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Neuro Education In Times Of Virtuality

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Abstract

In the last two decades, neuroscience has taken center stage in society and in the scientific world, with more and more findings show the brain works and learns. Studies carried out in this context have allowed us to know some facts that can influence the daily life of the human being, since childhood one of the clearest examples occurs in the stage of education and from here arises neuroeducation, a discipline that studies the functioning of the brain during the teaching-learning process.

Desk research was used that promoted in the bibliographic search of scientific articles that have strengthened the knowledge about how the human brain works and learns, so the main objective was to guide on the new perspectives that are more effective in the construction of learning. , through the use of technological tools designed for the field of education specifically in the use of virtual classrooms.

In the study of neuroeducation in the virtual classroom, it was based on the inductive method that helps to carry out an analysis of learning that goes from the particular to the general, in addition to analytical and synthetic methods. The research aims to show the technological and neurodidactic applications, as tools that help to establish pedagogical strategies in the acquisition of knowledge and contribute to the development of new paradigms that allow facing the health pandemic that humanity is going through and that has changed methodologies traditional to interactive and technological methodologies.

Faced with the situation of education in times of confinement, as a result of the declaration of a state of pandemic by the World Health Organization (WHO); Most of

the countries in the world resorted to virtualizing education. This is not new since totally virtual study programs have existed for some time. When specifying on this subject, it is considered as the modality in which learning teaching unfolds in its entirety through synchronous and asynchronous scenarios or environments.

Introduction

The world has generated an interest to change, innovate and improve education and teaching based on knowledge about the brain. Interest explicitly expressed by leading educational institutions in the world. However, it is true, there is still a long way to go between knowledge that provide current neuroscience and its direct application in the classroom (Mora, 2014)

about the use of information technology and communication (ICT) are multiple sususes in practically all areas such as: in economic and sociocultural life, education does not escape this reality, its functionality is evidenced, both in the possibilities of computerization of processes, as well as specific activities in terms of their management and development; as in the virtualization of their practices, roles, relationships, and performance environments (Zambrano, Laurencio, & Milan, 2018).

In March 2020, the perspective that humanity lived was stopped in front of an invisible danger, an imperceptible microorganism, which was not known, demonstrated the vulnerability of humanity before it. COVID-19 or coronavirus became a pandemic, having to radically change the way of living and relating around the world, forcing people to enter a process of virtuality in all areas (Boschiero, 2020).

There is a concern to know in detail, if the teaching and learning processes are generating useful knowledge in students. There are analyzes that focus exclusively on methodologies such as PACIE (Basrantes, Naranjo, & Ojeda, 2018), inverted class (Davila & Rodriguez, 2020), collaborative learning (Zuñá, Romero, Palma, & Soledispa, 2020), E-learning (Garcia, 2020), which have been used as resources in virtual classrooms in forums, chat rooms, simulators, videos, digital whiteboards, games, among others (Galindo & Badilla, 2016).

The role of the teacher as a reference is relevant, the methodology he uses directly influences the knowledge of his students (Martínez & Ávila, 2018). The pandemic has caused social isolation that has led to the implementation of virtuality as a means of communication in all sectors where education has been the most affected, both for teachers and students. This process has changed the method of learning, becoming more interactive to reach the student body (Bermúdez, Vera, & Patiño, 2020). Knowledge evolves and with them social processes with the rapidity of new knowledge, it is like another big bang where neuroscience plays a role in achieving the effectiveness of learning in teachers and students.

In learning it must be clear that a simple intuition is not enough to certify good pedagogical practices, teachers need to rigorously analyze in the virtual classroom the physiological, socio-emotional or behavioral factors that affect class time. When students carry a device with internet access in their hands, making good use of it through a link or application that facilitates the progress of teaching (Mora, 2020).

Neuroeducation refers to a scientific discipline that gives initiations to new pedagogies that demand the use of technological tools that simulate augmented or virtual reality, the cognitive development of the brain and the activation of its executive functions, thus helping a meaningful learning (Fernández, 2017).

In the last 20 years, Neuroeducation exposed the analysis of new topics that have enhanced the strengthening of learning in the virtual classroom and critical reasoning through the study of the brain and its functioning. The teacher must know how this body is constituted, capable of regenerating itself to adapt to changes, where the student learns in a different way (Lucas & Rodríguez, 2020).

Currently in the classroom, from the perspective of neuroeducation, teaching requires a teacher training that creates rapid changes to exercise education and links neuroscientific contributions with pedagogical practice. The research allows us to conclude that the new trend breaks the model of the traditional teacher, constituting a neuro educator and by applying the strategies of neuroscience in neuroeducation, meaningful learning is favored, and better results can be achieved at the time of acquisition, retention and application of knowledge in students (Pherez, Vargas, & Jerez, 2018).

Materials and methods

The desktop technique was used, which mainly consists of the documentary search that consists of collecting data from existing resources (MSG, 2015), the inductive-deductive method was used to delve into the subject studied, considering the most relevant contents of the information collected through descriptive interpretation, assessing the impact it has on the teaching-learning process, helping to obtain resources and information for the development of document analysis as a scientific investigative method, managing to substantiate the topic and reach true conclusions (Prieto, 2017).

Analysis and Discussion of the results

With the appearance of the Covid-19 pandemic, the educational system was affected and had to be transformed urgently and unexpectedly to a new virtual environment. This synchronous and asynchronous teaching / learning process replaced the traditional system of presence, giving a resounding change in the daily lives of teachers, students and all of humanity to adjust to the health emergency.

Faced with this crisis, the national government proceeded to close the educational establishments, at all levels being one of the first measures to prevent the spread of the coronavirus, the country's educational institutions faced a change in the way of bringing knowledge to students (Quinteros, 2020).

Neuroscience and education

Neuroscience focuses on the study of the nervous system, on integrating the different tools that can be used in education, to understand how the brain works, how it goes from chemical transmitters and electrical signals to thoughts, dreams, feelings or memories, which makes each person different from another, in their analysis and reasoning (Jiménez & Fernández, 2020).

When applying the strategies of neuroeducation, neuro learning and neuro evaluation, it is considered that they favor teaching and better results can be obtained at the time of acquisition, retention and application of learning in the student, taking into account that by understanding how it works the brain, teachers are better prepared to help their students, focusing attention to increase retention, which is the promise of learning based on the functioning of the brain (Navacerrada & Mateos, 2018).

In this sense, the methodological strategies in the classroom based on neuroeducation not only benefit students in the regular classroom, but also people with learning

difficulties, the student must be motivated to generate their interest in the acquisition of knowledge of what It surrounds him, weakening his attention deficits and correcting his self-control and his ability to enlighten himself. For this reason, it is necessary to have positive perspectives on the capacity of the students that materialize in motivational aspects that do not allow them to fall into stress, and in the premature abandonment of their studies (Quílez, 2019).

Neuroeducation must be related to pedagogy, in such a way as not to be ignorant of the structure and functioning of the brain and the essential knowledge of learning such as: memory, attention and emotions, developing a new style of teacher teaching.

In this respect (Soto Parra, 2016) adds that it is necessary to highlight that to build a curriculum from neuroeducation, it is not only necessary to inquire about the theoretical proposals that such research brings, but that pedagogical practices are fundamental for the aforementioned design, in education Reform policies are continuously enacted, which cause curricula to be modified without taking into account the contexts or the daily work in the classroom. And there is precisely where the ambition is for neuroeducation to become a permanent and innovative tool for teachers.

Neurocognitive Process

Through Neuroscience it is possible to understand the neurocognitive process that the brain has to intuitively regulate its learning and establish the appropriate tactics for each environment. The methods that support metacognition are: attention, reading, writing, perception, comprehension, communication and memorization, which open up meaningful learning (Gómez & Vásquez, 2018), which are shown in Figure 1.

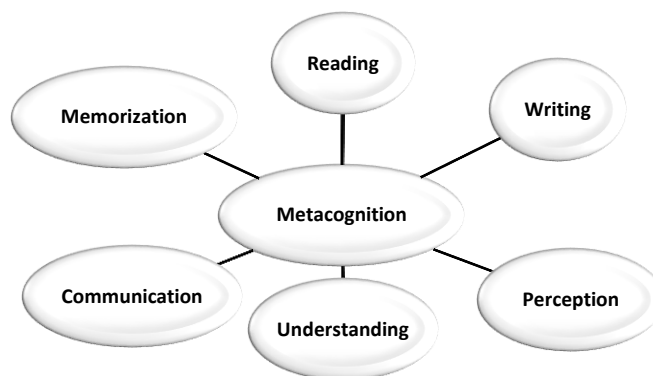


Figure 1. The methods that support metacognition

Source: (Gómez & Vásquez, 2018).

If, when training students, the necessary inductions that stimulate the brain are offered, metacognitive abilities can be developed in them and it will be easy to learn and understand, because students often learn content by heart, without understanding it.

Studying the brain is complex, so some specialists rely on using neuroscience and its elements, considering it as a set of knowledge that is oriented as mirror neurons, also called mirror neurons, which are the nerve cells in charge of imitating actions that unconsciously attract attention, these allow the brain to reproduce information from the outside like the effect of a mirror, as well as to achieve the student's attention on a subject that will undoubtedly be able to learn from it (Araya & Espinoza, 2020).

At birth, the brain has trillions of neurons that interconnect with each other and give rise to highly efficient and specialized neural networks. In neural networks, electrochemical information is transmitted in a synchronized way between neurons, which gives rise to mental representations. This mechanism is the biological basis of all neurocognitive processes. These nuclear capabilities are the scaffolding on which the acquisition of knowledge occurs (Reigosa, 2015).

Indeed, when a task proposed by the teacher is well solved, the levels of dopamine and acetylcholine increase in the student, which are neurotransmitter molecules whose increase produces feelings of well-being and a feeling of happiness. the student rewards himself, increasing his self-confidence and motivation.

Neuro-didactic processes

It is a discipline specialized in the optimization of the teaching process, based on the development of the functioning of the brain, it is the science that merges didactics with neuroscience, thus supporting the design of more efficient strategies and methodologies that promote a greater brain development (Moreano&Páez, 2020).

For learning to be effective, it is necessary that the emotional environment of the classroom is as real as possible, that the emotional brain of the students and the amygdala in particular, are ready to capture the stimuli from the environment that must be positive so that the new knowledge is easily acquired. Teachers must handle didactic strategies that are based on the knowledge of how the brain learns, based on the principles of neuroeducation (Benavidez & Flores, 2019), it is also supported by Rodrigo Rodríguez Cepeda in the learning models of Kolb, Honey and Mumford: implications for science education (Rodríguez, 2018), as shown in figure 2.

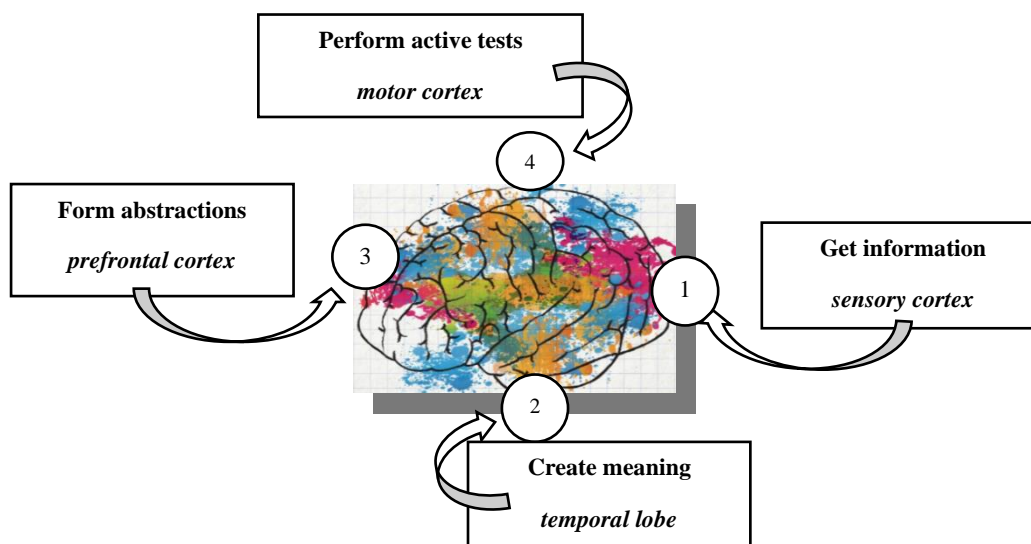


Figure 2. The learning models of Kolb, Honey and Mumford

Source: (Rodríguez, 2018).

The brain works in such perfect synchrony, that each stage allows the information entered in it to be treated correctly and distributed as the case may be, the extensive network of neurons is interconnected and allows the flow of information that for the

most part is stored in the prefrontal cortex so that each time If this information that was significantly recorded is needed to be displayed intact and available.

Technological tools for education

Having the pedagogical support of the different technological tools in the present computing heyday is logical, different authors propose teaching methodologies based on ICT, which allow the integration of different disciplines from the symbiosis between didactics and technology. The use of technological applications in the virtual classroom not only broadens the coverage of the learning strategy, it also facilitates a better interaction between the teacher and the student (González, 2019).

The use of information and communication technologies not only provides tools and content, but mainly provides new environments that promote interactions and innovation experiences in education (Varguillas& Bravo, 2020). Among the most used technological tools in the educational field, we have the following:

Class Dojo. It is an application that allows recording the behavior of students among other things (ClassDojo, 2021).

Kahoot. The use of this application in class can be used to know the knowledge of the students in certain topics, since questionnaires or surveys can be elaborated so that the students instantly know the result (Kahoot, 2021).

Powtoon. It is an online educational tool for creating animations and all kinds of video presentations. The platform has a very intuitive English interface that allows creating personalized animated videos and presentations with a high-quality result (Powtoon, 2021).

Genially. You can create a variety of interactive resources, video, presentations, images, infographics, games, maps, questionnaires, posters and many more options (Genially, 2021).

Prezi. It is a multimedia application to create dynamic and original presentations. Prezi works as an open canvas in which to organize and distribute different elements or animations that will later be viewed as a whole (Prezi, 2021).

Kine Master. It is the only full-featured professional video editor for Android, supporting multiple layers of video, images and text, as well as precise cutting and cropping, multi-audio tracks, precise surround control, LUT color filters, 3D transitions and more (Kinemaster, 2021).

Canva. It is a web of graphic design and composition of images for communication founded in 2012, and that offers online tools to create your own designs, whether they are for leisure or professional. Among the designs you can create with Canva you have logos, posters, and business cards (Canva, 2021).

Easel.ly. It is an online tool that allows us to design and create infographics to use them in our projects or presentations for free (Easelly, 2021).

I Mindq. It is a project management software that will keep your management in order and under control. Planning is the second of the five stages of project management. Additionally, iMindq can help people stimulate learning, organize and present ideas visually (ImindQ, 2021).

Quizlet. A learning tool for any subject, including vocabulary, biology, chemistry, English, and more. Quizlet is the easiest way to practice and master what you are learning (Quizlet, 2021).

Edpuzzle. It is an online tool that allows you to edit and modify your own videos or those from the Internet to adapt them to the needs of the classroom (Edpuzzle, 2021).

Word wall. It is a platform to create interactive and printable activities. These can be used as games during class or assigned as homework for students. It has a variety of very entertaining and innovative templates that allow you to monitor learning effectively (Wordwall, 2021).

Jamboard. It's a smart screen that lets you quickly extract images from a Google search, automatically save your work to the cloud, use the easy-to-read handwriting and shape recognition tool, and draw with a stylus pen, but erase with the finger the same as on a blackboard (Google, 2021).

Note Book Cast is a real-time multi-user shared online whiteboard. Draw, teach, collaborate, explain, entertain (NoteBookCast, 2021).

Padlet. It is a digital platform that offers the possibility of creating collaborative walls. In the school environment, it works as a virtual collaborative whiteboard in which teacher and students can work at the same time (Padlet, 2021).

In any case, these are technologies that complement the work of the teacher in the virtual classroom by promoting and activating the graphic memory of the brain, improving retentive memory, enriching the content and making learning more dynamic. These technological tools do not turn students into machines of learn but multiply their potential to train and grow more academically.

Conclusions

The neuroeducation offers field educational tools that motivate teachers to be strategists in their work and provides the skills students will allow be self-advocate for their own learning process, shedding habits bad related to rote learning and seek a change, a transformation in the way of managing knowledge.

The use of technological applications notably stimulates the participation of students, awakens their interest in developing the activities proposed in the virtual classroom. In the current situation, the teacher implements ICT in teaching - learning, to develop analytical and creative thinking of students, meaningful and quality learning.

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