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El impacto de las actividades de gimnasia cerebral en el aprendizaje significativo del idioma inglés

The impact of brain gym activities on meaningful English language learning

O impacto das atividades de ginástica cerebral na aprendizagem significativa da língua inglesa

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Resumen

Hoy en día hablar inglés no es una ventaja, sino una habilidad básica que las personas deben desarrollar en su formación, lo que les permitirá ser competitivos en el mercado laboral global. El objetivo fue identificar la relación de la gimnasia cerebral con el aprendizaje significativo de los estudiantes de inglés de 2do año del Nivel Medio, curso A, de la Unidad Educativa Dr. Alfredo Pérez Guerrero, cantón Guano, provincia de Chimborazo, durante el año escolar septiembre. 2023 - junio 2024". La metodología de investigación aplicada en este estudio fue un enfoque "mixto" y el diseño de esta investigación fue de tipo "cuasi - experimental". Asimismo, el alcance de la investigación fue de nivel descriptivo. Así, la "investigación de campo y documental" sustentó este estudio y el método para analizar generalidades fue el "deductivo - inductivo". Además, la "muestra" del presente estudio corresponde a la "población" de 25 estudiantes del Grupo Experimental. Por lo tanto, se aplicó un cuestionario con 4 ítems sobre habilidades lingüísticas para recolectar información en el pretest y postest. Así, la información fue recopilada en una base de datos y analizada mediante estadística descriptiva e inferencial donde se aplicó la prueba T paramétrica de muestras pareadas para verificar la hipótesis utilizando el software Jamovi. Los resultados se ilustraron en gráficos con valores matemáticos, por lo que los resultados mostraron que con 24 grados de libertad y con un nivel de significancia (α) de 0,05, el valor p = 0,001 es menor que α = 0,05. De manera similar, la T de Student calculada es 18, que es superior a 1,711 de la tabla de distribución de la prueba T de Student. En resumen, se rechaza Ho y se acepta H1. Significa que si se aplica un programa de gimnasia cerebral se logrará un aprendizaje significativo del idioma inglés por parte de los estudiantes.

Palabras clave: Actividades de gimnasia cerebral; Aprendizaje del idioma inglés; Aprendizaje significativo; Mercado laboral global; Metodología de investigación.

Abstract

Nowadays, speaking English is not an advantage, but a basic skill that people must develop in their training, which will allow them to be competitive in the global labor market. The objective was to identify the relationship of brain gymnastics with the meaningful learning of 2nd year English students of the Middle Level, course A, of the Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, Chimborazo province, during the school year September 2023 - June 2024 ". The research

methodology applied in this study was a "mixed" approach and the design of this research was of a "quasi-experimental" type. Likewise, the scope of the research was descriptive. Thus, "field and documentary research" supported this study and the method to analyze generalities was "deductive - inductive". In addition, the "sample" of the present study corresponds to the "population" of 25 students of the Experimental Group. Therefore, a questionnaire with 4 items on language skills was applied to collect information in the pretest and posttest. Thus, the information was collected in a database and analyzed using descriptive and inferential statistics where the paired samples parametric T test was applied to verify the hypothesis using Jamovi software. The results were illustrated in graphs with mathematical values, so the results showed that with 24 degrees of freedom and with a significance level (α) of 0.05, the p value = 0.001 is less than α = 0.05. Similarly, the calculated Student T is 18, which is higher than 1.711 from the Student T test distribution table. In summary, Ho is rejected and H1 is accepted. It means that if a brain gym program is applied, significant English language learning will be achieved by students.

Keywords: Brain gym activities; English language learning; Meaningful learning; Global labor market; Research methodology.

Resumo

Hoje em dia falar inglês não é uma vantagem, mas sim uma competência básica que as pessoas devem desenvolver na sua formação, o que lhes permitirá ser competitivas no mercado de trabalho global. O objetivo foi identificar a relação da ginástica cerebral com a aprendizagem significativa dos alunos de Inglês do 2º ano do Nível Médio, curso A, da Unidade Educativa Dr. Alfredo Pérez Guerrero, cantão de Guano, província de Chimborazo, durante o ano letivo. . 2023 - junho de 2024.” A metodologia de investigação aplicada neste estudo foi uma abordagem “mista” e o desenho desta investigação foi do tipo “quase experimental”. Da mesma forma, o âmbito da pesquisa foi de nível descritivo. Assim, a “investigação de campo e documental” sustentou este estudo e o método para analisar generalidades foi “dedutivo - indutivo”. Além disso, a “amostra” do presente estudo corresponde à “população” de 25 alunos do Grupo Experimental. Assim sendo, foi aplicado um questionário com 4 itens sobre competências linguísticas para recolher informação no pré e pós-teste. Assim, a informação foi compilada numa base de dados e analisada através de estatística descritiva e inferencial onde foi aplicado o teste T paramétrico de amostras emparelhadas para verificação da hipótese através do software Jamovi. Os resultados foram ilustrados em gráficos

com valores matemáticos, pelo que os resultados mostraram que com 24 graus de liberdade e com um nível de significância (α) de 0,05, o valor de p = 0,001 é inferior a α = 0,05. Da mesma forma, o T de Student calculado é de 18, que é superior a 1,711 da tabela de distribuição do teste T de Student. Em síntese, Ho é rejeitado e H1 é aceite. Isto significa que se for aplicado um programa de ginástica cerebral, a aprendizagem significativa da língua inglesa será alcançada pelos alunos.
Palavras-chave: Atividades de ginástica cerebral; Aprendizagem da língua inglesa; Aprendizagem significativa; Mercado de trabalho global; Metodologia de Investigação.

Introducción

Currently, the English language has become the main means of global communication, which is why speaking English is not an advantage, but rather a basic skill that people must develop in their training, which will allow them to be competitive in the global labor market. This competitiveness requires companies to search for human talent that has not only technical skills but also the ability to communicate effectively in several languages, which is why this demand has potentially increased in the labor market in the last 10 years. The New American Economy report indicates that job offers for bilingual candidates in the United States have increased by 150% between 2010 and 2020 (New American Economy, 2020). On the other hand, the 2023 EF Education First English Proficiency Index indicates that 80% of companies conduct their daily operations through the English language in sectors such as Technology and Information Technology, Bonding and Banking, and Higher Education and research. (EF EPI, 2023). Consequently, speaking English provides many international job opportunities, and improves the competence of working in multicultural teams that allows us to understand different markets better.

According to the private organization EF English Proficiency Index (EF EPI, 2023), it indicates that Ecuador is in the 'low proficiency band', ranking 80th (467 points) out of 113 countries, where the city of Quito reaches a 'proficiency moderate' with 513 points, the same as the cities of Algiers and Rio de Janeiro, contrasting with the National English Curriculum reformed in 2016, where the exit profile 'Independent User – B1' is established according to the CEFR, and according to the Ministry Education of Ecuador the High School level are B1.1 to 2nd year and B1.2 to 3rd year (Ministerio de Educación, 2019). Therefore, empirically it is observed that the pedagogical and didactic activities developed in the teaching-learning process of the English language in the classroom are not fully aligned with the basic principles of the curriculum such as: communicative

approach, child-centered approach. student, thinking skills, content integrated learning for foreign languages (CLIL), international standards according to the CEFR. This implies a negative impact on learning reflected in the demotivation and apathy of students towards the subject, limiting the achievement of meaningful learning of the English language. Faced with this problem, many educational institutions look for effective and motivating solutions so that their students show interest in learning.

In the Dr. Alfredo Pérez Guerrero Educational Unit from Guano canton, Chimborazo province, attention deficiencies are observed in high school students during the execution of English classes. The teachers' work constantly focuses on capturing the attention of the students during the explanations of the learning content, ensuring that the students listen carefully and respectfully to what their classmates think, that they understand the proposed instructions, and develop each assigned task. Consequently, teachers through these strategies seek to help distract or with attention problems, and inclusive students to learn in a second language. Thus, this problem hinders the efficient development of communicative competence for a high percentage of students, and for teachers to achieve the learning objectives set at the end of each of the study units, limiting the significant learning of English language students. Due to the above, the teacher sees the need to look for a motivating and innovative strategy that contributes to the solution of this problem.

To contribute to the solution of the problem raised, several authors have carried out many studies on brain gymnastics to optimize education to improve the teaching-learning process. For example, a study titled "The Importance of Brain Gymnastics in the Development of Creativity of High School Students at the La Salle Educational Unit" concludes that 'Brain Gymnastics' intervenes directly in 50% of creativity by developing abilities in human beings that allow contact with imagination, initiative, and perception to create new ideas or solutions to any type of problem (Lopez, 2012). Similarly, the study titled "Brain Gymnastics to Strengthen Significant Learning at the Cruz del Norte Educational Unit", concludes that 'brain gymnastics' allows modifying neuronal structures to increase concentration, creativity, and problem-solving (Quiroz & Vaca, 2023). Finally, the study titled "Brain Gymnastics for Creativity in University Students" concludes that 'brain gymnastics' is a strategy of neuronal activation in the areas of the students' cerebral hemispheres, generating higher levels of concentration and attention, understanding and reasoning allowing the reorganization of perceptual processes and restructuring of thinking causing a better learning response (Vega & Zila, 2023).

In reference to the variable 'meaningful learning of the English language', a study titled "B-learning as a methodological tactic to optimize the teaching-learning process of English students in the blended modality of the specialized language department of the Technical University of Ambato" concludes that the 'B-learning' model has generated a positive impact on the emotional aspect of the students, as well as on their competencies and communication skills in the English language, promoting significant learning through more dynamic and flexible ways to communicate, obtain and share information, as well as work cooperatively (Hernández E. , 2014). Likewise, the study titled "Brain Gym Program to Optimize the meaningful learning of the English Language in the High School Students of the I.E. "Innova School Pimentel" concludes that the program contributed to students achieving significant learning of the English language, through the execution of different brain gymnastics techniques such as central line, stretching and energizing movements, developing the four skills of the language such as listening, reading, writing and speaking with a dynamic, experiential and practical methodology (Huancas, 2018).

The purpose of this research study is to improve English language skills through a program of brain gymnastics exercises that promote and accelerate comprehensive learning in students in a fun and harmonious way, so that students achieve a significant learning of the language under study, thus preparing students to use all their abilities and talents in various life situations. Consequently, the present study has a significant impact on the pedagogical and psychoeducational field since teachers have a pedagogical and didactic resource that facilitates the teaching-learning process of language skills, and in this way, they can provide timely responses to the existing problems in the teaching-learning process of the English language.

The present study raises the hypothesis: "If a brain gymnastics program is applied, significant learning of the English language will be achieved in the students of the Dr. Alfredo Pérez Guerrero Educational Unit". Therefore, to operationalize the present study that allows us to respond to the proposed proposal, the objective is to "Identify the relationship between the brain gymnastics program with the significant learning of the students from English language in 2nd year from the High School Level, course A, at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, Chimborazo province during the school year September 2023 - June 2024"

Theoretical Framework

The present study raises the hypothesis: “If a brain gymnastics program is applied, significant learning of the English language will be achieved by the students at the High School Level, at Dr. Alfredo Pérez Guerrero Educational Unit. Therefore, to operationalize the present study that allows us to respond to the proposed proposal, the objective is to “Identify the relationship between the brain gymnastics program with the significant learning of the students from English language in second year of the High School level, course A, at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, Chimborazo province during the school year September 2023 - June 2024.”

The theoretical foundation in this study describes the research variables: Independent variable, ‘Brain Gym’, and the dependent variable, ‘English language learning’.

Brain Gym

Authors such as (Dennison & Dennison, 2006) maintain that “Brain gymnastics is a practical and dynamic communication technique between the brain and the body” (p. 19). This implies that posture, behavior, and movement of the body activate the brain for learning and increase its mental capacity. Similarly, (Ibarra, 1997)explains that “cerebral gymnastics involves the brain to exercise through strategies, which encourage logical thinking to develop, the activation of verbal, spatial and numerical abilities are related to the left hemisphere of the brain”. This implies that movement and the practice of exercises are vital for the development of thinking and learning, leading to the generation of neural networks, therefore, when neurons are activated by learning they generate ‘myelin’, a substance that increases the speed of transfer of nerve impulses, protecting them, isolating them and assisting the nerves to regenerate when they have been damaged by this, the more myelin, the faster the transmission of the message.

On the other hand, (Velásquez, Calle, & & Cleves, 2006) points out that “brain gymnastics begins with Quantum Physics, taking the functionality of the brain and multiple intelligences as a reference” This means that our body and brain are energy in continuous movement since for physics all matter is energy. However, (Vos Savant, 2005) mentions that “the essence of brain gymnastics lies in exercising control over mental processes, developing mental and physical connections to stimulate skills and solve problems, with intellect and movement, thus freeing oneself from the ties that come with false perceptions, activating the body to new capacities” This means that the brain works like a muscle, which must be strengthened and toned to reinforce and

fine-tune new neural connections, which represents an intrinsic relationship between the mind and body capable of being trained in an integrated way.

How brain gymnastics works

(Dennison M. W., 2013) contribution is very simple and advantageous to apply since his finding is based on exercises that make up three parts of the brain, without the application of therapy, but through movements that create new neural connections, being in the ability to replace the affected models that are imprinted on the brain when it is being formed. The theory of the triune brain developed by (Sperry, 1973) and Paul Maclea is taken as a basis, which explains the functions of the three parts or dimensions of the brain: According to this theory, the brain is divided into three parts or dimensions, each one with different functions: The Reptilian-Associated with logical reasoning processes, analysis-synthesis functions and decomposition of a whole into its parts (Maclea, 1998). The Limbic System-In this system there are emotional processes and states of warmth, love, joy, depression, and hatred, among others, and processes related to basic motivations. The Neocortex is made up of the basic brain in which processes occur that give rise to the values, routines, customs, habits, and behavioral patterns of the human being.

Similarly, (Rodríguez, 2022) maintains that 'brain gymnastics' works from three dimensions of space: laterality, centering, and focus. Laterality dimension: responds to the ability to coordinate both cerebral hemispheres, especially in the middle field, a fundamental ability to be able to read, write, and communicate, and is also ideal for the fluid movement of the entire body. Transforming into the ability to move and think at the same time. Example: When laterality is not balanced, it can only be partially understood, and writing becomes mechanical and is not understood, which leads to situations of learning disability or dyslexia. Focus or centering dimension responds to the ability to coordinate the upper and lower areas of the body; these skills are related to the child's emotions and free expression. This manifests the expression and active participation of children in the learning process. On the contrary, over-focused children try too hard, achieving incomprehension, and in terms of emotions, if they are unfocused, learning is blocked. Dimension of concentration or focus: related to the ability to coordinate the frontal and posterior lobes of the brain, the emotional component, and abstract thinking are skills in responses in this dimension since nothing can be learned without feeling and a sense of compression, which indicates that, when the student is focused, he will be able to see and recognize a part of the reality before him.

Consequently, both the Triune Brain theory and the spatial approach conceive of the person as a being constituted by multiple interconnected and complementary capacities; hence its integral and holistic character allows for explaining human behavior from a more integrated perspective, where thinking, feeling, and acting come together in a whole that influences the individual's performance, both personally and professionally. And social. This leads teachers to create varied learning scenarios that enable the maximum development of students' brain capacity. At the same time, the curriculum must revolve around real, meaningful, and integrative experiences where the psycho-affective climate in the different learning scenarios Learning must be pleasant, harmonious, and warm, that is, provide optimal interaction in the classroom (student-student, student-teacher) to achieve significant results.

Benefits of brain gymnastics

As described by (Huacas, 2018) 'Brain Gym' helps achieve communication between body and brain, which means eliminating stress and tension from the body by moving blocked energy and allowing energy to flow easily through the mind-complex body. In addition, it is a very simple and effective method that can be practiced at any time of the day and does not require a specific place. The benefits of brain gymnastics vary according to the age groups. Therefore, the benefits to the age group of older adults are preventing Alzheimer's and learning problems such as (dyslexia, dyslalia, hyperactivity, attention deficit, etc.).

Similarly, (Franco, 2022) describes the contributions of brain gymnastics in the educational field, such as increasing memory, awaken creativity, improving concentration, improving learning, helping learning difficulties, reducing stress, reducing boredom, maintaining normal brain function, improves motor skills and cognitive abilities.

'Increasing memory' linking physical activity with cognitive activity is very positive because the mind is stimulated through movements. This implies putting cognitive skills, perceptual-motor skills, and physical-conditional skills into integrated activities through gymnastic activities.

'Awaken creativity', brain gymnastics activities generate an integral relationship between motor creativity and intellectual creativity. It follows that there are three determining factors for the creative process. First, the 'quantitative fact' is related to the number of responses issued. Second, is the 'flexibility' factor, which is related to adaptation to various circumstances. Finally, the 'originality' factor, constitutes the ability to produce particular or novel responses.

'Improving concentration', body movement generates new neural connections in our body, one of these is the executive area responsible for concentration and the degree of attention we dedicate to an activity. In this sense, it is essential as educators to stimulate a broad and strong nervous tissue that allows the student to learn the greatest number of contents, improve concentration, attention and academic performance. To achieve this, the best way is to give the student great motor and mental amplitude.

'Improving learning', through movements motor patterns are generated, while in the nervous system, a series of neural connections are created that will allow cognitive improvement, since through movement the student can capture attention, memory, and concentration. In other words, learning occurs through an excitatory impulse.

'Helping learning difficulties', brain gymnastics can reduce the levels of learning difficulties in dyslexia, dyspraxia, dysgraphia, dysorthography, attention deficit, and hyperactivity through exercise that stimulates the overcoming of these difficulties.

'Reducing stress', brain gymnastics helps achieve communication between the body and the brain, which means eliminating tension and stress from the body through energy, where gymnastic activities allow the brain to generate substances such as serotonin, Responsible for reducing anxiety and regulating moods, endorphin, also called the hormone of happiness, also increases the production of acetylcholine, which is essential to promote attention, concentration, and memory, factors necessary for learning.

'Reducing boredom', immersed in gymnastic activities we find mental and physical challenges that encourage curiosity and draw the attention of students, setting the challenge within their mind and body, in their mind to generate a response action and in their body to express the reaction in movement, which allows good learning and the feeling that you are learning or achieving it.

'Maintaining normal brain function', brain gymnastics stimulates specific areas of our brain, stimulating the free flow of information within the brain, restoring our innate ability to learn to function more efficiently to achieve results that prevent damage to the performance of brain functions.

'Improving motor skills and cognitive abilities', motor skills are a key aspect in the physical development of students, while cognitive abilities are the mental development of students, therefore, an active brain requires a body that moves. This implies that learning is done through movement with simple sensorimotor exercises.

Brain gymnastics movements

Brain gymnastics movements promote the flow of energy in the brain, which increases the learning capacity of students (Valerio, 2016). At a biological level, (Cortés, 2019) indicates that the secretion of hormones activates neuronal connections, stimulating the structure of the nervous system and allowing the generation of responses to certain stimuli during learning. However, (Aguirre, 2010) points out that brain gymnastics exercises are divided into three groups according to the type of movement, such as centerline movements, stretching movements, and energizing movements.

First, 'centerline movements' focus on skills that allow easy lateral movement (left-right) across the centerline of the body. The central line with its movements helps to have binocular hearing, binocular vision, and the right-left side of the brain and body for total coordination. Eleven exercises comprise centerline movements. However, in the present study, only four of them were applied. One, 'cross gait' allows the two cerebral hemispheres to work together, this implies a coordinated functioning of the mind and body. Additionally, it improves concentration, balance, and coordination. Therefore, it helps in reading, comprehension, writing, and listening skills. Two, the 'elephant' improves listening comprehension, helps with short and medium-term memory, therefore, exercises memory. Three, the 'X', improves visual attention, activates both hemispheres, and relaxes the body.

Second, 'stretching movements' support students in reinforcing and increase neurological channels that will allow connections to be made between the ability to express and the back of the brain to process and express the data obtained in the front of the brain. There are 11 exercises proposed by Dennison in this movement. However, in the present investigation, only four were applied. One, the 'owl' helps to reactivate auditory skills, as well as allows both views to work as a team, perfects binocular vision, enhances language by increasing breathing and tone of voice, and improves concentration and attention. Two, the 'gravity swing' allows you to restore movement to restore the integrity of the hips, gastrocnemius muscles, and pelvis and relax the tension in each of them. Three, 'grounding' allows the relaxation of the iliac muscles. The iliac muscle group is a very important group of the human body, as they are the ones that stabilize the body and settle it with respect to the ground, and their elasticity is essential for balance, focus, and total body coordination. Fourth, 'arm activation' helps improve your typing by stretching your shoulders and pectorals.

Third, ‘energizing movements’ facilitate the flow of electromagnetic energy through the body. These energizing movements activate the brain to send messages from the right hemisphere to the left or vice versa, as well as regulate the activation of neurotransmitters, thus improving communication. The ‘brain buttons’ exercise optimizes reading and improves coordination, relaxes the neck muscles, and improves the development of reading, writing, speaking, and improves the ability to follow instructions. The ‘power yawn’ helps move facial muscles, read aloud and speak in public, activates verbalization and communication, helps reading, and deeply oxygenates the brain. The exercise called ‘thinking hat’ stimulates the ability to listen, helps improve attention, verbal fluency, and balance, and improves the ability to hear one’s voice and the ability to think silently. The ‘balance buttons’ exercise allows you to keep the body relaxed and the mind alert, helping with concentration and decision-making.

English language learning

In the variable ‘English language learning’, this research focuses on the theory of ‘Meaningful Learning’ proposed by Ausubel who points out that learning involves an active restructuring of the perceptions, ideas, concepts, and schemes that the student has in his or her cognitive structure. Furthermore, he conceives the student as an active processor of information, therefore, he maintains that learning is systematic and organized because this process is a complex phenomenon that is not reduced to simple rote associations. Therefore, to ensure that the student carries out meaningful learning, it is necessary to modify or break the initial balance of his schemas concerning the new learning content, that is, if the task is too far from the student's schemas, he cannot attribute it to the student, meaning and the teaching-learning process is blocked. In the same postulate, Ausubel maintains that the significance of learning is closely related to its functionality, knowledge, facts, concepts, skills or abilities, values, attitudes, norms, etc. Thus, they must be functional. So, It implies that they can be used effectively when the circumstances in which the student finds himself demand it (Ausubel, 1963). In other words, the greater the degree of significance of the learning carried out, the greater its functionality will also be, and the student will be able to relate to more situations and new content in different contexts. Consequently, meaningful learning aims to ensure that the student, rather than capturing and accumulating information, can produce it, transform it, and apply it.

Meaningful Learning in Foreign Languages

Ausubel maintains that the 'grammatical approach' is immersed in the traditional educational current, where learning is developed through memorization and repetition, hindering innovation processes. However, in contrast to the grammatical learning approach we find the 'communicative approach', which, according to Ausubel, is a set of pedagogical methods that are based on the simulation or direct reconstruction of communicative exchange situations that are as authentic as possible. , which involves the use of language in a functional way in possible real-life situations. Furthermore, this approach considers the student as an active agent within the teaching-learning process, who uses the language based on the pragmatic, informative, and expressive needs that are required according to the communicative needs of the language.

Aspects in the teaching-learning process of the English language

Communicative aspect

(Watzlawick, 1991) maintains that communication is the use of a series of codes of personal and interpersonal behavior that regulate their appropriation to the context and therefore their significance. Consequently, ‘communication’ is a combination of a series of elements with a specific purpose and intention. This means that the student being aware of communicating implies the above, therefore he will be open to modifying the schemes of his native language.

Textual aspect

According to Watzlawick (1991), ‘text’ is considered a process, an interactive event, and as a social exchange of meanings. Also, the ‘text’ is a form of exchange whose fundamental form is the interaction between speakers (Halliday M. , 1978). Consequently, the texts used must, as far as possible, be real or authentic, whether oral or written used by natives of the language for the purpose of communication.

Functional aspect

Watzlawick (1991) explains that the analysis of communicative functions is carried out within a discourse. Describing the functions and learning the use of the linguistic forms that are used to perform them allows the students to express themselves in an appropriate way. The student acquires

not only knowledge of the order of words or lexical and syntactic elements but also knowledge that allows him or her to understand how to carry out a specific function.

Grammatical aspect

Watzlawick (1991) indicates that knowledge of lexical elements, the rules of morphology, syntax, semantics, and phonology, allows the student to manage the linguistic code of the foreign language. At first, the student establishes relationships between his or her mother tongue and the foreign language to try to understand and carry out more effective learning (Gass, 1994). Therefore, this process is called transfer.

Cultural aspect

Watzlawick (1991) concludes that culture is important to understand the situational contexts in which communicative exchanges take place since culture is related to the appropriate use of a foreign language. It is a determining factor in the different types of situations in which the person uses the appropriate cultural forms. The context of the situation together with the context of culture allows the interpretation of a text (Halliday K. &., 1985). The context of the situation has a series of characteristics that, when realized, are attributed to a series of values and meanings (culture). As stated (Lado, 1957) when pointing out that individuals tend to transfer forms, as well as meanings from their mother tongue and culture to a foreign language and culture, in order to be able to speak the language, act in said culture, and to be able to grasp and understand the language and culture in the same way that native speakers of the foreign language do.

The context and the situation

Whenever something is expressed or understood, it occurs within a context, that is, language works only within a situational context. The situation refers to the environment in which the text takes place (Halliday, 1978). This concept of situation context refers to the relationship established between the elements of a situation with the formal and structural characteristics of an utterance, and the way in which these language characteristics depend and are structured based on the context. When something is stated in a certain situation, it is determined by contextual factors that influence the linguistic event, systematically determining the form, appropriateness, or meaning of the

statements. Then, there is a close relationship between context and text, allowing people to make predictions.

Basic English Language Skills

Halliday (1978) defines basic English language skills as the inherent receptive and productive linguistic capabilities of the human being. Reading and listening are predominantly receptive skills while speaking and writing are productive skills that not only require the ability to recognize different elements of language but also combine them in a creative way to produce new speech or text writing. These communication skills are usually used in an integrated way, that is, we typically speak and listen or read and write at the same time. Therefore, the basic skills are listening, speaking, reading, and writing.

Listening

The 'listening' skill, according to Halliday (1978), is an interactive process that consists of perceiving and constructing messages through a number of cognitive and affective mechanisms. It is essential to understand what others say in order to respond or respond to another person.

Speaking

From a Communicative approach, 'auditory' and 'oral' skills are closely related. The acquisition of oral skills is a gradual and directed process, in which the student practices the language in a real way through discussions, conversations, or other strategies that motivate him to express himself orally. Therefore, the 'communicative' approach prioritizes the development of oral skills in the teaching-learning process of a foreign language in order to communicate efficiently with the native and non-native of the English language (Halliday.1978).

Reading

According to Goodman's Kenneth (1970, cited in Brown, 2001), 'reading' is a process that includes factors such as intellectual skills such as inferring or interpreting meaning, retention of information, experience in understanding a text, etc., and knowledge of a variety of linguistic signs such as morphemes, syllables, words, phrases, etc. Comprehensive reading involves the intelligence to interpret the text, whether it is being read in the native language or a foreign language. People

normally read for two main reasons: for pleasure as in the case of novels, short stories, poems, etc.; or to obtain information, that is, to find out something or to do something with that information. Consequently, reading is an interactive process that is best developed when associated with writing, listening comprehension, or speaking activities.

Writing

Brown (2001) considers 'writing' as a type of reinforcement and extension of other skills such as listening, speaking, and reading. It is very important in the process of learning the English language since it initially helps to develop oral expression and listening. There is a variety of written texts, each one represents a different genre and has certain rules for its production, for example: reports, essays, articles, letters, diaries, messages, advertisements, addresses, recipes, invitations, maps, etc.

Materials and methods

The research methodology applied in this study had a ‘mixed’ approach in that this approach represents a set of systematic, empirical, and critical research processes and involves the collection and analysis of quantitative and qualitative data, as well as its integration and discussion jointly, to make inferences resulting from all the information collected and achieve a greater understanding of the phenomenon under study. Likewise, the design of this research was of a ‘quasi-experimental’ type where at least one independent variable is deliberately manipulated to observe its effect and relationship with one or more variables. Likewise, subjects are not randomly assigned to groups or paired, but rather these groups are already formed before the experiments, also known as intact groups (Hernández-Sampieri, 2018).

Diagram:

EG O1 X O2
CG O1 __O2

Where:

EG: an experimental group made up of 2nd year, course A, students from High School level at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton.

GC: a control group made up of 2nd year students, course B, students from High School level at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton.

O1: Application of the pretest on English language learning to the experimental group

X: Students of "2nd year, course A, from High School Level at Educational Unit Dr. Alfredo Pérez Guerrero, Guano canton.

O2: Application of the post-test on learning the English language to the experimental group

_: "2nd year students, course A, from High School Level, at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton.

The scope of the research was Descriptive since it seeks to specify the properties, characteristics, and profiles of people, groups, communities, processes, objects, or any other phenomenon that is subjected to an analysis (Urréa, 2021). This means that the information obtained about the hypothesis or theory is presented and carefully analyzed to obtain significant conclusions that could contribute to achieving new knowledge.

The types of research on which this study was based were 'field research' and 'documentary research'. 'Field research' bases its work on obtaining information about the object of study in the place where the phenomenon to be studied occurs, which means that the researcher moves to the place where the phenomenon occurs. Likewise, documentary research is based on obtaining and analyzing information about an object of study from different bibliographic or documentary sources where the analysis and interpretation of the researcher predominate (Quishpe, 2022). On the other hand, the method to analyze generalities of brain gymnastics and meaningful learning was the 'deductive-inductive' method. This implies that the 'deductive' method studies the phenomenon from its generality to particular situations, while the 'inductive' method establishes the generality specific cases. Consequently, these methods work in duality (Germán, 2021).

The 'sample' in the present study corresponds to the 'population' because the population is defined as small and finite. Therefore, the population of the Experimental Group and Control Group were 50 students of the English subject corresponding to the second year, course A and B from the High School Level, at Unidad Educativa Dr. Alfredo Pérez Guerrero, from Guano, during the school year September 2023 - June 2024. Therefore, the study sample was made up of two groups. One, 'Experimental Group-EG' or group that receives the stimulus, 2nd year, course A. Two, 'Control Group-CG' or group that does not receive the stimulus, 2nd course B. Additionally, the 'sample' was stratified by gender (EG: men=13, women=12, total 25 students) and (CG: men=9, women 16, total 25 students), (Pantoja, 2022).

The techniques to organize and analyze the data in the present study were the field technique and the office technique. The 'field technique' consists of directly obtaining information from the

primary sources under study. The 'office technique' consists of the procedure to process and analyze the data through the classification of information through coding and tabulation, to then carry out the analysis, and in this way prepare and interpret the data, to finally write the report that contains the results of the research (González, 2019).

The techniques used for data collection were Observation and Survey. The 'observation' was of a simple type since the results point to the most superficial, and its data collection instrument during the application of the workshop was the 'check sheets'. The 'survey' allows us to directly obtain information from the students who are related to the object of the research, and for this the 'questionnaire' instrument was used, composed of 4 items for each of the communicative skills of the English language (Writing, Reading, Listening, Speaking) (Calva, 2023). For its validity, the instrument was subjected to the expert judgment method (3 experts), and for its reliability, Cronbach's Alpha was applied, whereas Cronback's Alpha (α=0.856 based on 25 elements). The minimum acceptable value for Cronback's alpha coefficient is 0.7, below this value internal consistency is low. However, the maximum expected value is 0.9, since values above this value mean that there is redundancy or duplication. Consequently, the instrument with a value α=0.856 has a high degree of reliability because the said value is close to unity-1 (Torres, 2021).

The analysis of the results was carried out through the 'triangulation' method as it allows the examination of a topic or phenomenon from various sources or data to improve the validity, reliability, and exhaustiveness of the research results (Abbadia, 2023). In addition, descriptive statistics were applied such as frequencies and percentages, as well as inferential statistics applying the 'Paired Samples T-Test' whose results were interpreted with the contribution of the theoretical framework related to each of the variables of the hypothesis with theory and practice.

Results

The results in the present study showed that the application of brain gymnastics activities in the English classroom of 2nd-year from High School Level to the students from Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, during the development of language skills such as listening, reading, writing, and speaking are closely related to meaningful learning of the English language.

According to the descriptive statistics, there is a significant difference in the mean post-test value (2.56 points) in relation to the pre-test value. Furthermore, the median maintains a difference of (3 points) in the post-test. *(See table 1)*

Table 1: *Descriptives of the Post Test and Pre-Test*

Descriptives

	N	Mean	Median	SD	SE
Post_Test	25	6.88	7	1.74	0.348
Pre_Test	25	4.32	4	1.84	0.368

Author: Researchers

Note: Student's difference descriptives from language skills in post test and pre-test

The results of the pre-test applied to the experimental group on the level of mastery of English language skills (listening, speaking, reading, writing) showed an average of 4.32 out of 10 points before receiving the stimulus of the brain gymnastics activities, which according to the qualitative, quantitative and numerical equivalence scale for the assessment of learning of the evaluation and accreditation system of High School Level students established by the National Curriculum Directorate of the Ministry of Education of Ecuador for the year 2023-2024, points out that 'students do not achieve their learning', this means that more than half of the students (68% - 17) have poor development of target language skills.

On the other hand, once the brain gymnastics stimulus was applied to the experimental group, the average of the post-test was 6.88 points out of 10, where a significant difference of 2.56 points is observed in relation to the pre-test. Therefore, language skills (reading, writing, listening, speaking) have improved substantially, with almost half of the students in the experimental group (48% - 13) 'achieving their learning', and (16% - 4) of the students 'master the learning' as established by the learning evaluation system at the High School Level in the Ecuadorian secondary education system *(See Table 2).*

Table 2: *Assessment criteria to achieve learnings*

Descriptive's Frequencies

	Pre_Test		Post_Test	
Assessment Criteria	**Counts**	**% of Total**	**Counts**	**% of Total**
DOES NOT ACHIEVE THE LEARNINGS (E-)	1	4.0 %	0	0.0 %
DOES NOT ACHIEVE THE LEARNINGS (E+)	3	12.0 %	0	0.0 %
DOES NOT ACHIEVE THE LEARNINGS (D-)	3	12.0 %	0	0.0 %
DOES NOT ACHIEVE THE LEARNINGS (D+)	10	40.0 %	4	4.0 %
IT IS CLOSE TO ACHIEVE (C-)	2	8.0 %	1	76.0 %
IT IS CLOSE TO ACHIEVE (C+)	2	8.0 %	3	12.0 %
ACHIEVE THE LEARNINGS (B-)	2	8.0 %	9	36.0 %
ACHIEVE THE LEARNINGS (B+)	2	8.0 %	4	16.0 %
MASTER THE LEARNINGS (A-)	0	0.0 %	2	8.0 %
MASTER THE LEARNINGS (A+)	0	0.0 %	2	8.0 %
TOTAL	**25**	**100 %**	**25**	**100 %**

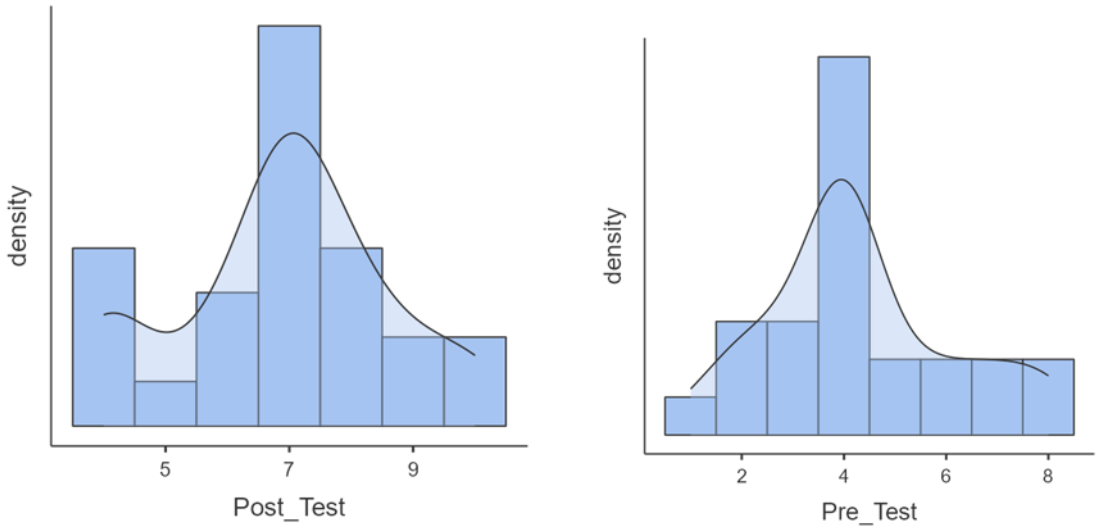
Author: Researchers

Note: Frequencies of the scores in the Pre-Test and Post test

The scores of the students in the experimental group in the post-test are significantly higher in relation to those achieved in the Pre-test, which is reflected in the difference of the means of the two tests. At same time, the 'median' has a value of 7, which means that the students after the

stimulation of the brain gymnastics exercises achieve their learning, significantly improving their language skills (See the Figure 1)

Figure 1: *The median value*



Author: *Researchers*

Note: *The scores of the Psot Test have a medina value of 7 points over 10 points*

Hypothesis Testing

The hypothesis verification calculation in this research was carried out through the application of statistical inference, applying the parametric test 'Paired Samples T-Test' where the independent variable is 'brain gymnastics', and the dependent variable is 'meaningful learning of the English language'.

Null Hypothesis, H_o*:* If a brain gymnastics program is applied, significant learning of the English language will not be achieved in the 2nd year of High School Level students, course A, at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, Chimborazo province, during the school year September 2023 – June 2024.

Alternative Hypothesis, H_1*:* If a brain gymnastics program is applied, significant learning of the English language will be achieved in the 2nd year of High School Level students, course A, at Dr. Alfredo Pérez Guerrero Educational Unit, Guano canton, Chimborazo province, during the school year September 2023 – June 2024.

According to the mathematical model of the hypothesis, a one-tailed statistical test is observed since the critical region of distribution is completely in one tail cola (Constante, 2019), where μ_1 is equal to the average of the pre-test population of the experimental group, μ_2 is equal to the population average of the post-test of the experimental group.

Mathematical Statistics

H_o = $\mu_2 \leq \mu_1$

H_1 = $\mu_2 > \mu_1$

Hypothesis Conclusion

The results showed that with 24 degrees of freedom and with a significance level of 0.05 (α), the value of p = 0.001 is less than α=0.05. Likewise, the calculated value of the **'Paired Samples T-Test'** is 18, higher than the value of 1.711 of the distribution thresholds of the T-student test table. Consequently, the Null Hypothesis **(H_o)** is rejected because the mean of the post-test differences is different from the pre-test mean. For this reason, the Alternative hypothesis is accepted. **(H_1):** If a brain gymnastics program is applied, significant learning of the English language will be achieved (See the Table 3). At the same time, the descriptive graphics showed that the intervals

Table 3: *Paired Samples T-Test value*

Paired Samples T-Test

			statistic	df	p
Post_Test	Pre_Test	Student's t	18.0	24.0	< .001

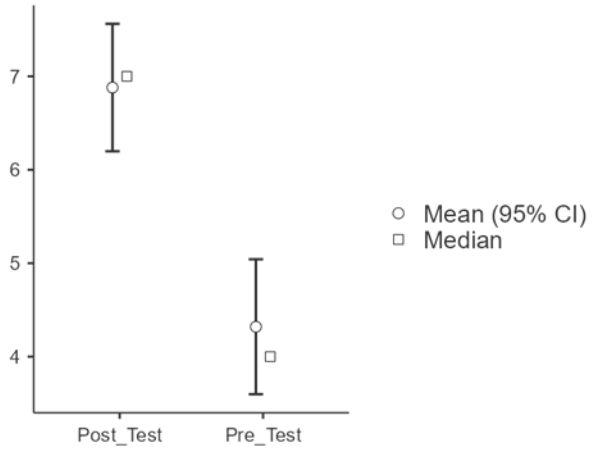
Note. H_a $\mu_{\text{Measure 1 - Measure 2}} > 0$

Author: Researchers

Note: p value is < 0.001

The Figure 2 shows that the intervals do not touch because the difference in the means is significant with a 95% confidence interval (See Figure 2)

Figure 2: *Descriptive Graphic*



Author: *Researchers*

Note: *p value is < 0.001*

Discussion

The results of this study support the hypothesis that the application of brain gymnastics exercises in the English classroom allows students to achieve significant learning of the language under study, given that the average achieved in the post-test is higher than the average reached in the pretest of the experimental group where it can be deduced that the learning scenarios were motivating, effective, and innovative. At the same time, English teachers generated communicative activities around real, meaningful, and integrative experiences that address the needs and realities of the students, thus breaking traditional or conventional learning processes. It is also important to highlight that each student achieves learning differently due to the levels of neurocognitive development or triune brain, this implies that not all students learn at the same pace, nor in the same way (Velásquez B. C., 2006).

The brain gymnastics exercises in the present study were classified into centerline movement, stretching, and energizing techniques applied before carrying out English language skills learning activities (listening, speaking, reading, writing) denoting that the majority of the students in the experimental group are highly satisfied with brain gymnastics activities that allow movement and increase a motivational climate in accordance with the results obtained in the study carried out by (Cervelló, 2007). Likewise, the results maintain that creativity is essential for the development of cognitive functions during the teaching-learning process of the English language, similar to what was concluded in the study carried out by (Galarza, 2021). The application of brain gymnastics

exercises also allowed students to improve their communicative skills in the English language, increasing the level of interaction of the students in accordance with what was concluded in the study carried out (Cordero, 2020).

Additionally, the English language skills of the students in the experimental group improved significantly as established in the post-test results. This implies that the language skills of the National Curriculum for foreign languages of the Ecuadorian secondary education system are aligned with the Common European Framework of Reference at exit level B1-Independent User. Therefore, in the 'reading' skill, students respond to literal-level questions from short texts with high daily frequency, work, as well as descriptions of events, feelings, and desires.

Regarding to 'Writing' skills, students follow a grammatical structure to form sentences according to the given images connected to familiar topics or personal interests. Therefore, the students' listening ability is acceptable since they can identify basic words in the workplace, bone activities, school, etc., from audio or recordings of short conversations of native English speakers. Finally, the 'speaking' skill is developed efficiently, where students can efficiently interact with their peers about everyday situations such as experiences, events, realities, dreams, ambitions, explanations, and opinions with a simple vocabulary that is easy to understand. Therefore, these results are like the results achieved by (Ruiz, 2016), when maintaining that brain gymnastics improves the intellectual, emotional, and physical abilities of students, while exercise and movement allow for significant learning and training. Neural structures that promote short- and long-term memory as established by (Been, 2021).

Conclusions

From the results found in the present study, it can be deduced that brain gymnastics allows modifying neuronal structures to increase concentration, creativity, and problem-solving. Thus, implementing brain gymnastics exercises in classrooms allows memory, psychological perception, and cognitive activities to be enhanced through the stimulation of the cerebral hemisphere and the remodeling of neuronal connections. Therefore, neuroplasticity is modulated by the mental condition of the individual and the information acquired, allowing cognitive performance and knowledge retention to be improved due to the flow of energy in the brain that increases the learning capacity of students where the secretion of hormones activates neuronal connections, stimulating the structure of the nervous system.

The implementation of brain gymnastics exercises in the classroom contributed significantly to the learning of the English language, in which central line movement, stretching, and energizing techniques were used, allowing the development of the four language skills (listening, speaking, reading, writing) with a dynamic, practical and experiential methodology developing significant learning because the student relates previous knowledge with new knowledge and its adaptation to the context, readjusting and reconstructing both information in this process. Furthermore, it should be noted that brain gymnastics activities are aligned with the development of the dimensions of meaningful learning such as motivation, understanding of knowledge, functionality, relationship with real life, and active participation.

Within the teaching-learning process of the English language, it can be concluded that teachers using brain gymnastics as a new teaching strategy improve the understanding of the English language, since the teacher teaches the students to contextualize their learning, to do so achieve motivating and dynamic classes by promoting the student's interest in this foreign language. It means that the student could demand that his teacher apply new methodologies in his English hours and not settle for rhetorical and repetitive classes.

Finally, the results of the non-parametric Paired Samples T-Test rejected the null hypothesis, accepting the study hypothesis, which maintains that the brain gymnastics activities applied to the students in the experimental group allowed them to achieve significant learning of the four skills of the language given that the significance of 0.001 is less than the significance of 0.05. Concluding that the application of brain gymnastics in English classes generated a significant effect on students' learning.

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