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NEUROSCIENCE AND LEARNING DISORDER

NEUROCIENCIA Y TRASTORNO DE APRENDIZAJE

NEUROCIÊNCIA E DISTÚRBIOS DE APRENDIZAGEM

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ABSTRACT
The present work aims to explain what Neuroscience and Learning Disorder is, as well as the importance of its knowledge for professionals working in the areas of education, health and social. Because it shows how the brain works and its implications in people's daily lives. Since without this knowledge it is difficult to understand, diagnose and treat behaviors and diseases related to brain functioning.

KEYWORDS: Neuroscience. Disorder. Education.

RESUMO
O presente trabalho tem como objetivo explicar o que é Neurociência e Transtorno de Aprendizagem, como também a importância do seu conhecimento para os profissionais que trabalham nas áreas de educação, saúde e social. Pois mostra como o cérebro funciona e suas implicações no dia a dia das pessoas. Já que sem esse conhecimento fica difícil entender, diagnosticar e tratar comportamentos e doenças relacionadas ao funcionamento cerebral.

PALAVRAS-CHAVE: Neurociência. Transtorno. Educação.

RESUMEN
Este artículo pretende explicar qué es la Neurociencia y los Trastornos del Aprendizaje, así como la importancia de su conocimiento para los profesionales que trabajan en el ámbito educativo, sanitario y social. Muestra cómo funciona el cerebro y sus implicaciones en la vida cotidiana de las personas. Sin este conocimiento es difícil entender, diagnosticar y tratar los comportamientos y enfermedades relacionados con el funcionamiento del cerebro.

PALABRAS CLAVE: Neurociencia. Trastornos. La educación.

1. INTRODUCTION

This article refers to neuroscience and learning disorders presented by students from 1st to 5th grade of Elementary School I of the municipal network of Paudalho do Estado de Pernambuco, especially the illiterate and functionally illiterate. This fact was characterized by studying Neuropsychopedagogy and Urgency and Emergency and finding illiterate and functionalille people who did not know how to express themselves in a comprehensive way.

This study began with the following question: Why are there people who are not literate in elementary school? So, the following hypotheses were raised: Do they present any neurological problems? Because many have a brain that works properly, has adequate genetics and has difficulty learning? Is the influence of the family environment the predominant factor in literacy? From there, a

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research plan was drawn up whose objective was to discover the causes of the learning problems of these students.

The choice of school is very important and also almost always difficult. For the family must analyze with tranquility from a critical plan of the various capacity to consider. They should take into account some fundamental aspects that can cooperate in so that the student has a better education, making it out of the coherence of life existing between the family institution and the school institution.

Today, the educator's task is to facilitate learning and contribute to education, not imposing statically a "training" to perform individually with the student and smarten in it the ambition to learn. Only after having achieved this ambition, is it possible to transfer school content (BACK, 2022).

It has to show the areas to be worked and the way to realize its growth, being attentive and prepared to support the student and solve the problems that appear (BUENO, 2018).

Maria Montessori - One of the most important people in the field of Pedagogy. Italian pedagogues studied medicine and at first devoted themselves to the study of children with learning disabilities, preparing a special education planning. Maria Montessori's ordered manner of proceeding had an intense effect and were then used in general pedagogy (BRZOZOWSKI, 2012).

The Montessori method is intended particularly for the preschool phase, with the intention of revealing and elevating all personal attitudes and creativity that each student has inside. It appeared as an opposite action to the authoritarianism and inflexibility that directed the pedagogical methods at the beginning of the 20th century, opposing to these precepts those of spontaneity and self-correction, missteps practiced by adults. The adult persons responsible for its application have the duty to respect the student's freedom to advance others in speaking or acting, interfering only when required (CARVALHO, 2010).

For this to happen, Maria Montessori elaborated and put into action a class of new and material elements in the area of education, such as letters, furniture, counting materials and sheets of paper to be placed on certain objects, etc., presenting new paths that arouse interest for the learning of reading, writing and mathematics (HIPÓLITO, 2008).

Jean Piaget Sensational advances in evolutionary psychology, especially in the studies of cognitive processes, are due to the great work of the Swiss psychologist Jean Piaget. Initially graduated in philosophy and logic, after dedicating ten years of his studies to the natural sciences, he had his interest focused on the theory of knowledge (CARVALHO; CYRUS, 2018).

It experiences and maintains its original method of investigation based on the systematic and everyday observation of its children. Because of this observation he announced the concept of sentient - motor intelligence and elaborated the basic principles of his theory, known as genetic epistemology. With this, he realized not only the great qualitative differences between the way of thinking of adults and children, but also the fact that there are different phases of cognitive development (HIPÓLITO, 2018).

Vigotsky - Lev vigotsky, russian and graduated in philosophy and psychology, worked in the thirties of the twentieth century. This way of teaching gives great importance to the active role of the

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teacher, while the skills of students develop "naturally" through various routes of discovery. It sought an intermediate zone that could account for the power of the environment through its consequences on consciousness (FERNANDES, 2015).

I thought of the social environment as paramount for learning, starting from the factors of social and personal integration. The occurrence of social energy contributes to the explanation of change of consciousness based on a psychological theory that unite behavior and mind. The social environment interferes in cognition through its tools, i.e. through its materials (machines, automobiles) and also its speeches and social institutions such as schools and churches. Cognitive exchange is the result of the use of cultural objects in social interrelations, the fact of internalizing them and transforming them into the mind. Its principle is a model of dialectical constructivism, which emphasizes the exchange of the human being with the environment (MAIA, 2018).

2 TITLE NEUROSCIENCE

2.1 CONCEPT

Neuroscience is a science that studies the nervous system, its chemical, structural, functional and pathological development (MEDEIROS, 2011)

Neuroscience is divided into:

- **Molecular Neuroscience: Which** seeks to investigate the chemistry and physics involved in neural function. It also seeks to study the ions and their exchanges that are necessary for the cell to transmit its information to the entire nervous system, thus reducing sensations, movement, understanding, planning, relationship, speech, and various other functions that are dependent on chemical and physical changes at the most fundamental level.
- **Cellular Neuroscience:** That studies the differentiation between all cells of the nervous system and how each works separately. And that also studies how neurons receive and pass on the information and non-neural functions of nervous system cells that related subjects at the cellular level.

  In 1890, Cajal, a neuroanatomist, established that each nerve cell is unique, distinct and individual. For scientist Sherington when he was studying reactions, he reported that nerve cells (neurons) respond to stimuli and are bound by synapses.
- **Systems Neuroscience:** This science aims to study the sets or classes of neurons that perform a common work through various series and bonds. The example of this is the propriocephalic system, which passes its information from one place and the movement of the parts of the musculoskeletal to the Central Nervous System, and also the way it controls the movements of the motor system.
- **Behavioral Neuroscience:** This is the one that studies the exchange between the parts that instill behavior, postural control, the influx related to visual, vestibular, and proprioceptive sensations of our balance in various situations.

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- **Cognitive Neuroscience:** Its field of action is thought, learning, memory, planning, language use and the diversity between memory for the execution of specific events and memory for the fulfillment of certain motor skills.

2.2 UNDERSTANDING THE FUNCTIONING OF THE CENTRAL NERVOUS SYSTEM (CNS)

"Our brain is the instrument of learning, and to know the explored path of information by the sentient impulses until they reach the brain, there is a need for an anatomical and functional explanation of this brain." **Learning Anatomy-** The boosting of a region of the cortex, ordered by an excitation, causes modification equally lives. This cellular come over caused by an excitation is transmitted to another fraction of the cell through conductivity. Contractility is the character that makes the displacement of the cell safe, thus effecting the preservation of the organic constitution (PINHO, 2018).

The mutual unions between the various cortical extensions ensure organization between the arrival of sensory stimuli, their deciphering and meeting, and determining activity of responses, we call superior nerve functions, interpreted by the cerebral cortex, which is divided into (SOUSA, 2017):

- **Frontal Lobe:** has the role of controlling the motricity, programming the acts (putting in series, in order, planning), modulates immediate memory or appear unexpectedly, keeps control of attention and psychomotor organization (visual investigation, visual-postural works and space-time storage), affection, reasoning, personality (social decision, emotional domain, motivation is also responsible for the articulation of words (speech).
- **Parietal Lobe:** Observes, guards and translates sensations-tactile record, representation of the body, identification of object and forms; governability; digital gnosia and reading.
- **Temporal** Lobe: receives and represents taste and smell; receives and represents nonverbal verbal auditory stimuli and is also linked to episodic and emotional memory and very primitive emotions.
- **Occipital** lobe: Receives and represents visual sensations (visual perception, visual sequence, visual decipherment; background figure perception; positioning and visual roll).

According to Marta Relvas (2015) the formation of the nervous system makes us understand more easily the cultural-motor adaptation of living beings and, consequently, of the learning subjects, because the most primitive of human beings and the current one continuously adjusts to the environment, which is changeable for the purpose of preserving the species. The brain does not work as separate areas**.** This is due to the life of a large number of necessarily formed places of union.

Three semblants are essential for the adjustment of the human being to the environment in which he lives: irritability, conductivity and countertibility that are made in the nervous plane, through very small structures entitled neurons. Irritability is the characteristic that the cell has to detect the changes of the medium. The brain is still divided into the right and left hemisphere and in terms of structure are practically equal (VENTURA, 2010).

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The left hemisphere, which is usually the dominant one, performs the functions of language. He is also responsible for specific functions such as analyzing objects in detail (deciphering reading, writing, primary calculations, analytical visual perceptions, and others). The right hemisphere has a greater ability to process visório-spatial information that is not described by words. Penigton (1991) recognizes five modules linked with cognitive functions, and that each of them is equivalent to areas in defined circuits of the brain, whose dysfunction of origin or specific learning disorders.

3. LEARNING DIFFICULTY

Learning difficulties occur in a brain with normal structure, with good working conditions, with correct neurochemical conditions and also with an adequate genetic set, because situations that run outside the CNS also interfere with learning (RELVAS, 2015).

The factors that interfere with learning are:

1. Factors linked to children.
2. The factors linked to the family.
3. The factors linked to the school.

Child

The child with physical impairment is such as:

- Sensory impediments, which account for appropriate perceptual conduction, both visual and auditory, having the possibility of being hereditary, acquired, congenital, chronic and acute.

  We have as examples: chronic otitis, tonsillitis and sinusitis that interfere with learning.

  A child who does not listen well presents himself as restless and inattentive.

  A child with convergent strabismus, when undergoing surgical treatment late, will cause only an aesthetic result, since the vision will no longer be established, because amblyopia will be established.
- Myopia, Astigmatism and Hyperopia: In these cases, both visual and auditory perception need to be included among the exams that the child takes when he/she is in school.
- Diseases such as hypothyroidism, parasittoses, anemias, rheumatic, recurrent, cardiac, pneumonia, allergies, malnutrition also bring harm to school performance.
- Children with psychological impairment.

  The child at the beginning of his studies may present psychological disorders such as: insecurity, anxiety, shyness, lack of interest, low self-esteem, and desire for affirmation.

  Soon, you can survive the development of disorders, the moment you join the conflicts, making depression, phobias, antisocial behavior, antisocial behavior and

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opposing defiant disorder emerge. These problems are often confused with attention deficit and hyperactivity.

- Neurological impairment: The most common circumstances that are not the main causes of learning difficulties are: mental disability, epilepsy, and cerebral palsy.

Family

It should provide the child with the necessary means to develop satisfactorily. The level of education of parents has a great influence on the way they conduct their children's studies. Developing in the child the habit of reading is very important for their cognitive development. The disaggregating factors of the family are: alcoholism, smoking, drugs and illicit drugs (SOUSA, 2017).

School

The conditions necessary for good school performance and good inclusion are due to:

- Good classroom conditions, such as good lighting, good hygiene, and a number of students per class that facilitates learning.
- Pedagogical method that is according to the reality of the student, teaching materials according to the age group.
- Motivated, dedicated, qualified and well-paid teachers.

4. LEARNING DISORDER

Learning disorder is understood as a lack of ability or ability to perform reading, writing or mathematics activities in people who show results far below what is expected for their state of development, their schooling, and their intellectual capacity. Learning disorders can be conjectured in children with the following characteristics (ROCHA, 2012):

- Intelligence within normal levels;
- Lack of motor or sensory changes;
- Who acquired a certain degree of perfection in relation to his emotional but underhanded;
- Socioeconomic and cultural situation within the "acceptable".

The relationship of learning disorder is found in the international compendia for the diagnosis of diseases: ICD-10 and DSM-VI. These compendiums recognize the inaccuracy of the word "disorder", presenting justification for its function avoiding major problems, related to the way of using the word "disease" or "illness". "What are the learning disorders"? Learning disorders are (RELVAS, 2015):

- Reading disorder that is characterized by an exclusive impediment in the area of comprehension of written words.
- In mathematics disorder, this disorder is known as dyscalculia, and it is not established its relationship with the lack of aptitude to perform fundamental mathematical tasks, such as counting, but the way student does the association of this aptitude with the world around him.

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This act of acquiring mathematical concepts, as well as those of others, requires a good reasoning in the realization of the activity, which is affected in this disorder, in low aptitude to deal with numbers and mathematical ideas or thoughts is not caused by injuries or any other organic problem.

- Expression disorder are those related to spelling and calligraphy, with the removal of different difficulties of written expression. There remains a difficulty in producing written texts, proven by grammatical errors and punctuation within the sentences, in the poor structure of paragraphs. The ordering in classes of learning disorders by compendiums does not take into importance the pathological support of the brain area compromised in the procedure or follow-up.

Learning is an act that encompasses elements that are complex and dynamic that converts or follows structural and functional changes of the central nervous system (CNS). These changes happen due to an act motor that is perceptive and organized in the cerebral cortex, which gives ancestry to cognition.

Existing obstacles in learning can be classified by taking into account the psychological functions that are affected. These are acquired from birth and are of fundamental importance for formal learning.

These obstacles that are encountered in learning during the first years can be observed when using devices to assess neurological development, such as evolutionary neurological examination of three to seven years of life and examination of brain functions from the age of 12 years. Herons to this group of tests it is possible to detect disorders such as attention, memory, gnose as, praxis, oral and written language.

5. METHODOLOGY

The present work is a systematic review of the literature, made from sources such as books, articles, dissertations, theses and monographs and reliable websites. The websites of SCIELO, SCIRUS, SCOPUS, PUBMED, MEDLINE, LILACS, BIREME, BDDT, Redalyc were searched using the following descriptors "neuroscience", "neurology and education", and "science and learning".

The inclusion criteria were articles published on reliable websites in Portuguese and that are relevant authors of the area and that have contributions in both areas neuroscience and knowledge, learning and learning difficulties.

6. FINAL CONSIDERATIONS

The problem of education in Brazil is known to all Brazilians and the reasons why they exist as well, and when there is an opportunity to work on issues that will improve education, the school environment and the work of teachers and professionals in the area should take advantage and not take actions that hinder these jobs. If there were more union of education professionals to claim the

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rights and work the problems of the area there would not be so many sick professionals, being assaulted, giving up the profession and even dead.

In 2021, when this study began, the objective was to study the relationship between learning disorders and the central nervous system, so we spoke to the school principals, coordinators and teachers, then a bibliographic research project was made. In view of the study, it was evident that there is a relationship between the lack of capacity to perform reading, writing and mathematics activities with the lack of family stimulus. That the students mostly did not present emotional problems, did not present within normal levels. With regard to teachers, they understand the problem of their students, but they can do little because the content needs to be given.

The subjects studied in the classroom are not according to the reality of the students. They are not active protagonists of your learning. The classes do not allow them to give their opinion on the subjects with other students and also with the teacher. Students with learning disabilities and special needs do not receive activities tailored to their needs and are automatically approved.

Most families are not interested, as they have low schooling and a difficult life. Because of this the school became a "deposit" of children.

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