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SCHOOL OF ENGLISH LANGUAGE TEACHING

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EDUCATION

BENEFITS OF IMPLEMENTING THE NEUROSCIENCE EDUCATIONAL METHODOLOGY
AND THE LEARNING PROCESS OF A FOREIGN LANGUAGE (ENGLISH) IN
PRESCHOOLERS FROM THREE TO FOUR YEARS OLD AT LOS ANGELES SCHOOL
LOCATED IN SAN JOSÉ, SAN JOSÉ DURING THE FIRST QUARTER 2025.

AUTHOR:

KIMBERLY MOREIRA ALFARO

TUTOR:

MSc. Ariel Gustavo Vargas Vindas

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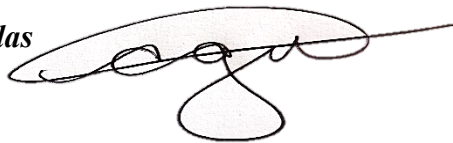
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Cedula: 204420300



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He revisado y he hecho las observaciones relativas al contenido analizado, particularmente lo relativo a la coherencia entre el marco teórico y análisis de datos, la consistencia de los datos recopilados y la coherencia entre éstos y las conclusiones; asimismo, la aplicabilidad y originalidad de las recomendaciones, en términos de aporte de la investigación. He verificado que se han hecho las modificaciones correspondientes a las observaciones indicadas.

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To my baby,

You came into my life like a whispered promise of hope,
soft and bright, changing everything without asking for anything.

In your eyes, I found courage: in your presence, a reason to keep going.
You were the silent rhythm behind every step I took,
the gentle push forward when I wanted to stop.

Without knowing it, you gave me the strength, the intention, and the resilience to reach this dream.
Your presence filled my days with purpose and my heart with sweet determination.
In the stillness of long nights and the weight of demanding days,
you were my light that guided me,
your smile that lifted me,
and your love that reminded me why I began.

This achievement is yours as much as it is mine,
because you were always my reason, even when you did not know it.

With all my love,
Mommy.

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This project represents much more than the completion of a professional job. It is the result of many hands, hearts, and minds that accompanied me along this way.

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Abstract

Esta investigación explora los beneficios de implementar una Metodología Educativa Neurocientífica en el proceso de aprendizaje de una lengua extranjera (inglés) en preescolares de tres a cuatro años de la Escuela Los Ángeles, ubicada en San José, durante el primer trimestre de 2025. El estudio analizó cómo las estrategias basadas en la neurociencia apoyan la adquisición temprana del lenguaje y el desarrollo cognitivo general en preescolares.

Guiada por un enfoque cualitativo, es importante mencionar que la investigación se centró en comprender las experiencias vividas de los participantes mediante la aplicación de dos talleres basados en la neurociencia diseñados para fortalecer el aprendizaje del inglés. La recopilación de datos incluyó una lista de verificación de desempeño alineada con el plan semanal y entrevistas con docentes de preescolar para obtener información sobre el progreso y la participación de los estudiantes.

Cabe destacar que, los participantes eran preescolares de familias de clase media que asistían a una institución privada de bajo costo. Los resultados, organizados según los objetivos específicos del estudio, revelaron que la implementación de la Metodología Educativa Neurocientífica influyó positivamente en la atención, la motivación, la retención del lenguaje y la interacción sensorial en el aprendizaje del inglés. La triangulación de datos cualitativos proporcionó validez y profundidad a la interpretación de los hallazgos.

Para finalizar, este estudio destaca la eficacia de integrar los principios de la neurociencia en la educación del lenguaje en la primera infancia, ofreciendo implicaciones valiosas para prácticas pedagógicas innovadoras centradas en el niño.

Palabras clave: Aprendizaje del idioma Inglés, Educación en la primera infancia, interacción sensorial, metodología basada en la neurociencia, niños preescolares, participación estudiantil, investigación cualitativa.

Executive Summary

This qualitative research study, titled "Benefits of Using the Neuroscience Pedagogy Model and the Three- to Four-Year-Old Preschoolers' Foreign Language English Learning Process at Los Angeles School in San José, San José, First Quarter 2025" was undertaken to test the impact of neuroscience-based educational interventions on English language learning in early childhood.

The general goal was to study the benefits of applying the Neuroscience Educational Methodology in foreign language learning, in this case, English for preschool children. The study also aimed at applying this methodology through comprehensive workshops, profile its importance in early schooling, and measure its success.

The research employed a qualitative approach to understand the experience of three- to four-year-old children in a low-cost private preschool setting. Two workshops were designed and piloted based on neuroscience principles — "Brain Gym for English Time" and "Little Scientists: Sensory Exploration in English." These workshops employed movement, sensory stimulation, and active learning methods to enhance students' motivation and cognitive development.

Data were collected through a performance checklist against weekly lesson plans and through interviews with preschool teachers. Findings were examined using triangulation for validity and interpretive richness. Also, the findings indicated that implementation of Neuroscience Educational Methodology positively affected areas like attention, emotional arousal, language development, and sensory integration. Teachers also witnessed improved participation, motivation, and retention from the children.

In conclusion, this research confirms the effectiveness of neuroscience-informed practice in creating rich, interactive, and developmentally appropriate English language learning experiences among preschool children. The results call for increased application of neuroscience-based strategies in early childhood education.

Keywords: Neuroscience Education, Preschool English Learning, Early Childhood, Brain Gym, Sensory Exploration, Active Learning, Cognitive Development, Qualitative Research.

Chapter I

Research Problem

1.1 INTRODUCTION

Is the Neuroscience Educational Methodology a key of a new and innovative approach in education? Some institutions have implemented the Neuroscience Educational Methodology in their curriculums as a new paradigm to improve the quality of teaching in learners. Nowadays, technology is increased in Education. To Sheila R. Dennis “Technological advances have accelerated our knowledge of the brain’s functioning, and there has been a neurobiological explanation to our human quandaries. For this reason, schools are no exception, and this interest in neuroscience has spawned the creation of educational neuroscience, a transdisciplinary convergence of education, neurosciences, and psychology” (2018, p. 15). In a Webinar with Bueno, (2020) about Neuroscience, it is mentioned that “the way students are taught can help push them to unlock their curiosity, lose their fear of change and move them to action”. It is interesting how the neuroscience can connect with the pedagogical stage in any age and it is more incredible how teachers can improve their methodologies to teach a second language analyzing the neuroscience process in the learner’s brain.

According to Vásquez (n.d) citing to Loewstein (1994, p. 18), “To create curiosity, teachers leave a gap between what the person knows and what he wants to know. And sometimes, the teaching-learning process make two mistakes: the first occurs when they try to teach all the information in one class, without giving time for curiosity to appear; and the second occurs when they ask the student to learn everything by himself, without offering a little of information that stimulates the want to know more” (Vásquez, n.d). For these reasons, teachers need to improve their knowledge and start to change their methods to introduce the Neuroscience Educational Methodology in their lives. In the Preschool stage, this methodology is vital in the learning process of children. It is important to analyze how the brain works when they are learning, knowing new information, vocabulary, etc. Also, putting in practice the methodologies that teachers choose it is evidence to improve the learning process in learners. Neuroscience Association of Murcia citing to Martínez (2017), professor of Human Anatomy and Embryology at Universidad Miguel Hernández and director at Institute of Neuroscience in Alicante

(Spain), considers “Education as acting up on the brain; the brain is the receiver of education since everything we think, feel, and perceive involves the brain” (2021, p. 25).

As teachers know, all learners are different, their brain works different. As the same author (2021, p. 35) mentioned: “In every child, we find a brain with special characteristics and functions that will condition the learning process, since behavior is completely determined by the brain”. For this reason, the time of each child is essential in the learning process. Teachers should combine the methodologies, change techniques, move activities and strategies to connect the learner’s brain. Children love knowing new information, exploring around them, observing different environments, and learning different ways to communicate and in this case, learners love a second language to express themselves. As bilingual teachers it is important putting in practice the Neuroeducation in teaching Foreign Language for early childhood.

For this reason, “Language is an inseparable part of human life, because by language a person can convey intentions and goals to others. In other words, language is a communication tool used by humans in their efforts to interact with each other. Language functions as a communication tool and it is an important tool in children’s lives” (Milla, Arini, Sri Endang, Dayati Umi, wd). English skills (listening, speaking, writing, reading) are fundamental in English foreign language teachers, especially in preschoolers. Children who have an opportunity to develop basic foundational skills in language and literacy in preschool enter kindergarten ready to learn, to read and write.

In a research Frydrychova mentions: “It has already been scientifically proven that children at this age have a strong potential to acquire almost an infinite percentage of new information, especially when a second language learning is concerned” (2013, p. 45). For all these reasons, this research is essential for a great methodology to teach English through Educational Neuroscience in a preschool area. Teachers will have a support to analyze the use of Educational Neuroscience in preschoolers who learn English as a second language in different institutions that apply it.

1.1.1 Background

Neuroscience Educational Methodology has been growing as an area of research and practice over the last several decades. It is important to analyze as Amran mentions “The development of imaging technology such as Magnetic Resonance Imaging (MRI), Electroencephalogram (EEG) and functional Magnetic Resonance Imaging (fMRI) has driven all the scientists particularly in neuroscience to interpret the structure and function of brain in micro” (2019, p. 11). For these reasons, curiosity arises when scientific can relate neuroscience with education, how the brain works when students learn different topics in their schools. In an article of Jolles, Dietsje D. and Jolles, Jelle (2021) mentions three important factors to improve the education through Neuroscience:

- a) Neuromyths are still prevalent, and there is a confusion of tongues between the many underdisciplined and the domains of behavioral and educational sciences.
- b) A focus upon cognitive neuroimaging research has yielded findings that are scientifically relevant but cannot be used for direct application in the classroom.
- c) The emphasis which has been on didactics and teaching, whereas the promise of neuroeducation for the teacher may lie more on pedagogical inspiration and support. Nowadays, these investigations in the educational neuroscience have taken great strength to move forward in the learning process.

On the other hand, English Language Teaching has changed for a long time ago, there are a lot of methods teachers can use to teach a second language in any age. In an article of Thanasoulas (2002) mentions “Perhaps more than any other discipline, this tradition has been practiced, in various adaptations, in language classrooms all around the world for centuries”. The same author explains the importance of research in the selection and implementation of the optimal methods and techniques for language teaching and learning:

- a) Classical Method: In the Western world back in the 17th, 18th, and 19th centuries.
- b) Directed Method: The last two decades of the nineteenth century ushered in a new age.

- c) Audiolingual Method: The outbreak of World War II heightened the need for American to become orally proficient in the languages of their allies and enemies alike.
- d) Suggestopedia: promised great results if we use our brain power and inner capacities.
- e) Communicative Language Teaching: The need for communication has been relentless, leading to the emergence of the Communicative Language Teaching.

It is indispensable to choose the method students feel comfortable and involve all needs and skills in the learning development. For this reason, learning about how to teach a second language and connect with Educational Neuroscience could be the most appropriate technique to teach in the integration of different institutions.

1.1.2 Problematization

The implementation of Educational Neuroscience is essential in the learning process in any stage of education. According to Amran, M.S., Rahman, S., Surat, S., & Bakar, A.Y.A. “There is growing interest in the contributions of neuroscience to educational practice because applying neuroscientific research to classroom is a new and exciting endeavor to promote better learning” (2019, p.18). However, the problem is how can you connect the Educational Neuroscience with learning a second foreign language (English)? As the same authors mention: “Education is about enhancing learning and teaching, and neuroscience is about understanding the biological brain as well as mental processes involved in learning” (2019, p.25). For this reason, it is interesting to analyze the methodologies in the institution and the integration of neuroscience.

1.1.3 Problem Statement

Benefits of implementing the Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers from 3 to 4 years old at Los Angeles School located in San José, San José during the 1st quarter 2025.

1.1.4 Justification

The most important purpose when educators relate Neuroscience Educational Methodology and the learning process of a Foreign Language (English) is to analyze how the cognitive neuroscience can help in the complexity of learning in students and develop more effective strategies in the learning process of preschoolers. NETTEN mentions the importance of Neurolinguistic Approach (NLA) explaining the positive results of the practical applications of the NLA indicate the important contribution research in cognitive neuroscience can make to improving learning in a classroom situation (2012, p.45). And the big question is: How influences Neuroscience Educational Methodology in the learning of a foreign language (English)? And, in this research will be analyzed. This new pedagogical approach has been conceptualized by Netten and Germain in the context of the emerging influence of neuroscience on education. Memorize words vocabulary and translation are the most common strategies to improve the English teaching. It is the moment to change them, teachers must put in practice the new educational paradigms with teach another language (2012, p.50).

At Los Angeles School, Sabana Norte, projects-based learning (PBL) is the basis of the methodology that institution implements in classrooms. It is mentioned: “The process and findings of PBLs are shared with the Los Angeles community in the learning celebration” (Los Angeles School, 2021). They try to develop learning skills as critical thinking, problem solving, assertive communication, bilinguals’ strategies, etc. through a metacognition process. It is important putting in practice the Educational Neuroscience with all these techniques that this institution uses. Nowadays, Los Angeles School is a 100% bilingual institution, but some teachers do not practice the foreign language (in this case English). And, some teachers have been there for a long time, they have traditional methodologies and are not trained to teach a second language.

1.2 RESEARCH QUESTION

What are the benefits of implementing the Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers from 3 to 4 years old at Los Angeles School located in San José, San José during the 1st quarter 2025.

1.3 OBJETIVES OF THE INVESTIGATION

1.3.1 General Objective

- a) To analyze the benefits of implementing the Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers from three to four years old at Los Angeles School, San José.

1.3.2 Specific Objectives

- a) To apply Neuroscience Educational Methodology in the learning process of a foreign language (English) in preschoolers from three to four years old at Los Angeles School located in San José.
- b) To describe the importance of Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers.
- c) To evaluate the effectiveness of implement Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers from three to four years old.

1.4 SCOPES AND LIMITATIONS

1.4.1 Scope of the Research

This study covers the analysis of the benefits of implementing the Neuroscience Educational Methodology and the learning process of a foreign language (English) in the Preschool area in a institution named: Los Angeles School that is located in Sabana Norte, as the center of capital of Costa

Rica, San José. Then, it is important to mention that Preschool Area in Los Angeles School has three groups: Nursery, Kinder A, and Prep. A. Almost with twelve students each group. According to time the duration of the study depending on the process of teachers. It could be a trimester. Also, study will discuss different topics to develop the objectives proposed: Neuroscience Educational Methodology, Teachers training, The Common European Framework of Reference for Languages (CEFRL).

1.4.2 Limitations of the Research

To develop all aspects putting in practice the Neuroscience Educational methodologies in a correct way in all the ages to analyze the similitudes and differences if them. On the other hand, it is difficult to visit and observe other institutions to analyze the different methodologies and promote the Neuroscience Educational strategies to change the learning process.

Chapter II

Theoretical Framework

INTRODUCTION

This chapter provides the theoretical framework in supporting research in advantages of employing the Neuroscience Educational Methodology in preschool children's process of learning English. The chapter is initiated with an introduction to neuroscience and its implications in early childhood education, specifically how learning is processed by the brain and how such information can be used to improve pedagogy. Follows this, the chapter addresses instruction of English as a foreign language (EFL) in Costa Rica, focusing on the establishment of the four fundamental skills of language—listening, speaking, reading, and writing—within preschool age.

The second topic presents active methodologies aligned with the principles of neuroscience such as Project-Based Learning (PBL), Game-Based Learning, and STEAM education. These approaches promote rich, interactive, and developmentally appropriate learning experiences for young children. Finally, the chapter offers a description of the setting of the study: Los Angeles School in San José. This includes an overview of its history, mission, vision, institutional objectives, and curricular organization by ambits, to have an overall sense of the setting of the study.

2.1 NEUROSCIENCE AND THE LEARNING PROCESS

2.1.1 Definition of Neuroscience

Neuroscience has been growing for many years; scientists investigated that the brain was where all sensations of the brain were created. Nowadays, neuroscience investigates how human and cognitive behavior, how connections are made neurons responsible for mental activity, which allows advances in the cognitive area to be seen and better analyze how the brain performs the acquisition of teaching and learning. González (2018) in her thesis describes the definition of Neuroscience: “It is a discipline and a field of scientific knowledge which is responsible for studying many sciences, but fundamentally in the structure and functional organization of the nervous system, especially the brain”. As the same author

(2018) tells “sometimes neuroscience is combined with psychology giving rise to a branch of neuroscience known as cognitive neuroscience, which allows us to know and learn more about the brain and consciousness”. Also, neuroscience gives a better insight into how a person relates to others and to the experiences they live daily, and how the thoughts, emotions and behavior of individuals occur. For this reason, neuroscience has investigated and explains what being human should and should not do to have a development in the best possible way. Nowadays, the neuroscience is a fundamental part of education and there are four essential areas to develop the learning process in children: social, emotional, cognitive, and academic that neuroscience puts in practice its functions to increase the learning process in a easy way.

As González (2018) it is mentioned “In the cognitive area, neuroscience strengthens memory systems, social cognition, emotional self-regulation, or empathy. Neuroscience is involved in the educational field by trying to solve the learning problems of infants, and brings innovative ideas to the educator, transforming pedagogical practices”. For these reasons, neuroscience must connect with child-education in Costa Rica. The importance of Neuroscience is essential in this research, so, González, María Cristina (2018) tells an integral justification of that: The importance of neuroscience integrates in a mixture of strategies, meaningful models, methods, and procedures in such a way teaching and learning are consistent with the neurophysiological development of the individual, if, when this is favorable for the student, since seeking strategies are fundamental and teaching-learning process is achieved in an effective because, much of this process takes place in in an individualized environment. It is important to have support from family and teachers to be able to understand and form a bond company, motivation, identity, self-esteem, to being able to teach and learn since the brain works globally.1.2 Neuroscience in

2.1.2 Children’s Learning Process in Neuroscience

Early children learning process is the best option when teachers want to increase the knowledge of learners in many times ago. Connecting neuroscience with education, teachers consider what doing a significant learning putting in practice how the brain works and teach in the same way. For these reasons,

neuroscience teaches how learn and acquire new knowledge. Thesis of González, María Cristina (2018) mentions: It can be observed how learning changes the physical structure of the brain, for example, it is strengthened with mental exercise, even study organizes and reorganizes the mind, it can be said that mental exercise changes their way of perceiving and understanding reality. On the other hand, it is given the teachers' needs to know how brain works and the lessons are more effective, and that the student takes advantage of their abilities. Also, neuroscience is beginning to light the way for education, and in the future increasingly efficient techniques will be applied not only to study but also to teach.

2.1.3 Neuroscience Educational Methodology

On the other hand, according to D'Addario (2019) "Neuroeducation is the application of neuroscience to education. Knowledge of the brain is contributing to knowing how they learn. It has been known for years that learning causes brain changes. Neuroscience has made the traditional psychological explanations go into the background, and sometimes they are banished due to their scientific scant basis". For this reason, it is important to consider the language skills that it is a key in the children learning process.

Language means the communication when people express feelings, thoughts, experiences telling them to others through symbols, signs, and sounds. According to UNESCO (2021) "In 1999, at the 30th Session of UNESCO's General Conference, countries adopted a Resolution that established the notion of 'multilingual education' (30 C/Res. 12) to refer to the use of at least three languages in education: the mother tongue(s), a regional or national language and an international language in education" (pr.1). Also, in the same page (2021) "Multilingual education based on the mother tongue (s) in the early years of schooling plays a key role in fostering respect for diversity and a sense of interconnectedness between countries and populations, which are core values at the heart of global citizenship. As such, it contributes to the fostering of learning to live together (pr.3)".

Then, English language is increasing in many countries, and it is important to implemented in the daily learning process to develop learners with a good English as a second language. At the language

level, both the expressive and comprehensive part since the lack of any of them can occur as a product of poor acquisition in the process of teaching and learning this skill, as fundamental in comprehensive child development as language is. For these reasons, Neuroscience and language are connected, teachers must teach a second language with neuroeducation strategies. As González (2018) mentions “Neuroscience allows us to know that we have a plastic adaptable brain to learn as many times as necessary as long as possible conditions are met, neuroscience allows the teacher to understand the particularities of the central nervous system and the brain in a more precise way”. But it cannot be ignored that neuroscience can currently help us to develop and modify educational programs, especially in preschool education, due to the significant changes that the brain shows in this stage of life.

2.2 ENGLISH AS A FOREIGN LANGUAGE (EFL) IN EARLY CHILDHOOD EDUCATION

2.2.1 History of EFL Teaching in Costa Rica

English teaching in Costa Rica started as early as the mid-nineteenth century and was first institutionalized in 1825 in the internal bylaws of the Casa de Enseñanza Santo Tomás. Records of English instruction in primary schools go back to the 1940s,¹⁵ but English classes were already included in academic programs upon the founding of the “colegios primario-secundarios” in 1887. Solano also mentions citing some authors that English classes were initially taught by foreigners, presumably native speakers of English, and it was not until 1954 when the first training of English teaching professionals took place at the Universidad de Costa Rica (UCR). It was also UCR which launched the first English teaching program in 1957. In 1973, the Universidad Nacional, along with the Escuela de Literatura y Ciencias del Lenguaje, opened its doors,¹⁷ also becoming a central actor in the training and preparation of professionals in the areas of linguistics, literature, second language teaching, and translation in Costa Rica. (Solano, 2012, pr. 01).

At the end, Solano mentions that English was considered a special subject, like art, music, and physical education at 1990s. It was not until 1997 that English was established as a basic subject or content area, in primary school, making Costa Rica the only country in Central America with an English program at that level (pr. 02). In my opinion, the evolution of English language teaching in Costa Rica demonstrates an impressive and progressive reorientation of educational priorities. From its founding in 1825 to the curricular revolution of 1997, English went from being a privilege taught to foreigners to a formally integrated element of the national curriculum. This change indicates the country's growing awareness of English as a part of global communication and a promising future for students.

2.2.2 Skills in EFL Learning: Listening, Speaking, Reading, and Writing

According to Barbuzza, S (s.f), In recent years, English as a Foreign Language (EFL) teachers have recognized the importance of the underlying dynamics of culture in second language communication. In fact, second language learning exceeds the limits of memorizing vocabulary items and grammar rules; other areas of knowledge such as social, cultural and discourse conventions are definitely to be included in the classroom input (pr.1).

But the English Foreign Language have four crucial skills that are fundamental in the neuroscience learning process such as: listening, speaking, reading, and writing. They are fundamental in the neuroscience educational learning process when students learn a foreign language. One of the key skills that supports this process is listening, as it plays a crucial role in how learners acquire and internalize a new language.

- **Listening:**

The importance of listening in language learning can hardly be over-estimated. Through reception we internalize linguistic information without which we could not produce language. In classrooms, students always do more listening than speaking. Listening competence is universally larger than speaking competence (Barbuzza, S., s.f, p.277).

Also, Barbuzza give a proposal class that is divided into five steps:

1. Preparing to watch a movie
2. Watching part of a movie
3. Filling out a number of tasks after watching the film to check comprehension, and listening to the recorded version of a novel.
4. Watching the movie a second time for better understanding.
5. Making connections beyond the script through guided questions after discussing the novel thoroughly (p. 278).

It reminds that production emerges from comprehension: only after students have absorbed and assimilated linguistic information can they successfully communicate. It inspires to emphasize more intentional and active listening in the EFL classroom, encouraging richer information opportunities that contribute to students' overall communicative ability.

- **Speaking:**

Speaking is another important skill in foreign language learning and, it allows learners to actively use the language for real communication. In EFL contexts, where exposure to English may be limited outside the class, speaking activities provide opportunities for students to talk, interact with others, and develop fluency and confidence. Also, it is important to mention “Speaking in EFL should aim to achieve communicative goals. It requires understanding how the language works, its components and functions; and how and when to speak adequately according to circumstances of real life” (Vaca & Gómez, 2017, p. 60). For these reasons, students who learn a foreign language need to practice and increase the speaking skills to facilitate the learning process.

Also, Vaca & Gómez (2017) mention an important function of speaking as EFL skill:

Interaction skills involve the social norms of when and how to speak with appropriate words, correct grammar, and organized discourse during a conversation, while negotiation of meaning refers to the skills of reaching a full level of clear understanding. It involves repeating, rephrasing, and restructuring

phrases between two or more learners to understand the meaning of the messages they are communicating. (p. 60).

Developing speaking skills learners could communicate effectively, but also can enhance confidence, motivation and active participation in the English learning process.

- **Reading:**

In the article of Barbuzza, S, mentions an important question: Should reading be taught in isolation or associated with other language skills? And it is mentioned that “the interrelationship of skills, especially the reading-writing connection, proves to be advantageous. Thus reading appears as a component of general second language proficiency, but only in the perspective of the whole picture of interactive language teaching” (p. 278). Reading and writing must be connected but the four skills work as an integral learning process to have an effective EFL methodology.

Reading skills have many activities that teachers can use to develop in EFL process to access to vocabulary, grammar structure, and culture knowledge using written texts, such as: using visual cards, story sequencing, repetition with stories, storytelling, etc. Not only with students can read, also with preschoolers that begin with the reading and writing process.

- **Writing:**

Writing relates to reading and all the EFL skills, but writing is an efficient skill that allows students to externalize concepts, consolidate spelling and vocabulary, and consolidate the language structures they see and hear. Writing begins with drawing, scribbling, and tracing in early EFL education—activities that improve the literacy in the future. From neuroscience, writing activates the motor cortex, visual processing centers, and prefrontal regions involved in planning and organization. So, meaningful multisensory writing activities not only strengthen language skills but also improve cognitive and fine motor skills.

As Barbuzza, states “EFL teachers should not forget that native language patterns of thinking and writing can interfere with second language writing. However, EFL teachers’ role is to value students’ native-languagerelated rhetorical traditions and guide them through a process of understanding them rather than rejecting students’ backgrounds. Hence, culture is at play” (p. 280). For this reason, it is important to always remind the native language and create a significative learning to students can synthetize the knowledge and the brain can create many connections to facilitate the process.

2.2.3 Preschool Learning Process in EFL

In several years, people thought early childhood can not learn a foreign language and learned until primary or secondary. Nowadays, Neuroscience Education and many others methodologies changed this syntesis and open the doors to preschoolers can learn another language many times better than others. According to Alexiou, Y. (2020) “The superiority of the child as a learner has been claimed for decades now. Children's brains are argued to be more exible, and researchers support that there is a “window of opportunity” at the early ages. In a similar vein, children are thought to be like “sponges” and able to absorb any language presented to them almost effortlessly” (p. 62). Children brain is magic, all people says children can repeat and remember in a long time ago. It is the advantage teachers use to learn EFL the executive function of memory and language repetition.

The executive functions are key of learning in preschoolers, as Alexiou, Y. (2020). it is mentioned:

Motivation is crucial at this stage as attitudes are shaped, so a teacher also needs a strong pedagogic background. Very young learners are restless by nature, and they lose interest quickly. Trying to teach anything at this is age is primarily a pedagogical task, so teachers of very young learners need to familiarize themselves with all relevant pedagogic principles “in order to find the best ways to ‘talk’ to the children’s minds and ‘touch’ their hearts” (p. 62).

Preschool learning is an intensive cognitive, emotional, and social development, it is the time of vital language acquisition. The children at this stage are spontaneously curious, energetic, and extremely sensitive to new stimuli, which is the perfect time to introduce a foreign language. The EFL learning process in preschool, therefore, must employ play activities, sensory stimulation, and repetition to build basic listening, speaking, and vocabulary skills. By using neuroscience-based-approaches, such as: movement, music, and emotional stimulation. On the other hand, teachers are able to enhance language memory as well as overall cognitive growth. This early exposure to English builds not only linguistic capabilities but also broader skills like attention, memory, and executive function.

According to Ministry of Education (2020), in Costa Rica, English is the most widely taught language in the country's preschool and primary schools. However, there is a significant gap in language coverage between these levels. It shows that, nationally, during the 2011-2020 period, preschool coverage remained below 25.0%, while primary education increased from 85.2% in 2011 to an average of 92.0% since the 2018 school year (p. 12). In the Preschool area, they are not giving the same interest and focus to learning a foreign language.

Although, according to the Ministry of Education (2020): “English is taught in person at all educational levels, from Preschool to Diversified Education, for many years it has been encouraged as an added value for better future study and employment options, and as part of communication in a globalized society”. And, nowadays, they have made many changes, such as: teacher training, and Oxford Test of English (OTE) certifications with C1 level. For this reason, it is important to consider these changes are significant steps to inclusive and competitive education system in Costa Rica and the goal is prepare to childhood for a globalized and multilingual environment.

2.3 ACTIVE TEACHING METHODOLOGIES BASED ON NEUROSCIENCE

In this section, it is mentioned the different active teaching methodologies that teachers can use in their classrooms relating it with Neuroscience Educational Approach and learning English as a Foreign Language. Some mentioned are Project Based Learning, STEAM Education, Game-Based Learning and Thinking strategies (Thinking routines and Metacognition). These are a fundamental tools to increase the learning process in students.

2. 3.1 Project-Based Learning (PBL)

Project-based learning (PBL) engages students to explore real-world problems through collaborative, participation and hands-on projects, and it is the reason why, some institutions apply this methodology. In the website of the institution in study (2020) mentions: “This methodology encourages all work to be done while learners are at the institution, which is why, with proper task and time management, there is no need to take assignments home. We promote the balance that should exist between work periods, recreation, and family rest”. But what is a Project Based Learning (PBL)? According to Goodman (2010) explains “Project Based Learning, or PBL, is an instructional approach built upon learning activities and real tasks that have brought challenges for students to solve. These activities generally reflect the types of learning and work people do in the everyday world outside the classroom”.

In other words, learners get knowledge through themselves and not only content, also, important skills where students will be able to function like adults in their society. As the same author mentions (2010) learners develop different skills to put in practice “These skills include communication and presentation skills, organization and time management skills, research and inquiry skills, self-assessment and reflection skills, group participation and leadership skills, and critical thinking”. The most important aspect is to be able to develop these skills in the classroom, even, students can learn all these skills through projects. Also, students as teachers, teachers as coaches, and parents as community involvement can connect with project based learning approach. First, students can access new and relevant information

not yet discovered by their teacher. Then, teachers teach their students how to question, and how to develop hypotheses and strategies for locating information. They become co-learners as their students take on a variety of learning projects which could be unfamiliar territory. On the other hand, parents, business leaders, scientists, and many other members of the community can play more effective and innovative roles as motivators, role models, sources of information, critics, evaluators, guides, and mentors (Goodman, 2010).

And, these are what the institution in study applies in their classroom from Preschool until Secondary levels. But what is the history of PBL to develop all of these skills in the students?

2. 3.1.1 Historical background of PBL

It's fascinating to see how project-based learning, once the domain of middle and secondary school curricula, is now becoming a preferred method of education in the early stages of a child's education. Learning by doing is of primary importance in early education and projects, particularly collaborative ones, provide innumerable touch points for children to grow and develop a range of skills. According to Nido Early School (2022) "Project-based learning is gaining traction much earlier on in the school system, but it's always been a guiding principle in the Reggio Emilia approach to early childhood education. In Reggio Emilia inspired schools, projects provide the backbone of the learning experiences for both teachers and children – but the projects that this world-leading education approach incorporates into its curriculum are nothing like the conventional projects that would be typically associated with an early education school". Reggio Emilia is a perfect methodology to put in practice projects in early childhood, preschoolers can develop exploration, observation, and communication with scientist theories in problem solving. For these reasons, project-based learning is connected with neuroeducation, because PBL requires critical thinking, problem solving, collaboration, and various forms of communication and with techniques of neuroeducation it is possible to improve the curriculum through projects. Also, PBL emphasizes learning activities that are long-term, interdisciplinary, and student-centered. Los Angeles

School do a great connection with those strategies to teach in the best way. Students enjoy the knowledge without explanations that they do not understand.

2. 3.1.2 Teacher's Role

In a PBL classroom, the teacher is a facilitator, guide, and co-learner to transmits the new knowledge to students. According to Madoyan, L. (2016) refers some important roles that teachers should put in practice when they apply the PBL approach:

1. Teachers must always keep in mind the linguistic skills and the content depending on it will be addressed. The choice of the topic is also of huge importance, it must be up-to-date, motivate the students and keep them interested throughout the project.
2. To develop realistic and authentic problems and materials, and as soon as this task has been fulfilled, the teacher fades into the background while students engage in solving the problem.
3. Help by directing the students to information which will answer their questions, but should not answer the questions by themselves.
4. Designs language-improvement activities to help students successfully present the final outcome of the project. Those activities may focus on skills for successful oral presentations, persuasive debates, editing, and so forth.
5. To monitor the students and the progress of the project, as well as to assess the final outcome. The teacher should not forget to ask the students to provide feedback on the project experience. (p.110).

In conclusion, the teacher's role in the PBL environment is far more than traditional teaching. As facilitators, they are responsible for designing meaningful learning experiences that lead the students to become independent, critical thinkers, and problem solvers of real-world problems. Through the development of realistic contexts and leading the students through each stage of the project, the teacher's model both language learning and the development of cognitive and social skills. Such active engagement is parallel to the neuroscience-based learning foundations, where meaningful learning is underpinned by

emotion, motivation, and active engagement. Therefore, teachers are paramount in providing dynamic, brain-compatible classrooms that facilitate early childhood language learning.

2. 3.1.3 Student' Role:

In a Project-Based Learning (PBL) as a methodology, students take an active and dominating position in the learning process. Rather than being passive recipients of knowledge, students become investigators, cooperators, problem solvers, and decision makers. PBL enables the learner to take ownership of the task at hand, make decisions, and assess the progress. This active participation aligns with constructivist and theory-neuroscience, where children learn most effectively when emotionally involved, inquisitive, and interested in actual experience. In English as a Foreign Language (EFL), children use the language as a tool to find out, wonder, and exchange ideas, which invites both language development and higher-order thinking. Through collaboration and learning by doing, children gain social competence, autonomy, and self-esteem—essential ingredients for early childhood development and brain-compatible learning environments.

2. 3. 3 Steam Education

The term STEAM is an integration of different areas to develop an interdisciplinary approach: Science, Technology, Art, and Math. According to Sánchez (2019) proposes “Among the active methodologies, the most suitable for the development of STEAM competencies are work for projects and those that derive from constructionism, in particular tinkering. The maker movement is closely linked to the development of skills and STEAM competencies”. Also, the development of programs or initiatives that promote and develop technological vocations and, in general, the skills and competencies related to innovation, has become one of the objectives in the educational planning. As the same author mentions (2019) “The STEAM education could be framed within the project-based learning developing skills through tinkering (thinking with your hands or learning by doing) a methodology derived from maker culture”. Many institutions integrate the STEAM Education as an individual class with a specific teacher where learners build, explore, and observe their own knowledge.

2.3.4 Game-Based Learning

In the course EIM Learning (2020) it is explained that in a book that game-based learning is a methodology used in a full game to assimilate contents curriculum and develop the student's skills, through experimentation, simulation of experiences, in an educational and safe environment. In the same course (2020) it is explained that the benefits on the implementation of game-based learning:

- Promotes autonomy and reasoning: the game deals with situations in which the student must: reflect, make decisions, contemplate failures, face defeats, formulate hypothesis, but also is expanding their cognitive abilities by employing critical thinking, by solving problems and examine the environment around you.
- Enhances the development of social skills: individually and collaboratively, reinforcing in the student aspects such as: following rules, cooperating, taking turns, negotiating, actively listening, self- control... Without ignoring aspects of communication such as: expanding vocabulary or improving pronunciation, in addition, of emotional education, bringing to light emotions and values, achieving group cohesion. • Use active and meaningful learning: when learning by doing, the student practices through trial-error, relating new experiences to previous knowledge.
- Guide their training through immediate feedback: from the student, empowering them to be aware of the degree of acquisition of what has been learned, helping him discover which components must improve. On the part of the teacher, it makes it possible to know the weaknesses and strengths as well as the level of understanding of the student, being able to evaluate in a personalized way.

2. 3. 2 Thinking Strategies

Some institutions use different thinking strategies to develop the Education. These strategies encourage all work to be done while learners are at the institution, which is why, with proper task and time management, there is no need to take assignments home. They promote the balance should exist between work periods, recreation, and family rest. In this research mentioned some different thinking strategies that put into practice in their classrooms every day to promote an efficient learning through Neuroeducation skills.

Thinking routines:

This strategy is a powerful tool that teachers could use to support the development of critical thinking, language skills, and meaningful learning in English. as a Foreign Language.

According to Dominicos Education (2023) it is mentioned some benefits that thinking routines can help in the learning process of the students:

- Development of critical thinking: They encourage critical thinking by providing specific structures and questions that guide in-depth reflection on a topic.
- Improved comprehension: organize knowledge and promote a deeper understanding of concepts.
- Support for decision-making: Different perspectives are explored, multiple options are considered, and the implications of each are analyzed.
- Assertive communication: They provide a common framework and shared structure for communication.

Then, according to Harvard (n.d.) there are many examples of thinking routines that teachers can use with their students:

- Think, Puzzle, Explore: This routine activates prior knowledge, generates ideas and curiosity, and prepares students for deeper inquiry.
- See, Think, Wonder: This routine encourages students to make careful observations and thoughtful interpretations

- I used to think... Now I think... This routine helps students to reflect on their thinking about a topic or issue and explore how and why their thinking has changed. It helps consolidate new learning.

Metacognition:

Metacognition in Education as Cambridge Assessment International Education (2019) mentions “Metacognition describes the processes involved when learners plan, monitor, evaluate and make changes to their own learning behaviors”. In fact, there are different benefits to implement metacognition in the classrooms (2019):

- Help learners to plan, monitor and evaluate their own progress and take control of their learning as they read, write, and solve problems in the classroom.
- Practices make a unique contribution to learning over and above the influence of cognitive ability.
- Improve academic achievement across a range of ages, cognitive abilities and learning domains.
- Help students to transfer what they have learned from one context to the next, or from a previous task to a new task. The teacher can support this by explaining how what has been learned from one task can be applied to the next.

On the other hand, Valera (2019) in TRILEMA Foundation tells there are tools to apply thinking strategies to improve the assessment in education:

- a) Kolb Cycle: Learners analyze concrete experience, reflexive observation, abstract conceptualization, and an active experimentation and connect with their knowledge in the learning process.
- b) Compare and Contrast: Learners compare similitudes and contrast differences in the new knowledge to analyze in a more effective way.

2.4 EDUCATIONAL CONTEXT: LOS ANGELES SCHOOL

2.4.1 History And Characteristics Of Los Angeles School, San José

Los Angeles School is an institution with more than 90 years ago in the educational field. It has a large campus designed to build skills and abilities for life, through innovative methodologies. Los Angeles School (2020) sustains: “Educational model by areas allows learners of our three academic units (Preschool, Primary and Secondary) to be protagonists in the construction of knowledge, based on the interdisciplinary guide of teachers” (pr. 2).

2.4.2 Mission, Vision and, Institutional Objectives in LAS

The mission of this institution is “To facilitate critical analysis, an inquiring spirit and a dialogical attitude in the educational community in order to integrate compassionately into a diverse and globalized world, based on the mystique of the Order of Preachers” (Los Angeles School, 2020).

The vision is: “To be a leading Educational Community in the preparation of people who, through knowledge, solidarity, and a conciliatory spirit, transform and humanize the social relations in which they are inserted” (Los Angeles School, 2020).

On the other hand, Los Angeles School is based in different values to accomplish the institutional objectives:

- **Healthy and pleasant environment:** It is the responsibility of all members of the Educational Community to generate a healthy and pleasant work environment that promotes communication, constructive trust, teamwork, and the exchange of ideas.
- **Improvement:** every member of the Community must seek a higher level of improvement, both for personal benefit and for the Institution.
- **Equity and respect:** in the teaching, administrative and pastoral work we must respect and assert the rights of all members of the Educational Community.

- We believe in God who has manifested in Jesus: teachings of solidarity, attitude of listening and respect for people, so these are the guidelines to regulate our Institution and its collaborators.
- Love of truth: they believe in the search, deepening and teaching of the truth, in everything that implies the being and doing of the Institution.
- Responsibility: each one of us is doing what corresponds to us with a criterion of excellence, either in our field of work or where the Institution requires it according to its needs.
- Training: everyone in the Institution must believe in teaching as a process for training people.
- Responsible for the environment: all the members of the Educational Community are co-responsible for caring for the environment, whether natural or physical, as in the case of the school's facilities in its green areas or buildings. (Los Angeles School, 2020).

2. 4. 3 Curricular Organization by Ambits

When institutions teach through ambits teachers map the curriculum together, contribute global vision about the ambit, encourages collaboration, use co-teaching, and avoid tunnel vision. For these reasons, teachers can divide ambits in three:

- a) Expressive (Music, Physical Education, Religion),
- b) Sociolinguistic (English, Spanish, Early Stimulation),
- c) Scientific-Technologic (Math, Science, Technology) to develop all the curriculum in the year.

To elaborate an interdisciplinary curricular model Cervera (2020) in the TRILEMA Foundation, teachers must:

- Determine contents learners need to learn.
- Map curricular contents around them.
- Select topics that require knowledge of different disciplines for understanding.

Perkins, David (2020) mentions “Las escuelas tienen que convertir lo extraño en algo conocido para presentar a los alumnos conocimientos nuevos”. With ambits teachers must change the traditional methods to teach with innovative strategies to put in practice the Neuroeducation and enjoy the process.

Chapter III

Methodological framework

3.1 TYPE OF RESEARCH

3.1.1 Purpose of the study

This research connects educational neuroscience with learning English in a second language that nowadays, it is essential in the new learning process from childhood to adults. As University College London (2011) mentions: The aim of educational neuroscience is to generate basic and applied research that will provide a new transdisciplinary account of learning and teaching, which is capable of informing education. A major goal of educational neuroscience is to bridge the gap between the two fields through a direct dialogue between researchers and educators, avoiding the “middlemen of the brain-based learning industry”. These middlemen have a vested commercial interest in the selling of “neuromyths” and their supposed remedies (prr. 04). On the other hand, early childhood is a crucial period in a child’s development during which their experiences can have a significant influence on the new knowledge examining how brain processes are involved in the early years development and learning for children. For these reasons, the acquisition of language is related to the environment where during the process is given contact with reality creating forms of attention and memory, it should be noted that language has as an essential value the development of language, the connection with educational neuroscience is vital with learning a second language in early ages.

About the type of research, this investigation is applied, because the main goal is to analyze the educational neuroscience in preschoolers who learn English as a second language in Los Angeles School, Sabana Norte. Additionally, with the applied investigation makes recommendations, do a planning with neuroeducation activities to solve problems that happen in these institutions. Learners could learn better when teachers use this methodology.

3.1.2 Temporal dimension

This research is longitudinal because researchers consider the influence of time and the historical changes. Educational Neuroscience has a lot of background that it could help to improve when teachers apply it. When researchers analyze all the changes, they could decide the most appropriate with early childhood, in this case preschoolers. According to Simkus, Julia (2021) mentions “A longitudinal study is a type of observational and correlational study that involves monitoring a population over an extended period of time.” (pr. ‘1). Because of, the investigation mentions different historical changes.

3.1.3 Framework

Micro research is the size and range of this research. This research will work in a small period between February and April, in a private institution in Sabana Norte, San José, Los Angeles School.

3.1.4 Nature

This investigation has all the aspects of a qualitative nature in the research. Because of, allow to understand the complex world of the lived experience from the point of view of the people in the study, such as the group of children from three to four years in Los Angeles School, also the teachers of the level, in the investigation qualitative researchers could observe the qualities, since in this type of research no numbers or statistics are used because everything is based on people, which the fundamental aspect of qualitative research is that the researcher could interact with the participants.

3.1.5 Character

The descriptive character is seen in this investigation. According to a research carried by Gonzalez (2018) “Describe a situation that is taking place, such as the development of Educational Neuroscience activities in preschoolers and thus apply methodological didactic strategies based on neuropedagogy, therefore, achieve a greater stimulus in that area of development so the data will be evaluated or observed according to the investigated theory.” (p. 106). For these reasons, connecting

Neuroeducation with learning English researchers could have a best example of a descriptive investigation.

3.2 SUBJECTS AND SOURCES OF INFORMATION

3.2.1 Subjects

The participants in this research were preschool students in the three to four years old class at Los Angeles School in San José, Costa Rica. Eleven students in the sample participated in English language acquisition activities during the first quarter of the 2025 school year. These children were selected through non-probability convenience sampling, considering their admission to the institution and their availability during the intervention period. All participants were typically developing, with no diagnosed learning disabilities, and all had learned English as a foreign language in the school curriculum.

In addition, the students, teachers and neuroscience specialists also participated indirectly. Classroom feedback and informal interviews with teachers and specialists, who participated in a brief perception survey at the end of the intervention, provided complementary information on the children's learning progress at home. Participation in this study was entirely voluntary, and ethical considerations, such as child protection, parental consent, and confidentiality, were strictly adhered to throughout the research.

3.2.2 Sources of information

This research implemented some primary and secondary sources to provide a comprehensive benefit of implementing a neuroscience-based methodology in the English learning process as a foreign language in preschool childhood.

Primary Sources

- Directed classroom observations
- Photographic and videos of classroom activities

- Surveys applied to teachers and neuroscience educators to gather perceptions about the learning process
- Observation checklist to evaluate the knowledge, the attention, participation, and the use of English in context.

These sources provided authentic and contextualized data regarding students' cognitive, linguistic, and emotional responses to the implemented methodology.

Secondary Sources

The secondary sources in this research are books, academic articles, conference papers, institutional documents, and digital materials that theoretically supported the research. These texts help to understand the theoretical part and offered relevant insights on neuroeducation, early second language acquisition, language development in childhood, executive functions and active methodologies.

3.3 SAMPLING (OBJECTS AND SUBJECTS OF STUDY)

3.3.1 Sample selection

The research subjects who will provide information for the realization of this study are children of Preschool of Los Angeles School. The sources use for the research are the teachers of Preschool specifically the same level of the research at Los Angeles School and an specialist in Educational Neuroscience.

3.3.2 Population

The population of this research is children from three to four years old with middle class families. Even, the institution is a private school but with cheap prices to access.

3.4 TECHNIQUES AND INSTRUMENTS

In this research, it will use a planification of English classes (Annex 1) and interviews for teachers and specialists of Educational Neuroscience (Annex 2). They will be the instruments and techniques to apply the propose of the research. The evaluation is essential for this investigation to analyze the group, performance, and the daily work to use the Neuroeducation method connecting with learn a second foreign language. For this reason, it uses a checklist to evaluate the students in the activities of the planification. And the interviews help future teachers to know the knowledge and thoughts in another perspective.

3.5 VARIABLES

Type of variable	Variable	Description	Instrument
Independent	Neuroscience Educational Methodology	Implementing of neuro-education-based activities (Brain Gym and Little Scientists Workshop: Sensory Exploration) in EFL preschool teaching	Design and application of specific workshops and activities.
Dependent	English Language Learning Process	The effect of the methodology on students' learning of English as a foreign language.	Vocabulary acquisition, participation, attention, comprehension, engagement.

Chapter IV

Analysis of the Results

Current chapter of the analysis of data collected, while applying the Neuroscience Educational Methodology. Learning English as a foreign language includes preschoolers from three to four years old. The analysis was organized according to specific objectives of the study by triangulating qualitative data sources to achieve validity and interpretive richness. Instruments include a performance checklist applied in accord with the weekly plan implementation, along with interviews with preschool teachers. Findings will be presented in correspondence to each objective, showcasing emerging patterns in learning, engagement levels both cognitive and emotional, and regarding the impact perceived in neuro-education strategies for the preschool context.

4.1 ANALYSIS OF THE FIRST SPECIFIC OBJECTIVE

Objective: To apply the Neuroscience Educational Methodology in the learning process of a foreign language (English) in preschoolers from three to four years old at Los Angeles School, San José.

The programmed weekly plan based on the neuroscience educational methodology was created to incorporate multiple brain systems in conjunction with multi-sensory strategies that have been carefully selected. The implementation concentrated on phonological awareness, memory encoding, emotional involvement, and motor integration-all of which are deemed crucial in language acquisition at early childhood. Performance checklist was used to measure results under five domains: naming farm animals (cow, duck, dog, sheep, rooster); identifying animal sounds; recognizing the phonics letter A/a; engaging in multi-sensory learning; and emotional connection to activities.

In order to measure the development progress of preschoolers, the checklist was designed with three levels, each level reflects the degree of skills acquisition, participation, and independence shown by the child.

- Able to: this level indicates that the students consistently demonstrate expected behavior or skill on their own and confidently.
- In process: at this point, the student is acquiring the skill but isn't independent yet. They will probably display partial knowledge or perform the task somewhat irregularly.

- Needs support: this level means that students require frequent or steady adult assistance to attempt or complete the task. The skill is not yet developed.

The analysis of the data checklist showed that most of the students perform at the level of 'Able to' or even 'In process' in all the categories. This implies that the methodology adopted had positive impacts overall. With respect to the identification of the sounds of animals, five of the eight students achieved the highest level of performance. The other domain that showed similarly good results was that of emotional engagement, an engagement critical for both attention and memory consolidation.

For instance, Student 3 and Student 8 exceeded expectations in all four of the five domains, which included phonics recognition and emotional participation. These students have proved that they not only identify content correctly but also participate very actively and enthusiastically during emotionally charged and movement-based tasks.

By contrast, Students 1, 2, and 6 performed equally in "Able to" across all dimensions. Clearly, it is not just high performance that requires differentiated reinforcement in phonics and attention; these students also desire that push to attain those higher levels. None of the students, however, seemed to have a debilitating lack of achievement or minor achievement, indicating that the overall design was accessible and at the right developmental level.

The next table shows the anonymized performance:

Table 1. Checklist Summary – Weekly Plan Implementation

Student	To name farm animals	To identify the farm animal sounds	Recognize letter A, a	Multisensory learning	Emotional engagement
Student 1	Able to	In process	Able to	Able to	Able to
Student 2	Able to	In process	Able to	Able to	Able to
Student 3	In process	In process	Able to	In process	In process

Student 4	Able to	Able to	In process	Able to	Able to
Student 5	Able to	Able to	Able to	In process	In process
Student 6	Able to	Able to	In process	Able to	Able to
Student 7	In process	In process	Able to	In process	Able to
Student 8	In process	In process	In process	Able to	In process

The results of the weekly implementation checklist point to consistently positive performance on the part of the eight students observed, with most landing in the "Able to" or "In process" range on all five areas on the checklist. While this might imply an ease of success, a deeper view reveals that the actual instruction given involved strategies that are multi-sensory and emotionally based, which work on the cognitive and affective systems necessary for early second language acquisition.

When naming farm animals, semantic association and contextual cues heavily influenced what looked very much like a linguistic task. Using visuals, manipulative, and dramatized storytelling, the children were establishing connections between hearing the word, conceptual categories, and their personal experiences. This describes the sensory integration through which the encoding of lexical items occurs, with visual perception of the input site, motor coordination for input manipulation, and auditory perception for word recognition together assuring enhancement of memory.

In the same checklist, with the proficiency, they recognized the sounds of the animals, which provided a pertinent auditory experience in support of the foundational development of phonological awareness. This sound-symbol connection, when intentionally emphasized through imitation games and exaggerated phonetic activities, activates the auditory-motor loop that is fundamental for the emergence of language. The engagement of the loop is particularly relevant in bilingual or second language contexts as it fast-tracks the differentiation of foreign phonemes. It can be inferred from students' reactions that the sound patterns connected to meaning were not only distinguished but also internalized, which means activating the superior temporal and frontal language areas.

The recognition of the letter "A/a" marked the transition from concrete to symbolic learning, where students moved from real-life associations (animal and sound) to abstract representations of

language. Slightly lower yet consistent performance here indicates the cognitive demands of grapheme-phoneme integration. This integration doesn't develop on its own but requires numerous exposures and multi-sensory reinforcement. For example, tracing the letter on textured surfaces, visually linking it to familiar words such as "apple" or "ant," and the use of rhythmic songs deeply reinforced this symbolic link. 'In process-level performance likely means that these learners were stronger in cross-modal processing and could switch from sound to visual-symbolic representation with great ease.

These strong results from multisensory settings reflect the overall effectiveness of the approach on preschool-aged children. Excitingly, the combination of movement with sound, color, tactile input, and social interaction facilitates not just attention but simultaneously lays the groundwork for richer and longer-lasting memory networks. The students did not just perform tasks; rather, they literally experienced language throughout their bodies. Being neurodevelopmentally significant, this type of engagement activates motor, sensory, and emotional systems at the same time, yielding greater retention and internalization. This success in the area signifies that learning was not filtered down separate channels but emerged from an embodied experience.

Emotionally speaking, all the participants were very engaged in the training. In early childhood education, the feeling states and associated conditions are not peripheral: they are placed in the center of learning. Children are likely to process new information if they feel emotionally safe, socially connected, and intrinsically motivated. The structure of the week's activities-puppet storytelling, teamwork, and feedback based on praise-most probably created an emotionally engaging environment that facilitated dopamine production, thus broadening their attention span and deepening memory encoding. A child rated above expectations on this dimension would likely be one who perceived the learning experience not as a task to perform, but as an emotionally safe and very enjoyable thing to do.

Considering all results, this leads us to inference that the weekly plan was indeed pedagogy-driven and, therefore, neuro-cognitively coherent. Children, using strategies that activated different brain structures in unison, were able to learn the vocabulary, auditory associations, and preliminary symbolic representations. The data not only means successful performance. It means also successful conditions for

learning. Multi-sensory input, emotional security, and activity-based interaction should, for the time being, be built upon for future weekly plans, especially as the curriculum will become more abstract and symbolically demanding. Continuing integrated approaches with even more targeted support for those students requiring extra reinforcement of symbol recognition will help ensure it is truly the case for progression.

To provide qualitative information on the strategies applied and obstacles encountered, the teacher who had delivered the weekly plan was interviewed. When reporting on which neuroscience-based strategies were used in the classroom, the teacher remarked, “Active pauses and interesting warm-ups are used to make rhythms and engagement really paramount in grabbing children’s attention and getting them involved emotionally with learning.”

Obstacles included, according to the teacher, “One major obstacle, really, is the families’ influence through the process, because most of the time they do not help the children or keep on complaining about things.” Also, this is very important from the point of view of feedback. While the classroom may have been set for learning, reinforcement at home was minimal. When there is collaboration, or even support, from the family environment, the school will not be able to reinforce what is practiced there. This is dangerous when repetition and continued exposure are required for long-term retention.

In responding to whether the neuroscience-informed methodology could help tackle these challenges, she stated, “Yes and no, because teachers are not supposed to fight against families.” The answer points to the limitation of any classroom intervention when not supported by the entire educational system. A carefully designed methodology may have little long-term effect if not reinforced on the outside.

With the merging of checklist results and teacher's qualitative perspective, the methodology based on neuroscience was evidently well applied and received by the children. The high level of engagement and performance across various domains tells us the strategies were developmentally appropriate and

cognitively stimulating. New vocabulary and phonetic structures were consolidated through movement, repetition, storytelling, rhythm, and emotional expression.

Yet, the teacher's reflections indicate that the potential was hindered by external factors, mainly the role of families. If families do not support the application of these methodologies, neurocognitive gains made in the classroom can scarcely be reinforced or extended.

The implementation thus realized the intent of the first specific objective. The activities designed substantially relied on neuroscience principles and were well received by the preschoolers in terms of learning and emotional involvement. However, the success of these programs in the wider sense depends on their implementation in the classroom and on networking with families, facilitating continuity and reinforcement of what is learned beyond school times.

4.2 ANALYSIS OF THE SECOND SPECIFIC OBJECTIVE

Objective: To describe the importance of Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers.

The integration of practical classroom perspectives and theoretical expert insights is the key to comprehending the benefits of neuroscience in foreign language acquisition in the early years. This section studies the perceptual understanding, perceived importance, and practical application barriers that manifest in applying neuroscience-informed practices in early childhood education as established through evaluating responses from a preschool English teacher and a neuroscience practitioner.

From the teacher's perspective, Neuroscience Educational Methodology is an interesting classroom tool. She says when asked about the experience; she believes the methodology does increase engagement in classrooms and time efficiency. This is clearly an intuitive realization concerning the practical effects of the method on students' motivation and classroom management. Further, the teacher described neuroscience as 'important approach' to enhance teaching and a 'tool for students.' The language, though not elaborative, demonstrates appreciation for the methodology role but not at the level of technical detail in both instruction and learning.

Table 2. Interview Responses – Preschool Teacher

Question	Response (Preschool Teacher)
1. What do you know about Neuroscience Educational Methodology in your experience?	Is such a great topic to develop in class, you can use better the time in class and get more interest of children.
2. How would you describe the role of Neuroscience in early childhood education?	Is an important approach teachers can use and an important tool for students.
3. Do you think Neuroscience could help to acquire a foreign language?	Yes.
4. How does brain development in early childhood influence the ability to acquire a foreign language in preschoolers?	In early ages, the brain can learn more and some organs such as the tongue can be used better to develop sounds; also, the speaking structures can be well structured since this time.
5. What are the cognitive benefits of exposing preschoolers to a foreign language (English) at an early age?	Children can learn even more of different cultures, have an advantage on communicative skills and open their minds to new adventures.
6. What Neuroscience-based strategies do you think you apply in your classroom to facilitate English learning?	Active pauses and interesting warm up activities.
7. What are some challenges in implementing Neuroscience-	Time, content accomplishment, families' influence, school's influence.

**informed project-based learning
to teach a foreign language?**

8. **What are the biggest obstacles in teaching English to preschoolers?** In my case, I think one of the biggest obstacles is the families influence during the process, because most of the times they don't help children or are always complaining about things.

9. **Do you think neuroscience-informed methodology could help overcome these obstacles? Why or why not?** Yes and no, because teachers are not supposed to fight against families.

She added that neuroscience can help by developing a foreign language too early because the brain gets more adaptable and structurally ready to receive a language in those early months of development. She talked about the physiological readiness of the brain and of organs related to speech by emphasizing that, at a very early age, it is possible to train parts such as tongue. Moreover, she explained that early language exposure was stated to promote awareness of culture and communication skills in addition to giving new concepts, which all would accord with the larger cognitive and socio-emotional gains observed through educational neuroscience.

However, the teacher also recognized the significant lack of challenges related to applying the project-based education system on neuroscience. It was limited time, the school curriculum, and the role of families and the environment of the institution. Her phrase "families' influence" and "influence of school" imply external elements because of which innovations or long-lasting pedagogical transformation are not possible. This reflects the reality that teachers would face sometimes, learning about progressive methodologies but not having institutional support or powering resistance from parents who don't understand the approach.

The neuroscience specialist, on the other hand, gave a far deeper and more systematic articulation of the theoretical underpinnings of early language acquisition. He emphasized that brain plasticity is paramount while children are young and that many synaptic connections are created in areas associated with auditory perception, memory and emotional processing. According to him, early exposure to language, especially in an emotionally positive environment, allows children to absorb and retain new linguistic structures almost effortlessly. This serves to reinforce what the teacher understands intuitively while adding neurobiological justification to it.

Table 3. Interview Responses – Neuroscience Specialist

Question	Response (Neuroscience Specialist)
1. Based on your expertise, how does early brain development influence language acquisition?	Brain development during early years is vital for language acquisition due to high neural plasticity. Synaptic connections grow rapidly, and learning is reinforced through emotional and environmental stimuli.
2. What neurological processes are involved when a preschooler learns a foreign language like English?	Multiple regions are involved including auditory processing (temporal lobes), memory (prefrontal cortex), and mirror neurons. Motivation and emotional safety enhance retention.
3. What neuroscience-based strategies do you recommend for teaching English to preschoolers?	Use multisensory strategies like songs with gestures, storytelling with visuals, imitation tasks, and movement-based vocabulary. Emotional connection and curiosity boost learning.

4. What are the key neuroscience principles that should be integrated into teacher training for preschool English instruction?	Teacher training must include principles such as neuroplasticity, emotional learning, developmental timing, and executive functions to align instruction with brain function.
5. How can teacher training emphasize the role of neuroplasticity and repetition in language retention?	Training should show how disguised repetition and emotional relevance enhance retention. Teachers must understand how to structure multisensory, emotionally engaging learning experiences.
6. Do you think teachers must receive neuroscience training to implement its principles? Why?	Yes, teachers need neuroscience training to make informed pedagogical decisions and understand cognitive diversity. This fosters inclusive and effective learning environments.

On the neurological processes, the expert elaborated that the temporal lobes process auditory stimuli while the prefrontal cortex supports working memory and the construction of language patterns. He also described the significant contribution of mirror neurons to imitation, the core of learning in early years, with the modulation of motivation and emotional engagement by the limbic system. Such representations prove that language acquisition is not a unidimensional aptitude but rather results from orchestration across multiple brain systems dynamically responding to stimuli.

The expert extended the recommendation of a range of strategies in preschool language learning, grounded on neuroscience, which almost tally with activities listed in the weekly plan applied earlier in this study: storytelling, songs with gestures, imitation and movement-based activities. He placed emphasis on emotional safety, curiosity and creativity, which agrees with the criticality of affective engagement in learning. The pedagogical implication of an emotionally rich and multisensory classroom environment-an aspect that the teacher informally referred to, but which herein garnered scientific reinforcement-does so

because learning could be enriched by multisensory experiences that include not only the deep, but emotional connection also that comes from story-sparking.

In arguing the significance of teacher training, the expert stated four basic principles of neuroscience: neuroplasticity, emotional learning, appropriate to the development stage, and executive function development. He suggested including these principles into all teacher training programs so that teachers can plan more precisely and react to diverse learning needs. This, however, addresses a notable gap in the discourse of the teacher, as she did not mention any form of incorporation of neuroscience training or principles in her planning. Although she demonstrated engagement and appreciation, the absence of technical vocabulary or explicit references indicates that her implementation is based more on intuitive practice rather than scientific grounding.

Moreover, the expert described how essential repeat practices could be when they are combined with emotional relevance and variety. According to him, repetition should be meaningful, multi-sensory, and involve emotions as key aspects in ensuring long-time memory retention while highlighting that neuroplasticity is not triggered by frequency alone but mostly by quality and newness of experience. Such a call for cloaking repetition with diverse and engaging activities sets up a practical infrastructure for planning that could assist teacher interviewees who express concerns about limitations in content and time.

Lastly, according to both teacher and expert, it is crucial that teacher training be prioritized in neuroscience. The absence of formal training would be implicitly inferred by the teacher's responses, while, in the contrary instance, the expert would say that a teacher should know an understanding of the biological and cognitive bases of learning for proper decision-making and personalized strategies for emotional management. Thus, this duality reinforces that structural training beyond supposition is not only desirable but also necessary for comprehending and applying Neuroscience Educational Methodology.

The objective of this analysis pertains to the finding of concurrence between intuition in the classroom and scientific theory of experts. The preschool teacher purports to have a positive inclination

and reasonable insight into neuroscience-informed applications, but she lacks the technical base to state or maximize the utilization of such practices. On the other hand, the neuroscience specialist provides accurate conceptual guidance and implementation practices to overcome the research-theory gap. These two perspectives illustrate the necessity of continuous professional development for educators, and at best, the necessity of collaborative dialogue with specialists in their respective fields when such innovative pedagogies are relevant in the context of early childhood language education.

4.3 ANALYSIS OF THE THE THIRD SPECIFIC OBJECTIVE

Objective: To evaluate the effectiveness of implementing the Neuroscience Educational Methodology and the learning process of a foreign language (English) in preschoolers from three to four years old.

The assessment of the Neuroscience Educational Methodology's efficacy in the preschool milieu had, largely, to do with a direct classroom intervention with a weekly multisensory plan and a checklist that could be applied to some eight preschoolers aged among three and four. This instrument evaluated five core dimensions of neuroeducation and language learning: vocabulary recognition (farm animals), sound recognition (animal sounds), phonemic awareness (the letter A), engagement through multisensory strategies, and emotional involvement. Each student received a qualitative assessment based on three category assessments: exceeds expectations, good expectations, and needs support.

Table 4. Summary of Student Performance Based on Weekly Checklist

Student	Farm Animals (naming)	Animal Sounds	Letter A Recognition	Multisensory Learning	Emotional Engagement
1	Able to	Able to	Able to	In process	Able to

Student 2	In process	In process	Able to	In process	In process
Student 3	In process	In process	In process	In process	In process
Student 4	Able to	Able to	Able to	Able to	Able to
Student 5	Needs support	Needs support	Needs support	Needs support	Needs support
Student 6	Able to	Able to	Able to	Able to	Able to
Student 7	Able to	Able to	Able to	Able to	Able to
Student 8	Able to	In process	In process	In process	In process

The table above provides a qualitative overview relating to each student's performance throughout the implementation of the Neuroscience Educational Methodology weekly plan. It gives the levels of response of students in major areas such as vocabulary recognition, sound identification, phonological awareness, multi-sensory participation, and emotional engagement. These indicators were selected as they resonated with neuroeducation principles and were identified as relevant for early foreign language acquisition.

The concern behind the subsequent analysis is the interpretation of these results regarding individual patterns of achievements, observations made in the classroom, and teacher perceptions. Consequently, this fulfills the purpose of analyzing the effectiveness of the applied method in general while identifying strengths and potential areas for improvement.

The evidence points towards an overall positive impact. Most of the students met or exceeded expectations in all five areas, with very strong performance noted in the areas of multi-sensory learning and emotional engagement. Students 2, 3, and 8 stood out by consistently exceeding expectations across almost all dimensions, indicating a strong positive response to the neuroscience-informed approach. These students readily and clearly identified animals by name, made animal sounds with confidence, and actively engaged in creative activities such as yoga, stamping, and imitation games. Emotional involvement was also palpable with students smiling, expressing enthusiasm, and giving verbal affirmation for participation in groups.

By contrast, Student 5 struggled with all the indicators and consistently received "Needs Support" on all ratings. This highlights the disparate readiness of different students or other possible barriers: attention span, mismatch in learning styles, or emotional discomfort. This became evident even in the context of differentiated planning: universal strategies are insufficient for keeping all learners equally engaged. This reiterates the principle of neuroeducation, that brain growth and emotional states affect one's ability to learn and retain information, which is pivotal at this very young age.

Behaviorally observed, phonetic recognition was obviously on the mend by the end of the week. During the "Ant Path Game", many students spontaneously associated the /æ/ sound with the visual prompt of the letter A and could articulate either "ant" or "apple" without teacher prompting. Tactile materials, such as letter tracing with shaving cream and singing routines for vocabulary reinforcement, stimulated multisensory memory paths and reinforced letter-sound connections. The farm animal songs and storytelling techniques likewise created an emotional bridge between content and comprehension, with students associating language with movement, rhythm, and narrative immersion.

The interview questions Q3, Q6, and Q8 shed further light on these findings by bringing the teacher's perception into consideration. In reference to Q3, whether neuroscience can support foreign language acquisition, the teacher replied "Yes" and continued to say that early ages provide a critical window for structured learning and intuitive development in the language. Her emphasis was that during early ages, the organs, like the tongue, and cognitive mechanisms, become amenable to quick adaptations

and thus assist sound articulation and sentence formation with maximum efficacy. Even though she did not mention it in such technical language, her response seemed to implicitly correlate with the neuroscience principle of critical periods in language development.

Regarding Q6 about which strategies were applied, the teacher mentioned active pauses and engaging warm-ups, which revealed some awareness of attention and emotional pre-loading. She did not name multi-sensory planning; however, her use of warm-ups aligns with neuroeducation practices that sustain attention and activate emotional centers prior to more cognitively demanding tasks. In Q8, she nuanced her reflection around their value, acknowledging neuroscience-based approaches, but constraining it with barriers from outside-the-classroom environment in the form of families that sometimes do not encourage learning at home or resist pedagogical shifts. This comment hints at one of the concrete barriers to implementing it consistently in the real world, aside from the constant opposition in the life of a classroom teacher.

All in all, the analysis suggests that the maximum extent of influence exercised by the neuroscience-writing methodology was measured in the affective and multi-sensory domains. The kids reacted well to emotional cues, tactile experiences, and dynamic repetition. This storytelling, music, movement, and guided play brought alive engagement and strengthened retention. Teacher observation and tracking show that students were engaged, articulate, and inspired to collaborate in ways unlike any other context.

However, the research also highlighted other limitations. The wide individual variation in response demonstrated, especially in the case of Student 5, indicates that some additional adaptive scaffolding will be required and potentially some other diagnostic instruments to tap into instruction. The other remaining open channel would be the gap through which parental environments would not synchronize with neuroeducation principles, which must thus be bridged at institutional levels through awareness and training programs. Without a supportive atmosphere of learning outside of the classroom, these strategies would be partially impeded.

In summary, the data from this study offers very compelling qualitative evidence that the Neuroscience Educational Methodology stands for improvements in teaching of foreign languages to preschoolers while improving motivation, engagement, and rudimentary phonetic and lexical awareness. While not every learner performed uniformly, it is quite readily observed that the method indeed provided a dynamic yet emotionally engaging space conducive to language growth. Further efforts should delve into more individualized assistance for students as well as shared engagement with families to strengthen the current method's benefits.

Chapter V

Conclusions

5.1 CONCLUSIONS

5.1.1 First Specific Objective

This weekly plan about neuroscience has been found to be very efficient in developing the ones learning English within the preschool brackets. The results on the checklist given to children showed high performance in such key areas like sound recognition and letter identification as well as emotional involvement.

According to the observations, activities incorporated with multisensory experiences like songs, dramatizations, and exercises in touch literally buoy how basic learning is more easily manageable at the level of their developmental state. As shown in their animated disposition during sessions, these students reminded clear to everyone that this neuroeducation perspective creates a more comfortable environment for acquiring a second language.

The data pointed out that neuro-scientific principle-based planning enabled the simultaneous activation of cognitive, motor, and emotional systems which is beneficial, as it favors both sustained attention and later retrieval for complete integration of learning experience.

5.1.2 Second Specific Objective

Interviews confirmed that the methodology is considered by teachers and specialists as a significant tool for implementing neuroeducation. It was recognized within the context of grasping the children's attention, spending time during class more productively, and inducing interest toward subject matter thereby making it all the more satisfying for the teaching of English in this age range.

On the other hand, neuroscientific might also add theoretical backings stating that brain plasticity, emotion activation, and multisensor stimulation were all the necessary elements developing a young child's potential linguistically. Yet such praise has also been marred by glaring hurdles like inadequate penetration of teacher training and lack of family involvement which could sustain the fire of such strategies.

In short, although neuroeducation proofs s benefit, the full application of such concepts requires an interconnectedness of teacher training, institutional accompaniment, and work with families.

5.1.3 Third Specific Objective

Such data showed that the method was mainly effective, especially pertaining to emotional learning and multisensory participation. Most children achieved performance levels rated as "good" or "beyond expectations," which indicates that the activity design fits well with both content and cognitive access.

Individual differences, however, were pronounced where a case of a child who needed additional support fairly reflected that though the approach is very effective, there will be much adaptation to individual differences required. Furthermore, the teacher's impressions like the aforementioned supported the view that such activities could activate the attention, movement, and emotion but pointed out that the absence of reinforcement from the home limited progress beyond the walls of the classroom.

Therefore, it has been found that the methods do work, although their success depends on such conditions as adapting them to the diversity of the student population and creating a community- and family-based environment that enhances what has been learned.

5.2 RECOMMENDATIONS

5.2.1 First Specific Objective

Preschool educators are recommended to regularly include multi-sensory sources in daily lesson plans like action songs, tactile games, dramatization, and phonemic recognition exercises because all people have different areas of the brain to be activated at the same time in preparation for long-term memorization.

The suggestion is made to the institution's direction to create spaces for continued capacitation in neuroeducation to all the teaching staff for the consolidation of the scientific foundation of those strategies that would serve in the classroom.

Finally, it is necessary to involve families through workshops or information capsules on how to reinforce learning done at school, especially in vocabulary, phonetic, and simple multisensory routines.

5.2.2 Second Specific Objective

To the educational authorities, recommendations are made to integrate specific content about neuroeducation in initial teacher training programs regarding the foundations of brain plasticity, emotional development, and multisensory strategies so that future professionals have scientific weapons for their pedagogical applications.

The pedagogical coordination team of the respective educational institution is suggested to generate conversation between the specialists like neuropsychologists or speech therapists and their primary teachers for their input to the extended community in the real-world context application of the neuroscience premises.

Finally, it is proposed to build accessible, tailored materials for parents for the understanding of the impact of such methodologies while actively participating in the instituted strategies within the institution.

5.2.3 Third Specific Objective

It is recommended that teaching teams do a case-by-case exhaustive follow-up on progress made by individual students with qualitative checklists and systematic observation, since it will enable the early detection of supportive needs and allow for relevant strategy adjustment while still holding the neuroeducational perspective.

For pedagogical advisors, it is recommended that they apply reflexive accompaniment processes with teachers in order to reflect and analyze the appropriateness of the strategies used and their real impact for continuous improvement.

Finally, it is proposed that this institutions create links with families via collaborative communication plans to ensure that positive stimuli created in the school are resonant in the home and thus close the learning effective cycle.

Chapter VI

Proposal

6.1 PROPOSAL OF THE RESEARCH

This research seeks to explore how Neuroscience-informed strategies can enhance early foreign acquisition. Early childhood is a critical period for brain development and language learning.

Incorporating Neuroscience into educational practices allows educators to stimulate children brain more effectively though movement, sensory input, and emotional engagement. This study will apply two neuroscience-based workshops:

- a) Brain gym Workshop
- b) Little Scientists Workshop: Sensory Exploration in English

6.2 PLACE WHERE THE PROPOSAL IS DEVELOPED

These workshops will develop in Los Angeles School, located in Sabana Norte, San José, with 3 to 4 years old children. However, any professional can apply it in any institution, and in any age.

6.3 OBJECTIVES OF THE PROPOSAL

6.3.1 General Objective

- a) To analyze the effects of implementing Neuroscience-based educational workshops on the learning of English as a foreign language in preschoolers aged 3 to 4 at Los Angeles School.

6.3.2 Specific Objectives

- a) To evaluate the impact of physical movement (Brain Gym) on vocabulary retention and attention in English language activities.
- b) To examine how sensory-based experiences improve English vocabulary use and oral language production.

6.4 SUGGESTED ACTIVITIES

⇒ **Brain gym Workshop:**

General information:

- Duration: 40 minutes
- Neuroscience approach: Brain breaks, and cross-lateral movements improve focus and some executive functions (attention, keep action, etc.).
- Materials: speaker, cellphone.

First, the objective of the activity is children participate through brain gym exercises like cross, crawl, elephant swings, neck rolls, and lazy 8s with simple English commands from the teacher (e.g., “Touch your head,” “Stretch your arms”, etc.). These are the types of movements that children will have shown to engage both sides of the brain, facilitating attention, coordination, and memory, important for language use.

Then, children will work enthusiastically playing “Simon Says in English,” which they must listen attentively and react to commands such as the following: “Clap your hands”. “Turn around”, “Jump three times”. This served to consolidate the action verbs and body parts new vocabulary. Together with the teacher, the children will repeat each word and use movement to help them pronounce each word.

At the end of class, the students sat in a circle and practiced the new words using physical motion and repetition. The workshop concluded with a relax breathing exercise (“Smell the flower, blow the candle”) and a goodbye song. The session was scored with a rubric including participation, vocabulary, sustained attention length, and overall emotional affect.

⇒ **Little Scientists Workshop: Sensory Exploration in English:**

General information:

- Duration: 40 minutes
- Neuroscience approach: Curiosity activates dopamine pathways, enhancing attention and retention.
- Materials: Safe sensory materials

Beginning the activity, children will identify colors with flashcards, the teacher introduced key vocabulary in English that included “soft,” “hard,” “wet,” “dry,” “cold,” “red,” and “blue.”

Then, children will be in series of multisensory stations, which included materials that they could explore to experience different textures, temperatures, and colors. The materials will include colored rice, cotton, sponges, water, and some small, floating items. At each station, there were guiding questions in English to help the children's participation (e.g., What do you feel?, Is it soft?, Is it big or small?), and sentence frames that built upon a previous session with aspects like "It is cold," or "This is soft."

Children will have a great time pouring, mixing, squeezing, and sorting. These activities were all cognitive in nature, and they also led children to connect word representations to real-world chunks. In addition to providing the children with exploration opportunities, the teacher also modeled conversations in English throughout the workshop, confirming vocabulary and facilitating oral work. Many of the children were making connections between the words and what they were experiencing, which shows a strong integration of sensory and linguistic aspects.

At the end of the workshop, students will sit together in a circle to share where they would use their preferred materials using English phrases and then review our key vocabulary. The session will finish with a short story in English that was made up of the words we learned in the workshop. An evaluative checklist and anecdotal notes documented language use, participation, and engagement.

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ANEXXES

Annex # 1

WEEKLY PLAN

Approach: Neuroscience Based-English Learning emphasizing multisensory learning, emotional engagement and movement.

Age group: Preschoolers (3-4 years old).

Contents:

- a) Farm animals
- b) Phonics: Letter A, a.

MONDAY

<u>Activity</u>	<u>Description</u>
Circle time	Hello song + Animal Sound Game. Teacher will use animal puppets and children guess by animal sound.
Story time	Farm-Themed Storybook named Old Macdonald with animal sounds and gestures.
Phonics	Letter A, a discovery: Children will trace in sand to find the letter A, a using apple and ants objects.
Music and Movements	Children will listen Old Macdonald song using gestures and masks.

TUESDAY

<u>Activity</u>	<u>Description</u>
Phonemic Awareness	“A says /æ/” chant. Children will clap and jump when hearing /æ/ in different words teacher will put.
Vocabulary	Farm Animal Yoga. Children will do yoga with cow, pig, dog poses using English vocabulary.
Craft time	Letter A Art. Children will make a big A using animal stickers.
Story Rhyme	Animal Phonics Rhyme. Children will do whatever teacher says related to animals. Ex: “A is for ant who walks in a line”.

WEDNESDAY

<u>Activity</u>	<u>Description</u>
Dramatic play	Farm pretend play. Children will dress up as an animal and use animal toys to imitate farm animals.
Tactile play	Apple stamping art activity with the phrase “A is for Apple”
Music	Animal Action Song with English instructions and movements.
Circle time	Review Farm Animals with flashcards and the sound.

THURSDAY

<u>Activity</u>	<u>Description</u>
Learning centers	<ol style="list-style-type: none"> 1. Letter A tracing in shaving cream. 2. Farm animal puzzles. 3. Playdough animal shapes.
Phonics game	Ant Path Game. Children will follow letter A to help the ant find the apple.
Story time	Singable Story: “An Ant Went Marching”. Rhythm-based interaction.
Circle wrap-up	Review letter A, sound /æ/ and animal names.

FRIDAY

<u>Activity</u>	<u>Description</u>
Music	Old Macdonald with props. Perform favorite animal.
Art	My A book. Mini book with drawings like A is for ant, apple, etc.
Presentation	Animal Parade. Each child says, “I am a ___”
Home connection	Letter A Bag. Children will collect A words with parents.

CHECKLIST TO EVALUATE THE WEEKLY PLAN ACTIVITIES

Aspect	Able to	In process	Needs support
To name farm animals	Name correctly 5 or more farm animals confidently and clearly.	Name 3-4 farm animals with some prompting.	Name fewer than 3 animals.
To identify sounds of farm animals	Accurately identifies sounds for 5 or more animals independently.	Identify sounds for 3-4 animals with occasional prompts.	Identify sounds fewer than 3 animals.
To recognize phonics letter A, a	Recognize and say the letter A, a sound and name with confidence.	Recognize the letter A and attempts sound with minimal help.	Have difficulty recognizing the letter A, and the sound.
Multisensory learning	Actively participate using movement, sounds, and visual aids to reinforce learning.	Participate with some use of multisensory activities.	Show limited participation or interest in multisensory activities.
Emotional engagement	Demonstrate excitement and positive emotions when interacting with farm animals and letter A, a activities.	Show some enjoyment and interest during activities.	Appear disengaged or uninterested during activities.

Annex # 2**INTERVIEWS:**Teachers:

10. What do you know about Neuroscience Educational Methodology in your experience?
11. How would you describe the role of Neuroscience in early childhood education?
12. How does brain development in early childhood influence the ability to acquire a foreign language in preschoolers?
13. What are the cognitive benefits of exposing preschoolers to a foreign language (English) at an early age?
14. What Neuroscience-based strategies do you think you apply in your classroom to facilitate English learning?
15. What are the biggest obstacles in teaching English to preschoolers?
16. Do you think neuroscience-informed methodology could help overcome these obstacles? Why or why not?
17. What are some challenges in implementing Neuroscience-informed project-based learning to teach a foreign language?

Specialist:

1. Based on your expertise, how does early brain development influence language acquisition?
2. What neurological processes are involved when a preschooler learns a foreign language like English?
3. What neuroscience-based strategies do you recommend for teaching English to preschoolers?
4. In your opinion, what are the key neuroscience principles should be integrated into teacher training for preschool English instruction?

5. How can teacher training emphasize the role of neuroplasticity and repetition in language retention?
6. Do you think, teachers must receive a neuroscience training to put in practice the principles of them? Why?