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Brain System Influences on Teaching-Learning Process

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Abstract--This research shows how the brain system influences the teaching-learning process and the stimuli, that must has applied in the classroom to generate significant learning in the students, the methodology used was the bibliographic review in which some criteria have referenced. The contributions of authors, the inductive and deductive since the criteria of the cited authors have analyzed, the objective of the work was to demonstrate the incidence of the correct functioning of the brain in the educational process.

Keywords---brain, learning, metacognition, motivation, neuroscience.

Introduction

Since its inception, man studied naturally, and in accordance with what nature provided him, over time science studies the brain, ways of learning and generating knowledge, the results of these studies have been taken in It has the purpose of obtaining positive results in the education system. It is important to know how the brain learns, since it allows to have knowledge of the strategies that teachers must implement in the classroom in order to generate significant learning that allow students to solve problems in the environment where they operate.

At present the traditionalist teaching method has been left behind, these paradigms have been changed by a social constructivist education in which the true protagonists of the classroom are the students who are looking for answers, they are reflexive, analytical, critical, experimental, humanist, teachers they become guides that encourage and motivate students through curiosity, and with the application of different technological tools and in this way they can develop cognitive skills.

The objective of the research is to determine how the correct functioning of the brain affects the teaching-learning process.

Materials and Methods

The methodology used in the research was the literature review in which some criteria and contributions of authors were referenced in relation to the brain's role in the educational process, inductive and deductive method was also used that allowed obtaining valid reasoning according to the subject that was studied.

Results and Discussions

The brain

The human being has manipulated by the brain because it is responsible for directing and controlling the actions that people perform. [Desalle & Tattersall \(2017\)](#), affirm that our brain governs almost all the actions undertaken. From

the behavioral point of view, it is what makes each of us a unique individual. And together, the human brain, extraordinary and unprecedented, is what makes it possible for our species to be the psychologically complex entity, extremely characteristic and sometimes strange, that is, the brain allows us to think about analyzing, reasoning about certain circumstances or situations that they happen daily in life and therefore direct the behavior.

This shows that there is a complicated dependence and interdependence between the brain and the behavior. The brain can receive external and internal information that allows you to release the most appropriate behaviors at all times. Through the positive and negative experiences of the decisions that are often made the brain manages to learn and transform behavior. The knowledge acquired causes changes in the synaptic connections of the brain.

The functioning of the brain, can be seen as a machine that controls all the functions of the body although there are specific areas responsible for particular functions, no sector of the brain ever functions independently of the others; Each specific function concerns a whole number of "regions" that collaborate as parts of a neural network dedicated to that function (Woodhead & Oates, 2012; Mendoza *et al.*, 2019; Vasquez *et al.*, 2019).

Aparicio (2009), refers that the central nervous system is an extraordinarily complex structure that collects millions of stimuli per second that processes and memorizes continuously, adapting the body's responses to internal or external conditions. It consists of seven main parts: The anterior brain that is subdivided into two parts: the cerebral hemispheres and the Diencephalon, that is to say that each one of these parts controls functions of the human body as the senses the emotions the evocations as well as is responsible for responding to stimuli, process and interpret information.

Pillars of the brain

Woolhead & Oates (2012), report that the brain is composed of about 100 billion specialized cells called neurons. Each neuron consists of four essential parts that perform functions, in addition the brain also works based on external stimuli that allow decisions to be made.

- 1) Dendrites: branched extensions of the neuron, which serve to receive the arrival of signals from other neurons.
- 2) Cellular body: fundamental part of the neuron, which serves to integrate all the information that arrives, adding the different signals.
- 3) Axon: Long fiber, along which electrical impulses are, transmitted ("action potentials").
- 4) Axon terminals: points that are at the end of the axon, through which the signal passes to another axon. In most of them the signal is transformed (electrical signals become chemical) in order to be transmitted to the next neuron.

Therefore, the brain, cerebellum, brainstem, pituitary gland and hypothalamus perform a teamwork, that is, without each other, it cannot function.

The brain as an engine of knowledge

Academic training in the individual allows obtaining greater and better possibilities of developing the brain to the fullest. According to Barrera & Donolo (2009), education and training in childhood offer intellectual stimuli necessary to develop the brain, since they allow the deployment of cognitive abilities and make learning viable. Therefore, children's brains continually look for stimuli that help them explore knowing everything they have around,

During the teaching-learning process, children are offered essential stimuli for the development of the potential of the brain, it is essential to take into account that from the age of three and 10 years is when you have to look for the best strategies to stimulate the Children's brain, as it generates more curiosity and this makes them want to explore the surrounding environment thus generating more knowledge, (Agillon & Pilozo, 2013; Chávez *et al.*, 2019; Suarez *et al.*, 2019).

The state that the development of knowledge is related to the physiological evolution of the brain, and learning occurs through direct physical activity with the things that are around, according to what this author establishes the brain learns through stimuli that can be seen in the environment where students develop, that is, they learn by experiencing solutions to realities and problems. Teaching through stimulation or motivation allows the student to want to perform the multiple tasks that teachers propose to carry out in the classroom.

Jean Piaget; Paulo Freire, Ausubel are some of the precursors of theories that support an education based on constructivism, creativity, experimentation, an active critical education based on the resolution of problems that arise

in the environment surrounding students, in the which should seek alternative solutions, and where students become protagonists of their own knowledge and the teacher is only a guide that will facilitate the teaching-learning process.

Because good learning

Habits are important Habits are behaviors that people learn by repetition. You have good and bad habits in relation to health, food and study, among others. Good habits, no doubt, help individuals achieve their goals as long as they are worked properly during the different stages of life (Hernández *et al.*, 2012; Alava & Martinez, 2019; Reina, 2019).

Good habits in people facilitate the acquisition and consolidation of knowledge that will be useful for the resolution of knowledge, that is why each individual must comply with the schedule in the different activities that are carried out daily, also time must be planned, and study in an orderly, comfortable environment without any distractions

Sleep can work as a cognitive process; each part of the brain can perform in the best possible way if it is rested. Woodhead & Oates (2012), report that between childhood and adulthood, we spend more than a third of our life sleeping, while the body replenishes energy and the brain reprocesses the experiences accumulated during waking hours, that is the rested brain allows greater concentration reasoning, assimilation of self-reflection knowledge.

There is research that reveals that the brain stores, accumulates and remembers what has learned, and in the teaching-learning process, one must obtain significant and diverse results that would predominate with authentic effects for teachers and essentially for the student since the brain is like a sponge. That absorbs knowledge of the environment

Motivation and learning

Motivation is closely related to emotions because it reflects the extent to which an organism is prepared to act physically and mentally, in a focused manner, and the emotional response constitutes the way in which the brain evaluates whether or not to act on things approach them, if they are pleasant, or avoid them, if they are unpleasant (Moreno *et al.*, 2018; Tuarez *et al.*, 2019).

The methodological strategies implemented by the teacher allow the student to motivate himself or herself so that they can build their own knowledge, investigate, and discover how to solve them with problems that occur in their surroundings. The use and application of technology as a work tool for teachers facilitate student learning, so that meaningful and lasting learning has generated.

Intrinsic and extrinsic motivation

Naranjo (2009), refers that in a different way, humanistic and cognitive perspectives emphasize the importance of intrinsic motivation in achieving objectives. Intrinsic motivation has based on internal factors, such as self-determination, curiosity, challenge and effort; on the contrary, extrinsic motivation includes external incentives, such as rewards and punishments, regarding these types of motivation. That certain people apply in their studies, because they want to get good grades or to avoid disapproval of the mother or father; that is to say, they are extrinsically motivated therefore, the teacher has a complex task that is to raise the self-esteem of the students.

The teacher has technological tools to facilitate the teaching-learning process because there are different ways to motivate students. The teacher must make the students part of the decision making process that will make Feel important, be enthusiastic, and must also propose challenges and encourage them to achieve the goals this is part of the stimuli that the brain requires for proper functioning.

Teaching strategies in teaching work

A strategy to prepare the brain for learning is motor stimulation, since when the body works well, the brain prepares to give rapid responses to the needs that arise, so exercise constant allows the generation of a substance that fosters the ability of neurons to connect with each other (Benavides & Flores, 2019).

The initial age the children must be stimulated to develop fine and gross motor skills. This will cause them to acquire skills and abilities that will be applied in the daily life, therefore the teacher of being in constant academic training, being investigative, stimulate self-learning, give an education based on values, and from these teachers organize the work to be done in the classroom to carry out the educational process properly. Table 1 shows the different reflections of the different authors related to the brain and learning.

Table 1
The different reflections of the different authors

Author	Theme	Year	Result
Barrera and Donolo	Neuroscience and its importance in the context of Learning	2009	Learning is achieved through intellectual stimuli developed by the brain
Aparicio	Neurosciences and transdisciplinarity in education	2009	The brain processes memorize continuously and evokes responses to stimuli.
Naranjo	Motivation: theoretical perspectives and some considerations of its importance in the educational field	2009	Intrinsic motivation is based on internal factors, such as self-determination, curiosity, challenge and effort, on the contrary extrinsic motivation includes external incentives
Woodhead and Oates	The brain in development	2012	The brain efficiently receives information whenever it is rested
Hernández, Rodríguez., And Vargas	. Study habits and motivation for Student learning in three engineering careers.	(2012).	Good habits, no doubt, help individuals to achieve their goals as long as they has worked properly during the different stages of life.
Agillon and Pilozo	Brain stimulation in integral childhood development	2013	The brain produces significant learning when it has contact. Direct with the situations that are in the environment.
Desalle, and Tattersall	Big Bangs, behaviors and beliefs	2017	It is human brain manages the behavior of people according to the knowledge that it has and allows to mediate in future behaviors.
Moreno, Rodríguez, and Rodríguez	The importance of emotion in learning	2018	Emotions are related to intrinsic and extrinsic motivation and in the classroom the teacher is the main promoter of motivation in students to generate meaningful learning in them.
Benavides, and Flores	The importance of emotions for neurodidactics	2019	The brain learns through stimulation to develop motor motor skills.

The authors mentioned in table one establish, the brain is the fundamental part of the human, being, this works according to the stimuli presented. In the environment where each person develops, the educational field the motivation in the students is indispensable so that the learning that is generated in them is significant and applicable, there are two types of motivations, the Intrinsic that is related to the motivation that comes from the same person, the desire for improvement, and achievement that each individual wants to reach, and the extrinsic motivation is one in which the teacher has the task of making students want to learn, this can be done through new methodology and with the application of technologies to ensure that students acquire knowledge that they can apply in everyday life, for the resolution Ution of the problems of society

Conclusion

The brain is incredibly beautiful and powerful since the only organ that gives the possibility to improve behavior, is constantly evolving because it enters information in every second, it is the one that allows to organize, manage, plan, coordinate, movements, behaviors, ideas, knowledge.

The vocation that the teacher has in teaching the subject, the environment in the classroom the different innovative activities, motivation can influence in a positive way so that students develop their brain to the fullest. Different methodological strategies, and the application of new technologies, creativity, and different stimuli will make each student participate actively in the teaching-learning process

References

- Agillon, Y., and Piloza, M. (2013). Brain stimulation in the integral development of children. (Undergraduate thesis). Miracle State University, Milagro, Ecuador. <http://repositorio.unemi.edu.ec/bitstream/123456789/1055/3/>
- Alava, E. E., & Martinez, M. E. M. (2019). Impact of teaching-learning process for brain. *International Journal of Health Sciences*, 3(1), 33-40. <https://doi.org/10.29332/ijhs.v3n1.304>
- Aparicio, X. (2009). Neurosciences and transdisciplinarity in education. *Journal University of Research and Academic Dialogue*, 5 (2), 2-5. <https://core.ac.uk/download/pdf/25787806.pdf>
- Barrera, M., and Donolo, D. (2009). Neuroscience and its importance in the context of Learning. *University Digital Magazine*, 10 (4), 1067-6079. <http://www.revista.unam.mx/vol.10/num4/art20/art20.pdf>
- Benavides, V., and Flores, R. (2019). The importance of emotions for neurodidactics. *Student Journal of Psychology*, 14 (1), 25-53. <https://revistas.ucr.ac.cr/index.php/wimblu/article/view/35935/36685>
- Chávez, E. J. M., Pibaque, W. L. D., Chávez, W. J. M., & López, M. M. L. (2019). Learning problems on brain disorders. *International Research Journal of Engineering, IT & Scientific Research*, 5(5), 8-15. <https://doi.org/10.21744/irjeis.v5n5.723>
- Desalle, R and Tattersall, I. (2017). Big Bangs, behaviors and beliefs. Retrieved from http://www.elboomeran.com/upload/ficheros/obras/el_cerebro_rus_web.pdf
- Hernández, C., Rodríguez., And Vargas, A. (2012). Study habits and motivation for student learning in three engineering careers. *Journal of Higher Education*, 163 (3), 67-87. <http://www.redalyc.org/pdf/604/60425380005.pdf> <https://bernardvanleer.org/app/uploads/2016/03/El-cerebro-en-desarrollo-0131.pdf> Student, Aspiring Magister, Pontifical Catholic University of Ecuador Manabí Headquarters Teaching, Master, Pontifical Catholic University of Ecuador Manabí Headquarters.
- Mendoza, L. R. M., Martinez, M. E. M., & Suarez, A. M. S. (2019). The brain as a fundamental axis in learning process. *International Research Journal of Engineering, IT & Scientific Research*, 5(4), 38-45. <https://doi.org/10.21744/irjeis.v5n4.689>
- Moreno, A., Rodríguez, J., and Rodríguez, I. (2018). The importance of emotion in learning: Proposals to improve student motivation. *University Pedagogy Notebook*, 15 (29), 3-11. <https://cuaderno.pucmm.edu.do/index.php/cuadernodepedagogia/article/view/296/273>
- Naranjo, M, L. (2009). Motivation: theoretical perspectives and some considerations of their importance in the educational field. *Education Magazine* 33 (2), 153-170. <https://revistas.ucr.ac.cr/index.php/educacion/article/view/510/525>
- Reina, A. L. V. (2019). The brain and learning on initial students. *International Journal of Health Sciences*, 3(2), 38-43. <https://doi.org/10.29332/ijhs.v3n2.329>
- Suarez, A. M. S., Martinez, M. E. M., & Mendoza, L. R. M. (2019). Brain and learning. *International Journal of Social Sciences and Humanities*, 3(2), 128-135. <https://doi.org/10.29332/ijssh.v3n2.302>
- Tuarez, M. A. V., Delgado, R. I. Z., Teran, O. V. T., & Martine, M. E. M. (2019). The brain and its role on learning process. *International Journal of Physical Sciences and Engineering*, 3(2), 27-33. <https://doi.org/10.29332/ijpse.v3n2.326>
- Vasquez, B. S. G., Martinez, C. J. B., Martinez, M. E. M., & Vasquez, M. A. I. (2019). Brain and learning on adolescence stage. *International Research Journal of Engineering, IT & Scientific Research*, 5(5), 1-7. <https://doi.org/10.21744/irjeis.v5n5.720>
- Woodhead, M., and Oates, J. (2012). The developing brain.