
Consideraciones sobre aportes de las neurociencias al proceso enseñanza-aprendizaje

Considerations on contributions of neurosciences to the teaching-learning process

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Resumen: Este ensayo pretende fomentar en el desempeño pedagógico de los docentes en ejercicios, así como en los estudiantes de carreras pedagógicas, el empleo de los aportes de las neurociencias para mejorar el proceso de enseñanza-aprendizaje, de modo que, los educadores se conviertan en neuroeducadores, capaz de enseñar basándose en los conocimientos que se disponen sobre el funcionamiento de nuestro cerebro, mediante estrategias en cómo se aprende y se estimula el desarrollo cerebral en el ámbito escolar. Se emplearon métodos de investigación del nivel teórico y empírico, como analítico – sintético en la sistematización de los principales fundamentos que sustentan este trabajo.

Palabras clave: Neurociencias; Neurodidáctica, Neuroeducadores, Enseñanza-Aprendizaje.

Abstract: This essay tries to promote in the pedagogical performance of the teachers in exercises, as well as in the students of pedagogical careers, the use of the contributions of the neurosciences to improve the teaching-learning process, so that the educators become neuroeducators, able to teach based on the knowledge available on the functioning of our brain, through strategies on how brain development is learned and stimulated in the school environment. Research methods of the theoretical and empirical level were used, as analytical - synthetic in the systematization of the main foundations that support this work.

Keywords: Neurosciences; Neurodidactics, Neuroeducators, Teaching-Learning.

Introduction

Research in the field of neurosciences, since the last decade of the last century, has contributed to a new way of developing education, based on the potential of the brain, these contributions on the knowledge and functioning of the brain, allowing teachers to perform more efficiently its work in the direction of the teaching-learning process.

Well, the relationship of neurosciences, education and educational psychology gave rise to Neurodidactics, whose purpose is the application of strategies, teaching-learning methodologies based on brain functioning.

When teachers understand how the student's brain learns, processes and stores information, they can adapt their teaching style, structure their classes, attitudes and emotions to influence the brain development of students and the way they learn, because this mode improves the teaching-learning process with Neurodidactic strategies and methodologies, that's when teachers are called neuro-educators.

With the aforementioned, it is intended to evidence a series of arguments and reflections about certain contributions of the neurosciences in the educational field that promote the best development of the teaching-learning process. Thus I reveal my point of view to promote Neurodidactics as a branch of Pedagogy and neuroeducators.

The motivation that drives me is that, the contributions of neurosciences through Neurodidactics, still a large part of teachers do not incorporate them in the pedagogical task, nor are they used in the training process in most pedagogical careers, for different causes. , such as: the lack of updating with the latest scientific advances, resistance to change in the way of teaching and learning, fear of leaving the comfort zone, among others.

Development

We treat in a general sense, two aspects of the multiple contributions of the neurosciences in their relationship with education and psychology, which act as methodological tools of Neurodidactics that affect pedagogical performance to improve the teaching-learning process.

A first aspect are the ten keys of neuroscience to improve learning (Morgado I., 2015), which are: *1) regularly practicing sports or physical activities; 2) avoid excess fat in the diet; 3) get enough sleep regularly; 4) frequently train working memory; 5) guide learning with questions; 6) frequently practice remembering what has been learned; 7) a little stress is not bad; 8) homage to reading; 9) early immersion in more than one language and 10) oral evaluations.*

Of these ten keys raised by Morgado, (2013) that affect the improvement of learning, some of them can be considered as tools of Neurodidactics, because they allow teachers to use them directly and consistently in the teaching-learning process of the different subjects, which we analyze below:

4) Frequently train working memory.

This memory is the one we use to think, reason, plan for the future and make decisions. Training it systematically increases the activity of the prefrontal and parietal cortices of the brain, on which it depends and also increases the neural connections between the two cerebral hemispheres.

Therefore, in the teaching-learning process of the different subjects, this type of memory should be exercised in which the students, guided by the teacher, develop activities in which they can understand reason and solve new problems regardless of previously acquired knowledge, from of the teaching content and its link with the social context.

5) Guide learning with questions.

It is a methodological procedure that motivates, guides and allows students to focus their attention to search any possible source of information for the solution to the questions posed by the teacher. Also, it is a way to teach them to work and gain autonomy to learn. In addition, it is a way to increase your ability to learn for yourself that serves as a model for the future.

Therefore, guiding learning with questions, as a methodological procedure in the teaching-learning process of the different subjects, should be used independently of the teaching content, according to the level of performance of the students in correspondence with the demands of the questions and the sources of information; they are fundamental elements in the application of this.

6) Frequently practice remembering what you have learned.

Generally, teachers use memory to evaluate what has been learned, it also serves to keep students learning. When asked about recently learned information, it benefits long-term memory by promoting the recruitment of neural memory circuits in subsequent study opportunities. It also helps maintain attention for long periods, avoiding distractions. It increases the subjective feeling that the student has of learning and thus reduces her anxiety regarding subsequent evaluations.

Well, it is favorable to memory; beginning the classes recalling the previous content, using questions that can be evaluative and attend to the control of the independent work of the previous class; as well as in the treatment of the teaching content during the development of the classes and end them with the orientation of independent work, so as to guarantee the study for the memory of what has been learned.

7) A little stress is not a bad thing.

In emotional or moderate stress situations, the activation of brain structures such as the tonsil and the release in the blood of hormones such as adrenaline and glucocorticoids can contribute to the facilitation of learning and memory, acting directly or indirectly on the neuronal circuits of the brain.

On the contrary, chronic exposure to stressful situations can generate unfavorable effects on learning; a favorable environment of empathy must be created. But a certain tolerable dose of stress often increases alertness and improves performance on complex tasks. From becoming chronic, stress affects cognitive, social, and emotional development, performance, learning, working memory, emotional self-control, and attention span, impacting student performance.

Therefore, teachers from the diagnosis must know the students who live in adverse conditions because, in general, they present chronic stress to give them a certain treatment. They must also induce in the teaching-learning process that emotion or moderate stress in the students so that they are concerned to take care of their learning, providing them with motivating information about the content of teaching, knowledge, skills to learn and its usefulness that will be evaluated.

8) Homage to reading.

Reading is considered the most affordable intellectual activity that enhances mental capacities and provides the best cost / benefit balance. Reading is one of the best exercises to keep the brain in shape. Because it requires putting into play an important number of mental processes, such as perception, memory, interpretation and reasoning. When read, the left hemisphere of the brain, which is the most endowed with analytical capabilities in most people, is preferentially activated, but many areas of the brain in both hemispheres are activated and intervene in the process.

Reading also reinforces social skills and empathy, in addition to reduce the level of stress for the reader. As a methodological procedure, it has the potential to be used by teachers in the teaching-learning process of the different subjects, either by working with textbooks and other sources of information or combined with other methods (verbal, visual and practical) and teaching means.

10) Oral evaluations.

Oral exhibitions and exams, in addition to constituting rigorous evaluations of the knowledge acquired by students, induce in them a type of study much more based on the understanding of materials and information than on simple memorization. They also generate a much better long-term memory than that resulting from the type of study consisting of reviewing texts from a certain

subject over and over again. These forms of evaluation offer enriched environments that are useful effort and challenge to form good memories than those that are carried out with little effort.

This does not mean neglecting traditional resources, such as: writing to dictation; summarize texts; memorize the spelling rules, historical dates, countries and their capitals, geographical features, among others, since they constitute invaluable resources of implicit memory that are useful as a support for mental evaluations and complex reasoning.

Therefore, oral evaluations for the advantages they offer for student performance should be applied in the teaching-learning process of the different subjects, whether in a systematic, partial or final way, that is, at different times of the school year .

A second aspect are the five proposals of neuroscience to improve your classes (Mora F., 2013), such as: *1) start with something provocative. A phrase, an image or a reflection that does not leave you indifferent; 2) connect with the life of your students, present problems that affect them and do it in such a way that they see it as interesting; 3) make them want and can speak, create a climate in which there is no fear of expressing themselves and leave room for them to build their arguments; 4) introduce inconsistencies. The world is full of them. Use contradiction, novelty, surprise, bewilderment, or uncertainties; 5) avoid anxiety. Reduce the pressure and don't show to your students. No one learns like this.*

- 1) Start with something provocative. A phrase, an image or a reflection that does not leave you indifferent.*

Teachers must bear in mind during the first activities of the classes, the preparation of the students to deal with the teaching content, which largely depends on the creativity and initiative of the teachers, according to the characteristics of the students to what they can use: videos, images, music or reflective situations related to the experiences and / or of the students, as strategies of Neurodidactics where senses are stimulated and you learn in an integral way.

Therefore, it is required to introduce novelties that achieve emotions and motivations to get our brains out of lethargy. In this way, teachers favor not only students' attention, but also their memory, since new and striking information is stored in our brains in a more lasting way..

- 2) Connect with the life of your students, present problems that affect them and do it in a way that makes them look interesting.*

Using problems in the teaching-learning process related to the teaching content and the social context of the students' lives, taking into account their characteristics and performance makes it

interesting for them, since they understand what they have learned for, it is significant and at the same time they are motivated to continue learning. In addition, the understanding and search for solutions to the problems posed, serves to train the brain by reasoning, improving and consolidating memory.

Due to the benefits of using problems in the learning process of students, related to the teaching content and connected to their lives, it is necessary to take advantage of all their possibilities in teaching-learning the different subjects, and not only in the discipline of Mathematics, as generally happens.

3) Make them want and can talk, create a climate in which there is no fear of expressing themselves and leave room for them to build their arguments.

To ensure that students achieve knowledge and participate in their teaching processes, it is necessary to take into account methodological tools of Neurodidactics such as creating a positive atmosphere in the classroom; seek the closeness and empathy of the teacher with the students, so that there is no excess stress, since it hurts academic performance, while, at low or moderate levels that may be permissible, stress stimulates and motivates learning.

The favorable environment during class is essential, as it stimulates and motivates students to express their ideas, allows good communication, providing them with the necessary spaces for them to build their own knowledge.

4) Introduce inconsistencies. The world is full of them. Use contradiction, novelty, surprise, bewilderment, or uncertainty.

3) Teachers must take advantage of the potential of teaching content, keep in mind the characteristics of the students and the means or resources available to present contradictions between what is learned and what they are going to learn, between the known and the unknown, so that it can be created in them a psychic situation of significant cognitive conflict that provokes emotions, motivations and concerns for the search for possible solutions.

The contradictions that are used should not be above or below the level of knowledge of the students, so that with the knowledge they possess and others they acquire in the process, they can carry out the work of searching for information, analysis, reasoning and solutions, achieving the desired success so that they continue to be motivated to continue learning.

4) Avoid anxiety. Reduce the pressure and don't show your students. No one learns like this

It is necessary for the students to learn, to always create a positive, favorable environment in the classes that is dominated by discipline, respect, empathy, demand between the teacher and the

students. Furthermore, there must also be help and cooperation among the students themselves; they are necessary conditions for the development of learning.

Students need to get excited to learn; emotion and cognition are closely related. Well, what we call emotional education must be achieved in the teaching-learning process, through self-knowledge, self-regulation, motivation and empathy that allows establishing good personal relationships and interrelationships, between the teacher and the students, collectively and individually with the aim of increasing personal and social well-being.

Conclusions

The analyzes that have been presented on the ten keys to neuroscience and the five proposals to improve classes are only a synthesis of what constitutes Neurodidactics; teaching strategies and methodologies based on the functioning of the brain to improve the teaching-learning process.

The reflections made can be considered by teachers in the search for methodological strategies to influence the brain development of students, starting from understanding the way in which they learn process and store information; teaching style may be appropriate. It is there that they call neuroeducators, capable of teaching based on the functioning of our brain.

Bibliographic references

- María García, F. (2019). Neurodidáctica: qué es, para qué sirve y cómo aplicarla. Castilla. Universidad de Castilla. <https://eresmama.com/neurodidactica-que-es-y-como-aplicarla/>.
- Mora, F. (2013). 5 Propuestas de la Neurociencia para mejorar tus clases. Barcelona. Universidad de Barcelona. <http://5-propuestas-de-la-neurociencia-para-mejorar-tus-clases/>.
- Morgado, I. (2018). Diez Claves de las Neurociencias para Mejorar el Aprendizaje: Propuestas para Maestros. Barcelona. Universidad Autónoma de Barcelona. <http://otrasvoceseneducacion.org/archivos/272695>.
- Paniagua G., M.N. (2013). Neurodidáctica: Una Nueva Forma de Hacer Educación. La Paz. Universidad La Salle. http://www.scielo.org.bo/scielo.php?script=sci_arttext&pid=S2071-081X2013000100009.