SUMMARY

Several generations of cognitive science studies have resulted in a wide variety of theories. In these, different aspects of the system that allow the human being to function in different environments are addressed. This is possible, because the brain system is plastic (adaptable), restructures itself on a scale of reality, imperceptible to the human senses. Along with this quality, there are others that encode information. That is the case of the mirror neuronal system that encodes the intentions of others, which allows us to understand each other.

Learning schemes can be structured, considering the holographic model of the mind, which exposes the way in which consciousness is distributed throughout the brain system and functions as a mechanism for information retrieval from different areas. These systems have as a product what in neuroscience is called memory, which is individual and collective.

Finally, language supports these mental capacities and allows the communicative manifestation of the schemes, through interaction with others.

1. INTRODUCTION

The ideas developed in this theoretical article come from several generations of cognitive science studies, but guided by an integrative perspective, which helps to have a general vision of how the human being works[1].

For what is stated in the previous paragraph, it is affirmed that a man as a specie is bio-neuro-psychological, communicative and socio-cultural. All these concepts are simply summarized in a human being, that lives in reality -in a context-environment / in a space-time- and acts to transform it.

From the biological point of view, following Maturana (1990), the human being is a second-order autopoietic living being (the cell is a living being of the first order), which develops in a social environment. Therefore, social phenomena belong to the category of biological phenomena, insofar as they are produced by the actions of beings that involve autopoiesis. This concept defines the process by which a living organism, through an autonomous network, produces itself in its closed dynamics (Maturana and Pörksen, 2004). This way of understanding life, especially the nervous system, was developed by Maturana since 1968:

> (...) had realized that the phenomena associated to the perception are understood only if it is understood the operation of the nervous system as a network closed circular internal correlations and simultaneously concluded that the organization of the living being explained itself to see it as a operate circular closed production of components that produced the same network of component relationships that generated them (theory that later called autopoiesis), (Maturana and Varela, 2003, p.XXI).

The living phenomenon allows the author to propose a set of basic systemic laws which extend the awareness that each subject is biological cultural, generates and evokes the worlds that inhabit their daily living (Maturana and Dávila, 2008) in his or her community, work institution or study center. This system of laws has implications that cover all areas of human life, seen as the possibility of:

- Know, understand and explain.

1. The first generation in cognitive sciences have a theoretical proposal focuses on the concepts of representation and computing as a human way of processing data. The second one develops the connection model, which is used by the human being to construct the reality by sense webs that activate a neuronal level. The third one construct a theoretical proposal about a corporal, interactive and situational base in the way a human being construct a reality. The last versión involves aspects of the previous generations, it is based on an experimental approach. At the beginning every experience is complex related to diverse aspects or levels of hierarchy interrelated and conjugated in a sociocultural matrix that favors the development of the capacities of the nerves system, the establishment of meaningful associations among diverse situations, the evaluation of emerging process that result from the socio-cultural practice and provide of systematization the human cognition through a shared network sense, the representations of determine aspects of an experience through other practices and the transformation of the socio-cultural practices at constructing and applying devices by the language, the studies, the creativity, the capacity of standardizing of the cognitive process related to the meaning and the use of instruments or devices of the surrounding (Redondo, 2012).

- Observe, reflect and communicate to others, bring to light the changes experienced, broaden reflection and recursive understanding of oneself.
- Do, according to regularities and structural and functional operational coherences of the living organism that are conserved in all circumstances and instants.
- Expand the recursive capacity to reflect on their own life.
- Live the reality, validate it, make distinctions about it, even if afterwards it doubts its validity.
- Investigate the history of the constitution of human life in its evolution.
- Change yourself and the environment, maintaining a balanced relationship.
- Observe the domains in which living beings exist and operate, in the changing present continuous.
- Assimilate the changes during the transformation process, allowing adaptation and conservation.
- Obtain results in relation to the possibilities created in the historical evolution.
- Operate as a center of the environment-context where one lives, is the reflection of the biological matrix of existence.
- Obtain results with processes that use disjoint domains of reality and knowledge.

Distinguish the components, the organization, operation, changes and maintenance of the structure (identity) in a living being, as a closed system and open to the environment.

All possibilities allow the human being to live in a biological-cultural matrix, which in turn generates, realizes and preserves the biological-cultural niche in its different socio-cultural areas: labor, educational, scientific, artistic, sports, etc. So, the result of this system is the matrix synthesis, which is known as continuous learning. Luzoro (2006), considers that this occurs "(...) when the behavior of an organism varies during its ontogeny in a manner consistent with the variations of the medium, and it does so following a contingent course to its interactions in it" (p.36) . This is so, because the organism is adapted to that particular medium (information, data, meaning), representing and storing it in its memory in the form of memories. During this process it conserves his corporal and mental organization as a reference that guides the structural changes operated with learning.

From this double point of view, the teaching-learning process is reduced to the second part of the correlate, because both the teacher and his students contribute, each with its own mental structure, body and knowledge, to reach a new level of cognitive, social and cultural

development. In the classroom, everyone is transformed, which can be seen in the history of their interactions: performances and speeches.

2. MATERIAL AND METHOD

This article is part of the theory that supports the doctoral thesis: "Grammar learning schemes". The main method used was the search and tracking of information, which is called bibliographic method. Hence, De la Torre and Navarro (1982) express:

> The acquisition or acquisition of knowledge, the establishment, organization and expansion of it, as well as its transmission, require special rules, a methodology that requires and educates in thought and expression, that stimulate and strengthen them. Thus, the method is a logical process, arising from reasoning and induction. (p.3)

Considering that the obtaining of information occurs directly or indirectly, and this last procedure is common in the current research practice (Sierra, 1986), the development of the subject: **"The cognitive sciences: preamble to understand the functioning of the schemes of the human being"**, focused its selection focus on those theoretical aspects that allowed to create the basis for the cognitive understanding of the theories that Piaget and the Neopiagetians developed.

Conceptualization and definition as strategies that make up the interpretive method predominated in the investigation. With this, it was gotten in a systematic way, to the structuring of theoretical expositions, that later favored the construction of the schema theory which was proved during an intense process of inquiry in the classroom.

3. THE COGNITIVE SCIENCES TO UNDERSTAND THE FUNCTIONING OF HUMAN LEARNING SCHEMES

3.1. Neural plasticity

All the distinctions that the human being can make in relation to the internal and external world, can be represented in an adequate and coherent way through the first order perceptual system: sight, hearing, touch, smell and taste. The knowledge, thoughts and feelings are structured schemas in the brain through a process, which generates the primary or external representational system. These processes can be coded in patterns of operation, depending on the perceptor employed (Carrión, 2005).

However, it is the second order representational system (Central Nervous System), which organizes and controls the configurations that the first one has been forming. This organization is not static, but dynamic, flexible, because it tends to change and reorganize from the recurrent categorization carried out by this system, which is made up of all the action schemes that are engramatized in the brain.

Each reconfiguration occurs by the relationship of the human being with his environment and with other members of his species. That is, language and communication also shape the neuronal structure. A series of skills are involved in the communicative phenomenon, Lugarini (1994) refers to them as "speech skills". These micro-skills or micro-schemas: ideative, pragmatic, syntactic, semantic and technical, comprise numerous elements that in turn are requirements for the fulfillment of the communicative function. Thus, the search and handling of information, the uses of the language, the ways in which its paradigmatic and syntagmatic schemes are structured and operate, the understanding of what is expressed (up to what is thought), are coadjuvants in the production of communicative units, able to transfer messages to one or several listeners, therefore, capable of transforming the neural networks and the schemes that are formed in them (learning).

Therefore, any signal of interaction involves a series of neurocognitive procedures, which work in a coordinated manner so that human communication can take place. All the messages addressed to the brain and from it are coded in neural language, and that language is the activation of the initial processing of the mind's operating system, to collect small and specific parts of the outside world. Therefore, the brain is a powerful filter of information which is directed by specialized mental schemes of evaluation, which does not allow the chaotic accumulation of information.

This is so, because this system has an intrinsic capacity called ***cerebral plasticity***, through which it restructures itself on a scale of reality, imperceptible to the human senses. This is what Maturana and Varela, 2003, Maturana, 1990, Maturana and Pörksen, 2004, Maturana, Luzoro, 2006 and Maturana and Dávila, 2008) call autopoiesis of living organisms, a process that occurs in the nervous system central of the human being with all its biological, neurological, psychological, sociocultural implications, etc.

The cerebral plasticity is a property of the brain, in terms of causality, produced by the functioning of the nervous system, the effects of the environment on the living organism and the experience of it in relation to the situations it faces. This is defined as the ability of the nervous system to change neuronal circuits during development. It is considered that the system of an adult person, also has that capacity to learn (new skills, establishment of new memories, face brain injuries, face new situations, etc.), which is based on carefully regulated changes -brew or more lasting according to experience- in neuronal synapses (Purves et al, 2007).

The plasticity, as brain capacity, generator of learning was corroborated by Kandell (2007) in different experiments with living beings called *Aplysia*. This proved that experience produces learning and this is the final synthesis of complex processes of neuronal malleability:

- Both the anatomy of the neural circuit and the firm modifications that occur in it are examples of the practice implies perfection, to say support the memory.
- Modifications in the interneuronal synapses underlying learning may be sufficient to reconfigure both the neural network and its information processing capacity.
- Different forms of learning can modify neural networks, attenuating it by habituation (long-term memory) or reinforcing it through sensitization and conditioning (short-term memory).
- Learning involves various forms of synaptic plasticity to create complex forms of connection.
- Memory is formed in stages. The short-term memory lasts a few minutes, this gradually -through repetition- becomes long-term memory and can last many days or longer periods.
- Long-term memory is not a mere extension of short-term memory. With the first increases the amount and synaptic activation, with the second decreases.
- With the necessary reinforcement, better memories are produced, therefore, learning is lasting.

If an analogy is made with the human being, Kandell's contributions are a first base for understanding the learning schemes seen as a result of human experience. To study them, it is not only necessary to know what happens in the brain (which is not the subject of this thesis), but to think that these processes are manifested in the behavior of the subject. Therefore, reproducing a certain learning implies a complex order of realization, which, as pointed out by Maturana and Dávila (2008) allows us to observe, know, understand and explain it, through new ways of perceiving human action.

This implies that both the observed and the observer share knowledge and practices. This happens, because individuals are endowed with a nervous system, among whose components is a system that favors learning. That means, all experience leaves a mark inscribed in the brain, a product of plasticity (Anserment and Magistretti, 2006), but that imprint -from the point of learning- is not impressed in the same way in each subject, therefore, the Kandell's (2007) explanation of the mechanisms that produce it and its effects, when it comes to human learning, is in a complex situation.

3.2. Mirror neurons

Another theory that can help the study of learning schemes is the one proposed by Iacoboni (2009). This argues that there is a neural system, which encodes the intentions of others,

that is, in addition to reading the world, humans read other humans. This system is composed of groups of specialized nerve cells - mirror neurons - that make it possible to understand them. Each person can understand the pain of another, the actions, the language[2], because a kind of neural template has been formed in the brain, a correlate of that feeling, language or action.

The system of mirror neurons can differentiate human actions and their intentionality in different contexts. This is because the brain can reflect them in a specular way, therefore, the subject can anticipate the movements and words of others -these nerve cells are located near the primary motor cortex, which sends electrical signals to the muscles, therefore, cooperate with motor behavior. Experimentation supports the hypothesis that mirror neurons encode intentions. Greater activity of these was observed while the individuals observed the prehensile action in the context of drinking than in the context of cleaning, because drinking is a more complex intention than cleaning (Iacoboni et al, 2005). These same regions with their mirror cells are activated when each subject achieves their own intentions in relation to the action taken by others (Iacoboni, 2009).

Gestures are an essential part of language, as well as words, phrases and sentences, so they make up the same system. Gestures often represent what is not achieved with language (McNeill, 1992). Golding-Meadow (1999), observed that the lack of correlation between words and gestures generates a high activity in the brain that favors the learning of new concepts in young students. Alibali, Heath and Myers (2001) studied how the presence of a screen that separated the speaker from the listener eliminated the realization of iconic gestures that reflect the content of the speech and not the rhythmic gestures that only mark rhythmic movements of the hands. The researchers concluded that the former help the listener's understanding and the latter the speaker's expression. On the other hand, (Molnar-Szakacs, Wilson and Iacoboni, in Iacoboni, 2009), verified that mirror neurons are activated more when the individual observes the iconic gestures that facilitate communication and understanding, than when observing rhythmic gestures.

The hypothesis that mirror neurons have greater arousal when they code hierarchically organized manipulations (Greenfield, 1991), is important to understand how these cells cooperate in the realization and understanding of articulated language. The experiments of Fadiga, et al (2000), in which two types of words were used -some with strong sounds of multiple vibrations and others with soft sounds of dental fricatives deaf- confirmed that when individuals heard words with strong lingual movements, these small movements of the tongue performed greater activation of the motor cortex, than the mild ones. Another experiment that consisted of pronouncing syllables aloud, while hearing with hearing aids to pronounce them to

2. It excludes autistic people without treatment.

other people, confirmed that the same motor area was activated when they spoke and when they listened (Wilson, et al, 2004).

In synthesis, the human brain-body is an autopoietic system, whose plastic capacity and the system of mirror neurons can produce learning. No matter what mental model is adopted -there are four generations of theories about the mind- these abilities are real in all living beings. Because this study has resorted to action schemes, as a theory to investigate grammatical learning, an argument is needed that at least helps to understand how information is processed into schemata. Until now, we only know what happens in interneural physical structures, but we cannot capture those images, models or schemes, which are known to be real, because they live with their owners, the only ones who can confirm their existence.

An important theory that comes close to this is the holography of the mind. A hologram offers the complete vision of the whole in three dimensions, so it is thought that this is what happens in the brain. The holographic model of the mind explains that consciousness is stored throughout the brain, and that it arises whenever information is required to be used. He makes a selection collecting it from all parts, by means of a kind of temporal-spatial mathematical analysis and synthesizes it in a single symbolic image (Melo, 2011).

This property was discovered in the visual centers of mice when it was extirpated a 90% of the visual cortex. It continued developing activities that required the use of sight (Briggs y Peat, 2005). So, the brain processes images by an internal hologram and each one of its parts it is constructed the total result captured by the eyes or any other sense. Physically, the electric slings are distributed around the whole brain as a result of the dense concentration of nerves cells. Therefore, with the expansion, they cross each other creating caleidospies collections of interfering nerve information, which can confer holographic properties to this organ (Talbot, 2007).

The former ideas are based on a proposed model by Príbram y Ramírez (1980). It was called nerves hologram, which has the following functional configuration, that pretends to explain in a microscopic observation scale how the human learning emerges.

- A neuronal network of three layers denominated: entrance, transformation and exit. In this some dynamics and statistic settings occurred and interact among them.
- The local sensibility of a concrete point of a cell measures the effective support that a presipnatic neuron administer to the total activation in that place.
- The contribution depends on the place where the information gets, in other words, depends on the position and the microstructures of the neuronal connections.
- Microstructured cells where the information is storage in a static way.

- The properties that results from the interneuron activity: storage, recognition and memories, depend on the activity of a specific citoarquitecture of the coefficient of coupling and the values of sensibility of the neuronal membranes.
- In order to storage information by the neuronal network it is required sequence in the transformation of the entrance.
- What is storage being not a real and complex image, but the values of intensity of the information.
- The information that is received will be distributed in all the neuronal network that conform regions where the synaptic microstructure begging in stability.

Against this model, some critiques have merged. Among them, the most relevant is the dualist, who see the brain hologram? The answer: the emergency itself of the corporal action. Varela, Thompson y Rosch (1997), with an integrated approach considers that the human cognitions happen by the sensor-motor experience of the body that belongs to a wider biological, psychological and cultural context. It means, the individuals- world is determined by the behavior and the environmental phenomenon, because of that it can be consider a hologramatic being.

As hologramatic human being each part of the body-world is a bridge between both orders of the reality: individual identity and the holonomy of everything. Therefore, the parts of the total of each person are reflected, this particularity is explained because all the sectors of the brain participate in any representation, respecting the corresponding specializations; therefore, it is not limited to be a set of modalities of informational processing, but some forms of knowledge are nestled and distributed by the entire brain (Melo, 2011).

The distribution of information is not only possible because of the autopoietic capacity of the organism, but to a certain extent it is also determined by the holomovement. In other words, it is a product of the non-local connections of the subatomic world as the basis of all the manifestations that exist in the material universe:

> (...) the content or meaning that is «folded» and «transported» is, mainly, an order and a measure that allow the development of a structure (...) what «transports» an implicate order is the holomovement, that its It is also a whole not fragmented or divided. In some cases, we can abstract particular aspects of the holomovement (for example, light, electrons, sound, etc.), but, more generally, all forms of holomovement intermingle and are inseparable. Thus, in its entirety, the holomovement is by no means limited at all (Bohm, 1998, p.122)

The mind, thought, emotions, desires, will, etc., which are based on memory, are material processes, manifestations that emerge from the implicate order as do all matter, therefore, they are not different from this (Bohm and Weber, 1982). Therefore, they are part of a domain that

does not go beyond matter and expresses order, coherence, unity and totality in the physical plane. "It is a deeper and more extensive movement that creates, maintains and finally dissolves the structure" (Bohm, 2002, p.129).

The structures that support or in which the ideas of Bohm (1998), Príbram and Ramírez (1980) are expressed, can be those presented by Salatino (2009). This considers that the cerebral cortex -most neurobiologists accept it- is formed by a double anatomical-functional structure: the horizontal arrangement of layers parallel to the cortex and the distribution of vertical arrays in the form of columns that cross orthogonally to the horizontal layers.

Despite the controversy generated by this type of theories, there is sufficient evidence to suggest that the anatomical columnar disposition evokes a basic cytoarchitectonic pattern on which the structure of the most important functional part of the brain is built in the same species and species different.

The basic unit of the mature bark is the minicolumna. It is represented by a chain of neurons of vertical disposition that crosses from layer II to VI (Mountcastle, 1997). In studies with primates, it was observed that each minicolumn contains between 80 and 100 neurons; except in the visual cortex where the number is 2.5 times greater. In humans, the diameter of these structures is significant (40 to 50 μm), and they are separated from each other, by about 60 μm (Buxhoeveden and Casanova, 2002a).

The minicolumns are assembled in larger structures, called macrocolumns or modules of 300 to 600 μm in diameter. Each of these contains about 60 to 80 minicolumns surrounded by six other columns. These adopt an approximately hexagonal arrangement, in the shape of a honeycomb (Favorov and Diamond, 1998a). This disposition has been proven in several regions of the cerebral cortex through a series of anatomical and physiological indicators (Buxhoeveden and Casanova, 2002b).

All biological processes operate in the time domain, this affects the columns, their cells, conduction pathways and synapses. The temporal sequence affects more the vertical organization of the columns than the horizontal. Therefore, the horizontal sector included in each one, would cause horizontal layers to affect all temporal phases of neuronal activity (Buxhoeveden and Casanova, 2002a). Without a correct sequence in neural activity, the nervous system would degenerate into a chaos and the interface between micro and macrocolumn would be lost, therefore, learning would not occur.

From the foregoing, it is extracted that this columnar organization is the basis on which, as nervous correlates, the captured information of the world is formed, stored and activated,

according to the requirements that the human brain-body system has. Therefore, this structure and its functioning can be the basis for the formation of learning schemes.

3.3. The memory

With the above considerations, it can be said that the functioning of the brain is the product of an incredible amount of mental processes. These have as basis of operation, in a mature human being, the storage system that keeps not only the daily experience, but the memories of the lived experiences. These are individual and collective, because the memory -which is understood as learning- is not only owned by an individual, but by all those who participate in the social events that surround it. That is, we are in the presence of a collective memory (Halbwachs, 2004).

Human memory has two components: the individual memory system and the collective system. The first system is in the brain of each person, it has its types, ways of functioning and utilities. For this, it is necessary to consider memory as part of human activity, its social activity, its training processes and development of its capabilities. In this sense, the following types and levels could be distinguished, from a model that considers the emotional and social system of the individual:

Table 1. Types of memories based on emotions and social behavior.

CONSCIOUS LEVEL REPRESENTATION MEMORY	MEMORIES OF CONSCIOUS LEVEL PROCEDURES
Memories of representations of subconscious level	**Memories of procedures of subconscious level**
Affective representations	**Emotional procedures**
a) Intrapersonal: 1. In relation to joy: bliss, pleasure, happiness, success, jubilation, enthusiasm, animation, pride, optimism, relief. 2. In relation to sadness: suffering, depression, grief, depression, nostalgia, abandonment, shame, guilt, remorse, melancholy, discomfort. **b) Interpersonal:** 1. In relation to love: affection, tenderness, esteem, sexual desire, lust, orgasm. 2. In relation to anger: grievance, frustration, indignation, contempt, envy, jealousy, hatred, anger, revenge, disgust. **c) Extra personal:** 1. Regarding the surprise: admiration, disbelief, stupor, ecstasy, disgust. 2. In relation to the anguish: alarm, fright, horror, terror, tension, worry, dread, panic.	

Table continues on next page

Cognitive representations	Productive procedures
• Regarding personal (corporal) space: body outline. • Regarding the personal peri space (the space that surrounds us and is within reach of the hands): it comprises the knowledge of the spatial relationships of things with each other and in relation to oneself -such as distance, perspective, location, size, shape, weight, texture, humidity; melody, harmony, rhythm, lexicon; use of objects and instruments; knowledge of faces and other people.	• Regarding the telepersonal space: of routes, places, orientation in outer space; the empirical and scientific knowledge of the outside world, which includes things and processes not experienced by oneself.
Conative representations	**Volitional procedures**
• Fundamental reasons: convictions and responsibilities.	• Operational reasons for social work: 1. intentions, obligations and duties; 2. aspirations, interests, objectives and purposes; 3. Prejudices, perspectives and pretensions; 4. Ideals and passions.

Source: (Adapted from Ortiz, 1998, pp. 49-61)

Another classification on memory considers it as an information processing system, which creates meaning from a series of necessary processes that result in a human being facing reality from that knowledge he has created:

Table 2. Types of memories as an information processing system.

CONSCIOUS LEVEL REPRESENTATION MEMORY	MEMORIES OF CONSCIOUS LEVEL PROCEDURES
Memories of representations of subconscious level	**Memories of procedures of subconscious level**
Affective representations	**Emotional procedures**
a) Episodic memory, events and events with a specific spatial and temporal location that includes, for example, autobiographical information. **b) Semantic memory**, contains the encyclopedic knowledge acquired through culture and education (as they are) the meaning of words, calculation, geographic information, historical, etc. **c) Work memory**, temporary storage of the information used to guide future action.	

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Perceptual representations	Imaginative representations	Conceptual procedures	Acting procedures
• They are the effect of a process of appreciation, confrontation, evaluation and use of information regarding intrapersonal, peripersonal and extrapersonal situations. • The retention of sensory information -affective or cognitive- for its perceptual processing, requires a neural network distributed and interconnected in parallel in both cerebral hemispheres, whose activity must be maintained all the time necessary for its conscious confrontation.	• This image memory provides us with autobiographical information, because it reproduces the category of data that corresponds to one's experience. • Information regarding the events in which one takes part, and regarding the things that one manipulates or uses directly and practically. It is about experiences and experiences that reflect facts made by oneself, or things made or experienced by oneself.	• Concepts are better understood and used once they are encoded in spoken language, or some other related language. • It has been assumed that speech is the real content of explicit memory -especially semantics- and is considered inherent in abstract thinking and its importance in social languages-speech, logic, mathematics, computation.	• At the epiconscious level, dispositions, aptitudes and attitudes are integrated to constitute the plan of action. • The productive (or creative) process is organized, the cognitive-type psychic production is integrated within the plan of anticipated (mental) action that is the model that organizes the personal activity that is carried out in the practical execution in the form of conduct, performance or effective or objective behavior of the personality as an agent that influences others or things.

Source: (Adapted from Ortiz, 1998, pp. 49-61)

The types of individual memory addressed work, depending on the utility that the subject or subjects give them. However, both memory capacity and attention capacity have limits. This capacity is associated with the time and amount of information that is retained and required for the functioning of the human being, therefore, Ortiz, (1998) states that:

> After the information -whose data is encoded in the memory systems at the subconscious level- recovers, reconstructs or accesses the epiconscious plane, its use as a model of the current personal activity requires the retention of this information at this level. conscious activity and its permanence in one of its planes of perception, imagination, thought or action (p.58).

Therefore, the idea of the brain's limitation to keep information active is not entirely valid for long-term memories. In the course of an average human life, the individual can store 2.8×10^{20} bits of information (Talbot, 2007). To say, the capacity of accumulation of information in relation to the activation capacity are different, but they work in a concatenated way.

Another important aspect that should be highlighted is the 'consolidation process', with which the processed information becomes memory at increasingly deeper levels of storage. This is true, for all neuropsychological functions and with all the information, because the neurons literally grow and connect together (Hebb, 2002), generating first purely physiological changes - the synapses of the circuit become more permeable to the same stimulus - and then permanent anatomical changes. Therefore, the activation of the synapses mobilizes in the cells genetic mechanisms that cause more synapses in these axonal junctions (Solms and Turnbull, 2004).

The types of memory give the human being a great capacity to handle the complex world that surrounds it. Thus, it recognizes people, places, imagines events, solves problems, hypothesizes about the future, makes social life, because it reasons, learns and remembers what it has in its brain (Damasio, 2007, 2010), but at the same time, it uses Real time external memory that has also built. This Bartra (2007) calls exocerebro, this device of environmental and social court is composed of symbolic exocerebral circuits that support and expand the capacity of brain circuits: artificial memories (libraries, USB drives, PC hard drives, museums), artistic-iconic engrams (paintings, sculptures, buildings, maps, plans), sound registers (acetate discs, CDs, DVDs, in which the image and human voice are recorded, as well as other sounds), and finally, the group social, as a living exobrain, that evokes memories, knowledge as a whole, through language.

The language, high-level brain function, supports various general mental abilities: create and manipulate symbols, combine concepts and categories, process auditory and visual information at high speed, recover information from long-term memory (MLP) and keep active in the working memory structures of complex knowledge (Demestre, 2003). The above occurs because the activation of information, by the use of language, correlated from the MLP is an automated process that occurs during comprehension. Short-term memory (MCP) transmits signals in parallel to the contents of the MLP, which is activated by a 'passive' process of neuronal resonance, over a certain element by the superposition of semantic characters and the strength of association between a activated element and a sign that travels or is distributed by the activation force of the neural network (Kintsch, 1988, McKoon and Ratcliff, 1992, Mckoon et al, 1996, Myers and O'Brien, 1998, in Fernández, 2002).

The way the brain works, and especially memory, has implications for the learning process. Bruning, Schraw, Norby and Ronning (2005) indicate as relevant, those in which the teacher must make his considerations:

- The processing of information is limited by sensory memory and in the short term, therefore, students need to selectively direct their resources to relevant information.
- Automation, through extensive practice, facilitates learning by reducing the limitations of resources to complete tasks.
- The perception and attention are guided by prior knowledge, which is activated by stimuli that help rescue them from memory.
- Perception and attention are flexible and automatic processes that can be improved in relation to each task.
- Both the limitations of resources and data limit learning and influence the resolution of tasks.
- They should be encouraged to manage the resources of each individual, teaching them to self-regulate their knowledge, strategies and motivation.
- The processing of information is easier when it is shared in the working memory what needs to be learned.

Therefore, it is in the mind-body work (memory system) that the action schemas of each of the individuals are formed. These are not only stored in the brain, but also extended to the contextual exo brain. In addition, it can be affirmed that they are activated by the action of the individual who thinks, moves and, above all, speaks to communicate with others.

This encourages us to consider the care that must be taken not only with the didactic instrumentation, but with the action and the language that is used in a classroom. Both the teacher and the students have their own intentions -understood by Searle (2004) as the ability of the mind to refer or deal with or correspond to objects and situations of the world outside of themselves-, to which they refer by means of what they say, understand and ways of performing their actions in learning situations.

4. CONCLUSIONS

The theoretical approaches developed above favor, or rather create a model of conceptual interpretation that allows you to delve into the experimental theoretical developments on the schemes of action, or as we call them: human learning schemes. Therefore, it can be concluded that:

- The brain system has an intrinsic capacity called cerebral plasticity, by which it restructures itself on a scale of reality, imperceptible to the human senses.
- This property is real and causally produced by the functioning of the nervous system, the effects of the environment on the living organism and its experience in relation to the situations it faces.
- There is a mirror neuronal system that encodes the intentions of others: "humans read other humans", therefore, allows us to understand each other.
- Learning schemes can be structured, considering the holographic model of the mind. This explains that consciousness (the being and its experience) is stored throughout the brain, and arises each time it is required to use the information. This is done by selecting and collecting it from all parts, by means of a kind of temporal-spatial mathematical analysis and synthesizing it into a single symbolic image: the mental schema.
- Brain functioning is the product of an incredible amount of mental processes. These have as basis of operation, in a mature human being, the storage system that keeps not only the daily experience, but the memories of the lived experiences. This system is called individual memory and collective memory. In these memories, memory-understood as learning-is not only the property of an individual, but of all those who participate in the social events that surround it.
- The memories give the human being a great capacity to handle the complex world that surrounds it. Thus, he recognizes people, places, imagines events, solves problems, hypothesizes about the future, socializes, because he reasons, learns and remembers what he has in his brain.
- Finally, the language supports diverse general mental abilities: create and manipulate symbols, combine concepts and categories, process high-speed audio and visual information, recover information from long-term memory (MLP) and maintain active memory structures. to know complex. That is to say, this function is the one that allows the communicative manifestation of the mental schemes, through the interaction with the others.

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