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TRAINING IN NEURO-EDUCATIONAL TOOLS TO IMPROVE THE PEDAGOGICAL PRACTICE OF INITIAL LEVEL TEACHERS

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Abstract

The research has developed a proposal called training in neuro-educational tools to improve the pedagogical practice of initial level teachers. The adopted design was based on an action-research and qualitative methodology, considering the categories of neuro-educational tools and educational practice, with the participation of four initial level teachers, belonging to two educational institutions that are members of the Educational Network 1 and 2 in the district of La Huaca. The study has achieved the objective of developing a training program in neuroeducational tools to improve the pedagogical practice of teachers. The results showed that there is a tendency to use neuro-educational tools, however, there are important needs for their application, which is why the general objective of the study was achieved, which was to develop a training program in neuro-educational tools for enrich the pedagogical practice of teachers.

Keywords: *Neuro Educational Tools, Pedagogical Practices, Education, Teachers.*

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1. Introduction

Neuroscience constitutes a scientific field dedicated to examining the configuration, operation, growth term that means (development and growth of the nervous system in the evolutionary process of the human being), chemical composition, pharmacological effects, and diseases of the nervous system, in connection with behavior. and the thoughts of the people. This discipline focuses on exploring the nervous system in depth, investigating its operations, structures, and salient aspects of brain function. In addition, neuroscience facilitates the analysis of behavioral traits. Good (2021)

The first six years of life are essential for brain growth, since neural connections are formed at high speed at this stage, which does not happen again later (Aguilar, 2017). During early childhood, the child develops essential skills for its functioning, so it is crucial to guarantee optimal development (Bodero, 2017). However, a UNICEF report (2018) indicates that in low-income countries, approximately 43% of children under 5 years of age face risks of poor growth and delayed development due to poverty, malnutrition, and lack of medical care.

In the Peruvian context, according to Law No. 28044 on Education, the child is considered an "Active Agent, holder of rights", recognizing that, from their early age and their situation, they are participatory individuals with the ability to get involved in the teaching-learning process. In this capacity, they build their own understanding, which is formed through sensory exploration of the physical and sociocultural environment around them. This knowledge becomes the foundation on which their future development will be built (Ministry of Education, 2003).

In recent times, as part of its management strategies outlined in the National Action Plan for Children and Adolescents (PNAIA) 2012-2021, currently in force, one of its fundamental objectives has been included, which is to ensure the comprehensive development and progress of children from 0 to 5 years of age (Ministry of Education, 2012). In this line, the State of Peru, aware of the significant importance of training in the early years, is promoting public policies that reinforce this aspect. Examples of these measures are the Program for the Promotion of Educational Results (PPR 95), the transformation of Non-School Initial Education Programs (PRONOEI) into educational institutions, the implementation of Peruvian Education Rooms, the Cunas Más program and the Bilingual Initial Education and Early Childhood Care (PEIBAT). (Ministry of Women and Vulnerable Populations, 2021).

The Directorial Resolution of UGEL Paita No. 01694-2021 (Paita, 2022) highlights the formation of the La Huaca1 and 2 School Management Educational Network. As part of its action plan, a diagnosis was made to evaluate the socio-emotional skills of students 5 years in five educational institutions. The survey revealed that 70% of the children were at an initial level, showing difficulties in the development of their socio-emotional skills, which include aspects such as self-concept, self-care, self-esteem, social behavior, empathy, emotional regulation, creativity, problem solving. conflicts, responsible decision-making, and teamwork, while 20% were in process, with some difficulties, and only 10% had reached a satisfactory level without difficulties in this aspect.

Additionally, cognitive challenges were observed in students ages 3-5 after two years of virtual education. There were difficulties in the development of a comprehensive and reflective language, as well as in the attention given to different learning situations. According to the diagnostic evaluation, 60% of the children were at the initial level, 35% in the process, and only 5% at the achieved level in terms of cognitive development. Given the situation described, it is important to develop a training program in neuroeducation tools that improves the pedagogical practice of teachers at the initial level of educational institutions in the district of the locality of Peru.

This research is justified because it highlights the importance of applying the knowledge of neuroscience in education, through neurodidactic tools that enhance the brain and socio-emotional development of teachers and students. Its practical utility to reduce learning difficulties and limitations in interpersonal relationships in initial level children stands out. The action-research methodology can serve as a reference for future studies on this insufficiently addressed topic in the region. It is suggested that these studies adopt a socio-critical

approach to design interventions that improve cognitive and emotional aspects in the educational community, crucial considering the pandemic context that has generated imbalances in these areas.

In this way, the objective is: to develop a training program in neuroeducation tools to improve the pedagogical practice of teachers, in order to achieve this end it is necessary to describe the use of neuroeducation tools, as well as to analyze the use of neuroeducation tools. of neuro-educational tools, as well as evaluating the impact of the training program on the use of neuro-educational tools for the improvement of the pedagogical practice of the teachers of the institutions of the district hosted in this investigation.

Research in various academic fields has recognized how neural evolution impacts thought processes and emotional regulation, key aspects of learning. This has given rise to neuroeducation (Aguilar, 2018). The Triune Brain Theory (Sperry, 1973; MacLean, 1990) states that this organ has three components: neocortex, related to logical thinking; limbic system, linked to emotions and motivations; and the reptilian brain, associated with values and behaviors. It is relevant that the teacher's emotions influence learning, because if he transmits content with negative emotions, the student's neocortex will not assimilate it well. For this reason, the emotional intelligence of the educator is essential to adequately manage their own emotions and those of others in the classroom (Goleman, 1999). In the reptilian brain, basic functions such as breathing are controlled and reactions to danger are executed. Santander (1996) argues that this region generates repetitive, imitative, and defensive behaviors, so that people feel comfortable in familiar environments, but may react inappropriately in new situations. This is related to cognitive dissonance, where behaviors are automatic and not reflexive. However, Heller (1996) suggests that these behaviors must be positively oriented in learning. Thus, the teacher must create practical experiences for children to store information in their reptilian brain (Colina, 2021).

In the first two years of life, the child registers sensory information to understand its environment, initiating mental representations. The brain has high plasticity to adjust behaviors. From 2 to 5 years of age, connections that are not useful for cognitive and social development are eliminated. It is essential to provide quality care in aspects such as sleep, nutrition, and affective bonds, to stimulate the brain system effectively (Bodero, 2017). Within the educational field, neuroscience provides educators with an understanding of how the brain operates in the teaching and learning processes. This is based on theories such as the triune brain, the interaction between the right and left hemispheres and the theory of multiple intelligences. These concepts complement each other, enriching the educational landscape (García, 2020). In the same way, Sindeev, citing Maureira (2019), underlines the importance of considering the brain in an integral way from the educational perspective. This ranges from its structure to the procedures for analysis, storage and retention of information. Taking advantage of this information effectively in the teaching-learning processes contributes to improving the educational results of students. From the Theory of Multiple Intelligences, Gardner (cited by Avero & Marrero, 2020) proposes that people have up to eight types of intelligence, each one focused on specific brain areas, which can operate autonomously or collaboratively if they develop in a Propitious environment.

Advances in neurosciences led to the emergence of neuroeducation, which studies the brain in educational processes in relation to disciplines such as psychology and medicine, to later apply this knowledge to learning, teaching, and memory (De la Barrera in Benavidez & Flores, 2019; Mora in Aguirre-Vera & Moya-Martínez, 2022). Learning arises from the interconnection between brain areas linked to emotions, reasoning, decisions and memory (Luque & Lucas, 2020). Brain plasticity and mirror neurons are key. The first allows adapting the brain structure through learning, being maximum in the first years of life. The second are linked to imitative learning (Herrera & Sierra, 2022). Neuroeducation is based on motivation, attention and memory. Understanding them helps the teacher to design challenges that activate the student's brain through collaborative strategies and problem solving of their interest (Linarez & Gómez, 2019).

In Peru, the National Plan of Action for Children and Adolescents (PNAIA) 2012-2021 was created to coordinate comprehensive child and adolescent development policies, seeking that the State, families and society establish optimal conditions for quality care of children from 0 to 5 years. The

Ministry of Women and Vulnerable Populations, 2021 (PEIBAT) and some educational institutions have introduced neuroeducational programs, such as the Hydration, stimulation, breathing, auditory, and tactile program (HERVAT) to promote early math skills in 5-year-old children in Lima (Tapia & Tellez, 2021). However, few teachers incorporate neuroeducation into their pedagogical approaches, since their initial training does not include these concepts and the Minedu curriculum does not consider neuroscientific principles (Acta, 2019). It is therefore necessary for educators to acquire an understanding of brain-learning interaction and knowledge of child neurodevelopment (Stamn, 2019). The teacher must use neuroeducational tools to promote social, cognitive and emotional skills, such as motivation, empathy, emotional intelligence, attention, memory and creativity (Bilbao, 2015). Incorporating them into their pedagogical approach involves planning, executing, and evaluating the curriculum, considering their training and experience (Jiménez-Espinosa & Sánchez-Bareño, 2018). Pedagogical practice thus becomes a contextualized knowledge strategy (Ripoll, 2021).

Vice-ministerial Resolution No. 002-2020-MINEDU conceptualizes school management as activities provided, executed, and evaluated, mobilizing the educational community so that students achieve expected learning. The leadership falls on the School Management Team of Educational Networks (EGERE) that groups educational centers by districts to create conditions for learning (RVM N°002-2020-MINEDU, 2020). The La Huaca 1 and 2 Educational Network carried out a diagnosis by applying a survey on socio-emotional skills to 48 5-year-old children from 5 institutions. 70% were at the beginning level with difficulties in socio-emotional skills; 20% in process with some difficulties; and 10% at a satisfactory level without difficulties (Paita, 2022). At the cognitive level, from the diagnosis to students from 3 to 5 years old, 60% were at the beginning level with difficulties in language, attention, and learning; 35% in process; and only 5% in level achieved.

According to Moreno (2017), the educational activity seeks to improve the performance and achievements of students in a school environment. Pedagogical practice focuses on the curriculum as learning objectives, the use of technology in the curricular process, and collaborative work. It must encompass organization, interaction, content transmission and cognitive processes (Agudelo et al., 2017). The current curriculum guides pedagogical strategies towards constructivism for autonomous learning (Noguera-Ramírez & Marín Díaz, 2017). Action research, based on the critical paradigm, emerges as an alternative to positivism. He argues that social action allows recreating meanings to generate transformations through communication and interaction. In addition, it allows participants to identify actions to solve problems and overcome obstacles (Loza et al., 2021).

2. Materials and Methods

The current research adopted an applied approach, since it designed a program aimed at enhancing the skills of initial level teachers in the use of neuroeducational tools, based on a diagnostic analysis. This made it possible to address a specific and previously identified need, taking advantage of scientific knowledge (CONCYTEC, 2020). The intervention was aimed at improving professional practice, aligning with the idea presented by Lomax (1990), cited in Latorre (2005).

The adopted design was based on an action-research methodology, since the participating teachers played an active role in the research by getting directly involved in the proposal. This resulted in a positive transformation of their pedagogical approach (Guevara et al., 2020). In this methodology, the researcher assumed a central role in choosing the research problem and supervising the project. Following the perspective of Stenhouse (1998) and Elliott (1993), the objective was to change the mentality of the participants and modify their social practices, giving the researcher a leading role in this dynamic (Latorre, 2005).

Within the framework of this research, the design proposed by (Susman & Evered, 1978 P.588), which is widely recognized in the field, was adopted. This design was structured in different stages, following the following scheme that is presented in figure 1.

Figure 1: The Cyclical Process of Action Research (Susman & Evered, 1978)

Diagnosis: allowing a deeper understanding of the origin and development of the problem, as well as the perception of the participants regarding the situation in question.

Planning and execution of the intervention plan: during this phase, an action plan was elaborated and applied with the participants with the purpose of solving the problem and achieving a significant change in the situation. This plan was characterized by its adaptability and openness to adjustments throughout the investigative process.

Implementation of the action plan: during this stage, the set of activities previously outlined in the previous phase was carried out, with the purpose of establishing changes. As in the previous stage, the actions carried out were characterized by their adaptability and openness, which allowed adjustments to be made as the situation developed.

Evaluation and interpretation of the action plan: at this point, conclusions were analyzed, interpreted, and derived from the information collected through the instruments applied to the participants and the observation of the execution of the action plan (Luna & López, 2011).

Within the scope of this research, the following categories and subcategories were established:

Category 1: Educational Practice. In this study, it has been defined as the set of actions undertaken by the teacher within the learning environment, with the purpose of promoting the holistic development of the student.

Category 2: Neuroeducation Tools. It refers to the set of strategies derived from neuroeducation, which focus on taking advantage of knowledge about brain functioning during the teaching and learning process.

Category 3: Effects of the training program on the application of neuroeducation tools. It refers to the data collection process, in order to evaluate the results of the training program in neuroeducation tools, in relation to its influence on educational practice.

Subcategory 1: Curricular Implementation, refers to the action by which the teacher carries out the planned activities, thus demonstrating their professional performance. SC2: Emotional Competence, refers to the ability developed by a person to understand, express and manage their emotions appropriately, without negatively impacting others.

Subcategory 3: Learning Achievements, is the result achieved by students after a period or learning experience.

The study had the participation of four initial level teachers, belonging to two educational institutions that are members of Educational Network 1 and 2 in the district of La Huaca, located in the province of Paita in the department of Piura.

3. Analysis and Discussion of Results

Public schools in the district of La Huaca that have a student population of up to 140 students, are organized in School Management Educational Networks (REGE). Each of these networks is made up of a minimum of 5 and a maximum of 10 educational institutions, in accordance with the regulations established by the Ministry of Education (RVM N °002-2020-MINEDU, 2020), in figure 2.

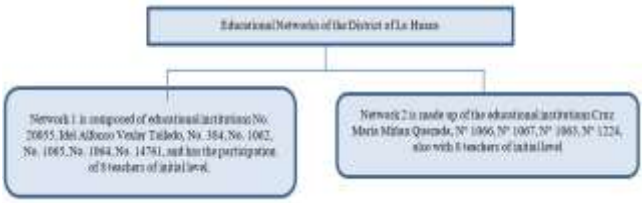

Figure 2: Educational Networks of the Huaca District. Source: (PAITA, 2022)

The educational networks involve 16 initial level teachers who serve children from 3 to 5 years of age in public schools in the district of La Huaca, Piura. Each network has a democratically elected coordinator, whose role is to implement strategies to improve educational quality. However, this has not been fully achieved because the coordinators also teach and do not have permission from the Paita Local Educational Management Unit (UGEL) to be absent from their work. In addition, 98% of the teachers live in other cities and commute to La Huaca daily. In 2022, they resumed face-to-face teaching without training on new pedagogical approaches by the School Management Educational Network (REGE), using MINEDU guidelines or previous methods. Most children enter without early education, provided by people without teacher training. Their parents prioritize manual and household chores, relegating child stimulation. Some mothers work outside, leaving childcare to relatives. This context makes the family-school

relationship difficult, so the latter is key to promoting its development.

For data collection, the semi-structured interview technique was used, which makes it possible to obtain the perspective of the participants (Kvale, 1986, cited in Villareal, 2002), as well as the analysis and synthesis of bibliographic documents from various journals indexed in databases. of data such as Scopus, Scielo, EBSCO, Google Scholar, and Web of Science among others. Initially, the problem was addressed in a contextualized way and the central problem with its specific aspects was identified. Then the objectives were defined, and the justification was elaborated. Related literature and related theories were also reviewed. Categories were established in a previous matrix. Finally, the semi-structured interview guide was designed to ensure adequate data collection. Data collection was carried out through a meticulous exploration of information, focused on research related to neuroeducation tools carried out in the last 7 years, considering the previously established inclusion and exclusion criteria.

The present study was based on the principle of scientific rigor to evaluate the quality of the collection and analysis of information, considering methodological aspects such as credibility, applicability, and adaptability according to Hernández et al. (2014). In addition, it is part of Bilbao's theory of neuroeducation tools (2015) and the results obtained. The data analysis stage was carried out using the Excel tool to organize, analyze and interpret the information from the semi-structured interviews (Friese, 2013). The constant comparison analysis method was also used as an inductive strategy to describe categories and establish comparisons with observations according to Quecedo and Castaño (2002). All the protocols established both by the university and by scientific research were followed. In ethical terms, paramount importance was attached to the informed consent of the participants, as well as the exhaustive analysis of the possible benefits and risks inherent in the research (Delclós, 2018). All information was handled ethically, as stated by Burns (1999), who argues that researchers must operate under the pillars of confidentiality, responsibility, and negotiation (Burns, 1999). Finally, the objectivity exercised by the researcher during the collection and analysis of the information was also considered.

The 4 teachers who participated in the "Tools to teach and learn better" program indicated that it contributed to improving their pedagogical practice. They observed changes in their teaching approach in planning, execution and evaluation thanks to the implementation of these neuroeducation tools to promote brain development. They also strengthened their emotional intelligence and intellectual capacity, improving their performance reflected in evaluations. They associated it with meeting students' needs for the acquired knowledge of how the brain operates in learning. Two participants wanted to include a deeper theoretical background in neuroscience.

The conception and design of a training program in neuroeducation tools is aligned with the approach of Acta (2019), who proposed a training model in neuroeducation aimed at teachers in the Dominican Republic, with the aim of providing them with the necessary skills to enrich their pedagogical practice in various areas. Similarly, in Colombia, Corredor (2020) presented a proposal based on neuroeducation, aimed at inmates in charge of educating their fellow prisoners. The purpose was to transform them into educational leaders who applied teaching methods based on significant learning, thus contributing to improving the quality of life of their peers through education. From a theoretical perspective, Linarez, mentioned by Gómez (2019), highlights the importance of teachers understanding the implications of neuroscience and neuroeducation. This would allow them to integrate this knowledge in the selection and design of learning situations that stimulate the brain functioning of students.

The results obtained in relation to the categories proposed in each category and subcategory presented in Figure 3 are detailed below.

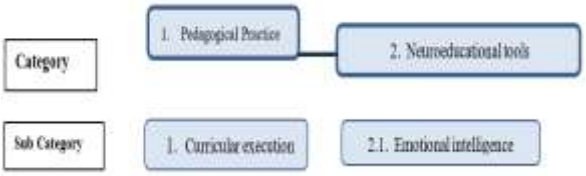

Figure 3: Categories and Subcategories of Pedagogical Practices

In reference to the first objective of describing the use of neuroeducation tools to improve teaching pedagogical practice, the main category was "pedagogical practice" and the subcategory "curricular execution". 4 questions were designed in

the interview. The results indicate that the participants apply neuroeducation tools in their pedagogical approach to enrich the brain development, emotional and intellectual intelligence of children. However, not all tools are fully applied, but each teacher uses at least one or two of each type. It stands out that two participants coincide in using specific tools to develop emotional intelligence such as "bond" and "trust".

According to the interviewees, in their pedagogical practice they implemented various neuroeducation tools to stimulate the cognitive, emotional, and intellectual abilities of the students. Interviewee 1 used attention, creativity, bond and trust strategies. Interviewee 2 focused on promoting brain, emotional and intellectual development. Interviewee 3 applied motivation for the brain, a fear-free environment and happiness promotion for the emotional part, and self-control for intellectual capacity. Interviewee 4 incorporated motivation, communication for the brain, bonding, confidence for emotions, and attention, memory, creativity for the intellect. These findings agree with Coello et al. (2022) on the relevance of neuroeducation in early stimulation for cognitive and social skills. They are also based on Gardner (cited in Avero & Marrero, 2020) regarding the interaction of multiple intelligences to maximize learning.

In relation to how they use neuroeducation tools, it is observed that teachers apply these techniques at various times and situations in their daily routine. Some of these, such as bonding, trust building, and effective communication, are reflected in the quality of their interactions with children. In addition, they integrate other tools in their methodological approaches, encouraging children to reflect on the stories presented, asking pertinent questions, or promoting direct actions for their development.

Interviewee 1 mentioned that he captured the children's attention by choosing interesting stories and keeping them focused during the narration. In psychomotor and artistic activities, I encouraged their creativity by giving them materials and letting them decide how to use them. He also highlighted the importance of establishing secure bonds through love and respect to improve children's self-esteem and confidence. Interviewee 2 indicated that he used communication in each interaction with clear verbal and non-verbal messages. He applied the bond to generate relationships of trust and attachment, providing love and care. He stimulated creativity by posing open questions so that they proposed solutions, while interviewee 3 indicated that he used these tools constantly at all educational moments, with a language appropriate to the age of the students. Finally, interviewee 4 mentioned that he applied them in all the activities and workshops through games that represented challenges and through stories to improve behavior.

It is relevant to highlight the positive results that the participants have experienced, when applying the neuroeducation tools acquired during the training program. Each of them mentions the benefits from different perspectives. Two of them emphasize the advantages for their own growth, such as the increase in their cognitive capacity and their effectiveness as teachers. Meanwhile, the other two relate the benefits to their students, indicating how they obtain improvements in their learning and overall development.

Interviewee 1 highlighted that the positive results he has obtained are the acquisition of knowledge and understanding about brain function in children. This gives you a deeper understanding of their behaviors and guides you in how to react to them. Interviewee 2 pointed out that these tools promote the overall growth of the child, since they are designed to address their development in the intellectual, social, and personal areas. For his part, interviewee 3 indicated that these tools have allowed him to use approaches adjusted to the individual needs of students, contributing to achieving improvements in their learning in cognitive, social and emotional terms and finally interviewee 4 mentioned that these tools have impacted in the improvement of his performance as a teacher, providing him with strategies to serve students through the application of approaches that promote their integral development.

Just as the positive aspects of the program have been mentioned, the challenges that teachers have faced when using neuroeducation tools are also exposed, emphasizing external factors such as the irregular attendance of some children to classes and the limitation of didactic resources in the classroom. school for the implementation of certain specific tools such as memory, attention, and language development.

Interviewee 1 pointed out that a notable difficulty has been the irregular presence of certain students, which has prevented the comprehensive application of these tools in all students. Interviewee 2 indicated that the scarcity of certain materials and resources in the educational institution has hindered the performance of activities related to attention, memory and visual perception, essential components of the tools intended to promote the intellectual development of the child. Interviewee 3 mentioned that he has not identified specific difficulties in his case. Finally, interviewee 4 pointed out that one of the main difficulties has been the insufficiency of educational materials at school, limiting the performance of important games in relation to the program, such as those linked to memory, attention, and language development. He considered that a more in-depth analysis could have been carried out by each teacher to discern whether the difficulties arose from internal factors or from limitations of the study plan. Given the obstacles, it would have been convenient to propose alternative solutions that would reach 100% of the students and have the necessary resources for the effective application of neuroeducation tools.

Regarding the second category, which consisted of analyzing the use of neuroeducation tools to improve pedagogical practice, it addressed the category of neuroeducation tools, specifically focusing on the subcategory of emotional intelligence. For this, four questions were structured that allowed collecting the perceptions of the participants about the use of tools to promote the development of emotional intelligence, how they apply them in their teaching practice and which ones have had a greater positive impact on their teaching.

In relation to the tools for the promotion of emotional intelligence, they are of great importance and have a significant impact on the creation of an environment conducive to learning and the integral formation of children. These tools allow children to develop their identity, promote a healthy coexistence and demonstrate values such as respect, in addition to promoting social skills and teamwork.

Interviewee 1 highlighted the importance of these tools to improve relationships between students, creating an environment of respect and emotional management. Interviewee 2 indicated that he applied them transversally, generating bonds of trust and affection, promoting growth without fear and moments of happiness. Interviewee 3 recognized the need to incorporate tools that promote emotional intelligence, contributing to an environment conducive to learning. The last interviewee implemented them through a self-knowledge project, where the children explored physical and emotional characteristics, developing social and collaborative skills.

The interviewees agreed on the relevance of these tools to generate positive bonds, manage emotions, create optimal learning environments, and promote comprehensive development through self-knowledge and socio-emotional skills. Its transversal application is beneficial. In the second aspect within this subcategory, the participants report that two of them have integrated the tools to promote emotional intelligence in a holistic way, applying them in all interactions with their students. This approach is viable because they have internalized these tools as intrinsic components of their teaching style. On the other hand, the other two participants mention how they have incorporated these tools into specific learning projects, promoting in children the identification and management of their emotions using emotional anchors that allow children to calm their emotions in conflictive situations, thus generating a conducive environment in the classroom.

Regarding the application of the program, the interviewees

Interviewee 1 used these tools in a transversal way, creating meaningful connections with children through positive messages. Interviewee 2 incorporated them globally in all pedagogical activities, cultivating a bond of attachment and trust, fostering an environment free of fear and moments of happiness. Interviewee 3 applied them as part of a learning experience on the knowledge and management of emotions, with playful activities that foster safe bonds and generate joy. Finally, interviewee 4 integrated them into a self-knowledge project where the children explored their physical characteristics and emotions. Promoted social and collaborative skills through teamwork. In summary, the interviewees applied these tools in a transversal way, creating links, managing positive emotions, fostering collaboration and promoting self-knowledge and socio-emotional skills.

The results presented agree with the study by Castro et al. (2021), which examines the correlation between emotional intelligence strategies and learning progress in preschool children, recognizing the classroom as an essential context to cultivate this intelligence through playful activities, assertive communication, and active guidelines. These findings support Luque and Lucas (2020), who postulate that learning involves brain areas connected to emotions, reasoning, decisions, and memory. Furthermore, they are consistent with Sperry and MacLean's triune brain theory, which highlights the crucial role of the limbic system in emotions and motivations.

Of the six tools for the promotion of emotional intelligence that have been introduced to teachers in the program, they express that the ones that have shown the best performance in their pedagogical practice are confidence and the cultivation of happiness. Through these tools, they manage to establish an affective bond in which children develop a sense of attachment and feel safe, both within themselves and in the learning environment. This, in turn, enables them to cultivate their autonomy.

The four interviewees agreed that the neuroeducation tools focused on generating trust, positive bonds and cultivating happiness have had a very favorable impact, observing positive changes in children, who develop greater self-confidence, confidence to express themselves in front of others, abilities to relationship and motivation to face challenges. Through these tools, a favorable environment has been achieved in the classroom, where students enthusiastically support each other to overcome obstacles, finding positive aspects in different situations. The interviewed teachers pointed out these behavioral and emotional changes as the main benefits of implementing neuroeducation strategies focused on socio-emotional development.

It is important to highlight that both the trust tool and the link tool are fundamental components of the principles that guide educational activities at the initial level. It is up to teachers to apply these tools in learning environments to establish a favorable environment that encourages the achievement of high-quality learning. In addition, the participants have chosen the bond of trust, development without fear and the cultivation of happiness as the tools that they would recommend to other teachers. However, none of them have mentioned assertiveness as an essential tool to promote the development of emotional intelligence, despite the fact that it is necessary to improve the forms of communication between students.

Third purpose in achieving the objective of this study is to evaluate the impact of the training program in the application of neuroeducation tools that is presented in figure 4.

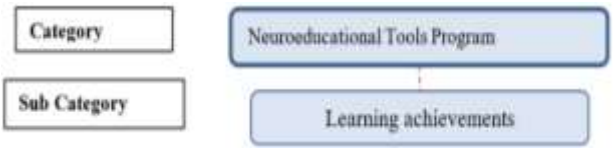

Figure 4: Impact of the Neuroeducation Training Program

Questions were asked that guided the interviewees towards a deep reflection on how these tools influenced the learning processes of the students. In addition, they provided the opportunity for the participants to offer suggestions and recommendations with the purpose of further enriching and strengthening the program.

When referring to the impact of the program on the educational progress of the students, all the interviewees agree that these tools have produced a beneficial impact on their learning. They have observed improvements when comparing the results of the first two months with those obtained in the diagnostic evaluation, which has allowed them to determine a percentage increase. In addition, they highlight that these tools have also contributed positively to relationships between students and the development of personal skills.

Interviewee 1 pointed out that students have experienced notable improvements in their educational achievement in various areas of the curriculum. Interviewee 2 observed an impact on the interaction between the children, who have strengthened their friendship ties, collaborate with more solidarity and respect, which has translated into progress in their academic results. Interviewee 3 indicated that the application of neuroeducation tools generated a harmonious environment that positively influenced the educational achievements of students. Interviewee 4 mentioned that these tools had a positive impact by fostering mutual knowledge, friendship, and overcoming fears, which

led to a significant increase in students' academic performance.

In this way, the participants indicate that the program has given them the ability to efficiently address the demands and preferences of the students, implementing the appropriate tactics to optimize their learning, based on understanding the role of the brain in the teaching process. -learning.

The interviewees agreed that the neuroeducation tools program has a highly relevant value and positive impact, since it provides them with effective pedagogical strategies that contribute to enhancing the educational achievements of students, improving their academic performance, and reaching the established learning objectives. Through the implementation of these relevant tools, they have observed advances in the comprehensive development of children in various curricular areas, as well as in the establishment of a harmonious environment conducive to learning. The interviewees agreed on the importance of this neuroeducation program for providing them with valuable pedagogical resources that they apply in their teaching work to benefit student progress.

The results agree with Aguirre & Moya (2022), who introduced neuroeducation as a novel strategy, concluding that educational policies should incorporate it to enhance the development of skills. They highlighted its importance to improve learning, by providing knowledge about the brain. Citing Maureira, Sindeev (2019) stressed the relevance of comprehensively addressing the brain in education. This information can be effectively applied to improve performance. Although it could be perfected, the participants provided recommendations such as expanding sessions and incorporating demonstration activities.

It is important to highlight that these suggestions could be considered in future contexts of implementation of this proposal or by other researchers who wish to follow a similar direction. Ultimately, all the interviewees agree on the importance of persisting in applying the neuroeducation tools they have acquired through this program. given that daily they face various situations in the classroom with children, in which it is necessary to apply these tools to promote their cognitive, social, and emotional development and thus contribute to the improvement of children's learning.

In general terms, when presenting and analyzing the results of the semi-structured interview carried out with the participants, it can be concluded that this training program in neuroeducation tools has effectively improved the teaching practice of the teachers who work in the educational institutions of the district. from La Huaca. In addition, it has contributed to filling the gap that was previously identified when evaluating their teaching performance in the year 2022, as described in detail in the introduction to this study. This proposal was presented as follows.

The structure of the training program in neuroeducation tools to improve the pedagogical practice of initial level teachers is presented in the following figure 5.

Figure 5: Structure of the Training Program in Neuroeducation Tools

The training program will always contain the objectives to be achieved in each training meeting and according to the activities to be carried out. There are seven of them, the first one develops the general introduction to neuroscience and neuropedagogy, while the second and third activities focus on the understanding of neuroeducation tools, four and five, for the exploration of related neuroeducation tools. With emotional intelligence, the sixth and seventh sessions or activities are intended to empower the intellectual brain of the person who teaches and the learner.

4. Conclusions

The results confirm the achievement of the general objective of the study. Teachers are applying some of the tools acquired during the training program. They consider that neuroeducation

techniques for the development of emotional intelligence are crucial elements to establish an environment conducive to student learning, generating positive effects both on the quality of pedagogical practice and on student learning achievements.

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