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Analysis of Curricular Adaptations and Teacher Training in the Area of Visual Disability

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Abstract

The objective was to evaluate the process of curricular adaptation considering the visual disability of the students of the school institutions of Region 00-17 of the La Encarnación District in Paraguay. It was a non-experimental, quantitative, descriptive cross-sectional study. The sample consisted of 69 teachers, selected in a non-probabilistic, intentional, and voluntary manner. The survey technique was used through a questionnaire, validated by experts, and applied through links on the institutions' platforms. The data were quantitatively processed with Microsoft Excel 2010. As results we found the usefulness of educational strategies for students with visual disabilities, the consideration that adapted furniture and folding tables were beneficial stood out. Most teachers pointed out the lack of adequacy of furniture and infrastructure. The training received to teach blind children found aspects such as special didactics, reading and writing in Braille, extremely useful. They expressed the need to receive more training. Significant Curriculum Adaptations were considered extremely useful. The importance of respect, tolerance, and general awareness around special education was highlighted. Regarding inserting children with blindness problems into the official educational system, most teachers agreed with being active participants in the learning process. We conclude on the critical need for comprehensive teacher preparation, the availability of adequate resources, the implementation of inclusive strategies, and the promotion of positive attitudes to guarantee the academic success.

Keywords: education, curriculum, curricular adaptation, inclusive education

1. Introduction

Inclusive education is an educational model that seeks to ensure equal opportunities for learning and participation for all students, regardless of their abilities, individual characteristics,

or environments. This approach encourages classroom diversity and recognizes each student's different needs, abilities, and ways of learning. Its objective is to eliminate obstacles to learning, whether physical, cognitive, socioeconomic, cultural, or emotional, to integrate all students fully into the educational system. Inclusive education involves adjusting the curriculum, teaching methodologies, teaching resources, and school environment to address students' individual needs. Additional support is provided when necessary, and an environment of respect, acceptance, and collaboration is fostered among all educational community members.

The right to education includes various stages to achieve inclusive education. The first stage lies in accumulating the groups excluded from being educated due to their differences and including them in special education, which is recognized as segregation. The separated students are integrated into the conventional educational system in the second stage. However, by adapting the system for everyone, the students can adapt to the system with the apparent difficulties of integration. The final stage, known as inclusion, is the creation of an educational system that meets the needs of all students (Díaz Rodríguez, 2017).

In this process of development and evolution of inclusive education, integration registered a partial insertion of the particular student into the ordinary school, an enrollment conditioned by the efforts that the student and his or her family were able to develop to achieve it. The procedure given to students with special educational insufficiencies concerned a single evaluation model. The difficulties belonged to the student, who was observed from the deficit; It was not recognized whether the educational model could or should be reflected on or changed (Ministry of Education and Sciences, M.E.C., 2018).

In Latin America, inclusive education necessitates adjustments to cater to students' diverse needs across all educational levels. To effectively address these needs, updated policies and expanded curricula are imperative, ensuring alignment with evolving student requirements. Inclusive education entails tangible actions that recognize and celebrate student differences, facilitated by thorough diagnostic assessments. Moreover, it underscores the importance of educational equity and prioritizes support for vulnerable groups. This paradigm prompts critical reflections on the efficacy of educational policies, equitable access to education, curricular adaptations, and strategies to bridge educational disparities (UNESCO, 2021).

In Paraguay, Law No. 5,136 on Inclusive Education (December 23, 2013) is pivotal, outlining measures to foster an inclusive educational environment within the standard school system. Its objectives include removing barriers that impede learning and participation, emphasizing accessibility for students with specific educational needs. This is achieved through the provision of trained personnel, adaptive technologies, and the implementation of universal educational design principles. However, the Ministry of Education and Culture of Paraguay faces the ongoing challenge of ensuring quality and integrity in education. Efforts are underway to integrate programs with additional financing sources, enhancing public education capacity (Ministry of Education and Culture, M.E.C., 2012).

The Paraguayan Educational Reform of the early '90s was a response to the imperative to combat inequality and discrimination within the education system. Equity was enshrined as a foundational principle of the reform, reflecting a commitment to fostering inclusive and

equitable education (UNESCO, 2007).

Despite the existence of the Inclusive Education Law and other pertinent policies, their implementation could have been more effective. The limited availability of resources and inadequate training for educators constrain the attention given to the diversity and specific needs of individuals with disabilities. Additionally, issues related to physical and technological accessibility in educational settings further hinder their active participation. The lack of coordination among various stakeholders involved in the education of individuals with disabilities exacerbates these challenges, while discriminatory attitudes persist both within society and the educational system. Addressing these multifaceted challenges demands coordinated strategic interventions, including the allocation of sufficient resources, enhancement of educator training programs, promotion of accessibility measures, fostering societal awareness, and eradication of discriminatory practices. These recommendations aim to surmount the hurdles encountered in educating individuals with disabilities and foster an inclusive, high-quality education system in Paraguay (Velásquez Moreira, 2020).

Furthermore, the Ibero-American Studies Organization (O.I.E.) underscores the significance of fostering inclusive educational institutions where students from diverse social backgrounds and abilities can coexist and learn. This model of schooling is championed as an essential driver of educational reform. In this vein, inclusive education must be conceptualized as a transformative endeavor toward equitable and high-quality educational systems that embrace all individuals, irrespective of individual characteristics (Ruiz, 2009; Simón and Echeita, 2013). Overcoming obstacles at various system levels to integrate students with special educational needs is imperative (Booth & Ainscow, 2002).

The inclusion of students with disabilities in the educational system is pivotal to ensuring that all children, without exception, receive relevant education employing appropriate methodologies, including tailored support for students with special educational needs, whether or not they have disabilities. Active involvement of families and communities in the educational process is underscored as essential for addressing these needs (Ministry of Education of Guatemala, 2009).

Therefore, there is an urgent need to bolster the provision of quality inclusive education for students with diverse educational requirements, including those with intellectual, physical, visual, and auditory disabilities, among others, as well as those with specific personal circumstances or unique educational backgrounds. Curricular adaptations play a crucial role in this endeavor, involving adjustments and modifications in the classroom and instructional materials to meet the specific needs of students with disabilities, thereby promoting their academic success and ensuring equitable access to high-quality education.

Accommodations and modifications must be individualized for students based on their needs and personal learning styles and interests. It allows students to access the general curriculum, other learning materials, and activities to demonstrate their learning. Motivation and learning increase as they experience success in the classroom, and overall student outcomes improve (Williams, 2001). In this sense, it is essential to consider guidelines and strategies for curricular adaptations for students with visual disabilities.

Guidance on curricular adjustments for students with visual disabilities

The guidelines for a proposal in individual adaptations include access, material, and spatial elements, personal and organizational access, and essential elements. They refer to the adaptation of resources and environments to meet the specific needs of each student with visual disabilities, allowing them adequate access to the curriculum and promoting their comprehensive development. Specific factors that facilitate access to the curriculum for students with visual disabilities must be considered, such as teacher preparation, reducing the number of students per classroom, the flexibility of the conditions of access to the curriculum, the active participation of the family and the increase in support for the school (Aguilera Cano et al., s/f; Council of Europe, 2020).

These factors are essential to offer an educational response adjusted to the needs of students with visual disabilities, promoting their success in learning and participation in the educational environment.

Study materials must be available in accessible formats such as Braille text, audiobooks, digitized text files compatible with screen readers, or tactile materials; use detailed verbal descriptions when presenting graphics, images, or videos. Large font and high contrast formats facilitate reading; access to screen reading software, screen magnifiers, special keyboards or touch devices that can facilitate interaction with technology; adaptations in assessment methods, such as providing exams in alternative formats or allowing additional time to complete tests; individualized support through a specialized educator or assistant who can help the student with academic tasks according to his or her specific needs; school environment adapted for the mobility of students with visual disabilities, with braille signage, obstacle-free routes, and mobility aids available; collaboration with special education specialists and vision health professionals to ensure that appropriate adjustments are implemented and necessary support is provided (Carney et al., 2003; Council of Europe, 2020; Mboshi, 2018; Texas Education Agency, 2017; Viljoen, 2020a).

For this, it is also vital to have clear instructions on orientation and mobility, which must be designed to guide students with visual disabilities to move independently and safely. It covers both mental orientation and physical locomotion. Skills such as sighted guidance techniques, protective methods, cane instruction, and street crossing contribute to students' social, mental, and physical development with low vision or blindness. The level of training required depends on individual factors such as diagnosis, prognosis, functional vision, age, and environmental considerations. Orientation skills, essential for spatial awareness, can be incorporated into regular classroom activities, while mobility skills such as identifying landmarks, directionality, depth perception, and interpreting environmental cues are crucial. Due to limited visual learning for students with visual impairments, environmental symbols, object associations, clear labels, and understanding of gestures and facial expressions are emphasized (Carney et al., 2003; Viljoen, 2020b).

Mobility skills are adjusted according to the particular needs of each individual, encompassing the assistance of sighted guides, cane skills, tracking techniques, self-protection methods, search strategies, and travel experiences in different environments. A

strong emphasis is placed on social skills such as help-seeking, refusing help, and courtesy, especially in public interactions.

It is crucial to consider each student's specific needs since the solutions may vary depending on the degree and type of visual disability each student presents.

Various strategies are proposed to support students with visual difficulties, such as the use of extensive writing on the board, reading aloud, preparing large print teaching materials, providing papers with thicker lines, the use of magnifying glasses, encouraging the use of a pointer or finger when reading, encouraging tactile manipulation of objects, pairing with classmates for organizational support, verbal praise or motivating touches, use of student's name during discussions, taking advantage of computers' capabilities for large print or use voice synthesizers, and use tactile tools such as the abacus, tactile geometric shapes and talking calculator (Mboshi, 2018).

Reasonable accommodations may commonly be applied, including: ensuring that all recommended specialized vision equipment or modified work is located in a location accessible to students so that they can also be used independently; The visual environment should be clear and organized where everyone can easily access information without distractions from unnecessary decoration; use of natural objects whenever possible to facilitate understanding for those who may not have visual memory to remember objects or concepts (The Educational Team for Hearing and Vision, 2017; Cox & Dykes, 2001).

Non-significant and significant curricular adjustments

Curricular adaptations refer to modifications in the study plan to meet students' individual needs. Curricula adaptations are widely used among the various strategies to address diversity in education centers. These adaptations are defined as adjustments in objectives, content, evaluation criteria, activities, and methodology designed to address students' differences.

Strategies for adapting the general curriculum are considered to adapt to students' needs, allowing greater individualization in the teaching-learning process, especially for those with special educational needs. Curricular adaptation involves a decision-making process to guarantee that all students can access the curriculum, considering their needs, the circumstances and possibilities of the center, and the available resources (Reta Sabarrós, 2017).

Adaptations can be significant or non-significant. Curricular adaptations, whether significant or non-significant, are educational strategies applied to satisfy students' individual needs and facilitate their learning. Significant ones involve substantial changes in content, objectives, and teaching methods to address significant challenges, such as reducing content, adjusting difficulty levels, and using alternative materials. The non-significant, less invasive ones offer support without fundamentally modifying the standard curriculum, including additional time, assistance, and alternative assessment environments. Both seek to ensure equal opportunities and access to inclusive education (Junta de Andalucía. Conserjería de Educación y Ciencia, 2016; Reta Sabarrós, 2017).

Individualized curricular adaptation (ICA) refers to the adjustments or modifications made in a classroom's educational proposal to meet a single student's specific needs due to his or her special requirements. These adaptations are classified as non-significant and significant. The non-significant ones do not affect the content taught to the rest of the class. The main advantage of the ICA lies in ensuring an educational plan that is effectively adapted to the needs of the student. (Reta Sabarrós, 2017; Educational Planning Services, s.f.). However, in situations where several students in the class have mild learning difficulties, the application of ICA can result in a considerable investment of time in trying to find individual solutions, it being more practical to develop a more general and specialized approach (Akroscomunicación, 2018)

It is important to note that specific accommodations may vary based on the individual needs of each student, and these decisions are often made in collaboration with the educational team, including parents and special education specialists. By assessing their compliance with these reasonable adjustments, schools can ensure they proactively consider the needs of children with visual impairments and make necessary accommodations to support their education.

State of the art

Next, a review of research and studies that address various aspects of inclusive education and the experiences of students with visual disabilities is developed. The first approach analyzes the factors influencing teachers' attitudes toward including students with special educational needs. A second approach focuses on the key barriers' children with visual impairments face. The third perspective draws on several investigations that explore educational inclusion from different angles that address the lack of teacher preparation and the need for psycho-pedagogical support. A fourth approach examines the curriculum for students with visual impairments in inclusive settings, highlighting the importance of independent living skills, recreation, leisure, the use of assistive technology, and teachers' mixed attitudes toward teaching students with visual impairments.

González-Rojas and Triana-Fierro (2018) from the Universidad de la Amazonía, Colombia, addressed the influential factors in teachers' attitudes towards including students with special educational needs. According to experts, the seven factors influencing teachers' attitudes toward students with special educational needs are responsibility, performance, training and resources, social relationships, classroom climate, beliefs, and emotional development. It was concluded that teachers, directors, professors, and educational entities possess potential, so insertion offers the favorable results expected from it in the comprehensive alignment of students.

In sub-Saharan Africa, the critical barriers to providing inclusive education to children with visual impairments are multifaceted and include both micro and macro factors, including the disability gap, children with visual impairments are less likely to enroll in education, complete a course in primary education, and be perceived as literate compared to their peers. Another factor is demoralized and underprepared staff, high student-teacher ratios, limited school budgets, outdated school infrastructure, overly prescriptive curricula, summative assessment systems, and poorly disseminated, sometimes lacking, policy framework,

specificity and relevance. The failure of education systems in many countries in sub-Saharan Africa further compounds the challenges children with visual impairments face. Addressing these barriers requires a comprehensive approach that considers the micro and macro factors that influence the provision of education for children with visual impairments (Le Fanu et al., 2022).

Lamichhane (2017), in a case from Nepal according to teachers reported some considerations for adjusting their teaching style when teaching students with visual impairments. These adjustments ranged from seating arrangements to pedagogical strategies like increased verbal interaction. However, questions still need to be answered regarding the adequacy of these adjustments. Students with visual impairments face challenges in tasks such as taking tests and completing assignments, while teachers struggle with tasks like grading assignments in Braille. Despite the increasing inclusion of students with disabilities in mainstream schools, support for teachers in accommodating their needs is lacking. Nevertheless, teachers are willing to adapt their teaching practices, indicating a welcoming attitude towards students with disabilities. It highlights the need for improved training and resources for teachers and students in inclusive education. Despite the lack of specific training, teachers are trying to create inclusive environments, underscoring the importance of ongoing support and development in this area.

Tumwesigye Niyisabwa et al. (2018) developed a study and found that there were minimal curriculum adaptations implemented in regular Universal Primary Schools (UPE) due to teacher training deficiencies, and both regular UPE schools and integrated schools lacked necessary physical adaptations for students with low vision. It highlights ongoing challenges in meeting the needs of students with visual impairments. Recommendations were made to address these issues. The study concluded that access and retention of students with low vision are heavily influenced by curriculum and environmental adaptations, emphasizing the importance of implementing these changes. The study fulfilled its objectives and addressed gaps through various research instruments. Overall, there is a need for increased support and resources to ensure quality education and independent living skills for students with low vision in regular UPE schools.

A study in Keya revealed that a majority of learners with visual impairments struggle academically due to the inadequate implementation of specialized educational provisions for the visually impaired in schools. It underscores the necessity for a tailored curriculum by the Special Needs Education policy, driven by a blend of social, economic, and partly cultural factors. Given the diverse range of needs among visually impaired learners, there is a pressing need for an increased number of specialized educators in special needs education, ensuring that each regular school can accommodate at least one such expert. Moreover, there is a crucial need to educate parents of visually impaired learners and the broader community on the importance and nuances of their education (Agesa, 2014).

A study evaluated the implementation of the expanded core curriculum (ECC) for visually impaired learners in a school in Zambia using a qualitative case study approach. Data was collected through interviews, discussions, questionnaires, and document analysis involving

various stakeholders. Findings revealed that ECC was taught inconsistently with a curriculum guide, leading to complete skill acquisition among learners. Challenges included a need for clear curriculum guidelines, insufficient time for teaching ECC, and a shortage of teaching resources. Proposed strategies for improvement include developing clear ECC guidelines and enhancing personnel training. Collaboration among teachers, trainers, curriculum specialists, and parents is crucial for enhancing skill delivery (Simalalo, 2017).

The analysis of inclusive education and its advances is supported by research by several authors. González Sarmiento (2013) and Fernández Núñez (2015) address educational inclusion from the lack of teacher preparation and the need for psycho-pedagogical support to transition from special classrooms to regular classrooms. For their part, Spinzi and Wehrle (2017) evaluate educational inclusion policies in Paraguay, highlighting progress, but there is a lack of evaluations and lags in vulnerable groups.

Jiménez Ruiz (2015) highlights the need to adapt primary education for students with visual disabilities and proposes strategies to improve academic inclusion. Likewise, it considers the importance of including students with visual disabilities in the educational system, the fundamental role of Information and Communication Technologies (ICT), and the application of cytotechnology, tools, and resources designed to improve their autonomy and social inclusion. For their part, Zamora López and Marín Perabá (2021) highlight the impact of typhlotechnology on daily life, education and access to information for people with visual disabilities. The importance of inclusive education that considers the individual needs of students with visual disabilities is emphasized, emphasizing the adaptation of technological resources to guarantee access to information and participation in the educational process on equal terms with their peers. They emphasize the need for greater awareness and acceptance of diversity in society and the educational system, recognizing the potential and individual capabilities of each person with visual disabilities and promoting an inclusive environment that allows their full development and participation in all areas of life.

Key components of the curriculum for students with visual impairments in an inclusive setting are independent living skills, recreation, and leisure, which emphasizes the importance of providing targeted instruction with opportunities to practice specific skills to ensure that students with visual impairments enjoy participation in recreational and leisure activities. Likewise, the curriculum should provide visually impaired people with first-hand experiences in various jobs and roles in life to make personal and independent decisions. It should also provide opportunities for students to explore their strengths and interests in a systematic and well-planned manner, as well as the use of assistive technology to equalize the ability to access, store, and retrieve information between sighted people and those with visual impairments, adapting the curriculum in instruction with strategies, instructional materials, and curricular content to address the learning needs of students with visual impairments (Parween & Dheesha, 2018).

It is imperative to develop innovative and effective teaching strategies to address the specific needs of students with visual impairments so that they can access quality education and participate effectively in the educational environment. Therefore, teachers should be

encouraged to adopt the principles of universal design for learning to provide effective and accessible instruction to students. It aims to adapt to various learning styles and needs and curriculum flexibility that emphasizes a consistent and realistic approach in curriculum planning and implementation to address specific learning needs. Another aspect that must be addressed is the mediated learning experience to improve social competencies and independent living skills with the adaptation of instructional strategies and resources that encompass alternative or multisensory modalities to compensate for their vision (Cabello et al., 2016; Cox & Dykes, 2001; Willings, 2022).

These components ensure that students with visual impairments can access a comprehensive and inclusive education that addresses their specific needs and challenges.

A systematic review study determined that teachers had mixed attitudes influenced by several factors, including unpreparedness for teaching and learning students with visual disabilities. The author proposes that the ideal training would encompass theoretical and knowledge-based content on inclusion and visual impairment, along with authentic, face-to-face interactions and practical teaching experiences. Effective teacher training will allow general education teachers to develop strategies that promote student access to learning material; however, teachers should have a comprehensive support system. Specifically, there must be internal and external support, and internal support must incorporate principals, teachers, and other professionals (Miyauchi, 2020).

Adapting the curriculum can be done with the implementation of learning strategies and with the appropriate formulation of objectives, the development of teaching materials, learning media, and evaluation activities. Learning strategies can be adapted using cooperative and participatory learning methods, providing equal opportunities between children with special needs and normal children. The use of educational media can be adapted in several ways. For example, a child with visual impairments is provided with more visual media, while a child with hearing loss is provided with more audio. Meanwhile, the curricular evaluation is adapted according to the study materials delivered. For children with hearing loss, eliminate oral (listening) assessments, replace them with sign language on oral tests, and use more on written and performance tests. The findings of this research reveal that, although some adaptations have been made in learning strategies and materials, there is room for improvement, emphasizing the importance of interventions such as seminars, training, and workshops to improve the competence of special assistant teachers in the adaptation of the curriculum for inclusive education (Mirasandi et al., 2019).

In this sense, teacher training is crucial in this process, needing updates that address student diversity and promote inclusive attitudes. Teachers are essential in implementing inclusive policies, so more research is required on best practices in the classroom and their scalability to broader levels (UNESCO, 2021).

The diverse perspectives presented in this state-of-the-art section highlight the complexity of inclusive education and the need for holistic and adaptive approaches to address the specific needs of students with visual impairments.

Through an integrated examination of these research studies, the following observations emerge:

Similarities:

1. Focus on Teachers' Attitudes and Training: These studies underscore the significance of teachers' attitudes and training in accommodating students with special educational needs, particularly those with visual impairments. They acknowledge the pivotal role of teacher preparedness and attitudes in shaping the inclusivity and effectiveness of education for these individuals.

2. Challenges in Curriculum Implementation: These studies recognize the hurdles of implementing specialized curricula for visually impaired students. These challenges encompass insufficient training, unclear curriculum guidelines, time constraints, and resource shortages.

3. Need for Collaboration and Support: The studies stress the importance of collaborative efforts and support from various stakeholders, including teachers, trainers, curriculum specialists, parents, and educational institutions. They advocate for a comprehensive approach involving all stakeholders to address the identified challenges effectively.

Differences:

1. Geographical Context: While these studies delve into issues concerning visual impairments in education, they are situated in different geographical contexts. One study focuses on Colombia, while the other explores challenges specific to sub-Saharan Africa, particularly Zambia.

2. Specific Findings and Recommendations: Each study presents context-specific findings and recommendations tailored to the identified challenges. For instance, the Colombian study identifies seven factors influencing teachers' attitudes and advocates for comprehensive alignment among stakeholders. In contrast, the study in sub-Saharan Africa outlines multifaceted barriers and recommends strategies such as curriculum adaptations and resource enhancements.

3. Policy and Contextual Analysis: The depth of analysis regarding policy frameworks and contextual factors influencing inclusive education varies between the studies. The sub-Saharan Africa study offers a detailed examination of the region's policy gaps and contextual challenges.

Therefore, it is essential to analyze the state of teacher training, the adaptation of resources, and school infrastructure to verify whether an inclusive and quality education is being implemented for students, regardless of their differences and needs.

Thus, the question arises about the adaptation process regarding the curriculum, learning resources, and teacher training considering the visual disability of the students in Region 00-17 of the La Encarnación District in Paraguay. The general objective was to evaluate the process of curricular adaptation considering the visual disability of the students of the school

institutions of the region above. The specific objectives were to characterize the necessary curricular adaptations made by teachers to students with visual disabilities, describe the specific training that teachers receive to facilitate learning for children with visual disabilities, identify types of training and their level of usefulness in improving teachers' knowledge regarding the processes of curricular adaptation and learning of children with visual disabilities; analyze the difficulties of teachers in facilitating learning for children with visual disabilities in the selected institutions; identify the types of management carried out by teachers for the effective insertion of children with blindness problems in the official educational system; and determine the degree of usefulness of the curricular adjustments made for students with visual disabilities and the limitations found in the teaching-learning process.

The research is relevant in producing results on the situation of inclusive education, the adaptations of support infrastructure, curricula, and teacher training in the area of visual disability in order to find a way to optimize management methods used to provide better education for students with different disabilities. Likewise, it will directly benefit teachers because, from the results obtained, they will obtain knowledge for good inclusive management practices in these educational centers, identifying the types of management for the insertion of children with visual disabilities.

2. Method

It was a non-experimental, quantitative, descriptive cross-sectional study. A descriptive cross-sectional study is a type of research design that involves collecting data from a population or a representative subset at a single point in time to describe the characteristics of that population. In this study, researchers do not manipulate variables or follow participants over time; instead, they observe and describe the variables of interest as they naturally occur (Hernández et al., 2014).

All six educational institutions from Region 00-17 of La Encarnación District in Asunción were included. The study was carried out in 2022. Each school's teaching staff participated, making a total of 69 teachers, thus forming the subjects of the study. It was an intentional and voluntary sampling. Because the population was small and accessible without restrictions, working with the entire population was convenient. Sampling was no longer necessary (Ñaupas et al., 2014; Vara, 2015).

The survey technique was used through a questionnaire explicitly developed with closed questions to collect self-reported data from participants, using the indicators of curricular adaptations, teacher training, types of difficulties teachers face, types of management strategies, and the usefulness of curricular adjustments for students with visual disabilities. The questionnaire was thoroughly reviewed by five experts in special education, curriculum development, and visual impairment. These experts had to provide feedback on the questions' relevance, clarity, and appropriateness. They confirmed the instrument's validity without presenting changes to the initial proposal of the instrument. The questionnaire was distributed to every teacher via email and through the digital platform utilized by their respective institutions. This approach guaranteed accessibility for all teachers and facilitated the

streamlined data collection. Before accessing the survey, the researcher conducted a comprehensive presentation elucidating the research's objectives and the significance of teacher participation, securing explicit consent from each participant. This process ensured that teachers comprehended their role and the confidential nature of their responses. Additionally, active involvement and endorsement from school directors were obtained prior to commencing the survey, further fostering participation among teachers and validating the research within the institution.

The questionnaires were processed quantitatively through the Microsoft Excel spreadsheet version 2010. The ethical principles established in all research were respected. The researchers guaranteed that the participation of the study subjects was voluntary, with the possibility of withdrawing from the research at any time. The privacy and confidentiality of the data obtained was maintained.

3. Results

The results on teachers' perception of the degree of usefulness of educational strategies aimed at students with special educational needs, 19 teachers considered that the strategies related to the use of adapted furniture and folding tables were beneficial, 24 thought that the application strategies of oral exams for students with visual disabilities were beneficial, 14 considered the ramps to the school very useful and 12 considered that reading and writing in Braille was extremely useful. Most teachers determined the lack of appropriate adaptation of school furniture and access infrastructure such as ramps.

According to the teacher's perception of the usefulness of the training they received for teaching children with blindness problems, the majority reported that the training and training such as special didactics, reading and writing in Braille, and the abacus were extremely useful (33), and typhlotechnological resources, visual stimulation and orientation, and mobility, beneficial (36). The majority, 59, thought that they required more training.

Regarding teachers' perception of the degree of usefulness of curricular adaptations in students with visual disabilities, it is observed that the majority, 36 teachers, considered that the Significant Curricular Adaptations (SCA) were extremely useful, 19 of them thought that the Non-Significant Curricular Adaptations (NSCA) were very useful and 14 that the Individualized Curricular Adaptations (ICA) were beneficial tools.

Curricular adaptations for students with visual disabilities are essential to guarantee equitable education access. Below are the results of some significant adaptations that, according to teachers, should be implemented in the curriculum to meet the needs of these students.

Teachers could choose more than one option:

1. Provide textbooks, teaching materials, and resources in accessible formats, such as Braille, audiobooks, or electronic versions compatible with screen readers (59).
2. Facilitate assisted technologies, such as screen readers, voice recognition software, and special keyboards, to improve access to information and participation in digital activities (64).

3. Ensure that visual information is presented verbally or tactilely, providing detailed descriptions of graphs, diagrams, and other visual representations (54).
4. Adjust assessment media and resources for equitable participation, such as providing tests in Braille format, allowing oral or written responses assisted by adaptive technologies, or providing additional time (53).
5. Develop specific training programs in tactile and mobility skills, allowing students to acquire independence in exploring the environment (48).
6. Provide clear and detailed verbal instructions and support them with tactile materials or concrete examples to ensure understanding of concepts (63).
7. Ensure the physical environment is safe and accessible, with obstacle-free routes, tactile signage, and auditing to facilitate independent mobility (61).

Regarding knowledge about the difficulties or complications that could arise in facilitating learning for children with visual disabilities, respect and tolerance were highlighted as extremely useful (33), and general awareness regarding special education was beneficial (19), and face and resolve the limitations regarding teaching resources (17).

The results on the level of agreement with the types of management carried out for the insertion of children with blindness problems in the official educational system, the majority of the teachers, 19, mentioned that they agreed with being actors participating in the process. of learning, 17 of them considered the option of knowledge transmitters, 13 chose to agree with the role of collaborator, 12 as learning guides and 8 indicated control and direct learning.

4. Discussion

The results of the research on the usefulness of educational strategies aimed at students with visual disabilities, the majority of teachers considered that the distribution and adaptation of furniture was beneficial, which agrees with other positions and studies such as those of Carney et al. (2003), Cox & Dykes (2001), Viljoen (2020b), Parween & Dheesha (2018), the Junta de Andalucía. Department of Education and Science (2016), and Reta Sabarrós (2017).

Likewise, teachers also highlight the need to implement oral evaluations as an alternative for assessing the learning of students with visual disabilities, reinforcing this result with the contributions of studies and conceptualizations formulated by various authors (Andrade Lozada & Yepes Camacho, 2020; Carney et al., 2003; Council of Europe, 2020; Mirasandi et al., 2019; Texas Education Agency, 2017; Viljoen, 2020a). Notably, they propose other evaluation alternatives such as reading tasks carried out in Braille, use of graphic material, and replacement or complement of an image or diagram with a written description (Andrade Lozada & Yepes Camacho, 2020; Viljoen, 2020b).

Authors such as Allman & Lewis (2014), Carney et al. (2003), Raver (2009), Kızılaslan (2020), and Pierangelo & Giuliani, G. (2008) offer and support a variety of perspectives and strategies for adapting the oral assessment and making it accessible for students with visual impairments. There are a variety of oral assessment methods that can be beneficial for

students with visual impairments: structured interviews allow students to express themselves verbally about a specific topic, which may include open and closed questions to assess their understanding and knowledge; oral presentations in which students can present assigned topics or projects they have developed, allowing them to demonstrate their understanding and verbal communication skills; guided discussions on relevant issues help assess students' ability to argue, debate, and express their views verbally; narrations in which students narrate a story, describe an event or explain a process can be an effective way to assess their ability to organize and communicate information orally; role-plays can help assess understanding of social situations and the student's ability to communicate effectively in different contexts; group problem-solving to solve problems that can allow students to demonstrate their ability to communicate and collaborate verbally; creating simulated situations where students must communicate and make decisions can be an effective way to assess practical and problem-solving skills; providing accommodations and support based on the student's needs is also essential. It may include using Braille materials, detailed verbal descriptions of graphic materials, assistive technology such as screen readers, and allowing more time to answer questions or complete tasks. The key is to ensure that assessment methods are accessible and equitable for all students, including those with visual impairments.

Regarding the training teachers received to teach children with blindness problems, most said that the special didactics had been very useful, reading and writing in Braille and the abacus were extremely useful, and the typhlotechnological resources, visual stimulation, orientation, and mobility. They are fundamental knowledge and training to meet students' specific needs, as established by other authors (Mirasandi et al., 2019; Miyauchi, 2020; Zamora López and Marín Perabá (2021). Adopting a comprehensive approach encompassing both the content and the specific methods and techniques of teacher education is essential.

Regarding content, teachers must be sensitized about diversity, understanding its importance and value in the educational environment. It involves knowing and recognizing the various dimensions of diversity, such as cultural, linguistic, gender, and skill differences. Additionally, educators must become familiar with the theories and practices of inclusive education, which promote the participation and success of all students, regardless of their characteristics. Likewise, they must acquire skills in differentiated teaching strategies to adapt teaching and learning to student's individual needs, recognizing their rhythms and learning styles. Finally, teachers must develop skills to create an inclusive and respectful environment in the classroom where all students feel valued and safe to participate.

About teacher training methods, the implementation of specialized workshops and seminars on diversity in the classroom, which allow educators to learn and practice new strategies and approaches, is recommended. Additionally, observation and mentoring by educators experienced in creating inclusive classrooms can be invaluable to teachers' professional development. Collaborative peer learning is also an effective tool, allowing educators to share experiences, resources, and best practices for addressing diversity in the classroom. Introduction to educational technology, such as using reading software for students with visual impairments or adaptive learning applications, can also help promote inclusion in the academic environment. Finally, the importance of collaboration with families and

communities is highlighted, recognizing their fundamental role in supporting the success of diverse students.

By combining these elements, teacher education programs can equip educators with the skills, knowledge, and attitudes necessary to effectively address diversity in the classroom and create inclusive environments where all students can reach their full potential.

Teachers considered that Significant Curricular Adaptations (SCA) were beneficial. SCA are adjustments to the school curriculum to meet the needs of students with visual impairments.

It is imperative to highlight here that the SCA. involves modifications in the didactic systematization that affect the achievement of the objectives and evaluation criteria in the area, subject, or adapted module. NSCA refers to elements of the curriculum that keep the content taught to the rest of the class the same. Significant individual curricular adjustment is carried out only if a psycho-pedagogical evaluation is first carried out on the student (Resolution 22720, June 8, 2018).

They are crucial for inclusive education; they seek to provide equitable access to information through accessible formats such as Braille or auditory versions. In addition, they facilitate full participation in educational activities, adapt the curriculum for the development of specific skills, promote autonomy by providing support, guarantee the fulfillment of rights to education, and promote the comprehensive development of the student (Mirasandi et al., 2019; Parween & Dheesha, 2018; Reta Sabarrós, 2017). In short, they are essential to ensure equal opportunities and active participation, comprehensive development, and autonomy of students with visual disabilities.

Accommodations must be personalized to each student's needs, and open communication and collaboration with professionals, parents, and the students themselves are critical to ensuring an inclusive and thriving educational environment.

In the context of the teachers' difficulties in teaching children with blindness problems in the institutions selected for the study, they mainly highlighted the lack of training. Teachers still need to gain the skills and attitudes to meet these children's diversity of expectations and needs, coupled with the scarcity of resources. Therefore, teacher preparation is mandatory to guarantee an effective and quality teaching-learning process. Indeed, in research and other studies on the quality of education aimed at students with visual disabilities, particular reference is made to this fact (González-Rojas and Triana-Fierro, 2018; Fernández Núñez, 2015; González Sarmiento, 2013; Le Fanu et al., 2022; Miyauchi, 2020; UNESCO, 2021).

Training teachers to teach students with visual impairments is crucial for several reasons that impact the student's educational experience and the school's inclusive environment. Through training, awareness and sensitivity are created; specialized pedagogical skills are acquired to adapt their teaching; it also allows teachers to become familiar with and effectively use assistive technologies and specific tools designed to improve student access and participation; teachers can create and adapt educational materials to make them accessible to students with visual impairments; creating an inclusive environment in the classroom and at school; and ensuring the application of educational regulations and policies related to the inclusion of

students with disabilities.

Another of the difficulties encountered by teachers when teaching children with blindness problems was the limitations related to resources since having adequate infrastructure and resources facilitates the teaching and learning of these students.

The literature establishes that having adequate resources for the teaching and learning of children with visual disabilities is of vital importance for several reasons, including that they facilitate the accessibility and active participation of students, allowing them to make the most of their potential, in addition, they contribute to the creating an inclusive environment, where equal opportunities for all students are promoted. Providing adapted materials and specialized tools removes barriers, and full participation in the classroom is encouraged. It also encourages the development of specific skills, such as reading Braille, using assistive technologies, and other adaptive tools. Likewise, adequate resources for teaching children with visual disabilities can enhance their independence and autonomy, allowing them to develop critical skills for their daily life and future integration into society (Aguilera et al., s.f.; Carney et al., 2003; Cabello et al., 2016; Jiménez Ruiz, 2015; Zamora López and Marín Perabá, 2021).

Another result was the usefulness of knowing the difficulties in facilitating learning for children with visual disabilities, such as the attitude of respect and tolerance, resource limitations, and an awareness of special education. Teachers must know and maintain a climate and attitude of respect and tolerance towards students with visual disabilities. It creates an inclusive educational environment where diversity is valued, and equal opportunities are promoted.

Understanding the challenges faced by children with visual disabilities underscores the importance of respect and tolerance. By implementing specific strategies and cultivating a culture of inclusion, societies can create environments where individuals with visual disabilities are valued, respected, and provided with equal opportunities in all aspects of life. Negative societal attitudes, stereotypes, and misconceptions about disability can erect barriers to inclusion, hindering access to education, employment, and social engagement. These attitudes often stem from fear, ignorance, or lack of exposure to individuals with disabilities. Various strategies can be employed to promote societal change and enhance inclusion. Raising awareness and understanding of visual disabilities through educational initiatives can challenge stereotypes and foster empathy. Media representation plays a crucial role in shaping attitudes; hence, increasing the portrayal of individuals with visual disabilities in a positive light can combat stereotypes. Ensuring inclusive environments with accessibility features such as Braille signage and screen readers is vital. Empowering individuals with visual disabilities to advocate for themselves and fostering partnerships among stakeholders can drive systemic change and promote inclusive practices. Collaborative efforts across government, non-profit organizations, businesses, educational institutions, and community groups can support initiatives that enhance accessibility and benefit individuals with visual disabilities, such as job training programs and accessible education services (Manitsa & Doikou, 2022; Randle & Reis, n.d.).

Awareness of resource limitations specific to visual impairment is crucial to adapting the teaching environment and materials appropriately. On the other hand, understanding special education aimed at these students allows teachers to address their needs effectively, promoting their independence and comprehensive development (González-Rojas and Triana-Fierro, 2018; Mboshi, 2018; Mirasandi et al., 2019; Miyauchi, 2020).

Regarding the efforts carried out by the teacher to insert children with blindness problems into the official educational system, it is mentioned that they are participating actors in the learning process, transmitters of knowledge, and guides in the educational process. The teacher's role in teaching students with visual disabilities involves cultivating an inclusive and adapted educational environment. It includes understanding and applying pedagogical strategies that fit the specific needs of students with visual impairments. The teacher must provide access to adapted materials and resources, encourage independence and active participation, and cultivate an attitude of respect and support. Furthermore, collaboration with special education professionals and constant updating in inclusive practices are essential to optimize students' learning and comprehensive development with visual disabilities (Council of Europe, 2020; Mboshi, 2018; Viljoen, 2020b; Willings, 2022).

Limitations of the study

The results are based primarily on teachers' perceptions and do not include the direct perspective of students with visual impairments. Therefore, it is recognized that the lack of inclusion of the perspective of students with visual impairments represents a significant limitation in the interpretation and applicability of the study results. For future research, it would be beneficial to incorporate methods that allow the active participation of students with visual impairments, such as interviews, focus groups, or questionnaires adapted to their specific needs, in order to obtain a more complete and accurate understanding of their experiences and perceptions in the educational context.

Scope and applicability of the study

The scope and applicability of the study lie in its comprehensive examination of the process of curricular adaptation for students with visual disabilities within the selected school institutions of the region. The study aims to provide insights into various aspects of this process by addressing a range of specific objectives, offering valuable information for educational practitioners, policymakers, and researchers:

1. The study seeks to characterize the curricular adaptations teachers implement to cater to the needs of students with visual disabilities. It includes identifying the specific adjustments made to the curriculum, instructional materials, and assessment methods to promote inclusive learning environments.
2. It aims to describe the training received by teachers to enhance their capacity to facilitate learning for children with visual disabilities. By examining the nature and extent of this training, the study can assess educators' preparedness in addressing their students' diverse needs.

3. The study intends to identify the types of training programs available to teachers and evaluate their effectiveness in enhancing teachers' knowledge and skills related to curricular adaptation and the learning process of children with visual disabilities. This evaluation is essential for informing future training initiatives and professional development efforts.
4. The study seeks to analyze the challenges teachers face in facilitating learning for students with visual disabilities, shedding light on potential barriers to effective inclusion and highlighting areas for improvement in support services and resources.

5. Conclusion

It concludes with a schematization of the results as follows, taking into account the objectives of the research:

1. Distribution and Adaptation of Furniture:

Most teachers found the furniture adaptation extremely useful, which supports its importance for the inclusive educational environment.

2. Oral Evaluations as an Assessment Alternative:

The teachers highlighted the importance of carrying out oral evaluations.

3. Teacher Training:

Training in special didactics, Braille, abacus, typhlotechnological resources, visual stimulation, orientation, and mobility was considered highly useful.

4. Significant Curriculum Adaptations (SCA):

SCA are perceived as extremely useful. Its crucial role in inclusive education is supported by underlining its importance in ensuring equity in access to education.

5. Difficulties of Teachers:

The lack of training is the main difficulty pointed out by teachers, which is required to address diversity in the classroom more effectively and appropriately.

6. Resource Limitations:

Teachers identify resource limitations as a difficulty since it is essential to have adequate resources to ensure effective and equitable education.

7. Attitude of Respect and Tolerance:

Teachers highlight the attitude of respect and tolerance as essential, highlighting the importance of creating an inclusive environment that values diversity.

8. Teacher Management for Insertion into the Educational System:

The teacher plays roles of learning development, collaboration, and guidance in the insertion of students with visual disabilities; the importance of the teacher's role in creating an

inclusive educational environment is reinforced.

As a general conclusion, it is established that:

The research highlights the critical need for comprehensive teacher preparation, the availability of adequate resources, the implementation of inclusive strategies, and the promotion of positive attitudes to guarantee the academic success and comprehensive development of students with visual disabilities in the educational system.

6. Recommendations and Lines of Action

- Systematically implement the adaptation of furniture in educational environments, considering the specific needs of students with visual disabilities. Develop training programs for teachers on techniques and strategies for adapting furniture in the classroom.
- Develop specific resources and guides for the effective implementation of various types of evaluation in various educational contexts.
- Improve and expand teacher training programs, incorporating aspects related to special didactics, Braille, abacus, typhlotechnological technologies, visual stimulation, orientation, and mobility—design and offer continuing education courses that specifically address the educational needs of students with visual impairments.
- Promote the widespread implementation of SCA as a standard practice to ensure equity in access to education. Develop guidelines and resources for effective planning and implementation of SCA., involving teachers, administrators, and inclusive education specialists.
- Advocate for more equitable and appropriate allocation of resources to meet the needs of students with visual impairments. Collaborate with educational institutions and authorities to identify and guarantee specific resources for inclusive teaching and learning.
- Promote awareness and training programs to create a culture of respect and tolerance in the educational environment. Integrate training modules on diversity and inclusion into educational programs and promote activities that foster understanding and empathy.
- Recognize and strengthen the teacher's active role in the development of learning, collaboration, and guidance of students with visual disabilities. Establish protocols and practices that support and recognize the teacher's management in the insertion and development of these students in the educational system.

Suggested lines of research:

- Effectiveness of furniture adaptations considering their impact on the learning and well-being of students with visual disabilities.
- Optimization of assessment methods explores the effectiveness and feasibility of

implementing various assessments, considering educational contexts and their impact on students' understanding and academic performance.

- Development of teacher training programs to determine the effectiveness of programs that specifically address aspects that impact the quality of teaching for students with visual disabilities.
- Evaluation of implementation of Significant Curriculum Adaptations (SCA) to determine how it affects students with visual impairments' academic performance and active participation.
- Exploration of practical and sustainable solutions to mitigate resource limitations identified by teachers, examining collaborative strategies between educational institutions, authorities, and organizations to ensure adequate resources.
- Exploration of the interrelationship between these research areas, promoting integrated approaches that address the complexity of ensuring inclusive and quality education for visually impaired students. Furthermore, it is suggested that the implementation of the recommendations derived from current research in specific educational environments be evaluated to measure their effectiveness and adjust strategies according to the results obtained.
- Subsequent studies might delve deeper into implementation inclusive education policies challenges, analyzing their underlying reasons and suggesting targeted strategies for resolution.
- Implementation of a more robust study design, such as a randomized controlled trial, to establish causal links between curricular adaptation and academic achievement.
- Expansion of the sample size to encompass greater diversity, ensuring the findings accurately reflect the broader population of students with visual disabilities.
- Incorporation of qualitative research techniques, like interviews or focus groups, to obtain a more profound insight into the experiences and viewpoints of both teachers and students with visual disabilities.
- Develop longitudinal research to evaluate the enduring effects of curricular adaptation on academic outcomes and the overall well-being of students with visual disabilities.

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