
The Neuroeducation: Creativity and Motivation in Education

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ABSTRACT

Talking about neuroeducation is your topic. Although it may seem new, teachers have already used it in classrooms for some years, even if they have not called it by that name. Teachers implement strategies from neuroeducation in neurodidactics, where they apply techniques to enhance students' learning. However, only in recent years have researchers begun to recognize the importance of neuroscience and psychology in the learning process, which has opened a clearer view of the brain's role in educational institutions. This research seeks to promote the applicability of creativity and motivation as part of neuroeducation in different educational settings. The study uses a qualitative and descriptive methodology and includes 30 participants randomly selected from a population of 110. The researchers conducted interviews with various stakeholders in the educational field from different countries through distance learning. One of the most significant findings is that, within the category of motivation, neuroeducation revealed that, by having good self-esteem, students enhance their academic trajectory

Keywords: *self-esteem, creativity, motivation, neuroeducation, academic performance*

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La Neuroeducación: Creatividad y la Motivación en la Educación

RESUMEN

Hablar de neuroeducación es un tema que, aunque se pareciera nuevo, ya tiene algunos años que se ha trabajado en las aulas, aunque no con ese nombre, porque los docentes implementan estrategias desde la neuroeducación en la neurodidáctica y en ella realizan estrategias para potencializar el aprendizaje en los alumnos. Sin embargo, no es, sino hasta hace unos pocos años donde se empieza a reconocer la importancia de la neurociencia y la psicología en el proceso de aprendizaje y con ello se ha abierto en las instituciones educativas una visión clara de la importancia del cerebro, esta investigación tiene por objetivo fomentar una aplicabilidad de la creatividad y la motivación como parte de la neuroeducación en los diferentes ámbitos educativos, su metodología es cualitativa, descriptiva, participaron 30 personas de manera aleatoria en una población de 110 participantes en entrevistas con diferentes actores dentro del ámbito educativo de diferentes países a distancia, Uno de los hallazgos más significativos es que, dentro de la categoría de la motivación, la neuroeducación revelada que, al tener una buena autoestima, los alumnos potencian su trayectoria académica

Palabras clave: autoestima, creatividad, motivación, neuroeducación, trayectoria escolar

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INTRODUCTION

Neuroeducation is not just about discussing brain function, how information is processed, or the specifics of neuroscience. The cognitive aspect often leads to this topic seeming like it has been around for a long time in teaching practice; however, this is not the case, and it is important to promote this area (Belda, 2023). Understanding how the brain functions in the teaching-learning process is essential for teachers to promote and stimulate learning through their teaching methods, regardless of the educational level at which they teach, and so that students actually learn.

However, it is not just about imparting knowledge about brain physiology, but also about implementing playful activities in their classes. Often, teachers are hesitant or unsure how to incorporate play into the teaching-learning process. It is beneficial to use play-based activities whenever they have a pedagogical purpose or the intention of helping students learn, fostering self-regulation, and thereby understanding the important role of emotions. In being able to maintain composure in academic decision-making and throughout their school career. As well as the teacher's motivation towards students, which should not only lead to reflection but also to its promotion as a tool for the current teacher (Bueno, 2021).

This research seeks to emphasize the importance of creativity and motivation in learning, where the teacher is a fundamental pillar for impacting students during classroom instruction at different educational levels, regardless of whether the educational sector is public or private. This underscores the importance of neuroeducation in teaching practice, as proposed by Mora (2013).

The objective of this research is to highlight the importance of creativity and motivation as fundamental components in fostering the teaching-learning process within the increasingly prominent field of neuroeducation.

This is because, as a research question, does traditional education focus solely on memorization or the application of techniques, where students meet deadlines but neglect the process itself, failing to motivate them and emphasize their creativity? This often leads students to drop out of educational institutions, regardless of level.

Theoretical framework

Neuroeducation:

This section will revisit some important concepts from leading authors on neuroeducation, one of whom is Mora (2013). This author highlights the importance and necessity for the educational field to recognize that the brain is a marvelous machine and its substantial role in teaching and learning processes, regardless of the educational level or course. It is important to acknowledge that neuroeducation began to be discussed in a context where learning seemed to be mechanical or automatic, without explaining why it was important to understand how the brain functions. This contrasts with current trends, where one of the main approaches is to focus on how human beings learn not only from a physiological perspective, but also from the perspectives of emotions, motivation, creativity, and other aspects that are highly relevant to individuals' educational trajectories (Ortiz, 2021).

However, where does neuroeducation come from? Researchers have studied the brain for a long time, and they have found its study to be highly complex. Furthermore, people have made undocumented claims, such as the idea that we will never fully understand the brain's functions. However, over time, researchers have conducted very interesting studies on the brain, although they have not yet explored it in its entirety (Ortiz, 2021).

Its anatomical parts, it is functioning, and everything related to it have been studied extensively, but in recent years, it has taken on a significant role in how we learn, cognitive development, and its importance in the teaching-learning process (Pascale, 2012).

The predecessor and creator of neuroeducation is not well documented, and therefore, there is no clear understanding of this figure; it is only known that he was a professor in Germany who created a course that linked the brain with pedagogy and neurodidactics, and that his name was Gerhard Preiss (Neuroeducation, 2017).

Neurodidactics, as the study of neuroscience in education, has as its main objective the design of strategies that stimulate the potential cognitive development of students within the educational environment. It is important to understand that this is not only the responsibility of those who will learn, but also of those who will teach, such as teachers, who are now also considered facilitators or mediators (Soto del Águila, 2021). Neurodidactics seeks to implement strategies in the classroom that are contextualized to the needs of the classroom and the educational level, with the aim of maximizing the brain's potential and fostering the greatest possible interconnections among students. This development begins at the start of their schooling and continues through formal education, extending into non-formal and informal settings, since, as we know, the brain never stops learning until death (Paniagua, 2023).

It should also be mentioned that neuroeducation, according to Mora (2013), involves discussing brain function through multidisciplinary work across fields such as medicine (for its focus on brain physiology), psychology (for aspects like motivation and creativity), sociology (for understanding each individual's context), and pedagogy (for everything involved in the teaching and learning process). However, neurodidactics focuses on classroom work, both for teachers and students, with the aim of enhancing the learning and teaching processes for both teachers and students.

It is also worth noting, as already demonstrated in previous paragraphs, the role of creativity and motivation in neuroeducation. First, we must define the concept of creativity.



According to the Royal Spanish Academy (2023), it is the ability of a human being to create and produce new and innovative ideas and projects within a specific context and time, with the aim of facilitating, reflecting upon, or motivating the adoption of new perspectives and activities. Therefore, neuroeducation seeks to enhance creativity, especially in the classroom. However, how can we achieve this? By taking artistic activities such as painting, art, music, and dance seriously and formally, recognizing them as part of neural development. This contributes not only to creative activity but also to enhancing the development of students or participants, enabling them to become specialists in these activities, rather than simply engaging in recreational activities or distractions (Sanz, 2022).

Considering that Graham Wallas, cited in Matsson (2025), proposes that the creative process comprises four phases or stages, the first of which is preparation. In this stage, the individual identifies the direction of their creative vision and the attitude they will adopt toward the process, beginning to envision the future of their creative perception, regardless of their field, age, or educational level. The second part of the process is incubation, where all the necessary information for carrying out the activity or process is gathered. This is when ideas, materials, the required discipline or depth, and other details begin to take shape (Matsson, 2025).

The third phase is illumination, during which the creative person refines their work or action, detailing, modifying, and reviewing what would be best in terms of materials, resources, and time. This also allows them to become aware of their limitations or creative barriers, both within and beyond their control. In the final phase, we verify the work and implement actions to improve and perfect it.

Creativity plays an important role in neuroeducation because it enhances neurological processes and supports neuronal development. However, what is the ideal educational level for fostering creativity?

The answer is none; all educational levels encourage creativity. However, certain factors contribute to its development, such as motivation (Pascale, 2012).

Ultimately, motivation, as Schunk (1998) states, is the impulse that drives a person to act, whether intrinsic or extrinsic, to perform an action or achieve a goal. Here, neuroeducation tells us that in the educational process of teaching and learning, intrinsic motivation is the internal drive that leads us to perform an action without receiving a reward or recognition from others, while extrinsic motivation is based on obtaining a reward or benefit for performing an action. Both of these motivations exist in the classroom (Carrillo, Padilla, Rosero y Villagómez, 2009).

We should also add that Abraham Maslow (1943) proposed one of the most representative theories of motivation. In this theory, he presents a hierarchy of needs in the form of a pyramid and explains the importance of satisfying each level in order to move toward self-actualization. Educators should recognize this pyramid throughout students' academic careers so that they can achieve their academic goals, whether earning a degree, acquiring tools to develop a skill (of which there are countless), or strengthening attitudes that improve communication skills, among others. We can apply this theory to both very specific and more general situations (Romo, 2005).

What does each of Maslow's (1943) hierarchical levels consist of? We will show examples below of situations where these needs in the pyramid are not met. On the first lower level are physiological needs, which include eating, sleeping, and using the bathroom. To mention a few things that happen when a student arrives in the classroom without having eaten beforehand, regardless of the class period, this student will not be able to perform physiologically. They will think more about the feeling of hunger than about learning or concentrating on the teacher's explanation (Sanz & Aguilera, 2021).

Another example is from the teacher's perspective: what happens when they arrive to teach without having met their physiological need for sleep? During class, they will feel exhausted, hungry, and sleepy; their entire nervous system will be very irritable, and their attitude will be unfavorable. As a result, students will not feel motivated, and teachers may ignore everything they present or grade their work subjectively (Mora, 2013).

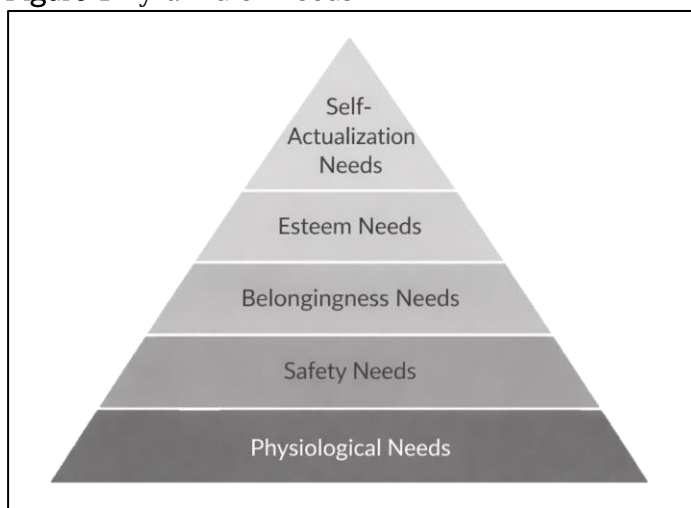
The next step in the pyramid is protection and security. At this level, a student arrives at school fearful that their parents constantly threaten them with the phrase, "If you don't improve in school, they're going to abandon you." This student will not pay attention because they are worried about their parents abandoning them. Another scenario is that of the teacher; for example, this can occur when their employment contract lacks stability. Because their contract depends on evaluations or is only temporary, this leads the teacher to be more financially concerned with finding ways to earn money to cover their basic needs than with providing quality education to their students.

The step of love and belonging. In this section, an example would be the need to belong to a group of peers, which students lack when they are not accepted by their classmates and are rejected. Whether due to perception, skin color, or coming from a different background, students often do not participate in activities like social gatherings, dances, or sports because of this type of rejection from their peers or teachers. Unfortunately, teachers often do not notice these situations because they have large class sizes, or conversely, they do notice that there are violent relationships among classmates that cause the victims to arrive unmotivated to attend class, physically injured, and it is the teachers who take the initiative to integrate the group.

Through activities that promote healthy coexistence (Mora, 2013).

In the case of the level of value needs, the need can be identified in students who do not get good grades in school, are constantly scolded, and feel that they are not good students, which is reflected in phrases like "I'm stupid," "I always fail," to mention a few. But what happens to teachers who do not meet these needs? They have to minimize their work; their personality is withdrawn; they exhibit feelings of inferiority, and, consequently, students lack respect for these teachers. Therefore, it is necessary to promote group management and educational leadership strategies so that these negative actions do not occur in class or with any teacher. Finally, there is the level of self-actualization needs, in which the need arises when students and teachers do not achieve their goals, such as, in the case of students, passing the school year, or, in the case of teachers, feeling fulfilled in their teaching practice (McGraw Hill, 2019). However, what happens when these needs are met? Both teachers and students achieve self-actualization, and this is where the power of neuroeducation comes in. Through self-regulation strategies, fostering creativity in the classroom, using exercises, working in teams, and boosting self-esteem, the brain is enhanced, and the perspective shifts from "I can't" to "I did it or I'm in the process of doing it." The order of these needs can be visualized in Figure 1, shown below:

Figure 1 Pyramid of Needs



Note edited by the author based on the European Institute of Positive Psychology (2024).

MATERIALS AND METHODS

This research follows a qualitative methodology, as Monje (2011) explains. This approach allows the researcher to observe participants' contexts, experiences, and perceptions with objectivity, precision, and clarity through techniques such as interviews, which the research team conducted in this study. Therefore, this methodology enables the researcher to express and interpret what participants observe in their perceptions, values, and contexts (Monje, 2011).

The study adopts a descriptive design because, in the social sciences and humanities, researchers consider it a non-experimental methodology. In this approach, key participants provide information about their reality from their own perspectives, including opinions, perceptions, and behaviors (García & García, 2012). The study also uses a cross-sectional design, since the researchers collected the data at a specific point in time (Stewart, 2025).

This design allowed us to observe the impact of neuroeducation through the contributions participants made during a neuroeducation diploma program. The program included 110 participants—men and women—from three different cohorts and several countries: Mexico, El Salvador, Bolivia, Colombia, Costa Rica, Argentina, and Chile. Throughout the 160-hour program, they shared diverse perspectives on creativity and motivation, as well as their importance and connection to neuroeducation. From this group, the research From this pool, 30 key subjects were selected based on inclusion criteria to participate directly in this research. They were chosen for their diverse profiles, including mothers, psychologists, educators, neuroscientists, and professionals from various educational modalities and levels, from preschool to higher education. This selection aimed to avoid information overload and to ensure the theoretical framework validates the research's theoretical and methodological rigor. active participant in the diploma program, agreeing to participate but not completing

the interview, or refusing to have it recorded or transcribed. Interviews lasted between 20 and 50 minutes, depending on the participant.

The ethical considerations involved obtaining informed consent via video call, where participants were informed about the purpose of the research, asked if they agreed to have their interviews recorded, and consented to their participation being recorded and transcribed in full, indicating whether or not they agreed to participate. The video call material was subsequently destroyed, although some participants requested its destruction, thus safeguarding their autonomy, beneficence, anonymity, and security. Justice was achieved through the voluntary choice of the participants (Hecker and Kalpokas, 2025).

Instruments

The research team developed the instrument during the planning stage of the diploma program and designed a set of questions that formed the basis of a semi-structured guide. During the Google Meet sessions, the researchers randomly selected participants to take part in in-depth interviews. This technique benefits qualitative research because it allows researchers to explore participants' perceptions of reality in depth, whether they conduct the interviews face-to-face, by phone, by video call, or through other means of communication (Díaz, Torruco, Martínez, y Varela, 2013).

The researchers conducted the in-depth interviews with key participants who voluntarily agreed to participate, ensuring a diverse and objective range of responses (Robles, 2011).

A positive aspect was the high level of interest in participating, but limitations such as time constraints and the interview schedule, which began after 11:00 PM, prevented some participants from participating fully. The time zone in Mexico City meant that participants were exhausted or had to get up early for work, but participation remained open for future research (Varguillas y Ribot de Flores, 2007).

Procedure

The researchers evidenced its application during the sessions, which they recorded in full and which lasted between 20 and 50 minutes, depending on each participant. Subsequently, they fully transcribed the sessions, focusing specifically on those related to neuroeducation, creativity, and motivation, as well as on the participants' integrative diploma projects, in which they linked these topics to education.

At this stage of the research, the team analyzed and collected information, concentrating exclusively on the sessions that addressed neuroeducation in relation to creativity and motivation. During these sessions, participants from various countries contextualized neuroeducation, creativity, and motivation within their teaching practice or from their perspectives as mothers. The researchers based their analysis on the proposed theoretical framework to maintain objectivity and ensure consistency with the established methodology. Throughout the sessions with the three cohorts of the diploma program, the researchers reached data saturation once they clearly understood the variables that emerged from creativity and motivation, as reflected in this section of results analysis and interpretation. The team continued coding the data using Hyper RESEARCH (2022), a program designed to analyze qualitative data in the social sciences and humanities. This software supported the coding and analysis of textual data, such as the interviews that the researchers fully transcribed for this study using the Windows version (Hyper RESEARCH, 2022).

RESULTS

1. Category: Neuroeducation and Creativity

Psychology is one of the areas linked to neuroeducation that studies creativity. One of its most recognized authors is Guilford (1967), who has come closest to explaining creativity as creating something new from scratch, which tends to be associated with the intellectual

abilities of creative people. He proposes characteristics such as divergent thinking, flexibility of thought, context, and adaptation to it, to name a few, as drivers of creativity (Gálvez, 2006).

(NEdu 3) There are aspects of preschool education that motivate and promote creativity, but others, such as the family context, especially in rural areas like my own, where parents treat preschool as a daycare for their children, which means that children only develop their creativity in the classroom.

(NEdu 3) The classroom, as Mora (2013) argues, is the place that, regardless of the student's background, will shape a creative individual and provide them with tools to enhance their creativity through music, painting, dance, and other art forms. Alternatives exist for developing creativity from the brain: hence the importance of not limiting oneself to memorization or using anthologies that become obsolete after months or even days.

(NEdu34) In the field of pedagogy, university students feel committed to creativity as part of their professional development. This means that, through activities such as crafts, group dynamics, and interaction with students, they gradually experiment with it in their teaching practice. This is because they have learned in theory the importance of fostering creativity in their students.

Regarding the creative process, it does not occur spontaneously; instead, it develops gradually, like waves, as individuals seek the final work in space, time, and form (Fernández, 2025). At the beginning of the creative process, individuals do not fully understand the outcome, because the brain explores physiological aspects that allow the right hemisphere to generate ideas, ultimately leading to the final product.

In the classroom, teachers foster this continuous exercise through the activities students carry out, regardless of their educational level. Throughout their educational journey, students become creative individuals: some express their creativity through visible products or ideas,

while others develop it more internally or for personal fulfillment. The important point is that education actively contributes to their creative development (Chávez, Graff, García, Vaugier, & Cruz, 2004).

2. Category: Neuroeducation and Motivation

One of the main purposes of teaching is to motivate students with dynamics and strategies so that education becomes an opportunity rather than an obligation for improving individuals' lives. Teachers must overcome the fear of implementing activities that inspire students, from the moment they wake up, to want to go to school and to view it as a path toward self-realization and the successful completion of their education (Gilbert, 2005).

Therefore, educators must carefully design the planning stage to ensure that the curriculum includes varied activities and encourages students not only to acquire knowledge but also to connect it to their present and future lives. In this way, through the teacher's guidance, students develop a love for learning and for attending school, while they strengthen the skills that their brains cultivate at each educational level and with every new piece of information; they acquire (European Institute of Positive Psychology, 2024).

(NEdu25) My role is to continually encourage students to see school as an opportunity to envision the future they need to achieve the job, travel, or family they desire. I try to ensure they have a variety of activities, and I have noticed that as the difficulty increases, they also solve problems correctly and with more critical thinking, supported by neuroeducation. I teach at the high school level in Salta, Argentina.

Neuroeducation aims to help students maximize their neurological development in order to enhance their neural processes throughout their lives and acquire tools that will allow them to maximize their brain's potential during their educational journey (Bueno, 2021).

(NEdu81) In my classroom, I use music and relaxation exercises to help students develop self-

control so that, when they reach adolescence or adulthood, they won't be afraid to express and balance their emotions. Besides the fact that they perform their jobs better, the difficulty lies in getting the institution to validate these kinds of exercises and not just assume that, as a teacher, I am wasting time. I work in primary education in La Paz, Bolivia.

These are some of the contributions that the students in the diploma program made to this research. It shows that the power of neuroeducation in the classroom does not depend solely on the teacher, but also on other actors who must be involved in the individual's educational trajectory. Such as: the educational system, making the importance of neuroeducation visible to people; institutions, providing training, promoting exercises that stimulate the brain and foster creativity; parents, supporting their children during infancy and childhood; and above all, the interaction between teachers and students to motivate and encourage them during the teaching-learning process.

DISCUSSION

For this section on discussion, it was found that in the category of neuroeducation and creativity, while Guilford (1967) argued that creativity is something that doesn't exist and that one starts from scratch, Gálvez (2006) proposed some characteristics that promote creativity, considering prior learning where context is crucial for enhancing creativity—something also supported by Mora (2013).

And Fernández (2025) adds that everything begins in the brain throughout life. In the second category, neuroeducation and motivation, Gilbert (2005) discusses the importance of teaching practice and its role in motivating students not only to learn knowledge but also life skills, which aligns with Bueno (2021). This author proposes neuroeducation as part of the current and innovative teaching-learning process at any level and in any educational system.

CONCLUSIONS

The study concluded that many participants do not clearly understand how neuroeducation supports not only brain processes but also how psychological processes connect to and influence learning, creativity, and motivation. It also showed that motivation could either encourage students to continue their academic journey or discourage them from doing so.

Participants in the diploma program proposed several activities to foster motivation. They suggested that teachers value all students equally, incorporate multiple intelligences into their teaching, and help students understand that these intelligences evolve throughout life and develop according to context and life experiences. They also recommended that educators guide students in creating a life plan that prioritizes academic success and promote creative and divergent thinking.

The study also concluded that teachers should value all students equally and intentionally integrate multiple intelligences into their practice.

Teachers should help students recognize that these intelligences change over time and grow according to personal context and experiences. Furthermore, the findings highlighted the strong influence of motivation on whether students continue or abandon their academic path, with teachers playing a central role in this process. A word of encouragement, an appropriate tone of voice, warm treatment, empathy, and openness to questions can significantly strengthen neurodidactic strategies in the classroom.

Findings and future lines of research

One key finding is that self-esteem plays a crucial role in building confidence in both teachers and students, giving them security in their work, especially when they master tasks or feel confident, for example, when they complete an activity and receive recognition.

Another finding is the need to focus on training in neuroeducation, as it is only just beginning



to gain traction and highlight its importance in education, particularly for developing not only better students in terms of knowledge and skills, but also in terms of attitudes, due to the self-regulation of emotions as part of their learning strategies.

Finally, another very important finding is the need to promote future research from different perspectives, such as those involving parents, the impact of neuroeducation at different educational levels, the role of self-esteem in positive academic performance, and above all, to emphasize neuroeducational topics in the classroom using neurodidactic strategies.

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