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Neuroeducation, a strategy to strengthen pedagogical and quality processes in science in district schools of locality 9, Bogotá, Colombia

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Abstract

Purpose: *The present work focuses on proposing and analyzing a model of pedagogical practice that is based on neuroscience, therefore, an exhaustive investigation was carried out to know the branch of neuroscience and how it influences the learning processes; at the same time the applicability that it must have in schools and even by parents in a continuous accompaniment. For this reason, neuroeducation and everything related to it was investigated; establishing a relationship between neuroscience and education as with neurocognitive processes.* ***Method/design/approach****: The present work is part of educational research, in this case a unique case design and implementation methodology, it is carried out under the pragmatic paradigm approach, with a qualitative, cross-sectional approach and the type of study is an investigation with an action-research design.* ***Results and conclusion:*** *Teaching needs were identified, such as the lack of financing for new educational didactics, the lack of initiative of many managers to renew the study plans, they consider that training on the concepts of neuroscience is important, as well as promoting the inclusion of parents in the initial and middle levels of the educational institution.* ***Research implications****: Based on this we can conclude that, in certain aspects, neuroscience has reached education and has been established, as previously stated in section 2.10, and some contributions of this science can be found in current methodological practices.* ***Originality/value:*** *It is highlighted that a large majority of teachers are in favor of a transformation of the educational system from the neurosciences, including components such as emotional education, healthy competition, and promoting student motivation from autonomy.*

Keywords: *Neuroscience, learning, education, development, cognition*

Introduction

Currently, the world is considered a global village that is determined and characterized by frequent changes and transformations that impose the need to be at the forefront of technology and information that is generated second by second. From this scenario, education is called to transform and adapt to all these changes and transformations, not only in terms of the Educational System and the academic curricular design as such, but also and specifically in the pedagogical and didactic process that are its own, in order to offer effective and efficient responses to the educational needs of students, proving to be an educational model of quality and warmth.

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Neuroeducation involves the union of neuroscience and education with the purpose of designing strategies that stimulate the brain to better learning, Hernández, (2018), points out that "three sciences are involved: neurosciences, psychology and pedagogy. Neuroscience studies the brain and we can now analyze its functioning" (p. 1). This implies the possibility of working pedagogically the student's brain in order to promote strategies that allow in a unique way, potentiate their brain not only to capture the maximum knowledge, but to gesticulate creativity and innovation as factors to achieve a comprehensive and complex education.

The technological and scientific innovations that characterize the twenty-first century provoke changes in the lifestyle of society from various angles, communication, new scientific discoveries, access to information, and especially in education which has increasingly seen the need to improve the educational system and its quality levels. The advances and findings of Neurosciences make up a set of scientific disciplines that study the structure, functioning and pathology of the nervous system and brain, these can provide relevant information regarding how we learn, how we forget and how we really remember (Bueso, 2017).

Neurosciences are the set of sciences and scientific and academic disciplines that study the nervous system, focusing their attention on the activity of the brain and its relationship and impact on behavior (Gago & Elgier, 2018). It is presented as a branch of recent research whose origin dates back to the 1960s, addressing neurobiological aspects of behavior supported by cognitive psychology, linguistics, anthropology and artificial intelligence, among others, which lately has gained a lot of interest to be studied (Martín-Loeches, 2015).

In a globalized world, which constantly seeks to unfold human potential, this, in turn, depends on the relationship of development and maturation of the Central Nervous System, the brain and our context. The teaching-learning methodologies commonly adopted at different levels of education, from preschool training to higher education, are in fact called to undergo profound changes or be eliminated within teaching practices (Pherez, Vargas, Jerez, 2016).

The field of neuroscience in recent years has revealed information about how the brain works, extraordinary findings that contribute to pedagogy, the neural bases of learning, emotions, memory that day after day are stimulated in the classroom. These neuroeducational themes need to be incorporated into teacher training programs, which will facilitate that teaching and learning become innovative, creative critical and purposeful processes (Gil, 2015). The fact that every teacher understands and reflects on how the brain learns, processes information, how it controls feelings and emotions, how it is strong or fragile depending on the stimulus, can become a basic and indispensable tool to transform and innovate pedagogical practices and undoubtedly educational quality.

Millions of students leave school unable to acquire basic skills and abilities in math, reading and writing. Similarly, the high rate of the number of people who consider themselves functionally illiterate even though they have completed their regular basic education is alarming. Why does this

happen?, Why in the face of so many global efforts is not able to improve the quality of education systems?

Therefore, the key is to analyze the main actors of the educational process, the quality of education is directly proportional to the quality of the educator. Consequently and urgently, teacher training and training initiatives are necessary that can help meet the goals set and achieve innovation and transformation of education, so how can this transformation be made without knowing what will be transformed?

Although at a global level the different techniques and strategies of application of neuroscience in the classroom are a matter of study, the present research proposes one of the possible effective ways that can be applied to improve learning, the way in which it is memorized, the autonomy of the student and in itself the teaching practice, In this regard, Caicedo (2016) states: "There does not seem to be a single, special instructional model to develop the principles described that support neuroeducational theory" (p.81)

Consequently, with the previous approaches, Caicedo (2016) mentions that the possibilities of application to education of recent findings on the functioning of the brain, provided by neuroscience and complementary related sciences such as neuropsychology, cognitive neuroscience and neurosociology, among others, has generated very serious commitments among researchers, educators, international organizations and higher education institutions of undoubted prestige. to consider new theoretical approaches based on evidence, for the development of educational proposals compatible with the functioning of the brain. (p.53)

The human being is endowed with multiple abilities, cognitive, emotional, moral, social, physical and spiritual, all coming from the most important organ in the body: the brain, in this body piece is where the wonder of transformation can occur, in the brain of the educator and the student, the brain only learns if there is emotion. Perception, attention and memory play a very important role in learning, especially the reading function of the brain.

Parents also have no knowledge of the contributions of neuroscience to education, Toaquiza Puco, N. M. (2017), training them by sharing significant experiences, makes it become a joint work aimed at developing brain potentialities in them and in their children, our students.

The work of the teacher with the basic psychological processes is to strengthen the processes so that the information enters the brain correctly, so that the attentional times of children and adults are unknown to determine when it is indicated to present the information that will nourish the brain, in the same way the memory capacity and the types of memory that are worked in the learning process are factors that must be taken into account (Valencia, 2019).

Current education requires an educator who does not adapt passively to the vertiginous changes of society in this new millennium, but who really practices what he proclaims, who is an agent of change of paradigms, thoughts, mentality, who exercises his role actively, who is a proactive leader,

that is, professionals who demonstrate quality in their classes, excellence, professionalism and that manages pedagogical strategies that enhance creativity, critical thinking and intelligence.

Therefore, in this research work and given all the above, the following question arises: What is the model of innovative pedagogical practice based on neurosciences, and applied to average teachers in the subject of science, which significantly affects the learning of students in the district schools of the town of Fontibón?

Objectives

General Objective

Generate a model of innovative pedagogical practice based on neurosciences, applied to middle school teachers in the subject of science, in such a way that it significantly affects student learning in the district schools of the town of Fontibón.

Specific objectives

- Identify the previous knowledge that teachers have about neurosciences in learning.
- Determine what are the factors that affect the application of neurosciences in science learning.
- Develop a proposal for the implementation of pedagogical practice based on neuroeducation for science teachers in the town of Fontibón country.

Research hypothesis

The application of a new and innovative model of pedagogical practice based on neurosciences in the classroom, will significantly affect the learning process of eleventh grade students in the town of Fontibón.

Justification

Over the course of the last few decades, considerable research has been done on how the human brain works and knowledge of the cognitive processes essential for education has increased: memory, intelligence, learning and emotion. The subject of neuroeducation is new, reliable and for the vast majority of educators, unprecedented or unknown.

We are in a time where there is a relentless search to change the way it is taught. This, due to the vertiginous evolution that society is currently experiencing, which forces us to innovate, so neuroeducation contributes in this sense, since it serves to understand how the brain learns and in this way manages to appropriate knowledge more adequately and optimize teaching and learning processes.

Involving neuroeducation in the classroom in this work, specifically in teachers of the levels of education of 3rd, 5th, 9th and 11th, in 11 institutions of primary, basic and secondary education in

the town of Fontibón, Bogotá, Colombia, is in order to implement a new model of pedagogical practice that considers the symbiosis between the brain, learning and human development.

This research will allow, based on the results achieved, that practicing educators, teachers in training or professionals involved in education, acquire a greater knowledge of the neuroeducation approach and reflect on its usefulness and benefits in the teaching-learning processes of their students who will have a better experience in their student stage, In addition to helping them to modify their ways of teaching, innovating and perfecting their classes.

Nowadays there are few works done on neuroeducation, a discipline that can be defined as a bridge between neurology and educational sciences, being a recent concept in the educational area. It is expected that this work will contribute to future research, given that neuroeducation is still an unexplored field but that promises great and important benefits given the results of the research already carried out.

Methodology

The present work is framed in the educational research in this case a methodology of design and implementation unique case. It analyzes various orientations in terms of the philosophical foundation, it is carried out under the approach of the pragmatic paradigm, since it focuses on the consequences, the usefulness of information and the adoption of plural strategies based on social and educational practices, (Lavelle, E., Barber, C. 2013), with a qualitative, transversal approach that is relevant to investigate the multi-causality behind the social facts and derivations that follow from them (Escalante-Barrios, E., L. 2020), and on which our research problem depends. The type of study is an investigation with action research design, the sampling technique is non-probabilistic and intentional.

From the perspective of action research, Dr. Bausela, a reference on the subject and professor at the Public University of Navarra, Spain, mentions that:

Teaching through action research is a way of understanding teaching, not just researching it. In this way, action research means understanding teaching as a process of research, a process of continuous search. This entails understanding the teaching profession, integrating reflection and intellectual work in the analysis of the experiences that are carried out, in the educational activity. The problems guide the action, but the fundamental thing is the reflective exploration that the professional makes of his practice, not so much for his contribution to problem solving, as for his ability for each teacher to think about his own practice, plan it and be able to introduce progressive improvements. (Bausela, 2017, para. 1)

However, this author is aware that there are several obstacles for teachers to be researchers, mentioning that the main ones are "time, the **degree of commitment of the academic, the motivation of the teacher and resources" (para. 5).**

Type of project

The type of project is action research (Blández-Ángel, 1996; Gallardo and Camacho, 2008), a conception that facilitates us to understand and solve the practical problems that happen in the classroom. With this methodology we can necessarily understand teaching as a research process, a process of continuous search (Herrera, 2014) in order to improve educational quality.

Action research defines a way of working that creates knowledge, that promotes changes, with it coexists in an intimate way the cognitive eagerness and the purpose of achieving objectives that are measurable, producing in the context of the population under study a transformative action and with greater commitment of the protagonists that mark the route to follow taking into account each of the goals separately and integrating them effectively to the Subsequent steps, the process is sequential and evidential.

Type of research

The work presented is exploratory-descriptive, since our study objective does not show that it has been studied before in the town of Fontibón, the scope of this research is cross-sectional exploratory without this determining that it can not contain in itself a diversity of descriptive elements (Sampieri, R. 2010).

In this sense, the objective of this type of research is to explore a little-studied situation and establish a description as complete as possible of a phenomenon, situation or specific element, measures its characteristics and observes the configuration and processes that make up the phenomena, only from observation (Sampieri, R. 2010).

In this case, it is intended to describe how a model of innovative pedagogical practice based on neurosciences, applied to middle school teachers in the subject of science, significantly affects the learning of students in the district schools of the town of Fontibón, Bogotá, Colombia.

Qualitative approach

This research was framed in a qualitative approach. This approach performs an inductive process contextualized in a natural environment, because in the data collection a close relationship is established between the research participants, prioritizing their experiences, discourses and thoughts to the detriment of the use of a pre-established measurement instrument. With the qualitative approach, there is a great breadth of ideas and interpretations that enrich the purpose of the research, since the ultimate goal is the deep understanding of a complex social phenomenon (Sampieri, 2010).

Sandín (2003, as cited in Sampieri, 2010) mentions that "action research aims, essentially, to promote social change, transform reality (social, educational, economic, administrative, etc.) and that people become aware of their role in this transformation process" (p. 552). Therefore, it implies the total collaboration of the participants in: the detection of needs (since they know better

than anyone the problem to be solved), the involvement with the structure to be modified, the process to be improved, the practices that need to be changed and the implementation of the results of the study (McKernan, 2001, as cited in Sampieri, 2010).

Design Research – action

The purpose of action research is to solve everyday and immediate problems, make the social world understandable and improve people's quality of life. McKernan (2001, as cited in Álvarez-Jugerson, 2003), defines action research as "the study of a social situation with a view to improving the quality of action within it" (p. 159).

Action research is based on three pillars:

- Participants who are experiencing a problem are best able to address it in a naturalistic setting.
- The behavior of these people is significantly influenced by their natural environment.
- The qualitative methodology is the most convenient for the study of naturalistic environments, since it is one of its epistemological pillars. (McKernan, 2001 as cited in Alvarez-Jugerson, 2003)

As can be seen, the method of action research is inserted in what is considered a predominantly pragmatic position of everyday life, seeking immediate solutions.

Population

The population corresponds to 11 teachers of intermediate level of the subject of science, of the following district schools of the locality of Fontibón:

- District School Villemar El Carmen
- INTEGRATED DEPARTMENTAL SCHOOL OF FONTIBÓN
- Costa Rica District School
- Pablo Neruda School I.E.D.
- Carlo Federici District School
- Rodrigo Arenas Betancourt School I.E.D.
- International Technical Institute College
- Collegiate Luis Angel Arango
- La Felicidad School
- Antonio Van Uden School Venue C

- Atahualpa District Educational Institution

Sample

The sample of this research consisted of 11 teachers of middle level of the subject of science, of district schools of the locality of Fontibón, Bogotá, Colombia, chosen from the technique of non-probability sampling, by convenience or intentional. Each school has approximately 5 to 8 science teachers, of which priority was given to those who teach at the middle level.

Techniques and instruments

Among the techniques used were open direct observation to observe science teachers, an initial interview with management authorities of educational institutions and a survey to be applied to the 11 teachers participating in the sample.

For data collection, a direct observation guide (semi-structured), an interview questionnaire and a survey guide were applied as instruments. They were built taking into account the coherence with the objectives.

Procedure

To carry out the research process, the following procedures were developed:

- Bibliographic diagnosis. An exhaustive review of books and analysis of the literature will be carried out to know the state of the art of the subject and, subsequent systematization of the same for the writing of the theoretical framework.
- Selection of the sample under exclusion and inclusion criteria
- Analysis of the social context of the sample at the locality level
- Development of observation guidance and survey guidance instruments.
- The validation of the instruments will be carried out.
- Design of the proposal for the implementation of pedagogical practice aimed at science teachers.
- Development of a workshop to socialize the proposal to teachers
- Application of instruments to management teams and 11 middle level teachers of the subject of science, from district schools in the town of Fontibón, Bogotá, Colombia
- Assembling a database with the information collected.
- Analysis and interpretation of the results.
- Extraction of conclusions based on the analysis of the data obtained and possible recommendations.

Results

In this chapter there are 9 answers, taking into account that 3 of the teachers who were intended to be questioned were in a state of disability.

The inquiry was carried out through questions oriented in several directions, since it is not about facing isolated and sporadic actions, but in a process of gradual and permanent transformation, which involves all educational agents, direct and indirect. That is why the interviewees were asked about their training (1-3) and their work (4-5), about points related to the brain, learning, physical activity and teacher training (6-16), about science learning (17-20), training of educational agents and curricula (21-26).

Given the objective of this work, the most relevant answers are taken from questions 6 onwards and the following conclusions are established.

It is evident that even today, with the knowledge we have, erroneous beliefs about what the brain is and its functioning, or what is called neuromyth, remain in force; However, it is observed that there is certainty about what is understood as a critical period of learning in childhood for example synaptogenesis as described by Martínez et al (2018) and the same happens with the conviction that sport is beneficial for brain functioning, since the brain uses 20% of the body's oxygen supply for optimal performance, And the ideal is to provide a greater amount of oxygen of better quality that can exercise a much more productive work, and this can be given through physical exercise.

A little more than three quarters of the interviewees correctly agree with the statement that stimulation from enriched environments at a very early age develops several of the multiple intelligences but all of them believe, and it is true, that there are different learning styles, since there are various neural networks in the memory system and based on this to be able to design learning experiences and activities that allow storing the Information in different forms both auditory, visual and kinesthetic, as well as group or individual work.

Asked about the relationship of learning with emotions, all respondents responded that learning is not a process far from emotions, which is true, since, according to neurodidactics, positive emotions allow to enhance learning and motivation.

On the other hand, when asked about the importance of training teachers, parents and students in neuroscience, they all recognize the importance of learning how the human brain works in all its complexity, to understand the students themselves. In the same way, they all maintain that scientific skills can be developed in students by applying knowledge about executive functions and in general the functioning of the brain.

Finally, 100% of teachers agree that all levels linked to the educational institution must contribute to educational change from neurosciences because they go hand in hand with the educational community environment.

Proposals in Technical Media

Of all the teachers surveyed, three belong to technical secondary education. The conclusions of their replies are in the following paragraphs.

Regarding the affectation of the new discoveries of the functioning of the brain in the middle level of the school environment, it is considered that they affect in a positive way motivating lifelong learning, providing tools that enable the change of learning environments and modifying the time in the rhythm of teaching.

The teachers indicated that among the useful strategies to work together with the parents are continuous contact, true accompaniment to the children and work on empathy and permanent motivation of the child.

Regarding the modification of the curricula to involve neuroscience in the classroom, teachers of the technical media consider that a serious diagnosis and review must be carried out to make changes in the teaching and evaluation plans.

Conclusions

In a first instance of survey, basic information about the participants of our fieldwork was obtained. The group studied is defined as teachers with an average experience of about 15 years (half above average and a minority below 10 years), most of them work at the middle level (a large part in technical education) and the rest at the primary level, with a high level of training (only a minority has undergraduate studies, and the highest percentages correspond to teachers with a master's degree or some specialization).

Regarding the relationship between neurosciences and education, and taking into account, as previously addressed, that the arrival of neurosciences to education is relatively recent, the level of knowledge that the teachers surveyed showed could be qualified as high.

It is noteworthy, in this regard, that in almost all the questions, teachers "well informed" on this topic were around 50% of respondents in the worst case, such as certain neuromyths such as questions about mother tongue and secondary language learning. In other examples of neuromyths, such as that we only use 10% of the brain, the percentage of teachers who proved to be well informed was much higher, as in those that refer to stimulation, the development of skills, the existence of different teaching methods according to the particularities of the student and the emotional nature of the knowledge.

Based on this we can conclude that, in certain aspects, neuroscience has reached education and has been established, as previously stated in section 2.10, and some contributions of this science can be found in current methodological practices.

It is also true that we can detect cases that, being a minority, do not cease to attract attention in this regard. There are, in current education, vestiges of the traditional school, chronologically prior to

the appearance of neurosciences and, therefore, ignorant of the fundamental contributions to the teaching-learning process that this science can make.

It is possible, for all the above, to consider as positive the results in terms of knowledge about neuroscience and neuroeducation that the interviewed teachers have (specific objectives 1 and 2).

As for specific objective 3, it is more difficult to give a value (both positive and negative) to the answers obtained. As has been argued in this work, emotion is a determining factor of knowledge. However, when selecting the most important factor, more than 60% of teachers chose attention, while emotion and motivation share a percentage just above 15%. In this regard, it should be noted that, despite the optimism justified in the conclusions of the previous objectives, it is evident that there is still a long way to go in terms of fundamental concepts of neuroscience applied to education.

We believe, based on the results obtained, that although teachers have appropriated some important advances in these disciplines, it has not been directly but through pedagogical formulas, that is, in the pedagogy manuals that do include them and not because teachers themselves are becoming direct consumers of the advances of this science.

This paper does not propose, however, to discuss the degree of real interest of the teachers interviewed by neuroscience issues. Let's say, based on the results obtained, that a large majority of them are convinced of the relevance that this discipline could have in education. And although we cannot distinguish between a politically correct answer (that is, taking into account that the interviewee, who has demonstrated a certain degree of information about it, can intuit a "correct answer") or a mere expression of desire or result of a firm conviction, if we can conclude that the teachers have expressed, beyond all doubts, Have basic knowledge about neuroeducation and share interest in an advance of this science on future education.

When developing in this regard, many of the teachers surveyed have shown some doubts about how neuroscience could be applied to schools. It can be said that, while everyone agrees on the benefits, the same is not true of the modes of implementation. There seems to be some consistency in this regard in that everyone is interested not only in applying this knowledge in school (that is, directly in school curricula or in the classroom) but extending it to the entire educational community: institutions, authorities, teachers and families.

In this way, even with the insecurities explained above, we can consider specific objective 4 fulfilled. At least, on the part of teachers and those directly responsible for the classroom, although they seem to coincide in a lack of interest at higher levels in the institutional hierarchy.

There is a majority agreement regarding the utilities that neuroscience can give to the teacher, however, it is noted in the interviewees certain doubts at the time of implementing them. As previously stated, most have shown to correctly handle certain contributions that pedagogy has already incorporated into their manuals, such as topics of motivation, attention and others that are

already being discussed. Apart from these formulas already given, many of the teachers seem not to be clear how they, without the coordination of a higher instance, can find solutions to specific cases. From the idea of convening experts to advise, dividing the programs by areas of study, giving talks to the parents of the students in order to educate them also in these issues, etc. the suggestions and concrete action plans seem to be in need of a coordinated and orderly planning by some instance that exceeds the teacher himself. Whether it is the establishment itself, local or regional or national authorities, it seems that this is where the tools of neuroscience seem to have been hampered. Teachers know, and manifest, that understanding how the brain works cannot be separated from teaching-learning processes. Knowing how to learn cannot be something anecdotal to the teaching process itself.

Regarding the general objective of this work, it has been demonstrated that neuroscience has made significant advances in terms of the general description of the brain and its functions, and the way in which it works. We have abundant theoretical material about the parts and functioning of this fundamental organ in human life, but, more than anything, in its incorporation and the processing of information that comes from outside.

The way in which the concepts are incorporated into the network of information that the brain processes, as well as the deeper details about the management of the information that takes place within the brain make up a new theoretical basis overcome in the pedagogical field. Any didactic practice prior to the advent of this science has been reduced to a mere pseudoscientific speculation that little or nothing can explain about the way in which the subjects learn.

Ignoring the scientific information demonstrated and shared by experts in these disciplines cannot even be considered a valid option in our modern educational systems. Because how can we teach without taking into account the way we learn?

In conclusion, it can be verified in the present research work that the application of a novel and innovative model of pedagogical practice based on neurosciences in the classroom does have a significant impact on the learning process of students; therefore, their science scores on the Saber 11 test could improve significantly.

Having carried out a survey applied to teachers, it has been possible to diagnose the results of the Saber 11 test in science of the previous three years, with science teachers in schools in the town of Fontibón, it was found that a majority is interested in the area of neurosciences seeking to delve into the subject in order to apply the different strategies and types of teaching involved. to the same within the classroom.

From these first steps of this research it was obtained as a result that many teachers know the functioning of the brain, however, many still have doubts about this or how such a radical methodological change could be made, which can harm when teaching students, either from the stigmatization of other types of learning or ignoring that they exist within the classroom.

At the same time it was possible to identify the teaching needs, among them in the survey it is possible to identify the lack of financing for new educational didactics, the lack of initiative of many managers to renew the curricula, among others, in the same way part of the main pedagogical models that teachers apply have to do with traditional models of education, that take into account the different ways of learning of students in the technical average.

In addition, it was seen that the different teachers contributed with ideas and proposals to condition the classroom to neuroscientific strategies according to the experience lived in classes every day. It is for this reason, and for the aforementioned doubts, that they consider it important to train teachers about the concepts of neuroscience, as well as to encourage the inclusion of parents in the initial and middle levels of the educational institution.

It is noteworthy to note that a large majority of teachers are in favor of a transformation of the educational system from the neurosciences, including components such as emotional education, healthy competition, and promoting student motivation from autonomy. In the same way, it is taken into account that changes must be made so that not only are the inclusion of the different types of cognitive learning known in theory, but also so that they are put into practice when teaching or evaluating the student.

All this requires a double effort of educators and administrators when it comes to school planning.

Finally, the importance of neuroscience in the classroom was verified and that its implementation in learning resignifies the evolution of the educational institution, in the same way it was possible to collect information that will serve future research in the area of education contemplating neurosciences taking into account the opinion of teachers with more than 15 or 20 years of experience in the area of education.

Finally, we must mention that, in order to integrate neuroscience into science classes, in the present work an educational proposal was projected that includes it within the class planning, with the name of "Neurocyte in the school". Therefore, as a recommendation, the program is inserted as a story in this work based on twelve basic steps that seek to balance rationality and emotionality.

To this end, it is suggested to create an empathic relationship with the science teacher, infer in the type of mentality that as a teacher can be instilled in students, so that this influence is healthy and balanced. At the same time, it is recommended to perform a training of brain functions in order to exercise memory and attention from the cognitive, look for ways to captivate the student as science teachers, and thus achieve greater management of the types of attention or activations of alert networks such as orientative and executive attention. In the same way, moments of rest must be understood and respected, from the field of teaching or from the position as a student, and encourage sports before entering science classes.

In many cases, the importance of art included in science classes is not taken into account to rethink how science can promote creativity, improve education and social-emotional learning.

All this is a set of gears that, moving at the same time, would improve teaching practices from the sciences, improving the performance of our students and therefore, improving the quality of education in our locality.

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