



Three-brain methodology: the way to achieve the Ecuadorian high school graduate's exit profile

Metodología tricerebral: camino para lograr el perfil de salida del bachiller ecuatoriano

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ABSTRACT

This article presents the three brains methodology proposed by Waldemar De Gregori as a way to obtain the exit profile of the Ecuadorian high school graduate and, consequently, access to higher education and a better preparation for life. A bibliographic review of projects that apply this methodology in different educational institutions is carried out in order to promote the development of skills such as leadership, teamwork, scientific research and innovation, among others. This research, with a qualitative approach, suggests the renewal of traditional methodological strategies for a methodology that allows the holistic development of the student and that enhances the values of the Ecuadorian high school graduate's exit profile.

Resumen

Este artículo presenta la metodología de los tres cerebros propuesta por Waldemar De Gregori como vía para obtener el perfil de salida del bachiller ecuatoriano y, en consecuencia, el acceso a la educación superior y una mejor preparación para la vida. Se realiza una revisión bibliográfica de proyectos que aplican dicha metodología, en

diferentes instituciones educativas, con la finalidad de fomentar el desarrollo de capacidades como liderazgo, trabajo en equipo, investigación científica e innovación, entre otras. Esta investigación, con enfoque cualitativo, sugiere la renovación de las estrategias metodológicas tradicionales por una metodología que permite el desarrollo holístico del estudiante y que potencie los valores del perfil de salida del bachiller ecuatoriano.

Keywords / Palabras clave

Tricerebral, Quality, Education, Exit Profile

Tricerebral, Calidad, Educación, Perfil de salida

Introduction

From its beginnings, education has evolved significantly throughout history. In ancient times, access to knowledge was limited to the elite classes, while the less privileged learned trades passed down through the generations within their own families. In Greece, education for free men was a milestone; the Middle Ages were characterized by the dominance of Catholicism and a purely religious and limited education; while in the Modern Age, the Renaissance and the Age of Enlightenment, the classics were taught, especially Plato and Aristotle, with important figures such as John Amos Comenius, father of didactics, whose pedagogical method was based on induction, observation, the senses and reason. In the Contemporary Era, education became public, free and compulsory. In this last stage, an active school that encourages students' abilities is promoted and new teaching methodologies are established, such as those of Montessori and Piaget. In short, education has evolved and expanded, allowing more and more people to have access to knowledge and personal and social development. Today, education is considered a right established in the Universal Declaration of Human Rights and it is the responsibility of the State to provide it. Faced with a global scenario characterized by the new generations of digital natives and the constant development of technology, the old ways of teaching must be rethought. Can we be satisfied with just transmitting a wealth of knowledge to our students? Is the methodology we use sufficient to achieve positive results in education? Does today's education form proactive, human, creative individuals capable of transforming reality?

Education goes hand in hand with an issue as important as it is controversial: quality. It was not until a few years ago that the quality of education began to be addressed as a problem and demanded as a necessity. Many authors have developed studies in this area, expressing their criteria on the subject and suggesting strategies to improve the teaching-learning process. In this regard, Víctor García Hoz (1980) states: "The right to education is not only the right to a certain quantity of education, but the right to a certain quality" (p. 5). The quality of education is expressed in the way in which the process is carried out; it is influenced by factors such as pedagogy, the type of content, the way in which knowledge is imparted, the infrastructure where it is developed, the motivation of the parties involved, among others.

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Ecuador's education system is divided into Initial Education, General Basic Education and High School, led by the Ministry of Education (MINEDUC), and Higher Education governed by the National Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT). According to Article 26 of the Constitution of the Republic of Ecuador (2008) "education is a right of people throughout their lives and an inescapable and inexcusable duty of the State" while Article 27 of the same document states that education must be of quality.

Throughout the teaching-learning process, from the basic level, students are prepared to achieve the exit profile of the Ecuadorian high school graduate, which is defined on the basis of three fundamental values: justice, innovation and solidarity, as mentioned in the curriculum of the Unified General High School (Ministry of Education, 2016, p. 9). Along with this, a set of skills and responsibilities that students will be acquiring in their transit through compulsory education is established. This exit profile aims to graduate high school graduates capable of facing new challenges and continuing their preparation in higher education. Is this objective achieved? In reality, do they feel prepared for the leap? In addition to the knowledge acquired to be innovative, do they develop the rest of the values and skills to which they aspire? The preparation with which the high school graduate completes his or her studies has an important influence on how he or she faces the new challenge of higher education and even on his or her performance when entering the labor market. Are our high school graduates ready to face these challenges? Are they ready to face the gap between what employers are looking for and the preparation they possess? As an educational system, do we provide an integral

education capable of forming critical, enterprising, humane and ethical professionals? do we work with students based on their strengths and needs? These questions lead to an in-depth analysis of current approaches to education.

"...we try to put the curriculum and not the brain at the center of school concerns" stated Waldemar de Gregori in an interview with the newspaper *El Colombiano* (2016) where he also emphasizes: "The current education system only develops the left brain. The right one is not used: love, peace, and for the central one there is no school, it is the financial one, which, he stated, is only seen in college and it is already difficult at that age. The curriculum is more left-brained.

In the work *El perfil de salida del bachillerato ecuatoriano y su conexión en la educación superior*, Tenesaca Simancas, Garcés Ortega, Gualpa Cando and Santacruz Quintero (2023) state as one of their conclusions that:

The changes in the Ecuadorian educational system did not consider the needs of the students, limiting the opportunities for their admission to universities in Europe, Latin America and the country because the proposed skills, abilities, knowledge and values are not in accordance with the conditions required by the Tuning methodologies and competency-based education, generating a high school exit profile with shortcomings that must be improved and projected to the XXI century. (p. 104).

This paper addresses the issue of the correlation between the preparation provided to students and the real possibilities of entering university careers both inside and outside the country, which leads us to think, once again, about the methods used in the educational process. This implies that, both in compulsory and university education, it is important to apply the appropriate methodology to achieve satisfactory results: an integral professional. How do we implement an appropriate method? Under what parameters do we select the right way to reach each student?

At the beginning of each academic period, in all educational institutions, diagnostic tests of knowledge are applied, but do the results of these tests really provide us with accurate information about the student? Do we have a real and valid diagnosis of the skills previously acquired? These exams are limited to the control of content mastery (logical) without allowing us to see beyond the student's needs, they do not provide information on other types of skills: artistic,

emotional, investigative, operational, among others, which must also be developed if we want to achieve a comprehensive education. The above mentioned leads us to think about the need to apply a tool that allows us to know our students from all points of view in order to create effective methodological strategies.

The objective of the present work is to analyze the viability of an avant-garde methodology as a way to improve the teaching-learning process (teaching as its author said) that facilitates the formation of the values of the exit profile in the Ecuadorian high school graduate, included in the national curriculum and, therefore, of future university students and professionals capable of facing the new world reality: The tricerebral methodology, proposed by Paul Mc Lean, in 1990, and developed by Waldemar de Gregori in his proportionalist social cybernetic theory, same that focuses on the human brain and how it processes information for learning.

Materials and Methods

A bibliographic-documentary research was carried out, using the technique of analysis and interpretation of texts, from a qualitative approach. Based on the results of the projects reviewed and the experience accumulated at ISTCED, it can be stated that the application of the three-brain methodology in the teaching-learning process helps students to enhance skills and competencies that are aligned with the exit profiles of the Ecuadorian high school graduate and thus face the challenges and opportunities of today's world. Each value of the Ecuadorian high school graduate's exit profile is related to a part of the brain in the three-brain theory, so that the value of justice is related to the left brain, innovation can be related to the reptilian brain while solidarity is linked to the limbic brain.

Justice: This value is mainly related to the left brain, which is responsible for critical thinking, analysis, truth and the ability to understand different points of view, fundamental aspects to develop discernment and equity skills that will allow students to understand and respect differences and advocate for social justice.

Innovation: According to De Gregori (2002, p. 19) "the brain is a system composed of three parts, or three sides. They are distinct mental processes, but interlinked, synergistic". This joint action is evidenced in the innovation profile, which is related to the right side,

due to the creativity involved in innovation; however, the reptilian brain, responsible for management, operability and execution capacity to develop an innovative project or venture, is also related. De Gregori states in this work "...the central brain commands and puts the other two at its service".

Solidarity: Relates primarily to the limbic brain, which is responsible for emotions and social relationships and involved in empathy, compassion and cooperation, which are fundamental to fostering a sense of solidarity and social responsibility. By developing collaboration and effective communication, students learn to work together and support each other.

Results

The three-brain theory states that the human brain is composed of three parts: the reptilian brain, the limbic brain and the neocortex. Each of these parts has a specific function in information processing:

The central brain, reptile or operative-factual process, as mentioned by Waldemar de Gregori (2002) in his work *Construcción Familiar - Escolar de los 3 cerebros*: "is the oldest brain..." (p. 20). (p. 20) It is in charge of basic functions such as breathing, digestion, body temperature and reproduction, it is also related to survival and safety.

The right brain, emotional, intuitive process, also known as limbic is in charge of emotions, spirituality and art. This part of the brain is responsible for our emotional responses and is related to motivation and attention. It is also involved in learning and long-term memory. In this work the author states that "Many identify its functions with the soul, religion, the supernatural and magic" (p. 21).

The left brain, logical or rational process known as the neocortex, is the most developed part of the human brain and is responsible for higher cognitive functions such as reasoning and planning. This part of the brain is involved in learning, abstract thinking and communication.

This methodology relies on the Triadic Mental Quotient (TQ) Revealing Questionnaire as a tool to determine the tri-brain profile. While the application of an IQ test only allows determining logical abilities and the emotional quotient test measures only that aspect, both detached from the rest of the brain functions, the TC collects information from the three brains which allows a more complete

vision of the student, answers questions such as which is his dominant and subdominant brain and what aspects should be improved to achieve their proportion.

According to Waldemar de Gregori's three-brain methodology, learning is most effective when using a holistic approach that addresses all three parts of the brain; this means that educators should develop teaching strategies that address the needs of the reptilian brain, the limbic brain and the neocortex. According to this theory, each part of the brain is responsible for different functions and abilities, and effective education should focus on developing all these parts in a balanced way. This view is related to the ideas of Comenius who advocated that "all should be taught to all", referring to the need for universality and integrity of education. Gregori's three-brain theory is applied to education and the development of social and emotional skills in a context of social cybernetics, where technologies play an important role in communication, social interactions and in the design of more effective methodologies adapted to human needs, considering the different parts of the brain and how they influence people's behavior and decision making.

To address the needs of the reptilian brain, the three-brain methodology emphasizes the importance of creating a safe and comfortable learning environment; this means that educators must provide a physical environment suitable for learning and establish trusting relationships with students.

In response to the needs of the limbic brain, the three-brain methodology emphasizes the importance of emotion and motivation in learning. Educators should use teaching strategies that engage students emotionally and motivate them to learn. This may include the use of stories, analogies, and relevant examples.

Regarding the development of the neocortex, the three-brain methodology stresses the importance of critical thinking and reasoning. Educators should develop teaching strategies that stimulate critical thinking and help students develop reasoning and decision-making skills.

The proposal to apply this methodology in the teaching-learning process to achieve the exit profile of the Ecuadorian high school graduate and, consequently, better prepared professionals, is based on a bibliographic search of projects that have developed this methodology in different institutions, with satisfactory results.

The study conducted by Omar José Castro Ortiz in students between 14 and 16 years of age at the San Carlos public school in the municipality of San Gil Santander, located in an urban area of Colombia, supports this idea. In the group analyzed, according to (Ortiz, 2020) "a grade where many of the characteristics necessary for collaborative work such as leadership, responsibility, empathy, among others; are not evident when working as a team, resulting in a deliberate waste of time in which the planned or objective defined by teachers, is not achieved in the end". In his work, Ortiz determined, through the use of the TC, the dominant brain of the students; with this information, two types of work teams were established, the first, formed randomly, and the second, integrated by a logical, an emotional and an operative student. All teams were assigned the same workshop. After comparing the results obtained, it was concluded that collaborative work was more efficient in the teams formed taking into account the dominance of the brains of its members.

On the other hand, researchers Carolina Pérez-Carrero, Sandra Milena Rodríguez-Moreno and Lida del Pilar Sánchez-Mayorga (2015), confirm the range of possibilities that open up when applying this methodology, in their project The triadic brain and its relationship with curiosity, teamwork and explanation of phenomena for the development of scientific attitude. The authors characterize curiosity, teamwork and the explanation of phenomena in thirty second graders from Colegio Cundinamarca, Colombia, in science classes, in order to contribute to the implementation of strategies that strengthen the scientific attitude of students and thus contribute to the learning of natural sciences. The variables to be evaluated were scientific attitudes (curiosity, explanation of phenomena and willingness to work in a team), taking into account that each attitude is directly related to each of the brains (thinking, feeling, acting). One of the tools used to carry out this project was the TC, which was used to determine the predominance of each student's brain. The authors conclude that: "Gregori's three-brain theory contributes to a deep understanding of the teaching-learning processes. It allows us to see children as integral beings, with the possibility of empowering all their abilities and competencies from school." (p. 110)

Jhonatan Orlando Martin Vivas, in his presentation work for his Master's degree in Education, applies this methodology in sixth grade students of the Departmental Educational Institution Monseñor Agustín Gutiérrez of the municipality of Tibirita Cundinamarca, Colombia. In this project, (Vivas, 2021) expresses: "the Triadic Mental

Quotient Developer of Waldemar de Gregori (2002) is applied, likewise, a tracking by subsystems was made and the CCT (Cybernetic Cycle of Transformation) was used. The results show a strengthening of academic performance in the area of electronics, teamwork and following instructions". An initial CT was applied from which the brain dominance of each student is analyzed, which develop an intervention project and activities to strengthen and enhance each part of the brain. Once the project was completed, the TC was applied again, showing as a result the tendency to proportionality of the three brains in most of the students, which confirms the viability of this methodology to obtain the expected results.

In the project El tricerebral: una alternativa para el trabajo cooperativo y por proyectos, y el logro de competencias en la asignatura de Química Básica, Patiño Jaramillo, García Mora y Moreno Jiménez (2018) expose that: "...taking as a basis that not everyone learns in the same way, it is intended in this work to apply the triadic approach, to identify and know in each of the students involved in this process, the particularities and mental faculties through the RCMT and according to this categorization of the student, conform the collaborative work teams, and follow up their academic performance". The authors used the Triadic Mental Quotient Revealer in two groups of students of the Basic Chemistry course of the first semester of the ITM University, Colombia, with the purpose of improving their academic performance. In one of the groups the learning method was applied and better results were obtained than in the group where it was not applied. In this case, the results of the TC served as a fundamental tool in the formation of interdisciplinary collaborative work groups and generated pedagogical strategies that allowed improving the learning of chemistry, problem solving and coexistence of students.

In the analyzed bibliography, the application of this methodology yields positive results in different areas: academic, collaborative, scientific, leadership, among others, and contributes, in a significant way, to the holistic education of students. The application of the three-brain theory in education allows for a deeper understanding of how students process and retain information. By knowing the functioning of brain systems and their predominance in students, educators can adapt their teaching strategies to be more effective in the retention of information by students, better understand students' emotions and their influence on learning.

It should be noted that the works reviewed were applied in Colombia. After an exhaustive bibliographic search on projects applying the three-brain methodology in Ecuador and other countries, very little information was found. A plausible explanation for this situation may be the relatively new nature of this methodology, the lack of knowledge about it, or the fact that most educational institutions cling to traditionally established models.

One of the few projects that develops this theory in Ecuador is the work of (Guallasamín, 2011) prior to obtaining a master's degree in Education and Social Development: Methodological proposal to improve the learning of mathematics of children and young people at the "María Augusta Urrutia" School "Cardenal Spínola" School in Quito, Ecuador, who applies this methodology to improve low academic performance and little interest in the study of mathematics. Its author states "The TC is used to select members of a work team. The best team will be the one that has the presence of the three types of brain dominance: the central one for coordination, the left one for questioning and analyzing, and the right one for creativity and team integration".

As mentioned above the practice of this methodology in Ecuador is not common, however, the Instituto Superior Tecnológico Corporativo Edwards Deming (ISTCED) assumes it as part of its mission where it emphasizes (...) "the application of playful and triadic learning methodologies". It applies TC to students at the time of their enrollment, and focuses on the results to create learning strategies that guarantee the quality of the preparation of its graduates and their proportional development in all areas. This practice is improved every day to achieve an education of excellence that provides scientific, innovative, competent and humane technologists for a better future of the country.

Conclusions

Based on the projects studied, it can be inferred that the three-brain methodology, due to its comprehensive approach to all areas of the brain, contributes to the holistic development of students. On the other hand, its application develops skills and competencies that are aligned with the exit profiles of Ecuadorian high school graduates, which guarantees a quality education and, as a consequence, better options for future professionals in the labor market, (Guallasamín, 2011)an improvement in the social development of the country.

Through the three-brain methodology, students can acquire skills to critically analyze information, evaluate different perspectives and make ethical and fair decisions while stimulating their creativity and innovation, allowing them to find innovative solutions to the challenges they face and to develop problem-solving skills. In addition to this, it allows them to develop social and emotional skills, such as empathy, compassion and cooperation, which are fundamental to foster a sense of solidarity and social responsibility.

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