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The Usage of the Treatment and Education of Autistic and Related Communication-handicapped Children (TEACCH) Method for Teaching English Language

Trabajo de Titulación para optar al título de Licenciada en Pedagogía de los Idiomas Nacionales y Extranjeros

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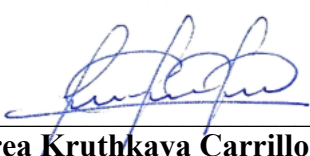Mgs. Daysi Valeria Fierro López

Riobamba, Ecuador. *2025*

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We, the undersigned, professors appointed as members of the Degree Tribunal for the evaluation of the research work **"The Usage of the Treatment and Education of Autistic and Related Communication-handicapped Children (TEACCH) Method for Teaching English Language"**, presented by Andrea Kruthkaya Carrillo Guevara with ID number 0202508024, under the tutorship of Mgs. Daysi Valeria Fierro López. We certify that we recommend the APPROVAL of this for degree purposes. The research work has been previously evaluated, and the tutor has been previously evaluated, and the author has been heard; having no further observations to make.

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DEDICATORY

To the most wonderful and supreme being who envelops my soul. My beloved and respected God, this is thanks to you, my morning sun, my light in the darkness, my path, my everything...

You have helped me, thanks to you I got up when I thought all was lost, always showing me that nothing is impossible for you, that when I have faith and surrender myself into your arms everything turns out for the best, thanks to you I am where I am. I love you...

To my beloved father Marcos, whom I love and admire, thank you for your affection, unconditional support, and for making this dream possible. Your help has enabled me to complete this degree, to write these words, and to continue this path called life. I know it does not end here and that I must continue to make you even prouder, because I want to be as great as you are.

I will be eternally grateful to you for your unwavering love, your messages of love and affection that have been my motivation to keep going day after day. My dear father, I feel only gratitude and pure love. Thank you for this. Thank you because, despite the distance, you have never made me feel alone.

You and I are one, like the day and the sun.

With love and respect, Andrea Carrillo G

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To my tireless engine, my guiding light, my purest love: my beloved mother, Marcia.

Her strength has been with me every step of my life, sustaining me on clear days and lifting me up on gray days. With her smile and her courage, she taught me that true strength comes from the heart and that resilience can also be tender.

Everything I am bears her mark. Every piece of advice, every lesson, and every loving silence have woven together the woman who walks firmly today.

Thank you for your infinite love, which cannot be measured in gifts or words, but in values, humility, respect, honesty, and courage. My Marcita, I love you deeply and admire you eternally.

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My brothers, my nephew, I love you all very much. You mean everything to me. Thank you for being there and accompanying me.

My dear and beloved friends, thank you for your beautiful existence, thank you for not letting me fall, for lifting me up and believing in me. To my friends from college, thank you for being there on my dark days, helping me, and showing me that true camaraderie exists.

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Finally, thank you to myself, for knowing how to fight, for not giving up when everything seemed difficult, for believing in myself, and for proving what I am capable of. Deep down, I always knew this would be possible.

Andrea Carrillo G

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SUMMARY

El presente trabajo de investigación se fundamenta en la aplicación del método TEACCH como estrategia para desarrollar la habilidad de comprensión auditiva en el idioma inglés en estudiantes con trastorno del espectro autista (TEA). Este método permite adaptar el entorno de aprendizaje a las necesidades individuales que posee cada estudiante, promoviendo su participación activa y el desarrollo progresivo de sus capacidades a través de la organización visual, la estructuración del espacio y uso de materiales adaptados.

La investigación se desarrolló bajo un enfoque cuantitativo, empleando una prueba diagnóstica aplicada antes y después de la intervención. Se usó el mismo instrumento en ambas etapas con el fin de asegurar la fiabilidad de los resultados y mantener la validez de los criterios de evaluación. El grupo de estudio estuvo conformado por cinco estudiantes con autismo pertenecientes a la Unidad Educativa Especializada Dr. Luis Benavidez ubicada en la ciudad de Riobamba.

Los resultados evidenciaron un proceso significativo en la comprensión auditiva, pasando de una media inicial de 4.46 (SD= 2.08) a una media final de 7.24 (SD= 1.77), Lo que demuestra le efectividad del método TEACCH en la mejora de esta habilidad. Se concluye que la aplicación continua y sistemática del método favorece al aprendizaje del inglés en niños con TEA, contribuyendo a su desarrollo y a una educación más inclusiva.

Palabras claves: Trastorno del Espectro Autista (TEA), Método TEACCH, Listening Skill, Educación Inclusiva, Lengua Extranjera.

ABSTRACT

This research project is based on the application of the TEACCH method as a strategy for developing listening comprehension skills in English among students with autism spectrum disorder (ASD). This method allows the learning environment to be adapted to the individual needs of each student, promoting their active participation and the progressive development of their abilities through visual organization, spatial structuring, and the use of adapted materials.

The research was conducted using a quantitative approach, employing a diagnostic test administered before and after the intervention. The same instrument was used in both stages to ensure the reliability of the results and maintain the validity of the evaluation criteria. The study group consisted of five students with autism from the Dr. Luis Benavidez Specialized Educational Unit located in the city of Riobamba.

The results showed significant progress in listening comprehension, with an initial average of 4.46 (SD= 2.08) rising to a final average of 7.24 (SD= 1.77), demonstrating the effectiveness of the TEACCH method in improving this skill. It is concluded that the continuous and systematic application of the method promotes English language learning in children with ASD, contributing to their development and a more inclusive education.

Keywords: Autism Spectrum Disorder (ASD), TEACCH Method, Listening Skills, Inclusive Education, Foreign Language.

CHAPTER 1

1. INTRODUCTION

Nowadays, Autism Spectrum Disorder has become more relevant in medical, educational, and social fields, since, according to several studies, it is estimated that approximately 1 in 100 children have autism (WHO, 2024), which reflects the high prevalence of this disorder. Although data may vary from country to country, several international health organizations argue that the number is increasing worldwide. In Ecuador, during 2023-2024, Ministerio de Educación registered 3,778 students with autism: 3,066 in formal educational institutions, 709 in specialized services, and 3 in youth and adult education (MINEDUC, 2024). For that reason, it has prompted several researchers to understand its origin better, needs, and characteristics.

This neurodevelopmental condition mainly affects communication, behavior, and social interactions. Consequently, these challenges may impair the teaching and learning process of students with autism. However, these individuals develop other strengths such as attention to detail, and visual, auditory, and other memory skills. Within the educational field, several students with autism enter different institutions to acquire knowledge and skills and promote personal development. In this context, the teaching process becomes complex for educators when teaching foreign languages to students with autism. For this reason, different pedagogical methods and strategies have been explored for autistic children to learn English.

For the development of this research work, the main objective is to analyze how TEACCH method contributes to the teaching of listening skill in English to students with autism spectrum disorder. Specifically, the study aims to assess the participants' English proficiency levels and identify the challenges they face in listening comprehension through

diagnostics tests. It also seeks to design and implement structure activities based on the TEACCH method, incorporating visual supports and structured teaching techniques, to address these challenges. Finally. The effectiveness of the intervention will be evaluated by analyzing pre- and post-intervention assessments and monitoring the participants' progress in developing their listening skill. This methodology ensures a tailored approach, fostering independence and reducing stress for the students.

1.1. Research Problem

Teaching foreign languages is essential for the cognitive development of students, however, in many cases it can become complex when within the classroom there are students with autism. People with autism spectrum disorder have difficulties in social-emotional, communicative and language processing skills, which interferes in the learning of a foreign language. In addition, the lack of resources, methodologies, materials and specific educational support adapted to their individual needs can limit their progress.

Due to this situation, the TEACCH method offers a structured and communication-based intervention, which allows students to develop their socio-communicative skills such as oral production, active listening and social norms, which are essential in their academic and interpersonal development. Likewise, this method uses audiovisual resources and materials that are adjusted to the needs, age and level of autism of the student. Likewise, the use of this methodology increases motivation, autonomy and above all allows the learning of a foreign language.

1.2. Problem Statement

English is considered the most important language in modern society; therefore, learning this language is necessary for everyone, including students with autism. For this reason, Professor Eric Schopler, in the 1970s, proposed a method that enabled students with

autism to adapt to school educational centers, allowing them to live and work at school, at home, and in society autonomously and efficiently.

In addition to the above, TEACCH (Treatment and Education of Autistic Communication Handicapped Children) is a methodology dedicated to students with autism, designed to adapt to both the level of development and the degree of disorder they have, since it focuses on three important factors: the organization and structuring of the physical environment, the anticipation of autonomous activities and the use of visual resources to promote understanding.

Similarly, the most important feature of this method is that it simplifies the teaching of a foreign language, since it uses didactic resources, for example, audiovisual and manipulative material such as pictograms, flashcards, and videos, allowing to associate words and phrases with images, which facilitates the understanding of the language. Classification games, ideal for teaching vocabulary and grammatical structures, and role-playing based on the individual interests of the students, allow them to practice everyday situations, reinforcing their comprehension and oral expression. Also, the use of ICTs (such as Canva, Kahoot, and other interactive platforms) allows for more dynamic and participatory learning, allowing the student to use the language while interacting with others, whether with teachers or peers.

Despite the benefits of the method outlined above, many teachers are unaware of this method, and their professional training is not aligned with the needs of students with autism, therefore, teaching a foreign language becomes complex and generally many of them are victims of exclusion or harassment by their peers. Equally important, teachers manifest difficulties in the elaboration of curricular adaptations, materials, and didactic resources that allow the learning of students with autism.

The proposal is then to apply it at Unidad Educativa Especializada Dr. Luis Benavidez, located in the canton Riobamba, province of Chimborazo, specifically in students with autism, in the academic period 2025-2026. This educational center, belonging to Zone 3, has an attendance modality, in the morning, with a special education type that provides academic training services from early to high school.

To address the research objectives, a quantitative approach was employed. Based on its characteristics, the study was classified as field research and, further categorized as both an applied study and case study. A pre-test was administered to gather baseline data and identify specific areas in need of targeted intervention, thereby addressing the first objective of diagnosing students' English proficiency levels. Subsequently, a post-test was conducted to measure the effectiveness of the implemented strategy, directly addressing the third objective: to assess the development of students' listening comprehension skills.

1.3. Justification

Currently, teaching English is a priority within the education system, as it broadens academic and professional opportunities. In addition, the communicative approach allows language learners to interact in different contexts, such as real-life or cultural situations, broadening their understanding of the world. Similarly, proficiency in English facilitates the development of key skills. Given this situation, language teachers must not only master pronunciation, grammar, and have a clear understanding of the structure of the language, but also use methodologies that facilitate learning (Hernández, 2025). However, conventional teaching methods do not always meet the needs of all students, and the use of inappropriate teaching methodologies can significantly affect student performance, especially those with autism spectrum disorder, leading to confusion, poor academic performance, demotivation, limitations in their learning and overall development, and even exclusion (Fernández, 2018).

For this reason, it is important to investigate inclusive teaching strategies that respond to the characteristics of these students. Therefore, the following paper presents the TEACCH method, known for its structured and visual approach, as a promising alternative for improving the teaching and learning of this group.

This study is highly relevant in the field of education, as it contributes to the development of inclusive methodologies for teaching English as a foreign language. From a social perspective, it contributes to a more equitable education, as previous research has shown that the TEACCH method is highly valued because it is effective in inclusive education and promotes the active participation of students with autism (Pérez, 2017). On a professional level, it offers practical resources to special education professionals and teachers who face the challenge of teaching neurodivergent students. The latter perceive the method positively and recognize its importance in the classroom, as it creates a personalized educational environment that promotes understanding and autonomy among non-neurotypical students (Angosto, 2024).

This study provides evidence on how the use of the TEACCH method can contribute to the development of listening comprehension in English in children with autism. Data obtained from its application allowed for an evaluation of its effectiveness and the adaptation of different resources to respond to the individual characteristics of the students.

Similarly, this research is considered feasible because there is an identified population of students with different levels of autism, as well as the support of teachers and parents to implement activities based on the method. The originality of this research lies in the application of the TEACCH method in English language teaching, combined with a methodological design based on the positivist paradigm, which allows for the collection of objective and quantifiable data through the application of the same pre-test and post-test. This strategy ensures accurate measurement of listening comprehension in students with ASD. Unlike previous studies, which

focus on theoretical reviews or contexts other than language teaching, the present study adopts applied approach, generating concrete and contextualized evidence. In addition, this methodological proposal seeks not only to generate knowledge, but also to offer practical solutions to real challenges in inclusive classrooms.

1.4. Formulation of the problem

How does the application of the TEACCH Method contribute to the development of English listening skills in students with autism spectrum disorder at Unidad Educativa Especializada "Dr. Luis Benavidez" in Riobamba, Chimborazo province, during the academic period 2025-2026?

1.5 OBJECTIVES

1.5.1 General Objective

To analyze how the TEACCH Method contributes on the development of listening skill in English to students with an autism spectrum disorder at Unidad Educativa Especializada Dr. Luis Benavidez in Riobamba, province of Chimborazo, during the academic period 2025-2026.

1.5.2 Specific Objective

1. To diagnose the level of English proficiency of the study population through a pretest.

2. To apply the TEACCH method for the development of listening skill, considering the findings obtained.

3. To evaluate the effectiveness of the intervention strategy in improving students' listening skill.

CHAPTER II

2. THEORETICAL FRAMEWORK

2.1 Research Background

Firstly, it is necessary to highlight the evolution of the term "disability" throughout history. During the Middle Ages, considered one of the saddest and darkest periods of humanity, people with disabilities were subject to marginalization and persecution, as they were considered abnormal. Years later, after the emergence of the Christian church, these people were considered as a divine punishment sent by God (Gil, 2018).

In this same context, the first case of a child with autism is diagnosed, a non-associated disability that emerged many years ago, but at the beginning of the 20th century two key figures: Leo Kanner and Hans Asperger were the first to document and analyze cases of children who presented characteristics of the autism spectrum, contributing with descriptions and highlighting the particularities of these people (De Goñi, 2015). Thanks to the contributions of these researchers, the foundations were laid for the development of new methods for the education of children with autism.

Afterward, the German psychologist Eric Schopler, carried out several investigations that sought to determine the causes of autism and develop an educational approach, where the results showed that the best way to support children in their development was teaching based on visual structure, and in turn, the collaboration of parents was of vital importance (Alonso, 2020). In this way the teacher implemented a method that allowed the development of skills and the achievement of adaptation of students with ASD, this is how in North Carolina the first TEACCH centers emerged.

Schopler summarized the objective of his educational proposal in this paragraph

TEACCH's long-term goal is that our students with autism, as adults, will fit as well as possible into our society. We will achieve that goal by respecting the differences that autism causes in each student and by working within the framework of their own culture to teach them the skills needed to function in our society.

After this method's initial success, the perception of other professionals and even parents of children with autism changed, and it was no longer considered a "rare disease". Subsequently, TEACCH expanded on a large scale, gaining recognition in several countries and consolidating itself as an approach to teaching various subjects, such as English.

Nowadays, this methodology is becoming increasingly influential. Its effectiveness allows students with autism to develop their social communication and learning skills. Visual systems, such as pictograms, facilitate the student's understanding. Moreover, this method adapts to each student's needs and learning styles. Finally, the focus of this methodology is to organize the study environment of children, since it facilitates learning, and reduces behavioral problems and personal confrontations that may occur due to anxiety or stress (Intriago&Vera, 2022).

2.2 The importance of English language teaching and learning

Currently, English is the most widely spoken language in the world, which has led many educational institutions to integrate it into their curricula. Learning English as a foreign language refers to the study of a language other than one's mother tongue, which is not part of the daily use in the student's life (Mei, 2008). In other words, the student uses the language only in the classroom, which significantly limits English learning and improvement.

Historically, the teacher was seen as the only source of knowledge in the classroom, however, this role has evolved, and currently the teacher acts as a guide that facilitates and

optimizes the language teaching and learning process (Beltrán, 2017). For the teaching of a foreign language such as English, it is essential to have teachers fully trained in methodologies, strategies and resources that promote the effective development of the language teaching and learning process. Likewise, teachers must be able to meet the diverse needs and challenges faced by students, adapting their approach to ensure inclusive and effective learning (Juan & García, 2013).

In this context, the student plays a very important role in the learning process, as he/she assumes an active role and is responsible for his/her own development of English skills. Their constant participation and commitment to the activities that take place both inside and outside the classroom are key to improving their level of proficiency in the language, thus achieving more meaningful and lasting learning.

2.2.2 Listening

Listening is one of the important skills that EFL students should develop, to understand the language in a better way. This skill is fundamental to effective communication and academic success for foreign students' learners, it not only improves their academic performance, but also facilitates the development of other key language skills, such as speaking, writing, and reading (Usanova, Iskandarova, Nodir, & Jurayev 2024). Moreover, listening comprehension involves using the language to interact with others, and requires knowledge of the speaker's vocabulary, grammar and phonetics, which enables one to recognize words and phrases in the language.

In addition, there are other factors that influence the development of this skill, which are described below:

2.2.2.1 Cognitive and Metacognitive Strategies

Metacognitive strategies are conscious actions that students employ when listening to a spoken text, focusing on how to learn. Through them, the earners reflect on their learning process while planning, monitoring and evaluating their understanding, like pre-task activities (Holden, 2004). On the other hand, cognitive strategies are activities that students perform independently to process and acquire linguistic information, such as when they infer the meaning of an unknown word from the text (Hesabi, Jafarpour & Serri, 2012).

2.2.2.2 Krashen's Hypothesis

The Input Hypothesis

The input, according to Krashen, is the language that the learner receives and understands in the learning process. For the input to be effective, it must be comprehensible, i.e., slightly more advanced than their current level, which Krashen calls input +1 (Torres, 2017). Thus, listening is one of the main ways to receive comprehensible input, since by listening to words or phrases that can be partially understood, students will process the language in a natural way.

The Affective Filter Hypothesis

Krashen's affective filter hypothesis explains how the process of second language acquisition is influenced by emotional factors. Similarly, Krashen (1981) describes three important affective factors that impact learning:

Motivation: Motivation is the key to the success of a language learner, if your level of

motivation is high you tend to perform better. Also, this factor positively affects the

relationship with the language you are learning, i.e. it will be easier to integrate into the

culture and be able to communicate with others without fear of making mistakes.

Self-confidence: Good self-esteem and personal security facilitate participation in the acquisition process. Students who show a positive self-image are able to take risks and speak in public, which accelerates their progress.

Anxiety: Anxiety can act as a barrier to the development of second language skills. Conversely, if the learner's environment is relaxed, he or she will not be afraid to make mistakes and his or her stress will be reduced.

In other words, if the affective filter is high, it blocks the learner from processing the language correctly, whereas, if the affective filter is low, the learner feels motivated, confident and secure, it facilitates language acquisition.

In this scenario, students with autism often face challenges in communication, but many possess highly developed auditory skills. By integrating these auditory strengths with visual resources and diminishing these affective factors, we can capture their attention more effectively and facilitate learning. In this context, the development of a receptive skill such as listening is crucial to acquire and strengthen productive skills such as speaking and writing.

2.3 Language Learning Theories
Constructivist Learning Theory

This theory emphasizes that learning is constructed through the daily interaction of individuals with their environment and with other people. According to the constructivist approach, this process depends on the learner's prior knowledge and on the internal and external activities carried out in relation to the new information. That is, learning is not a passive process, but is actively produced through experience, as happens, for example, in the classroom when performing tasks that allow integrating what has just been learned with what is already known (Torres, 2017).

An important impact of Piaget's theory is the coupling of students to different levels of instruction, which means that, during the learning of new knowledge by students, the teacher's job is to seek new and different opportunities for students to explore and expand their knowledge (Piaget, 1983), in other words, educational constructivism requires an integral vision, considering the diverse elements that surround each student. For this reason, professionals seek to establish diverse methods and techniques to apply them in the planning and work within the classroom in order to optimize student learning and attend to their individual needs. Educational constructivism emphasizes that the knowledge acquired should be useful for the personal and professional development of students, both in the present and in the future (Guerra, 2020).

Consequently, constructivism and the TEACCH method share key aspects related to active learning and the adaptation of the environment to individual needs. Constructivism holds that knowledge is not obtained passively but is constructed through experience and interaction with the environment. On the other hand, the TEACCH method designs structured environments that allow students to learn at their own pace, encouraging autonomy in the construction of knowledge.

2.3.1 Vygotsky Sociocultural Approach

Lev Vygotsky, one of the main exponents of constructivism, emphasizes that learning is consolidated through social interaction. Instead of considering learning as individualized, Vygotsky emphasized that communication, cognitive abilities and reasoning arise from a dynamic, participatory and collaborative process. Likewise, in his contributions he highlights the relevance of scaffolding strategies, in which different authors (teachers, parents, peers) provide support to the child for the development of activities and tasks that exceed his or her current performance (Main, 2022).

To talk about the socio constructivist theory, it is vital to highlight the concept of zone of proximal development, which refers to "the distance that exists between the current psychic development of the subject and its potential development, for this reason it is a concept of utmost importance for education at all educational levels" (González, Rodríguez & Hernández, 2011).

In this perspective, the application of the TEACCH method is understood as a way of adapting the educational environment to the learning style of the student with autism, which facilitates the development of skills within his or her Zone of Proximal Development. On the other hand, the support of their parents and peers plays a crucial role in their learning process by providing the social interaction and scaffolding necessary for the child to obtain new skills and, above all, to learn a foreign language.

2.4 Inclusive Education

Education is understood as a fundamental and non-negotiable human right, since it not only enables every human being to develop skills, attitudes and knowledge, but also contributes to his or her integral formation, enabling him or her to participate actively in society. In other words, all people have the right to a decent and inclusive education that respects each of their needs.

Therefore, inclusive education ensures that all students can access, remain in, and progress through the school system, guaranteeing their learning, participation, and completion of studies in different modalities, schedules, and educational levels nationwide. To this end, it seeks to eliminate certain barriers that hinder learning and incorporates pedagogical resources that promote educational equity and quality (Ley Orgánica de Educación Intercultural, 2024).

2.5 Disability in the Ecuadorian Context

Disability is a condition that results from the interaction between one or more physical, sensory, intellectual, or mental impairments of a person and barriers in their environment, which limits their full and effective participation with the rest of the population (Pan American Health Organization, 2024). According to World Report on Disability, around 15% of the population lives with some form of disability. Every day, these individuals face significant difficulties in developing in different areas, such as social, economic, employment, and education, as society itself creates barriers that harm them, causing their isolation and preventing the development of their skills and strengths. Therefore, governments have the capacity to implement various mechanisms to improve the quality of life and well-being of each of these individuals and their families, who are responsible for caring for and looking after their interests (Vayas, 2022).

Within the framework of the Ecuadorian State, the Consejo de Igualdad Nacional para Discapacidades (CONADIS) reports that there are 471,205 registered persons with disabilities, with men accounting for the majority. The provinces with the highest disability rates are Guayas, Pichincha, Manabí, and Azuay. CONADIS also notes that the age range with the highest number of people is 36 to 64 years old, and the lowest number of registrations is in the 0 to 3 age range.

As a result, the Ecuadorian government has implemented various benefits based on the degree of disability, such as vouchers, discounts on basic services, tax reductions or exemptions, discounts on airline tickets and imports of goods, among others.

2.5.1 Special Educational Needs

"Special educational needs arise when a student has some kind of difficulty, compared to the rest of the group, in achieving the results established in the educational process, unlike

the rest of their classmates" (Loor et al., 2023, p. 792). In such situations, it is essential that the various agents surrounding the student, such as teachers, families, guidance teams, and the educational community in general, implement strategies and resources that help to guarantee access to quality education. Addressing this situation is not only a matter of ethics, but also a requirement for building a more just and equitable society.

In Ecuadorian educational centers, there are many neurodivergent students in public and private institutions and/or specialized educational units who require specific attention due to their disability (mental, physical, cognitive, sensory) or a disorder such as ASD. Similarly, educational support or accommodations are required, which may be temporary or permanent depending on the severity of the disability. These will eliminate any barriers that impede learning, accessibility, communication, or others determined by the Ministerio de Educación (MINEDUC 2012).

NEE are divided into two main groups:

Special Educational Needs Associated with Disability

When referring to the specific educational needs associated with various disabilities, this refers to the provision of support services, specialized guidance, and appropriate teaching resources that enable students with disabilities to access, participate in, and progress through the education system on an equal basis. These supports must respond individually to the particularities of each student, promoting their full inclusion.

Ley Orgánica de Educación Intercultural (2024), describes the disabilities that fall within this framework: a) intellectual disability; b) intellectual disability; c) psychosocial disability; d) sensory disability; e) multiple disabilities; f) deaf blindness.

Specific Educational Needs Not Associated with Disability

Specific educational needs not associated with disabilities refer to difficulties that some students experience in their academic development, but which do not stem from a disabling condition.

According to the Ley Orgánica de Educación Intercultural (2024), the following are considered specific educational needs not associated with: a) situations of vulnerability; b) superior intellectual abilities or high intellectual capacity; c) specific learning difficulties such as dyslexia, dyscalculia, dysgraphia, dysortography, attention deficit hyperactivity disorder, and autism spectrum disorder.

2.5.2 Political Issues

Inclusive education in Ecuador gained prominence in 1940 and has come a long way since then, improving and evolving with the support of national and international agreements, as well as initiatives by parents and private organizations with a common goal: to provide educational services to their children with disabilities, regardless of their characteristics and needs (Ainscow, 2020).

Over the years, one of the greatest challenges facing governments at that time was to prevail and provide quality education for all students in the nation. Therefore, in order to achieve this and eliminate barriers such as inequality, it was necessary to establish adequate conditions that would ensure equity and equality for all. For example, in 2006, through a popular referendum, the Ten-Year Education Plan was approved by a majority vote, establishing eight policies with an inclusive approach that guaranteed education for all persons with disabilities (Ministerio de Educación, 2011).

Similarly, in fulfilling its obligations, the government established a response in Article 11, paragraph 2 of the Constitution, promulgated in Montecristi in 2008, which states the

following: all people are equal, as a principle of equality. All shall be equal and shall have the same rights, duties, and opportunities (Asamblea Nacional, 2008).

The current government has taken steps to provide quality care and meet the needs of people with disabilities. To this end, it has established inclusive education as part of its state policies, in line with the Constitution of the Republic of Ecuador.

Below is a detailed list of each of the articles contained in the Constitución de la Republica del Ecuador (2008) which establish the rights of students with associated and non-associated disabilities:

Art. 46.- The state shall adopt, among others, the following measures to ensure the following for children and adolescents:

1. Care for children under six years of age, guaranteeing their nutrition, health,

2. education, and daily care within a framework of comprehensive protection of their rights.

3. Preferential care for the full social integration of those with disabilities. The state shall guarantee their incorporation into the regular education system and into society.

Art. 47.- The State shall guarantee policies for the prevention of disabilities and, in conjunction with society and the family, shall seek to ensure equal opportunities for people with disabilities and their social integration.

7. An education that develops their potential and abilities for integration and participation on equal terms. Their education shall be guaranteed within the regular education system. Regular schools shall incorporate differentiated treatment and special education schools shall incorporate specialized education. Educational establishments

shall comply with accessibility standards for people with disabilities and shall implement a scholarship system that responds to the economic conditions of this group.

8. Specialized education for people with intellectual disabilities and the promotion of their abilities through the creation of specific educational centers and teaching programs.

9. Free psychological care for people with disabilities and their families, particularly in cases of intellectual disability.

10. Adequate access to all goods and services. Architectural barriers will be eliminated.

Furthermore, the state seeks to ensure a full and transparent life for people with disabilities:

Art. 48.- The State shall adopt measures in favor of persons with disabilities to ensure:

1. Social inclusion, through coordinated state and private plans and programs that promote political, social, cultural, educational, and economic participation.

2. Obtaining loans and tax breaks or exemptions that enable them to start and maintain productive activities and obtaining scholarships at all levels of education.

Starting in 2010, several institutions underwent a restructuring process, introducing a new organizational and curricular approach at all levels. In 2011, the National Assembly approved the Organic Law on Intercultural Education, which seeks to transform the educational, social, and cultural lives of students within the framework of society to this day.

2.5.3   Curricular Issues

Curricular adaptations for students with special educational needs must provide support and resources that facilitate their learning progress. "The curriculum will be open and flexible

to improve teaching and ensure that everyone has the same opportunities" (Gómez & Arroyo, 2024, p. 226)

Similarly, teachers must integrate different methods and strategies within the classroom, "in the case of students with specific educational needs associated or not with a disability, strategies for educational attention should be considered with a focus on inclusion within the framework of Universal Design for Learning, reasonable adjustments and curricular adaptations" (MINEDUC, 2024, p. 4). In this context, for students with autism, the curricular adaptation of the TEACCH method will favor their teaching and learning process.

Likewise, it is necessary to take advantage of the pedagogical tools available to students with NEE to promote their learning of a new language.

- **Differentiated assessment**: In the case of students with associated and non-associated disabilities, support is required from teachers, specialists, and even family members. Differentiated assessment respects, supports, and considers the needs that the student has, and adapts to their individual needs by reformulating assessment instruments or modalities to favor their learning (Castillo, 2017).

- **Individual Curricular Adaptations**: Adapts to the individual needs of students, integrating materials, resources, methods, and strategies to the curriculum normally used by the teacher in the classroom (Cornejo, 2022).

2.5.2 Teaching and Learning Method

"A method is a systematic set of teaching practices based on a particular theory of language learning, aimed at achieving linguistic objectives. A method is a general plan for the presentation of linguistic material based on an approach" (Torres, 2017).

In accordance with the above, a teaching method refers to the series of actions, activities or operations carried out by the teacher, which reflect the way in which the educational process is organized in an academic manner. On the other hand, a learning method is also a sequence of activities, tasks and actions performed by the student, which allow him/her to process and integrate relevant or significant information, learn and assimilate the contents taught, resulting changes in his/her knowledge and behavior (Navarro & Samón 2017). In this regard, when analyzing the study population, it was decided to select a method that adapts to the needs and interests of students with autism, called TEACCH Method.

2.6 TEACCH

The Treatment and Education of Autistic and Related Communication - Handicapped Children (TEACCH), proposed by Erick Schopler in the 1970s, was developed at the University of North Carolina and later implemented worldwide. This method provides students with autism spectrum disorder (ASD) with a structured earning environment, which includes the organization and physical adaptations of the classroom, scheduling, work system, structure, and visual information, thereby facilitating learning in any context.

Authors such as Alarcón and Montánchez (2021) state that this methodology is grounded in the implementation of innovative activities designed to support individuals who require them, regardless of their age or educational level, given the consistently positive outcomes achieved through its regular application.

Moreover, TEACCH is regarded as a method that facilitates the development of inclusive policies, promoting an educational process based on values and positive actions between students and teachers, who oversee and guide activities toward achieving set objectives. In addition, it is essential that educational content aligns with established goals, as

this will help enhance the skill and competences of students, enabling them to perform activities independently (Almachi, 2017).

In accordance with Schopler et al. (1995) cited in (Gandara, 2007) the primary objective is to improve each student's adaptation by: a) contributing to the improvement of their skills and b) modifying and structuring the environment to adapt autistic characteristics. In other words, the overall goal of TEACCH is to adapt to the diverse characteristics and abilities of each child with autism.

2.6.1 TEACCH Teaching Method

TEACCH is primarily based on the principles of applied behavioral analysis. This method suggests breaking down learning tasks into manageable steps, which must be taught using aids or prompts, and the desired behaviors must be progressively shaped using reinforcers (Lal & Shanane, 2011).

Figure 1.

Instructional Stages
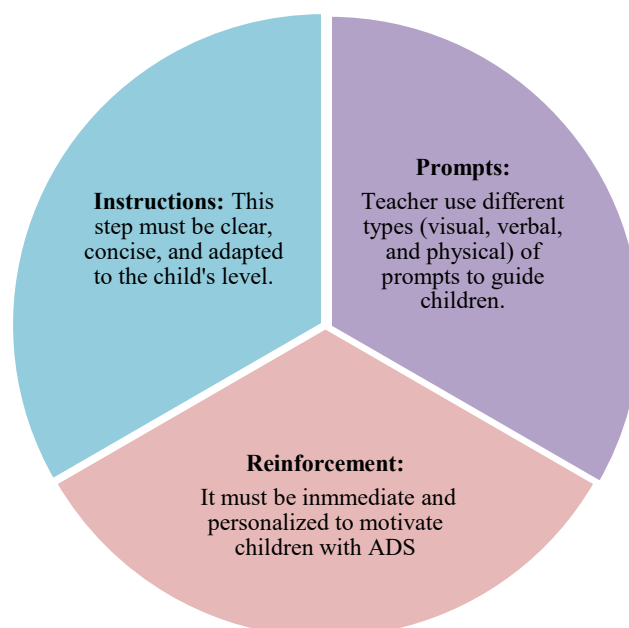
Note: Representation of three instructional stages to support students and facilitate learning and autonomy in the classroom. Source: created by the author.

2.6.2 Characteristics of the TEACCH Method

According to the European Graduate Institute (2022), the main characteristics of this method are detailed below:

- It presents exercises that are simple to perform.

- They present very clear and concrete instructions, avoiding abstract concepts.

- They are self-conclusive activities; that is, they have an end.

- Only indispensable help is provided.

- Visual materials such as pictograms are used.

In addition, Mesibov (2007) mentions some objectives regarding the use of this method:

1. to develop special ways in which children with ASD can live better

2. To enhance the motivation and learning capabilities of children with ASD to learn and explore.

3. To improve the development of their intellectual abilities, in collaboration with teachers, and parents.

4. To overcome difficulties in the areas of fine and gross motor skills through exercises and activities, as well as improving the process of school adaptation.

5. To reduce the stress on parents of children with ASD.

2.6.3 TEACCH principles

Lal & Shanane (2011) provided several principles about the TEACCH method, described below:

Strengths and Interests:

All children have interests and preferences, and students with autism are no exception. For example, a child's affinity for certain colors, routines, or materials can highlight relevant

information and be used as teaching resources to engage the child and help them complete their activities.

Ongoing Assessment:

All students with autism, from those with severe intellectual disabilities and challenging behaviors to those who can function satisfactorily in school, have various gaps in their skills and potential for improvement. TEACCH is based on observing how children interact with different items, materials, instructions, and levels of structure, prioritizing key areas such as communication, self-care, and recreational skills (TEACCH Autism Program, 2011).

Assistance in Understanding

Students with autism often have trouble understanding the meaning of their experiences, which leads to challenging behaviors. Even high-functioning students have difficulties. Therefore, teachers, with the help of TEACCH, must provide clear support that facilitates understanding and reduces confusion in various situations.

Parent Collaboration

It is well known that family, and especially parents, play a very important role in every child's life, and even more so in educational planning. The method is sensitive to the family environment. Therefore, it includes open dialogue with parents, who know their children and provide information about their interests and specific ways of dressing, eating, or spending their free time. This undoubtedly helps teachers to have detailed information and helps children to function effectively.

Individualization

Within the TEACCH methodology, understanding the individual differences of students with ASD is important, as children vary significantly in their abilities. Similarly, some

have difficulty working in groups, yet may demonstrate specific strengths, such as visual or artistic abilities, that do not correspond to their cognitive or functional level. Therefore, teachers must get to know each student well and adapt their teaching to their needs.

2.6.4 Environment Adaptation

Within the classroom, the physical layout of the room is of vital importance, as it not only ensures the comfort of students, but also optimal learning. In this context, the space must be designed in accordance with the characteristics of the TEACCH method, as well as the individual needs of students with ASD. Montero (2021) mentions that adapting the classroom according to this method allows people with autism to acquire new skills, improve their self-control and independence, and, above all, improve their education.

2.6.5 Structured Teaching

In order to adequately respond to the educational needs of students with autism, it is essential not only to understand their condition, but also to know how to structure the environment in which teaching will take place. For example, the main characteristics considered in the TEACCH method are visual processing, memory, and each person's individual interests. Another factor is the structuring of the physical environment, where activities, routines, tasks, and schedules must be organized and detailed in order to be effective (Sánchez, 2022).

As Gándara (2007) states, "Structured Teaching can contribute to the intervention by adapting the environment in a way that reduces distracting factors and facilitating visual cues and reminders that, among other functions, solve memory problems" (p.5). This is how you can avoid distractions and difficulties and remember information in the long term without any problems, as shown in Fig 1.

Figure 2.

Structure teaching components
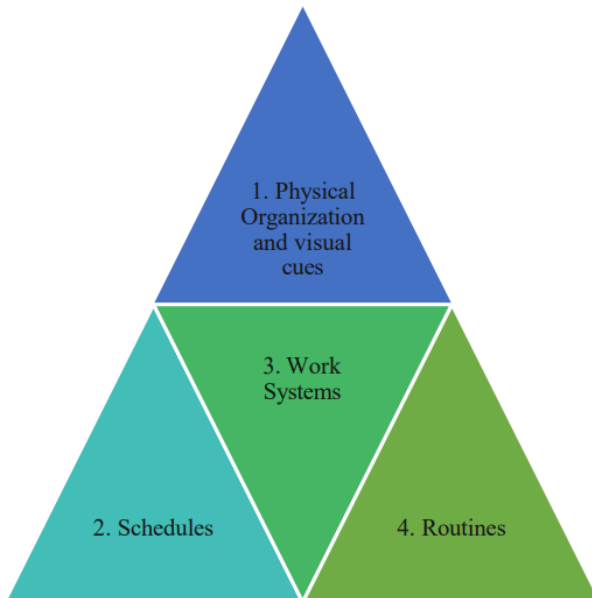
Note: Representation of the four components in which the structured teaching is constructed. Taken from *Método TEACCH para el desarrollo de la producción oral del idioma inglés* (p. 17), by K. Sánchez, 2022, Universidad Central del Ecuador.

2.6.6 Elements of Structured Teaching

Structured teaching has been one of the main components of the method since its inception. The elements that comprise structured teaching include several factors, which are briefly described below:

Visual Structure

The classroom should be visually structured to facilitate student comprehension, as students should be prepared and know what will happen before, during, and after class. Sánchez (2022) emphasizes three essential components: a) visual clarity, b) visual organization, c) visual instructions. Similarly, visual structure facilitates the information perceived by the child; tasks can be organized to avoid sensory overload that affects the task process.

Physical Organization

Within a TEACCH classroom, structure is a fundamental element of the method, as it must be reflected both in the physical organization (conceived as a system of working in "corners") and in the temporal organization, work systems, and task organization. These aspects configure specific spaces into which the classroom is divided in order to carry out specific activities adapted to the students' abilities.

Gómez et al, 2020 emphasizes that the physical layout and spatial organization of the classroom allow for the creation of a pleasant, accessible, and clear environment. The space plays a utopian role, as it helps students adapt to the environment, understand, and act with greater autonomy. It also helps reduce distractions and promotes more focused work. In the case of autistic students, it is essential to have structured classrooms with different areas, ideal material that guides students in completing their tasks.

The TEACCH classroom can be divided as follows:

- **Individual work area:** Here, students receive personalized attention that allows them to relax.
- **Independent work area:** The student carries out their activities independently.
- **Cooperative work area:** In this space, students with ASD will be able to work together (with neurotypical children or neurodivergent children).
- **Play area:** For all children, a moment of relaxation and rest after their activities is very important. Here they can play and have fun.

Schedule

Schedules are an important and beneficial aspect of the TEACCH classroom, as visual cues allow children to anticipate what will happen during the day and what activities will take place. Similarly, schedules help children understand how words relate to events.

Schedules improve sequential memory, language, and attention problems, and facilitate the transition between activities, which is often difficult for autistic children. Schedules can motivate students to successfully complete their tasks, as one of their main features is to help them achieve their goals.

Figure 3.

Schedules

Note: The image shows the calendar created for the English class in the TEACCH classroom. Source: created by the author.

Work System

Like schedules, work systems are tailored to the individual needs of the student and can be represented graphically and in writing. These systems help organize and complete tasks, and also allow students to organize themselves, concentrate, and maintain their attention to complete activities.

This strategy is recognized because it responds to the learning styles of people with ASD. Unlike schedules, work systems tell students what to do when class or an activity begins. According to Lal and Shanane (2011), there are four work systems: the system to be performed, the amount of work to be done, the indication of task completion, and what happens after completing a given task.

Figure 4.

Work Systems

Note: Class rules, instructions on what the child should do, and work system. Source: created by the author.

2.6.7 Process of applying the TEACCH Method in the classroom.

The following is a description of the process of applying the TEACCH method in the classroom, which is explained as follows according to Merino (2022):

o   **Phase 1. Initial Assessment:**

Before implementing the TEACCH method, an initial assessment is essential to understand the individual student's needs, strengths, interests, and behaviors. In addition, training of teachers and parents is crucial to ensure that all stakeholders are familiar with the principles and techniques of the TEACCH method.

o   **Phase 2. Planification:**

In this second phase, the researcher should have a previous approach with the students, then organize the study space, using specific areas to carry out the different activities. In addition, create and use audiovisual materials to organize the students' activities and routines, for example, AAC (Argumentative and Alternative system of Communication) picograms will be useful for preparing the different activities into the classroom.

o **Phase 3. Implementation of the TEACCH Method:**

The last step is to put the method into practice, so the design of activities and tasks must be clear and structured. The elaboration of a visual calendar will help the students to have a sequential structure of the work and a spatial-temporal organization of the work to be done during the day, this will facilitate the anticipation of activities, reducing the stress of the children.

2.7 Autistic Spectrum Disorder

Psychologists Leo Kanner and Hans Asperger were the main authors who began to develop the first observations on this disorder. Autism is defined as a disorder that "is dedicated to attacking the general progress of the child, contemplating social relations, without neglecting the fact that there is a deterioration of language, no eye contact, and facial expressions are not by the time or place" (Cornejo, 2022).

Symptoms are usually evident during the first three years of life, and their causes are currently unknown; however, some authors suggest that they are due to genetic or environmental problems. According to the aforementioned information, George (2009) states:

ASD is a condition that affects the proper functioning of the brain, interfering with daily tasks and development in various areas. As it is a condition that affects various aspects of their lives, these individuals have developed other alternative abilities to complement their balance (p.8).

To better understand the fundamentals of autism spectrum disorder, it is essential to address its definition, etiology, and diagnostic criteria. In the field of psychology, the term "disorder" is understood as an alteration that affects certain behaviors or physiological functions in the individual (Ander-Egg, 2006). The word 'autism' comes from the Greek auto, which means "related to oneself," accompanied by the suffix -ism, which denotes "pathological

process" (Bonilla & Chaskel, 2021). For many years it was considered a disease, but today it is described as a "spectrum" of characteristics that, when combined with social factors, can produce different levels of difficulty and abilities. Therefore, some of the main implications of the disorder are explained below:

Figure 5.

Main implications of the disorder

Comunication: Is characterized by difficulties in understanding and using communication, which limits interaction.

Socialization Interaction: Inappropiate interaction with others, accompanied by difficulties in coopering, establishing, and maintaining relationships

Limited interests and repetitive behavors: Difficulties in changing activities, routines, particular interests, and lack mental flexibility.

Sensory perceptions: Increaded sensitivity to auditory, visual, and tactile stimuli.

Planning skills: Difficulties organizing, sequencing, and managing time.

Attention: Reduced aability to maintain concentration and high distractibility.

Note: The figure illustrates the main implications of the disorder. Source: created by the author.

2.7.1 Degrees of impairment

The DSM-5 classifies the severity of ASD into three levels which affect the child's behavior, interpersonal relationships, and communication, grade 1 (requires assistance), grade 2 (requires significant assistance) and grade 3 (requires very significant assistance), also indicating the presence of intellectual deficits, language disorders or association with known medical, genetic or environmental conditions (Garcia et al., 2022).

Table 1.

Autism Spectrum Disorder Degrees of Affection

Degree of affection	Social communication	Restricted and repetitive behavior
Grade 3: requires very significant assistance	Severe impairments in verbal and nonverbal social communication lead to significant functional limitations, with minimal initiation of social interactions and very limited responsiveness to other social engagements	Behavioral rigidity and extreme difficulty adapting to change, along with other restricted or repetitive behavior
Grade 2: requires significant assistance	Marked deficits in verbal and nonverbal social communication skills, with obvious social difficulties even when support is provided.	Inflexible behaviors, difficulty adjusting to changes, and other repetitive or restricted actions.
Grade 1: requires assistance	Without support, social communication difficulties cause major disruptions, with challenges in initiating	Behavioral inflexibility can substantially impact daily functioning, as challenges in organization and planning

	interactions and responding appropriately to others.	reduce an individual's independence.

Note. The table presents the three levels of severity in individuals with ASD, along with the type and extent of support required at each level.

2.7.2 Diagnostic of Autism Spectrum Disorder

Autism spectrum disorder is a neurodevelopmental condition that requires timely and early diagnosis, since identifying it in the early stages of childhood enables the implementation of appropriate treatment, which has a positive impact on a child's neurological development and quality of life. However, diagnosis can be complex due to how the disorder manifests itself, how symptoms are expressed, and the diverse characteristics of the disorder (Cárdenas et al., 2021).

In order to make a diagnosis and subsequently provide treatment, it is necessary to begin with a process that involves sharing the child's daily life with their parents and/or caregivers. Next, the necessary evaluations are requested from the interdisciplinary team (psychologists, therapists). The diagnostic criteria are found in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, which are organized into two main groups: deficits in communication and social interaction and repetitive behavior patterns. Similarly, it establishes three levels of severity (mentioned above) (Cárdenas et al., 2021).

Finally, children with ASD may have comorbidities or associated conditions, which can manifest at different stages of their lives and affect various areas of the body.

2.7.3 Comorbidities of ASD

It is common for people with autism to have other comorbidities, which may be neurological or transneurological and require immediate attention, as they can negatively affect

the child's health. The caregiver's job is to pay attention to the first symptoms and take the child to a professional, who, after conducting tests and identifying the causes, will begin treatment or refer the child to an appropriate specialist (Garcia et al., 2022). The most frequent comorbidities of ADS are:

- Epilepsy

- Digestive system

- Ophthalmology

- Dermatology

- Dental

- Orthopedics

- Neuropsychiatric disorders

The latter is the most common comorbidity, as it encompasses OCD, tics, anxiety, and depression as well, "previous studies indicate that people with ASD may also have other disorders or disorders such as the presence of attention deficit disorder (ADHD), since they are related to each other" (Cornejo, 2022).

2.7.4 Teaching English to autistic students

Learning a foreign language is challenging even for neurotypical students, and even more so for those with autism. However, Fernández (2018) points out that the quality of education provided to students with autism depends largely on the professional training of the teacher, who must respond appropriately to the student's needs. Therefore, teachers must maintain a structured and safe environment that promotes relaxation, attention, and effective acquisition of the new language. In this way, learning a foreign language contributes to the development of the communication skills of students with ASD and allows them to explore the

particularities of both their native language and the foreign language, just like their neurotypical peers.

On the other hand, students with autism have developed other unique and important skills and characteristics that vary according to the individual. For example, many of them have excellent memory and tend to accumulate information, especially on specific interests, being perfectionists, they tend to be tenacious about their own goals, and they are also very creative, auditory and visual learners, showing a great ability to process information presented in images and videos. They excel in areas such as science, art, mathematics, and technology. The last emphasizes the use of devices and visual material that teachers can use in the classroom to achieve an understanding of the topics taught (Moller, 2024).

According to the above, it is vital to adapt the place and anticipate subjects and schedules so as not to interrupt and affect the daily routine of the autistic student, as well as the use of visual and dynamic material that calls and attracts the child's attention. The following are activities that the teacher can implement in the classroom to teach a foreign language, adapted to the TEACCH method and aligned with the characteristics:

- Elaborate schedules with pictograms, since it will help the student to plan his activities.

- Imitation games, as they are entertaining for these students (gestures and mimics).

- Worksheets with lots of pictures, to learn vocabulary. • Realia, using items we have in class.

- Soft and fun music on a specific topic • Interactive and problem-solving games to generate autonomy.

- Use of applications

- Motivate students with autism to participate in class

CHAPTER III

3. METHODOLOGY

3.1 Approach

This research adopted a quantitative approach, focusing on the measurement of numerical data, for which the researcher must use statistical tools that allow the collection of information that can be measured and counted. It provides data on the magnitude or intensity of the phenomenon under study and can demonstrate hypotheses and deduce knowledge (Hecker, 2024).

The design of this research has a quantitative approach, as this made it possible to evaluate the effectiveness of the TEACCH method in developing the English listening comprehension skills of students with autism. To this end, pretest and posttest techniques were used to assess the level of listening comprehension before and after implementing the method.

The data collected through these techniques were analyzed using statistical analysis, which made it possible to determine the results of the pre- and post-tests, with the aim of verifying the effectiveness of the intervention used.

3.2 Research Modality

Field research was the most suitable modality for this study. As Escárcega (2023) points out, it is an investigation of observation and direct data collection in the place where the study phenomenon occurs. Thanks to the benefits offered by this modality, it was possible to obtain data from primary sources and detailed information on the phenomena being studied, aligning with the quantitative approach employed in the research.

3.3 Type of Research

This study fits the characteristics of applied research, "in this type of research, the emphasis of the study is on solving practical problems, focusing specifically on how general theories can be put into practice. The research focuses on problem solving" (Rodríguez, 2020). Therefore, the applied research approach helped identify effective strategies for teaching English to students with autism using the TEACCH method.

3.4 Research Design

The case study is considered an ideal research tool for the development of this work, since it is a procedure that analyzes in detail a phenomenon or group of people, "case studies have been used as a resource to teach new teachers how students evolve when a teaching system or a specific study technique is applied" (Walker, 2002).

3.5 Study Population

For the development of this research, the population consisted of five students diagnosed with autism spectrum disorder, belonging to at Unidad Educativa Especializada Dr. Luis Benavidez" in the city of Riobamba, province of Chimborazo. The participants were aged between 7 and 8 years old, and all had a confirmed diagnosis of ASD. Despite varying degrees of autism and level of functionality between the students, the study focused on strengthening knowledge that could benefit a wide range of students with this disorder. Detailed information was provided to parents about the objectives of the evaluation and the method used, and, with the collaboration of the school principal, the validity of the documents used in the study was verified.

3.6 Sample

Due to the accessible size of the study population, there was no need to conduct a sampling process. Instead, the entire group of five students diagnosed with autism at the institutions was included, allowing for a comprehensive analysis.

3.7 Techniques and Instruments

Selecting appropriate techniques and instruments for data collection was crucial for the success of the research. The researcher defined the methods and chose the instruments according to each specific objective.

To achieve the research objectives, a pre-test was applied to assess the participant's English listening comprehension and identify using the TEACCH method with various resources and materials designed to support learning. Moreover, the effectiveness of the intervention was by analyzing the data obtained in both tests, with the support of R software.

3.7.2 Pre-test

In accordance with TEACCH guidelines, the researcher designed a preliminary test adapted to assess listening skills in English. This instrument included content aligned with level A1 English proficiency, which made it possible to diagnose the level of listening comprehension in English of students with autism. "These evaluations provide an overview of the students' current level of English listening comprehension or the participating populations, in such a way that areas for improvement and challenges are identified" (Ramírez, 2020).

In developing this test, it was essential to consider key aspects for adaptation, such as the use of simple and clear language, as well as the inclusion of short audio clips with familiar and engaging topics for the students, in which they could select the correct answer through a multiple-choice test. In addition, following the principles of the TEACCH method, visual aids such as pictograms and flashcards were implemented to reinforce the listening activities.

3.7.2 Post-test

The post-test maintained the same format as pre-test and focused on evaluating the student's progress after the intervention. The use of the same instrument allowed for the collection of objective and quantifiable data, consistent with the positivist paradigm. This paradigm, "also known as the quantitative, empirical-analytical, or rationalist paradigm, its main objective is to explain, predict, and control phenomena by verifying theories and laws" (Herrera, 2024). This methodological consistency ensured the reliability and validity of the results.

The collected data were analyzed using R software, a statistical tool for statistical and graphical analysis. Likewise, this allowed for nonparametric tests to be performed that were appropriate for small samples and data that did not meet the assumptions the normality. Finally, R facilitated the generation of tables, graphs, and measures of central tendency that supported the interpretation of the results.

CHAPTER IV

4. RESULTS AND DISCUSSION

4.1 Results

Baseline Diagnosis of English Listening Skills Using the TEACCH-Based Pretest

To answer the research question: How does the application of the TEACCH Method contribute to the development of English listening skills in students with autism spectrum disorder at Unidad Educativa Especializada "Dr. Luis Benavidez" in Riobamba, Chimborazo province, during the academic period 2025-2026? Firstly, it should be noted that the process began with the application of an adapted diagnostic test, developed by the research, who proceeded to adjust the content, questions, and visual resources according to the level, abilities, and characteristics of children with autism, in accordance with principles of the TEACCH method. This assessment allowed a reliable baseline to be established prior to the implementation of the activities designed under this approach. The results obtained are presented in Table 2.

The data in Table 2 show that students started with a low level of listening comprehension in English, with a mean of 4.46 and high dispersion (SD = 2.08), thus evidencing the need for intervention and adaptation of activities with a method that addresses the students' specific needs. After the TEACCH method intervention, the mean improved to 7.24 and dispersion decreased (SD = 1.77). This reflects that the methodological intervention helped improve the listening comprehension level of the student group.

Table 2.

Descriptive statistics of scores before and after the intervention with the TEACCH method

	Min	Max	Mean	Median	Standard Deviation
Pretest	3.30	8.10	4.46	3.30	2.08
Postest	5.20	9.50	7.24	6.70	1.77

Note. N = 5. Scores correspond to the validated A1 listening assessment instrument (0 to 9 correct items).

After confirming this stable level of dispersion, the next step involved determining whether the difference in overall performance was statistically significant. For this purpose, the non-parametric Wilcoxon signed-rank test was applied in its Right One-tailed form for paired samples, with the objective of verifying whether post-intervention scores were significantly higher than pre-intervention scores. The result is presented in Table 3:

Table 3.

Results of the Wilcoxon signed-rank test

	V Statistic	p-Value	Median Difference
Postest and Pretest	15	0.03125	2.9

Note. Right One-tailed test with $\alpha = 0.05$.

For better understanding, a graphical analysis provided below: The boxplot in Figure 6 showed that in the pretest, students were located in the lower part of the scale, with only one student reaching 8.10 points. This reinforces the fact that before the intervention, the group of students presented limitations in English listening comprehension, thus justifying the implementation of a pedagogical method adapted to their needs, in this specific case, the TEACCH method.

Figure 6.

Box Plots of posttest and pretest
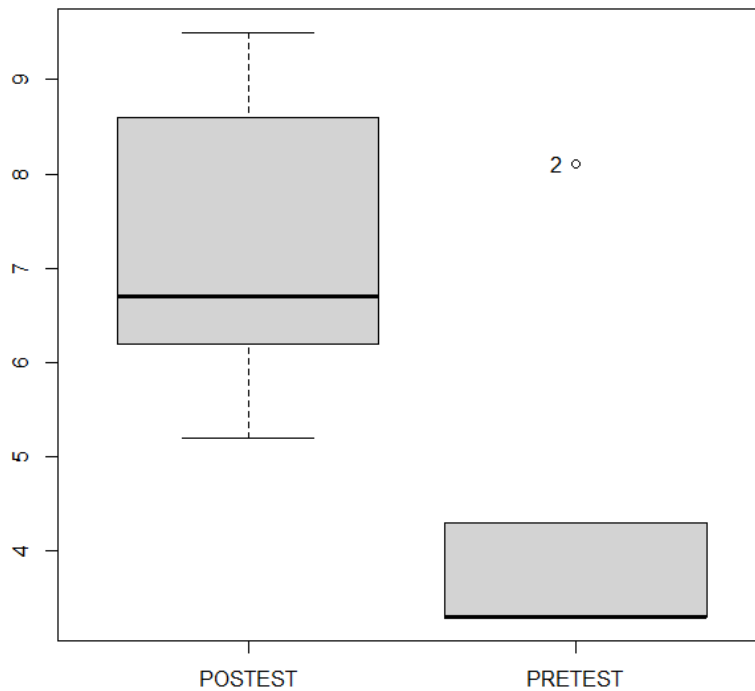
Note. N = 5. The outlier in the pretest corresponds to the score (8.1) of student ID = 2.

As shown in figure 6, each box represents the descriptive statistics if the two measurements applied, i.e., the values obtained in the pretest and posttest (see table 2). The thick horizontal lines within both boxes indicate the media obtained in each of the tests, allowing the central tendency of the data to be visualized.

In the case of the pretest, the lower quartile reflects the minimum score recorded, corresponding to 3.3, while the number 2 above the box refers to the students identified as (2°), considered an outlier, who obtained the highest score on the diagnostic test. In the second box, corresponding to the posttest, the vertical lines above and below the boxes, called "whiskers", represent the dispersion of the data. In this sense, the lower line shows the minimum score obtained (5.2), while the upper line shows the maximum score achieved after the intervention

(9.5). These results reflect a significant improvement in overall performance, showing a positive shift in scores toward higher values after the application of the TEACCH method

**Applying the TEACCH Method: Evidence of progress in listening skill development**

After the diagnostic stage, the TEACCH method was applied for approximately one month. The posttest evidenced a general increase in students' listening comprehension performance. The mean rose to 7.24 points and the median to 6.7, reflecting consistent improvement across all students.

When comparing the pretest and posttest boxplots in Figure 6, a general upward shift is evident, reinforcing the idea of improvement in the study population. Likewise, the analysis of the spaghetti plot in Figure 7 allowed to determine the individual improvement of each student. Each line has a positive slope, confirming that every student improved during the posttest stage.

These findings reinforce the effectiveness of the TEACCH method in strengthening English listening comprehension in students with ASD.

Figure 7.

Spaghetti plot of the pretest and posttest
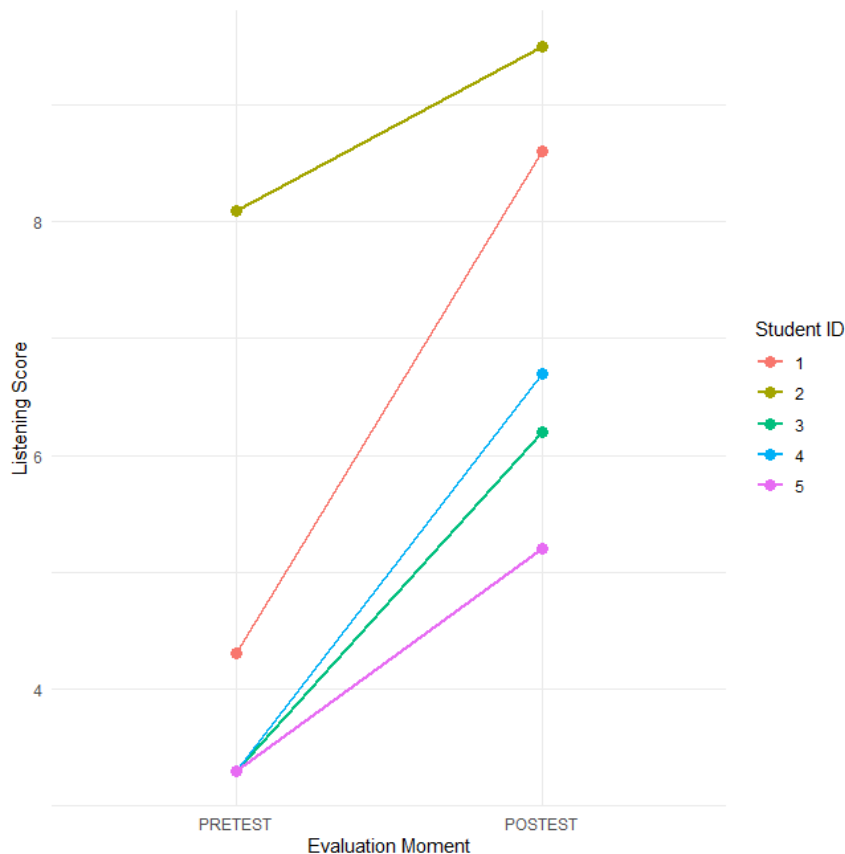
Note. N = 5. Scores correspond to the validated A1 listening assessment instrument (0 to 9 correct items).

Finally, to determine the effectiveness of the TEACCH method intervention, an inferential statistical test was applied to compare related groups. Considering first the results of the Shapiro-Wilk normality test, it was verified that the pretest data ($0.00588 < 0.05$) did not follow a normal distribution, while the posttest data ($0.70690 > 0.05$) met the assumption. For this reason, the non-parametric Wilcoxon signed-rank test, Right One-tailed, was applied.

The results of the test, shown in Table 3, returned a V statistic $= 15$ associated with a p-value $= 0.03125 < 0.05$, and a median difference of 2.9 points. This indicates that the difference between pretest and posttest is statistically significant at the 0.05 level. This implies that there is statistical evidence to support the fact that the overall improvement in students' listening comprehension is due to the application of the TEACCH method and not to chance.

Table 4.

Results of the Shapiro-Wilk normality test before and after the intervention

	p-value
Pretest	0.00588
Posttest	0.70690

Note. The Shapiro-Wilk test was applied to listening comprehension scores before and after the intervention.

4.2 DISCUSSION

The comparison between the pretest and posttest results showed a clear improvement in the students' English listening comprehension after the application of the TEACCH method. This improvement suggests that the structured and visual strategies used during the intervention contributed significantly to the participants' progress. In particular, the use of individualized tasks, visual schedules, and physical organization of activities allowed students to process auditory information more effectively and focus their attention during listening exercises. Most of the progress was observed in the ability to recognize familiar vocabulary and follow short oral instructions in English.

In addition, statistical analysis performed using R software confirmed the effectiveness of the intervention. Descriptive data showed that students started with a low level of listening comprehension (ME= 4.46, SD= 2,08), indicating high variability and difficulties in auditory processing. After the intervention, the mean increased to 7.24 and the standard deviation decreased (SD= 1.77), reflecting a more homogeneous improvement among participants. This reduction in score dispersion indicates that the TEACCH method not only helped students with higher performance but also supported those with lower initial scores to reach a more consistent level of achievement.

In other words, thanks to the method's ability to adapt to different levels of autism, all students can learn and understand a foreign language. Similarly, technological and professional advances in the field of autism have enabled the development of treatments based on therapy and psychological support, which improve understanding, behavior, and emotional regulation. As result, individuals gain self-confidence, improve social interaction and learn to manage their emotions, allowing them to participate in society like anyone else (Di Pasquale, 2025). This can be seen in the case of the student with the highest test scores, who, through ongoing private therapy, has developed various skills, including positive social interactions and appropriate behavioral responses.

Before performing inferential analysis, the Shapiro-Wilk test was applied to verify normality. The results showed that the pretest data did not meet the assumption of normality ($p = 0.00588 < 0.05$), while the posttest data did ($p = 0.70690 > 0.05$). Consequently, a non-parametric test was used. The Wilcoxon signed-rank test revealed a statistically significant difference between the two moments ($V = 15$, $P = 0.03125 < 0.05$), confirming that the students' listening comprehension significantly improved after the TEACCH method intervention. This finding aligns with the visual evidence from the box plots and spaghetti plot, which both showed a clear upward trend in all students' scores.

On the other hand, the reductions in variability between pretest and posttest scores also indicates a more equitable learning process, where all students benefited regardless of their initial level. As Alarcón and Montánchez (2021) explain, the TEACCH approach promotes gradual learning through visual cues, routines, and adapted materials, which can be especially beneficial for students with limited verbal communication. This explains why even students with lower initials performed showed noticeable progress in the post test.

Concerning the purpose of this research to analyze how the TEACCH method contributes to the teaching of listening skills in children with autism spectrum disorder the results demonstrates both statistical and pedagogical evidence of improvement. The Wilcoxon test confirmed that the observed change was not random, while the descriptive and graphical analyses supported the positive and consistent impact of the intervention, these findings concede with the previous studies such as those by Fernández, Pastor, Sanz, and Tárraga (2018), who found that TEACCH-based programs enhance cognitive and linguistic outcomes through structured environmental design and visual aids.

Despite the positive results, some variations were observed. A few students showed lower progress, due to differences in attention span, negative behaviors, school absenteeism (due to illness or other causes) and sensory sensitivity, characteristics that are common in people with ASD. As Alcalá and Ochoa (2023) point out, the symptoms and characteristics of ASD tent to adversely affect various factors in people with autism, such as low mood, anxiety, fears, phobias, and insecurity, which are prominent within the autism spectrum and can exacerbate the core symptoms of the disorder. Likewise, Mesibov (2007) explains, to reduce stress, fears, and difficulties experienced by students, teachers should remain calm, be consistent with activities, and allow time for progress. In other words, progress with the TEACCH method depends on its continuous implementation and individualized adjustments.

CHAPTER V
5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The main objective of this study was to analyze how the TEACCH method contributes to the development of listening skills in children with autism spectrum disorder. Similarly, the students' level of English was analyzed before implementing the method. Once the students' level was known, the necessary activities and resources provided by the methodology were applied in order to improve the English level of the autistic students. Finally, a post-test was used to determine whether the students' listening skills had improved. Based on the results and discussion of this research, it can be said that the implementation of the method is an innovative approach that English teachers can incorporate into their classes. These results, like those of several authors who have conducted this research, could change the focus of several traditional methods that emphasize repetition or memorization, whereas here the students are the main protagonists and actively participate in the activities and in their language learning, which also benefits their development, performance, and autonomy.

The most notable resources implemented were visual activities based on images, pictograms, and videos, along with structuring the classroom so that students felt comfortable and at ease while completing their tasks. Similarly, these activities provide a meaningful and real learning environment, as they have been applied in other subjects and have yielded positive results. However, this study adds that the continuous and consistent application of this method will yield better results and allow it to be applied to other English language skills.

However, the results were strong enough to recommend implementing the method and applying it to a larger population to get more results, as this could give a deeper insight into the real impact of the TEACCH method on students' language learning and independence.

5.2 RECOMMENDATIONS

Based on the results obtained and as recommendations for future research, the following is proposed. Firstly, it is recommended that the method be applied to all English language skills, as the implementation of all four skills is important for foreign language development and performance. In this way, its application would support student training.

Secondly, future researchers should consider using probability sampling and including larger groups. The use of a single population may limit external validity and prevent better results. As is well known, new language education emphasizes diversity and inclusion.

Finally, as mentioned above, the duration of the intervention should be extended. The TEACCH method is a methodology that requires time for change to occur. In addition, teaching a new language requires a great deal of discipline, participation, and motivation, even for a neurotypical student, and even more so for a student with autism and/or neurodevelopmental disorders. Similarly, training and adapting teachers to this method would help improve their knowledge and provide support to their students.

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Instrument:

- **Pre and Post Test**

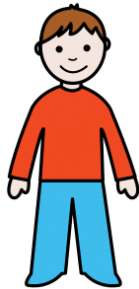## Listening Test – English A1

Instructions

Listen carefully to each audio. Then, choose the correct answer (a, b, c, or d). Circle the

correct option.

Audio 1

"Hi! My name is Tom. I am ten years old. I have a brother and a sister. I like pizza
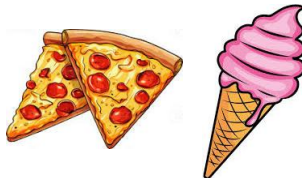
and ice cream."

1. How old is Tom?

a) Nine

b) Ten

c) Eleven

d) Twelve

2. What does Tom like?

a) Pizza and cake

b) Pizza and ice cream

c) Ice cream and salad
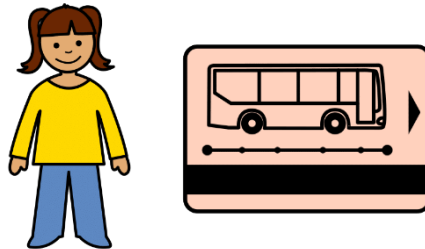
d) Cake and juice

Audio 2

"Sarah goes to school by bus every day. She likes her teacher and her friends."

3. How does Sarah go to school?

a) By car

b) By bike

c) By bus

d) By train

4. What does Sarah like?

a) Her school bag

b) Her lunch

c) Her teacher and friends

d) Her books only

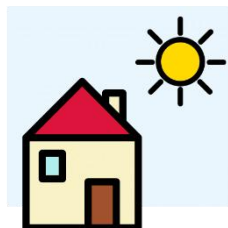**Audio 3**

"It is Monday today. John plays football on Mondays and Wednesdays."

5. What day is today?

a) Monday

b) Tuesday

c) Wednesday

d) Friday

6. When does John play football?

a) Mondays and Fridays

b) Mondays and Wednesdays

c) Tuesdays and Thursdays

d) Wednesdays and Saturdays

e) **Audio 4**

"Anna has a red bag and a blue pencil case. She puts her books in her bag."

7. What color is Anna's bag?

a) Blue

b) Green

c) Red

d) Yellow

8. What does Anna put in her bag?

a) Her lunch

b) Her books

c) Her toys

d) Her phone

Audio 5

"Mark likes to read stories before bed. His favorite story is about animals."

9. When does Mark read stories?

a) In the morning

b) At school

c) After lunch

d) Before bed

10. What is Mark's favorite story about?

a) Cars

b) Animals

c) Food

d) Space

- Photographs:

- Evaluation Criteria

Rúbrica de Evaluación – Listening A1 (TEACCH)

Indicador	Logrado (3 pts)	En proceso (2 pts)	Por desarrollar (1 pt)
1. Identifica palabras clave	Reconoce todas o casi todas las palabras clave sin ayuda.	Reconoce algunas palabras clave con ayuda.	No reconoce palabras clave aunque se le brinde apoyo.
2. Comprende instrucciones simples	Sigue correctamente todas las instrucciones dadas oralmente.	Sigue algunas instrucciones, necesita apoyo visual o repetición.	Tiene dificultad para seguir instrucciones, incluso con apoyo.
3. Asocia audio con imagen	Relaciona correctamente todas las frases con sus imágenes.	Relaciona algunas frases con imágenes correctas.	No logra relacionar frases con imágenes.
4. Reconoce saludos y expresiones cotidianas	Identifica y responde adecuadamente a saludos y expresiones.	Identifica algunos saludos, responde con apoyo.	No identifica ni responde a saludos, incluso con apoyo.
5. Identifica información personal básica	Reconoce y responde correctamente a datos personales del audio.	Reconoce algunos datos con apoyo visual o verbal.	No reconoce datos personales, necesita mucho apoyo.
6. Mantiene atención auditiva	Se mantiene atento durante toda la actividad de listening.	Se distrae ocasionalmente, pero retoma con apoyo.	Pierde atención frecuentemente, requiere apoyo constante.
7. Responde a preguntas cerradas	Responde correctamente a todas o casi todas las preguntas.	Responde algunas preguntas con ayuda o pistas.	Tiene dificultad para responder, incluso con apoyo.

Escala de puntaje total

- 18 – 21 puntos: Excelente nivel de comprensión auditiva A1.
- 13 – 17 puntos: Nivel básico, requiere práctica con apoyo.
- 7 – 12 puntos: Requiere mayor intervención y adaptación de actividades.