

**PERCEPTIONS OF NEURODIVERGENT STUDENTS WITHIN A
NEUROTYPICAL BILINGUAL ENVIRONMENT**

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2024

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ABSTRACT

The present study aimed to identify and establish the perceptions neurodivergent students have in regards their learning environment. Furthermore, this study employed a qualitative methodology, which is particularly well-suited to exploring the subjective experiences and perceptions of neurodivergent students within a predominantly neurotypical educational environment (Creswell, 2013)., gathering information through 3 instruments. The first instrument was an observation applied in some classes, also, a virtual interview was used to ask teachers about some specific aspects around the learning environment and as a last data collection instrument a survey was applied to the neurodivergent students, through this, the study inquired about some general perceptions they have from their learning processes and environments. Also, this is a multiple case study as the target were 3 neurodivergent students from elementary private school in Neiva-Huila, who are currently in 3th, 4th and 5th grade each one. After having carried out all the research steps, it turned out that inclusive education is essential for fostering equitable learning environments that accommodate the needs of all students. This study reaffirms that creating inclusive classrooms is not just a necessity for neurodivergent students but a transformative opportunity for the entire educational system. It emphasizes that inclusion benefits all students by promoting empathy, collaboration, and respect for diversity.

Key words

Education, Perceptions, Neurodivergent students, Neurotypical learning environment.

RESUMEN

El presente estudio tuvo como objetivo identificar y establecer las percepciones que tienen los estudiantes neurodivergentes con respecto a su entorno de aprendizaje. Además, este estudio empleó una metodología cualitativa, que es particularmente adecuada para explorar las experiencias y percepciones subjetivas de los estudiantes neurodivergentes dentro de un entorno educativo predominantemente neurotípico (Creswell, 2013), recopilando información a través de 3 instrumentos. El primer instrumento fue una observación aplicada en algunas clases, también, se utilizó una entrevista virtual para preguntar a los docentes sobre algunos aspectos específicos **en torno al entorno** de aprendizaje y como último instrumento de recolección de datos se aplicó una encuesta a los estudiantes neurodivergentes, a través de esta, el estudio indagó sobre algunas percepciones generales que tienen de sus procesos y **entornos** de aprendizaje. Además, este es un estudio de caso múltiple ya que el objetivo fueron 3 estudiantes neurodivergentes de una escuela primaria privada en Neiva-Huila, que actualmente cursan 3º, 4º y 5º grado cada uno. Luego de haber llevado a cabo todos los pasos de la investigación, resultó que la educación inclusiva es esencial para fomentar entornos de aprendizaje equitativos que acomoden las necesidades de todos los estudiantes. Este estudio reafirma que la creación de aulas inclusivas no es solo una necesidad para los estudiantes neurodivergentes, sino una oportunidad transformadora para todo el sistema educativo. Destaca que la inclusión beneficia a todos los estudiantes al promover la empatía, la colaboración y el respeto por la diversidad.

Palabras clave

Ambientes de Aprendizaje Neurotípicos, Educación, Estudiantes Neurodivergentes, Percepciones

INTRODUCTION

Education is one of the 17 sustainable development goals proposed in 2015 by the United Nations, intended to be achieved by 2030. *“Education is a human right and a force for sustainable development and peace. Every goal in the 2030 Agenda requires education to empower people with the knowledge, skills, and values to live in dignity, build their lives, and contribute to their societies”* (UNESCO Open Learning, 2015).

Colombia’s education system **that** has been applying strategies to train the institutions with approaches to assist students with “*special needs*” as is known in Ministry of National Education (MNE), Resolution 2565, October 24 of 2003, that states the characteristics and processes to have education for everybody, including neuro-divergent individuals, specially students with nonverbal communication who required constant support to be integrated into the dynamic of the classroom.

According to Noya (2023) in his article *“La exclusión de personas neurodiversas en Colombia: un desafío que debemos superar,”* Colombian education has established mechanisms to support neurodivergent students. However, these efforts are still hindered by a lack of proper training and infrastructure to ensure genuine inclusion. Despite the existence of certain regulations that promote inclusive practices, most schools across the country lack solid and effective inclusive processes within their learning environments.

On the other hand, the focus of the study is to explore the perceptions of neurodivergent students in relation to their learning experiences and the support they receive, especially in comparison with neurotypical students. To begin this exploration, it is important to clarify key

terms and characteristics. According to Harvard University, neurodiversity refers to the idea that individuals experience and interact with the world in diverse ways. There is no single "*correct*" way of thinking, learning, or behaving, and differences should not be seen as deficits. In other words, neurodiversity highlights the variety of human minds and experiences, though it is often discussed in the context of autism spectrum disorder (ASD). In contrast, neurotypical individuals are those whose brain functions align with what is considered typical or "*normal*," which represents most of the population.

To explore the perceptions of learning environments between neurotypical and neurodivergent students, this study focuses on primary neurodivergent students from a rural private school in Neiva. Regarding the school's project and curriculum, it is evident that there is no structured implementation of specialized topics or strategies for students with special needs. Furthermore, teacher training is often voluntary and limited to parents who are particularly concerned about the learning needs of their children.

RESEARCH QUESTION

What are the Perceptions of neurodivergent students within a neurotypical bilingual environment?

General objective

Explore the perceptions of neurodivergent students within a neurotypical bilingual learning environment.

Specific objectives

Identify the barriers faced by neurodivergent students in a neurotypical learning environment.

Assess the coping mechanisms employed by neurodivergent students to overcome these barriers.

Propose practical recommendations aimed at enhancing the inclusion and academic performance of neurodivergent students in a neurotypical learning environment.

LITERATURE REVIEW

The concept of neurodivergent individuals

Neurodivergent is a term that refers to individuals who have some kind of differences in the brain, mind or cognition from neurotypical people, also referred to as '*normal people*'. This may include conditions such as autism spectrum disorder (ASD), ADHD, dyslexia, Tourette, etc. Neurodivergent individuals process information and experience the world differently from neurotypical individuals, whose brain development follows patterns that are more '*conventional*'.

Research within the last few years highlights the growing acceptance of neurodiversity as a natural variation in cognitive functioning, rather than a condition to be "*fixed*" (Kapp, 2020). This has significant implications for educational systems, which are predominantly designed to attend to the needs of neurotypical students. Having an understanding of an existing neurodiverse population in the schools is recognizing the distinct cognitive profiles of neurodivergent students. This leads to an awareness on how we can create inclusive educational settings, which also understand the different ways neurodivergent students learn. Armstrong (2018) appeals for teachers to embrace flexible teaching practices, differentiated instruction and sensory environments that enable neurodivergent students to flourish, urging recognition of neurodiversity as an integral element underpinning human variability.

Moreover, the neurodiversity movement has sparked new discussions about the intersectionality of neurodivergence with race, gender, and socio-economic status. For example, studies show that neurodivergent students from underprivileged backgrounds often face

compounded challenges due to systemic biases, including delayed diagnoses and insufficient support systems in schools (de los Ríos & Flee, 2021). This highlights the need for systemic reform in how educational institutions approach neurodiversity in diverse sociocultural contexts.

The Autism Spectrum Disorder ASD

Contemporary communities exhibit remarkable richness in diversity, culture, knowledge, languages, and ways of interacting with their environment. They recognize their members as unique beings with distinctive characteristics, interests, abilities, and learning needs. According to UNESCO (2021), educational systems should be designed, and educational programs implemented to embrace this broad diversity of characteristics and needs (p. 8). The importance of local education adaptations to individual particularities of each person within communities aims to ensure the inclusion of all members without any exclusion. The goal is to guarantee everybody has equitable access to educational opportunities that fulfill specific needs.

Early childhood education or preschool is conceptualized as an uninterrupted and progressive educational process in which learners acquire knowledge, and establish patterns, and models of interaction and social relationships in their immediate environment. The objective of this stage **isto** equip children, from a holistic approach, with the fundamental skills and competencies required to navigate through life (UNICEF, 2010).

Autism Spectrum Disorder ASD is a neurodevelopmental disorder that manifests in childhood and persists throughout life, characterized by social communication difficulties,

restricted interests, and repetitive behaviors, with its presentation varying greatly between individuals (American Psychiatric Association, 2013). Given that ASD encompasses a broad spectrum, generalization is not possible, as no two individuals share the same characteristics (Bogdashina, 2016). Each person, in his or her individuality, will exhibit a distinct manner of being, communicating, thinking, and acting, where information processing can vary significantly (Coccoz, 2021, p. 32).

The processes involved in inclusive education for students with ASD entail a set of principles derived from the integration of global phenomena into our local context. This situation involves a series of processes, research, and suggested projects necessary to keep up with the advancements in this field. Recent research has shifted toward more inclusive models of education, encouraging schools to integrate students with ASD into mainstream classrooms (Lord et al., 2020). While these models aim to provide ASD students with exposure to neurotypical peers and curricula, they also present challenges, as mainstream teachers may lack the training to support students on the spectrum effectively.

Colombian ASD Laws

Comprehensive care of children with additional educational needs requires integrated services such as health, education, psychology support, among others, and at the same time, demands an exchange of information among the different sectors involved. To address disability, disadvantages, vulnerability, and social exclusion, it is crucial to implement strategies for early

detection, intervention, and prevention (UNESCO, 2006). These laws are based on the fundamental principle that all educational institutions must receive and accommodate children with disabilities, thus promoting inclusion in education by ensuring their access and coverage.

Colombia's legal framework for protecting the rights of individuals with ASD is relatively recent, but it has made significant strides toward inclusivity in education. These laws also aim to minimize the barriers that arise in the learning process.

In a broad sense, article 67 of the Colombian Political Constitution, establishes education as a fundamental right and public service, it aims to educate Colombians on human rights, peace, democracy, work, and environmental protection. Education is compulsory from ages 5 to 15, including preschool and nine years of basic education. Public education is free, with possible academic fees for those who can afford them.

There have also been important legislations specifically for neurodivergent individuals. Law 1618 of 2013, mandates the inclusion of individuals with disabilities, including those with ASD, into the general educational system (Rodríguez, 2019). This law guarantees the right to education, social inclusion, and equal opportunities for individuals with disabilities. Following this, Decree 1421 of 2017 established specific guidelines for the integration of students with disabilities into Colombia's educational system. The decree requires schools to develop Individualized Educational Plans (IEPs) tailored to the specific needs of students with disabilities, including those with ASD (Rojas, 2020). These IEPs must consider the student's

cognitive abilities, communication methods, and social-emotional needs, with input from multidisciplinary teams, including psychologists, teachers, and speech therapists.

National (*la Fundación Saldarriaga Concha*) and international guidelines (Global Partnership Strategy for Early Childhood) regarding educational assistance for students with disabilities within the context of inclusive education emphasize the crucial importance of efficient design and implementation of policies and services for early childhood (UNESCO, 2022). Partnerships between public and private entities, national and international, can enhance service provision to marginalized communities where local government falls short in meeting necessary educational needs. Collaborative efforts aimed at improving access to education in these communities play a pivotal role in addressing the educational gaps.

Neurotypical Learning Environments

A neurotypical learning environment is usually an educational space designed to cater to the needs of a set of students considered to be within a "typical" range of cognitive and neurological function. These environments typically rely on standardized curricula, assessments, and teaching strategies that may inadvertently marginalize neurodivergent students, whose learning needs do not align with neurotypical norms (Valencia, 2020).

In Colombia, traditional teaching methods such as rote memorization and lecture-based instruction continue to dominate many schools, particularly in public education systems (Montoya, 2021). Neurotypical learning environments are often characterized by rigid schedules, sensory-heavy classrooms (e.g., loud noises, bright lights), and social expectations that may

overwhelm neurodivergent students, particularly those with ASD (Patiño & Jiménez, 2021). Neurotypical students may flourish in these settings, but neurodivergent students may face sensory overload, difficulty focusing, and challenges in understanding social cues, making it harder for them to achieve academic success.

Elena Martín Pastor and Ramiro Durán Martínez (2019) explain, “*The autonomy of each government to adapt global standards to their national contexts and create action plans is essential to achieve effective implementation of inclusive education. In other words, governments are the entities responsible for promoting effective inclusive education through laws and policies, ensuring that all individuals have equal opportunities in the academic field*” (Pastor et al., 2019, p.26).

Teachers’ Role in a Neurotypical Learning Environment

Teachers play a pivotal role in shaping how inclusive and supportive a learning environment is for neurodivergent students. Studies in Colombia suggest that teachers often struggle to adapt their teaching methods to accommodate the needs of neurodivergent students, citing a lack of training, resources, and institutional support (Rodríguez & Pérez, 2020). Research by Valencia (2020) suggests that many teachers in neurotypical environments are unprepared to meet the needs of neurodivergent students. Moreover, the physical layout of classrooms, the sensory stimuli present, and the pace of instruction may not be conducive to neurodivergent learners, leading to a need for more teacher training and systemic changes. Colombian teachers may have a positive attitude toward inclusion, but they lack the knowledge and practical strategies to implement inclusive teaching practices effectively.

The role of teachers in inclusive education extends beyond classroom instruction. Teachers must act as advocates for their neurodivergent students, ensuring that their unique needs are met, whether through differentiated instruction, modified assessments, or collaboration with special education professionals. Teachers often serve as mediators between neurodivergent students, their neurotypical peers, and the larger school community. Professional development programs focusing on inclusivity, such as workshops on autism-specific teaching strategies or sensory-friendly classroom modifications, have been shown to improve teacher efficacy in supporting neurodivergent learners (Hernández & Salazar, 2021). However, such opportunities are still rare in many parts of Colombia, as we often face unexpected challenges on our own, without the contextualization of the specific needs of the educational community, or the correct strategies to support these students.

Teacher performance in working with students with Special Educational Needs (SEN) involves specific competencies. These competencies encompass attitudes such as patience, respect, vocation, and dedication, as well as cognitive skills that involve a solid preparation in the specialty and procedural skills related to the effective use of methods, resources, and instructional materials (Donayre and Sánchez, 2023).

A neurodivergent learning environment is an educational setting that is specifically designed to support and enhance the educational experiences of neurodivergent students. These environments recognize that neurodivergent learners may require alternative instructional strategies, flexible pacing, and sensory-friendly settings to succeed academically and socially (Garzón & Muñoz, 2022).

The design of neurodivergent-friendly classrooms often includes sensory accommodations such as soft lighting or quiet spaces, flexible seating arrangements, and individualized learning plans. Neurodivergent learning environments also prioritize the use of visual supports, clear communication strategies, and opportunities for students to work at their own pace (Reyes et al., 2021). Such environments are conducive to the specific needs of neurodivergent students, such as those with ASD, ADHD, or sensory processing disorders, by minimizing distractions and creating spaces where students feel safe and supported.

Recent studies in Colombia have highlighted the benefits of neurodivergent learning environments in promoting academic achievement and emotional well-being among neurodivergent students (Garzón & Muñoz, 2022). However, these environments remain scarce, particularly in public schools, where resources are limited and traditional methods still dominate. Reyes et al. (2021) call for systemic reforms to expand access to neurodivergent-friendly classrooms, advocating for government support in funding specialized training programs for teachers and investing in adaptive technologies.

The concept of perception and its use in an educative context

The term perception has been used by several authors and in many different fields. In educational research, perception refers to how stakeholders, such as teachers, parents, and students, view or interpret specific aspects of the educational experience. Hence, this study pretends to make use of this term in the educational context which routes the opinion and different conceptions towards their context and the diversity they find in their classroom,

including the relation between the neurodivergent and neurotypical students. In the context of neurodivergent inclusion, perception plays a key role in shaping how inclusion practices are developed and implemented.

According to Hind Brigui (Ibn Tofail University, Kenitra, Morocco, 2022) in the article *“The Multilingual Condition and EFL Paradigms in Moroccan Higher Education: Investigating L1 Perceptions and Practices Among Professors and Students in a Classroom Context”* perception is defined as *“The process by which individuals organize and interpret their felt impressions in order to understand their environment”*. Considering the previous conception, in this research the term perception aims to provide a general overview of the dynamics encountered in diverse classrooms like the ones they have in their learning environments, creating the conceptions and the initial way to an inclusive space to develop their human and cognitive skills.

Recent studies in Colombia have focused on teachers' perceptions of neurodivergent students, highlighting the gap between positive attitudes toward inclusion and the practical challenges of implementing inclusive practices. Hernández & Salazar (2021) found that while many Colombian teachers express openness to including neurodivergent students, they often feel underprepared to manage these students' needs in neurotypical learning environments. This lack of preparedness can lead to perceptions of neurodivergent students as disruptive or difficult to teach, further complicating the implementation of inclusive practices.

METHODOLOGY

This study employed a qualitative methodology, which is particularly well-suited to exploring the subjective experiences and perceptions of neurodivergent students within a predominantly neurotypical educational environment (Creswell, 2013). A qualitative approach allows for a deeper understanding of the personal and nuanced experiences of individuals, which may not be fully captured through more traditional quantitative methods. By prioritizing the students' lived experiences, this approach provides rich insights into the challenges they face, their strategies for adaptation, and their perceptions of inclusion within a system primarily designed for neurotypical students.

The qualitative nature of this research enables a more comprehensive examination of how neurodivergent students navigate educational contexts that may not always align with their specific needs. It allows for the identification of subtle factors influencing their learning processes, as well as an exploration of the emotional and cognitive aspects of their experiences. By centering the students' voices, this methodology offers a unique opportunity to understand how they perceive and engage with their learning environment, ultimately providing valuable insights that can inform practices and policies aimed at fostering greater inclusion.

RESEARCH DESIGN

For this study, a multiple case study design (Yin, 2018) was selected as the primary methodological approach. The multiple case study is a well-established qualitative research strategy that allows for a comprehensive analysis of complex phenomena within their real-life contexts, examining several cases to develop a deeper and more nuanced understanding (Yin, 2018). This design is particularly well-suited for exploring the diverse experiences of neurodivergent students within a neurotypical educational environment, as it facilitates the investigation of multiple individual cases while highlighting both commonalities and unique differences in their experiences.

Although the study involves a relatively small sample size, the use of multiple case studies is both valid and valuable in qualitative research. This approach provides a rich, context-specific understanding of each student's experience, enabling the researcher to explore how neurodivergent students perceive and navigate a learning environment that is predominantly designed for neurotypical individuals. By focusing on the perspectives of three neurodivergent students, the study can capture the depth and complexity of their experiences, while also identifying broader patterns and trends that may emerge across different cases.

The multiple case study design (Yin, 2018) offers three main stages:

In-depth analysis: This allows for a detailed exploration of each student's experiences independently, considering each individual's unique characteristics and needs.

Pattern identification: It facilitates the observation of similarities and differences that emerge from how these students interact with and adapt to the neurotypical environment, revealing key challenges and opportunities for inclusion.

Practical recommendations: By understanding these individual experiences, the study can provide targeted, evidence-based recommendations for improving future inclusion practices in neurotypical educational settings, ensuring that they better accommodate the needs of neurodivergent students.

This methodological approach not only enriches the understanding of the students' individual perceptions but also provides insights that can inform more effective strategies for fostering inclusive learning environments in the future.

Participants

For this specific study, three neurodivergent elementary students from a private school in the rural area of Neiva – Huila, have been chosen. It is important to highlight that each one of the three neurodivergent students selected as case studies presents different forms of neurodivergence, which limits their verbal communication and, therefore, their social skills, as well as their ability and willingness to follow orders and perform activities that require fine motor skills such as writing. This broadens the scope and depth of the research, as each of these students is immersed in the same neurotypical school environment, allowing us to evaluate not only their individual experiences but also how the shared environment impacts their experiences in differentiated ways. The specific characteristics of each student will be key to understanding how their perceptions and experiences vary according to these factors.

First Student Profile

The student is a 10-year-old in third grade, diagnosed with Down syndrome. She has a strong interest in creative activities such as painting, singing, and dancing, and enjoys spending time playing with her sister, solving puzzles, and engaging in group reading activities. Socially, she thrives in collaborative environments and enjoys working in teams with her friends, often participating actively in group activities.

Despite her enthusiasm, she faces some challenges in fully understanding certain activities and can easily become distracted or forget instructions provided by the teacher. When completing tasks, she sometimes works too quickly, which can prevent her from fully internalizing the content. However, when asked to perform a task practically, she is able to follow the instructions well in the moment. Additionally, she occasionally expresses her responses verbally, though not always consistently.

The student also has specific preferences and sensitivities. She dislikes physical contact with strangers, particularly being hugged, and is sensitive to feelings of being unclean. Audiovisual activities are among her preferred forms of learning, and when she is uncomfortable, she may express herself through guttural sounds as a way to communicate her distress or discomfort.

From the family's perspective, they hope that their daughter continues to experience enjoyment and inclusion within the classroom setting. They also emphasize the importance of

receiving the necessary support to enhance her understanding and ability to focus during activities, ensuring her continued development and well-being in the school environment.

Second Student Profile

Gerónimo is a 10-year-old in fourth grade, diagnosed with autism. He is a very affectionate, caring, and gentle child who consistently maintains a neat personal presentation and attends class regularly. While he sometimes displays stereotyped behaviors that can briefly interrupt his activities, these behaviors are manageable and can be redirected to help him stay focused on the task at hand. Importantly, Gerónimo does not exhibit any aggressive behaviors, and he responds very well to praise and positive reinforcement. He particularly enjoys receiving hugs or small rewards, such as the use of a favorite item, as a form of encouragement.

In his adaptation process, it has been necessary to implement specific planning mechanisms to help Gerónimo manage unexpected situations more calmly. These strategies are crucial in preventing feelings of frustration or irritability when he encounters new or unplanned scenarios. To support his emotional well-being, it is important for him to feel prepared and secure in his daily routines.

Gerónimo's affectionate nature also requires some attention in terms of social interactions. He tends to hug tightly or lean on others, which, given his height and physical strength, can unintentionally impact his classmates. Therefore, it is essential to remind him to be "gentle" with others to ensure positive social interactions. Additionally, fostering awareness

among his peers is key to preventing negative reactions or potential rejection, ensuring that Gerónimo's behavior is understood and accepted within the classroom community.

Third Student Profile

Santiago is a 12-year-old student in fifth grade, diagnosed with autism spectrum disorder (ASD). He demonstrates a strong consideration for those around him and shows a natural ability to build rapport with others. He often takes the initiative to communicate and engage in social interactions. However, his responses sometimes require interpretation and redirection from adults, as Santiago may need guidance to shift topics in conversation or better navigate social cues.

In terms of joint attention, Santiago can follow the examiner's gaze and facial expressions to focus on objects indicated by adults. He initiates this process independently, often referencing objects that are out of his immediate reach, although without the intent to obtain them. Additionally, he shares objects and topics of personal interest with others, promoting a sense of shared enjoyment in social activities. While interacting, Santiago makes occasional eye contact and displays some facial expressions toward adults, signaling his engagement. He responds to his name when called, though when deeply focused, he may need to be called more than once to regain attention.

Santiago also exhibits unique sensory sensitivities, particularly related to smell and taste, and tends to be hypersensitive to auditory stimuli. These sensitivities require consideration and accommodations in his learning environment to ensure his comfort and active participation.

From the family's perspective, they hope that Santiago will receive the supportive guidance he needs in social interactions and that accommodations for his sensory sensitivities will be made to help him thrive in the classroom. They also wish for his strengths in building rapport and sharing enjoyable experiences to continue being recognized and nurtured, as these qualities contribute to his positive social engagement.

This study also includes three teacher participants who are young professionals from diverse subject areas, bringing varied experience levels to their roles. These educators, ranging in age from 25 to 35, reflect a blend of perspectives shaped by their respective tenures at the institution.

First Teacher Profile

Ximena Montealegre is a 33-year-old Science teacher with five years of experience at the institution. Throughout her tenure, she has developed a strong understanding of her students' learning needs, especially those requiring additional support. Her years of experience in the school allow her to bring a depth of knowledge and familiarity with the institution's policies and teaching strategies, making her an invaluable resource in addressing the challenges faced by neurodivergent students in the classroom.

Second Teacher Profile

Yenny García Falla, a 28-year-old Math teacher, has been with the institution for two years. Although her time at the school is shorter, her passion for teaching and fresh perspectives brings a dynamic energy to the team. Yenny is particularly committed to finding effective

methods for engaging students who may struggle with traditional approaches, and her willingness to adapt to diverse learning needs is a key asset in fostering a more inclusive environment for all students.

Third Teacher Profile

Daniela Cachaya, at 26 years old, is the English teacher with two years of experience in the institution. Despite being relatively new, Daniela brings a strong enthusiasm for inclusive

teaching practices and a dedication to helping all students succeed. Her innovative approaches to language learning allow her to cater to a variety of learning styles, and she is eager to apply new strategies to ensure that neurodivergent students can fully participate in her lessons. Together, these teachers, with their diverse professional backgrounds and varying lengths of service, offer valuable insights into the study's objectives. Their collective experiences and willingness to collaborate help provide a comprehensive understanding of how neurodivergent students experience and navigate a neurotypical learning environment.

Data Collection Methods And Instruments

To gain a comprehensive understanding of the experiences of neurodivergent students in a neurotypical educational environment, a combination of qualitative data collection methods was employed. Each method was selected based on its ability to provide in-depth, context-rich insights into the students' experiences and perceptions.

First, semi-structured interviews were conducted with the students themselves. This method, as described by Creswell (2013), allows for a flexible approach to data collection, enabling researchers to ask open-ended questions while also probing deeper into responses based on the student's answers. In this study, the semi-structured format was particularly effective in capturing direct accounts from the students about their inclusion in the classroom. This personal insight is crucial for understanding the nuances of their experiences, particularly when navigating an educational environment that may not always be fully equipped to meet their needs. These interviews were complemented by surveys, which provided a structured way to gather additional perspectives from the students. While surveys are more standardized, they allow for the collection of broader data across the student group, helping to identify general trends and patterns in their perceptions of inclusion.

In addition to student interviews and surveys, interviews with teachers and parents were also conducted. These interviews followed a semi-structured format with open-ended questions to allow for a deeper exploration of how different stakeholders perceive inclusion and support for neurodivergent students. According to Patton (2002), interviews with key informants like

teachers and parents are essential for gaining a well-rounded understanding of the educational experience from multiple viewpoints. Teachers provided valuable insights into the classroom strategies they use to support neurodivergent students, while parents offered a perspective on how their children experience learning and inclusion outside of the classroom. Together, these interviews enriched the study by offering a comprehensive view of how inclusion is both perceived and enacted by those most involved in the students' education.

Another essential data collection method was classroom **observation**, which allowed the researchers to directly observe the interactions between neurodivergent students and their neurotypical peers, as well as their interactions with teachers. According to Yin (2018), observation is a key method in qualitative research, as it provides a real-time, contextually rich perspective on how participants behave in natural settings. In this study, classroom observation enabled the researchers to document how the environment adapted to the students' needs and to identify social dynamics, sensory challenges, and other barriers that might not be articulated verbally by the students themselves. This method was particularly valuable for capturing the subtleties of inclusion that may not be immediately obvious in interviews or surveys.

Additionally, document analysis was used to review key educational materials, such as the students' Individual Reasonable Adjustment Plans (PIAR), psychological reports, and educational intervention plans. Bowen (2009) notes that document analysis is an important tool for comparing formal policies and interventions with actual practices. In this study, the analysis of these documents allowed the researchers to contrast the intended accommodations and supports outlined in the students' plans with the experiences they reported during interviews and

the observations conducted in the classroom. This comparison helped identify any discrepancies or gaps between what was planned and what was being implemented in practice, offering insights into the effectiveness of the school's inclusion strategies.

Finally, teacher interviews were conducted using a semi-structured format with open-ended questions, allowing the researchers to explore in-depth the teachers' perspectives on the key issues of inclusion and support for neurodivergent students. Teacher interviews were an essential part of the data collection process because they provided detailed insights into educators' experiences, practices, and the challenges they face in implementing inclusive education. By asking follow-up questions, the researchers were able to delve deeper into teachers' approaches to supporting neurodivergent students, the barriers they face, and the strategies they use to foster an inclusive learning environment.

By combining these diverse instruments—interviews, surveys, observations, document analysis, and teacher interviews—the study was able to gather rich, multi-dimensional data. This methodological framework provides a comprehensive understanding of the neurodivergent students' experiences and offers valuable insights that can inform more inclusive educational practices and policies. The triangulation of data from different sources helps ensure the validity and depth of the findings, allowing the study to contribute meaningfully to the field of inclusive education.

DATA ANALYSIS

This research's data collection and analysis process involved a structured approach to ensure clarity and relevance. The study focused on three core students: Gerónimo, Maria José, and Santiago, chosen for their neurodivergent cognitive profiles. This selection was critical to understanding diverse perspectives within the bilingual educational environment. These students served as the primary data sources, allowing the research to explore unique experiences tied to their specific cognitive characteristics.

Individual surveys (Appendix,B) were conducted with each student to gather information. These interviews were carefully designed to address three essential aspects: the students' perceptions of faculty, their views on peer interactions, and their overall impressions of the institution. These categories were selected to provide a comprehensive understanding of the students' experiences and examine how various school environment elements influenced their learning and social dynamics.

A key feature of the interviews was the use of emojis as a communication tool. This approach enabled students to visually express their emotions and opinions about the topics discussed, making the process more accessible and engaging. Through carefully crafted questions, students shared their perspectives using emojis to represent their feelings about specific characteristics or scenarios in their educational context.

Finally, the data collected during the interviews was systematically analyzed to identify recurring patterns and meaningful insights. By examining the students' responses, the research

aimed to understand their perceptions and interactions within the bilingual environment, providing valuable information on how inclusive strategies could be improved to better support neurodivergent learners. This multi-step process ensured a thorough and empathetic exploration of the students' experiences.

Starting with the students' perceptions of the **faculty**, the survey revealed varying opinions. Gerónimo expressed uncertainty about whether his teachers find it challenging to work with students with special needs like his own. Similarly, Maria José noted that she believes her teachers find it somewhat difficult, while Santiago stated that his teachers probably struggle to address their special needs effectively. Regarding the teachers' ability to manage the class, Gerónimo and Maria José agreed that it might be challenging for teachers to lead the class while accommodating their needs. Santiago, on the other hand, was more certain, asserting that it is indeed an obstacle for teachers to guide the class effectively with neurodivergent students like him present.

In terms of the inclusive process in the classroom, Maria José and Gerónimo once again shared a similar perspective, stating that teachers include them only slightly in class activities. Santiago offered a more uncertain response, indicating that he is "*maybe*" or "*sometimes*" included in classroom activities. Despite these challenges, when it comes to feeling supported by their teachers, Gerónimo and Maria José both reported feeling only slightly supported. Santiago expressed a slightly more optimistic view, suggesting that he is probably supported by his teachers.

Finally, regarding how teachers treat them compared to their neurotypical classmates, Gerónimo and Santiago felt that they are treated somewhat differently. In contrast, Maria José felt strongly that she experiences a distinctly different type of treatment and interaction compared to the rest of the class. These responses provide insight into the varying levels of inclusion, support, and equitable treatment perceived by the students, highlighting areas for potential improvement in teacher-student interactions.

To continue with the analysis of the survey, the next aspect evaluated was peer perception, specifically how these neurodivergent students feel about the way their neurotypical classmates treat them and include them in various academic activities.

The first question addressed whether the students believed their classmates find it difficult to work with them. Gerónimo and Maria José both agreed that their classmates do find it challenging, while Santiago responded that they "*probably*" find it only slightly difficult. Regarding the relationship neurotypical students have with them, Santiago and Gerónimo concurred that their peers struggle to relate to and understand them. In contrast, Maria José perceived these difficulties to be less significant, indicating only slight challenges in her interactions with classmates.

When asked about their classmates' attitude toward them and their willingness to involve them in activities, Santiago and Maria José expressed a desire to participate more. However, Santiago felt that participating just a little is sufficient for him. As for feeling integrated into the

class group, Maria José and Santiago indicated that they feel only slightly included, while Gerónimo responded with uncertainty, stating that he is "*maybe*" included.

To conclude this section of the survey, the students were asked whether they feel comfortable with their class as a whole. Maria José and Gerónimo were unsure about their level of comfort, while Santiago stated that he "*maybe*" feels at ease with his classmates. These findings provide valuable insights into the students' perceptions of peer dynamics, highlighting areas where greater efforts in fostering inclusivity and understanding within the classroom might be needed.

Wrapping up the survey analysis, the final aspect evaluated was the perception neurodivergent students have of the institution. All three students agreed that the school could improve its pedagogical practices to better address their needs. For example, Gerónimo stated that the practices are "*not good at all*," Maria José expressed uncertainty, and Santiago perceived them as "*maybe good*."

When asked about the fairness of grading, their opinions varied. Gerónimo considered the grading system to be "*a little fair*," Maria José believed it to be "*not fair at all*," and Santiago was unsure, indicating he could not determine whether it was fair or not.

Regarding the opportunities provided by the school for learning and growth, Santiago felt there was no opportunity given to him, while Maria José was uncertain about whether such opportunities exist. In contrast, Gerónimo expressed that he believes he has been given the

chance to grow and learn within the institution. These responses highlight differing perceptions among the students and underscore the need for tailored strategies to improve pedagogical practices, ensure fair assessment, and create equitable learning opportunities for neurodivergent students.

As a general conclusion from this survey, it is evident that there is a significant need for training both teachers and students to better adapt to and include neurodivergent students in the learning process. The results highlight the necessity for schools to establish clear strategies and implement inclusive pedagogical frameworks to address the needs of students with special requirements. The findings reveal that these students do not feel entirely comfortable or convinced that they are being meaningfully included in their educational environments. This underscores the importance of fostering a more inclusive and supportive atmosphere that promotes equal opportunities for all learners.

Based on the analysis of the instruments applied to gather the findings, the repetitive patterns found were categorized into the following three main categories:

Obstacles to Communication and Language

Communication and language are fundamental to how students interact with their peers and teachers, making this category critical. Santiago demonstrates the advantage of leveraging his native Spanish proficiency to support his English language learning. His ability to speak, read, and write effectively in Spanish aligns with Cummins' (2000) Theory of Linguistic Interdependence, which posits that a strong foundation in the first language can significantly enhance the acquisition of a second language when native proficiency levels are well-developed.

This highlights the importance of fostering students' native language skills as a stepping stone for bilingual development.

Maria José, on the other hand, struggles with verbal communication, relying primarily on gestures and facial expressions to interact. This points to the necessity of incorporating alternative communication methods. Tabors (2008) emphasizes that non-verbal communication is a critical yet often overlooked aspect of early language learning. Similarly, studies such as Cárdenas (2009) highlight the need for inclusive communication strategies that accommodate diverse language learners, reinforcing the value of multimodal approaches to ensure all students can participate meaningfully in classroom interactions.

Gerónimo also depends heavily on non-verbal communication, underscoring the diversity of communication needs within a bilingual classroom. Prizant and Wetherby (1987) stress the importance of recognizing and facilitating non-verbal communication, particularly for students with Autism Spectrum Disorder (ASD). In the Colombian context, researchers like Restrepo (2010) have explored how tailored communication strategies help students with ASD integrate into mainstream classrooms. These strategies demonstrate the value of creating personalized approaches that support participation and learning outcomes for students with diverse needs.

The findings, supported by these studies, highlight the crucial role of effective and inclusive communication strategies in bilingual learning environments. Addressing the varied communication needs of students allows teachers to foster a supportive atmosphere that

promotes both language development and social engagement. This, in turn, creates a motivating and safe environment where students of all abilities can thrive academically and socially.

Impact of Behavior on Learning and Interaction

Behavior and conduct emerge as a critical category impacting students' learning and interactions in the classroom. Observations during the study emphasized the importance of understanding individual behavioral patterns and their relationship to learning experiences. For example, Gerónimo requires a nurturing and structured environment to manage his sensory sensitivities and behavioral challenges effectively. This aligns with Mesibov and Shea's (2010) research, which underscores the importance of personalized behavioral interventions for supporting students with autism spectrum disorder (ASD). Tailoring strategies to address specific behaviors is essential for fostering a conducive learning environment for such students.

In the Colombian context, researchers like López (2012) have explored the effects of behavioral interventions on students with special needs, emphasizing the necessity of culturally responsive strategies. These findings stress that educators must consider the cultural and contextual factors influencing student behavior, adapting interventions to align with students' backgrounds and lived experiences. Such an approach not only addresses behavioral challenges but also creates a bridge between the student's identity and the classroom environment.

Maria José thrives in a predictable and structured setting, which helps her regulate her behavior and actively engage in learning activities. This observation resonates with the principles of Positive Behavioral Interventions and Supports (PBIS), which advocate for proactive and

preventive measures to manage behavioral issues. González (2015), in his Latin American research, has examined the application of PBIS in educational systems, highlighting its success in improving both conduct and academic performance. By providing structure and predictability, educators can empower students to focus on their learning and interaction.

These findings and supporting research underscore the vital role of addressing behavioral needs in the classroom. Employing evidence-based strategies, such as PBIS, and fostering supportive environments can significantly enhance students' learning outcomes and social engagement. As UNESCO's 2030 educational goals highlight, inclusive and adaptive teaching methods are crucial for promoting academic and social achievement across diverse student populations.

Flexible Support in the Language Learning Environment

Adaptations and support emerge as the third essential category, focusing on the need for tailored educational approaches that address the diverse needs of students. The observations highlight the importance of curriculum adaptations that incorporate students' individual interests and strengths, as demonstrated by Santiago. This aligns with the principles of Universal Design for Learning (UDL), which advocates for flexible and inclusive instructional strategies. In Colombia, researchers like Quintero (2018) have explored the implementation of UDL in bilingual education, emphasizing its potential to improve learning outcomes for diverse learners by making the learning process more accessible and engaging for all.

Maria José benefits from the use of picture supports and visual cues to enhance her understanding and participation. This validates the effectiveness of such strategies, especially in helping students with limited verbal communication. Research by Fidler (2005) supports the use of visual aids for individuals with Down Syndrome, and studies in Colombia, such as those by Martínez (2013), demonstrate the positive impact of visual aids on student engagement and learning. These strategies are particularly beneficial for neurodivergent students, offering them alternative ways to process information and participate in classroom activities.

Gerónimo's need for visual and technological support further underscores the importance of a structured, visually supported learning environment. Mesibov & Shea (2010) highlight the role of visual support in addressing the needs of students with autism spectrum disorder (ASD), helping them better navigate classroom activities. In the Colombian context, researchers like Ramírez (2016) have examined the integration of technology in special education, illustrating its potential to enhance accessibility and encourage active participation from students with special needs. Technology and visual aids thus play a crucial role in supporting students' learning processes.

The findings from this research emphasize the crucial role of adaptations and supports in creating an inclusive and effective bilingual learning environment. By implementing customized strategies tailored to the varied needs of students, teachers can significantly improve students' engagement and academic success. These efforts are essential to ensuring that neurodivergent students are not only included but also thrive in the classroom. Additionally, schools and

institutions need to provide the necessary resources to address the growing needs of this diverse student population.

Practical Strategies for Improving Inclusion and Academic Success of Neurodivergent Students in Neurotypical Learning Environments.

Based on the analysis of instruments used to obtain evidence and the categories inferred from these, along with our third aim of giving some practical suggestions aimed at refining the inclusion and academic achievement of neurodivergent students, these recommendations are intended to make such bilingual environments more inclusive and better placed to support effectively in these population:

1. Project-Based Learning (PBL):

Neurodivergent students collaborate with neurotypical peers in cooperative groups, engaging in tasks and/or assigning specific roles to each participant. Together, they work to solve real-world problems or develop final projects, which are presented at the end of the academic term to the educational community. This approach fosters social connections, highlights individual talents, enhances motivation through meaningful work, and promotes inclusion within the learning bilingual environment.

Using the findings from the surveys, it can be inferred that neurodivergent individuals rarely participate in group work or role-based activities. This limits the development of interpersonal and social skills with their peers while also hindering opportunities to raise awareness among neurotypical individuals about the importance of inclusion and the need to approach this population in a different, supportive manner. Studies show that cooperative learning strategies increase interpersonal skills and promote social integration for students with diverse needs (Johnson & Johnson, 2009).

The institution should adopt new strategies tailored to this population, as there is clear evidence of a lack of an effective approach that ensures true education quality. It is essential that these strategies go beyond the administrative implementation of *PIARES* and *DUAS*, ensuring a real impact on educational practices and the students' life.

2. Teacher Inclusion Training to Support Neurodiversity

Implement teacher training programs focused on curriculum adaptations, inclusive teaching strategies, and digital tools to enhance the bilingual learning environment by integrating language immersion, acceptance, and collaboration between students, teachers, and families to support language development, social skills, and academic success of neurodivergent students.

In the students' and teachers' interviews findings, was revealed that neurodivergent students perceive their teachers as struggling to teach, communicate, and work effectively with them, indicating that specialized training could enhance both teaching effectiveness and integration.

The implementation of continuous training programs for teachers focused on inclusive pedagogies that address cognitive diversity and the specific needs of neurodivergent students, would enhance their integration into educational and social environments. This would foster a positive impact and greater acceptance of differences within this population.

3. Promoting a School Culture of Inclusion

Promote an inclusive school culture that embraces, values, respects, and empathizes with the cognitive and cultural diversity of all students, fostering a safe and equitable learning environment through bilingual education.

A variety of activities can be implemented to raise awareness about the importance and recognition of inclusion within the educational community. These include informational talks for parents and students, family assignments focused on inclusion, the dissemination of educational videos, and awareness short activities at the end of each term inform deliver. Such initiatives aim to foster greater empathy, understanding, and commitment to diversity, ultimately strengthening an inclusive, empathetic, and respectful school culture.

The analysis of the applied instruments highlights a significant lack of communication and support for the families of the neurodivergent population. This issue is critical, a collaborative relationship between the school and families is essential to ensure an inclusive environment and promote the comprehensive development of students.

CONCLUSIONS

About the perceptions of the neurodivergent students, they expressed feeling partially included in classroom activities. While some students appreciated specific accommodations, such as visual aids or structured routines, they also noted challenges in communication and forming connections with their neurotypical peers. Teachers revealed that while they were motivated to support inclusion, many felt unprepared due to limited training in handling diverse needs.

Non-verbal communication methods, such as gestures and visual cues, were commonly used by neurodivergent students to interact. However, the lack of universally adopted communication strategies often created misunderstandings and limited meaningful interaction. These findings highlight the need for implementing structured alternative communication systems, like pictograms or communication boards.

Behaviors such as sensory sensitivities and difficulty with transitions were frequently observed, creating challenges in maintaining focus and participation. Teachers noted that addressing these behaviors required additional planning and a deeper understanding of neurodivergent needs, which they often lacked.

Neurodivergent students exhibited a strong reliance on structured routines and visual aids. Sensory challenges, such as sensitivity to noise or light, were common and directly impacted engagement. These trends underline the importance of creating sensory-friendly and predictable environments to support these learners effectively.

The findings strongly suggest the need for continuous professional development for educators. This should focus on equipping teachers with strategies to identify and address the diverse needs of neurodivergent students, including the use of assistive technologies, differentiated instruction, and behavioral management techniques.

Adapting curricula to include visual supports, project-based learning, and flexible assessments can foster a more inclusive environment. Additionally, embedding social-emotional learning into lessons can help students build essential interpersonal skills and confidence.

Individualized accommodations, such as sensory-friendly seating arrangements, predictable routines, and access to quiet spaces, can significantly enhance neurodivergent students' classroom experiences. Personalized supports not only benefit these students but also create a more adaptable and inclusive environment for all learners.

Recommendations for Future Research

Future studies should explore the long-term impacts of professional development programs on teachers' ability to implement inclusive practices and their effects on student outcomes. Research on the efficacy of inclusive policies, such as mandatory sensory-friendly classroom designs, adaptive technologies, and flexible curricula, is crucial to inform broader educational reforms.

Further studies should also focus on how collaboration between educators, families, and specialists (e.g., therapists, psychologists) enhances neurodivergent students' academic and emotional well-being. Such research could highlight best practices for joint support systems. Investigating the long-term emotional and social impacts of inclusive education on neurodivergent students across diverse school settings can provide valuable insights into refining inclusion strategies.

Moving to the limitations of the study, the limited timeframe of this study restricted the ability to observe the long-term effects of the interventions and strategies applied. The relatively small number of participants provided in-depth, qualitative insights but limited the generalizability of the findings. Future research should include larger, more diverse samples to confirm these trends.

Inclusive education is essential for fostering equitable learning environments that accommodate the needs of all students. This study reaffirms that creating inclusive classrooms is not just a necessity for neurodivergent students but a transformative opportunity for the entire educational system. It emphasizes that inclusion benefits all students by promoting empathy, collaboration, and respect for diversity.

Investing in inclusive education—through teacher training, flexible curricula, and collaboration with families—paves the way for a society that values and supports individuals of all abilities. As education evolves, the goal should not only be to meet minimum standards of inclusion but to embrace and celebrate the strengths and contributions of every learner.

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APPENDIX

Appendix A. The Observation

Observation Format:

https://docs.google.com/document/d/1yIZqNlbCg7pE-qjyHc_fY6XKsrHhAMtZ/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Observation format processed :

https://docs.google.com/document/d/1vS5nSsTU8ZQYQ35lo0qs6v4h8LkypQae/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Appendix B. Semi-structured-interview

Semistructured-interview format:

https://docs.google.com/document/d/17oFns9rczu9wrTqm9aQBnD_nI0iuHPZ2/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Semistructured- interview daniel:

https://docs.google.com/document/d/19KwfaZZuZrIYpT8y1pPgDnKd2of05im/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Semistructured intwerview ximena:

https://docs.google.com/document/d/1QD13WDqb7OT5dEsyUQmofY3Pz19HE2DO/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Semistructured intwerview yenny:

https://docs.google.com/document/d/10TMM9VjCDRgSSegORc7oU8xt-zCEMePm/edit?usp=drive_link&ouid=116334901223690959428&rtpof=true&sd=true

Appendix C. Survey

Survey format:

https://docs.google.com/document/d/10jObLqj0DZzPvMkg8envR1NhPiXzYfRL/edit?usp=drive_link&oid=116334901223690959428&rtpof=true&sd=true

Survey gerónimo:

https://drive.google.com/file/d/1F9D7LsY8EH7ezQaa05UuaU1vul7mkjd/view?usp=drive_link

Survey Maria José: https://drive.google.com/file/d/1eyx1pkNab7-bnWBJmHjicxSN_pX0b9no/view?usp=drive_link

Survey Santiago:

https://drive.google.com/file/d/1iFcq2jo3o7Loj1WNrZmr_t9I821aVNW5/view?usp=drive_link