Jéssica Alegria Arca
Daniel Novaes
Marcio Hollosi
(Organizadores)

INCLUSIVE EDUCATION AND DIGITAL TECHNOLOGIES

EDITORA
SCHREIBEN

Jéssica Alegria Arca
Daniel Novaes
Marcio Hollosi
(Organizadores)

INCLUSIVE EDUCATION AND DIGITAL TECHNOLOGIES

EDITORA
SCHREIBEN

2026

© By the Organizers – 2026
Editing and cover design: Schreiben
Cover image: milachka - Freepik.com
Proofreading: the authors
Book published in: 24/01/2026 Publication agreement: TP0052026

Editorial Board (Schreiben Publishing):
Dr. Adelar Heinsfeld (UPF)
Dr. Airton Spies (EPAGRI)
Dra. Ana Carolina Martins da Silva (UERGS)
Dr. Cleber Duarte Coelho (UFSC)
Dr. Daniel Marcelo Loponte (CONICET – Argentina)
Dr. Deivid Alex dos Santos (UEL)
Dr. Douglas Orestes Franzen (UCEFF)
Dr. Eduardo Ramón Palermo López (MPR - Uruguai)
Dr. Fábio Antônio Gabriel (SEED/PR)
Dra. Geuciane Felipe Guerim Fernandes (UENP)
Dra. Ivânia Campigotto Aquino (UPF)
Dr. João Carlos Tedesco (UPF)
Dr. Joel Cardoso da Silva (UFPA)
Dr. José Antonio Ribeiro de Moura (FEEVALE)
Dr. Klebson Souza Santos (UEFS)
Dr. Leandro Hahn (UNIARP)
Dr. Leandro Mayer (SED-SC)
Dra. Marcela Mary José da Silva (UFRB)
Dra. Marciane Kessler (URI)
Dr. Marcos Pereira dos Santos (FAQ)
Dra. Natércia de Andrade Lopes Neta (UNEAL)
Dr. Odair Neitzel (UFFS)
Dr. Wanilton Dudek (UNESPAR)

This publication is an independent production. The accuracy of the information, opinions, and concepts expressed herein, as well as the origin and presentation of tables, charts, maps, photographs, and references, is the sole responsibility of the author(s).

Editora Schreiben
Linha Cordilheira - SC-163
89896-000 Itapiranga/SC
Tel: (49) 3678 7254
editoraschreiben@gmail.com
www.editoraschreiben.com

International Standard Cataloging-in-Publication Data (CIP)

E24 Inclusive education and digital technologies / organizadores Jéssica Alegria Arca, Daniel Novaes e Marcio Hollosi. – Itapiranga : Schreiben, 2026.
116 p. : il. ; e-book ; 15 x 21 cm.
Inclui bibliografia e índice remissivo
E-book no formato PDF.
ISBN: 978-65-5440-620-8 [versão impressa]
EISBN: 978-65-5440-621-5 [versão digital]
DOI: 10.29327/5773056
1. Educação inclusiva. 2. Tecnologias digitais na educação. 3. Inclusão escolar. 4. Tecnologia educacional. I. Arca, Jéssica Alegria. II. Novaes, Daniel. III. Hollosi, Marcio. IV. Título.
CDD 371.334

Responsible Librarian Juliane Steffen CRB14/1736

SUMMARY

PRESENTATION OF THE COLLECTIVE WORK.....5
The Editors

PREFACE.....7
Eladio Sebastián-Heredero

DIGITAL RESOURCES AS PEDAGOGICAL
MEDIATION TOOLS FOR STUDENTS
WITH AUTISM AND VISUAL IMPAIRMENT.....13
Daiane Mastrangelo Tomazeti
Daniel Novaes

DIGITAL DIDACTIC-PEDAGOGICAL RESOURCES
IN AN INCLUSIVE PERSPECTIVE.....29
Edjane Silva de Melo
José Augusto Falcão
Daniel Novaes

ASSISTIVE TECHNOLOGY, REFLECTING ON
SPECIALIZED EDUCATIONAL SERVICES IN CHILDHOOD.....41
Eromi Izabel Hummel
Alex Sandro Pires de Lima
Fludualdo Talis de Paula

EVALUATION OF STUDENTS WITH AUTISM SPECTRUM
DISORDER (ASD) ACROSS THE COGNITIVE,
EXECUTIVE-FUNCTION, AND CONATIVE DOMAINS.....55
Paula Carolei
Alice Maria Ferreira
Alex Sandro Pires de Lima

THE USE OF TECHNOLOGY IN SUPPORT OF MONITORING THE LEARNING PROGRESS OF DEAF STUDENTS.....65
Nivea Cristina Lopes Cardoso
Michelle de Oliveira Luna
Marcio Hollosi

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION FOR SCHOOL INCLUSION.....77
Luana Alves Santos
Darlene Glória Maria Tourinho Costa
Marisa Sacaloski

UNIVERSALIST MEDIATIONS IN THE SCHOOL REINTEGRATION OF STUDENTS RETURNING FROM HOSPITAL EDUCATION.....93
Jéssica Daniele Alegria Arca
Marcio Hollosi

ABOUT THE EDITORS.....111

INDEX.....113

PRESENTATION OF THE COLLECTIVE WORK

This collective volume aims to undertake an in-depth discussion of key issues in Inclusive Education, highlighting its challenges, resources, and possibilities. Through theoretical reflections and accounts of practical experiences, the book seeks to foster a meaningful dialogue on the work of education professionals and the pedagogical tools they employ to adress the specific educational needs of students, recognizing them as subjects of rights and active agents in the construction of their own learning trajectories.

Within this framework, digital technologies play a fundamental role by expanding opportunities for participation and engagement in educational processes. When applied critically, creatively, purposefully in school contexts, these tools enhance content accessibility, strengthen students' autonomy, and promote more inclusive, equitable, and innovative pedagogical practices.

The draws upon a broad theoretical foundation, including Vygotsky's historical-cultural theory, which emphasizes social participation in the human developmen; the Freirean approach, which values dialogue and student agency; Mantoan's perspective, which conceives inclusion as the active participation of all students; and the studies of Sebastián-Heredero, which clarify the principles of Universal Design for Learning (UDL), promoting flexible and accessible pedagogical practices responsive to the diversity present in classrooms.

By integrating these perspectives, taims to contribute meaningfully to academic reflection, teacher education, and pedagogical practice, strengthening the development of more democratic, innovative, and

inclusive school environments where all students can participate, learn, and fully realize their potential.

Happy reading!

The Editors

PREFACE

Writing a preface is never an easy task, as it involves two equally important and deeply interconnected dimensions that are equally relevant and deeply intertwined in shaping its final tone. On one hand lies the technical and scientific dimension, which requires immersion in the content of the book and the ability to intertwine the authors' knowledge with the reflections of the invited writer. On the other hand lies the emotional dimension, since the invitation to write a preface almost always carries some level of connection, affection, or admiration, requiring that heart and sentiment also be present in the text. I accepted this challenge fully aware of its complexity and with great honor.

This work navigates the fields of Digital Technologies and Inclusive Education, organized into seven compelling chapters, each more compelling than the next, by Jéssica Alegria Arca, Daniel Novaes, and Márcio Hollosi. Given the richness of this scope, it naturally evokes the pressing need to meaningfully integrate technologies into the educational world and especially into the field of Inclusive Education. The possibilities afforded by technological tools are immense, particularly in contexts marked by diversity, where students in Special Education benefit from increased accessibility, flexible pathways to learning, and pedagogical responses that respect their plurality. This has been the focus of numerous studies and educational initiatives in recent decades.

In recent years, I have focused my work on studying, researching, and implementing Universal Design for Learning (UDL). Emerging in the 1980s, the Center for Applied Special Technology (CAST) began developing strategies to support the learning of students with disabilities, by expanding curriculum access for all through technology. Over time, however, it became clear that this approach was limited, as it did not fully consider teaching and learning processes and tended to function mainly as an extension or compensatory mechanism for accessing content. Even so,

the connection between technology and universally designed educational practices has always been present, advancing the idea that support structures can and should benefit all students and not only those receiving Special Education services.

From this reflection emerged the UDL Guidelines in the early twenty-first century, developed as a project of the National Center on Accessing the General Curriculum (NCAC), the result of collaboration between CAST and the Office of Special Education Programs (OSEP) of the United States Department of Education. Inspired by the principles of inclusion and accessibility drawn from Universal Design in architecture, these guidelines were adapted to the educational field and initially compiled by David H. Rose, J. Gravel, and Anne Meyer, cofounders of CAST, culminating in Version 1.0 (2008). From their inception, the guidelines incorporated technologies not as the sole or exclusive means but as central tools for promoting accessibility and removing barriers.

Version 2.0 was released openly in 2011 and remains the most widely used edition. Its Portuguese translation is available in the document Universal Design for Learning Guidelines, Version 2.0 (2011)[1]. A subsequent revision, Version 2.2[2], published in 2018, reorganized the guidelines into a graphic format and incorporated conceptual updates developed collaboratively by hundreds of researchers around the world. At that point, dissemination was already significant, and publications on practices and impact were already revealing the great potential of this approach. As evidence of the approach increased in studies, practices, and educational impact, it became increasingly clear how transformative UDL could be. More recently, in 2024, Version 3.0 was introduced, grounded in accumulated practical experiences across multiple educational levels and contexts, and compiled in the official documents of the UDL Guidelines, Version 3.0 (2024)[3].

1 Diretrizes para o Desenho Universal para a Aprendizagem (DUA) – Versão 2.0 (2011). https://www.scielo.br/j/rbee/a/F5g6rWB3wTZwyBN4LpLgv5C/?format=pdf&lang=pt.

2 Diretrizes para o Desenho Universal para a Aprendizagem (DUA) – Versão 2.2 (2018). https://udlguidelines.cast.org.

3 Diretrizes para o Desenho Universal para a Aprendizagem (DUA) – Versão 3.0 (2024). https://udlguidelines.cast.org/more/downloads/.

Across all versions, digital technologies appear as key tools embedded throughout the UDL framework, enabling the implementation of its principles and guidelines. Rose and Meyer (2002) highlight that the flexibility afforded by technology, including its adaptability, transformability, ability to provide visual emphasis, and capacity to create connections, supports personalized learning processes. These same ideas can be found in the seven chapters of this volume.

According to Edyburn (2010), what makes UDL truly feasible today, unlike in the past, is precisely the evolution of digital technologies, which allow a high degree of flexibility in how content is presented and in how learners express what they know. In a broad sense, technology serves as an instrument to support personalized educational proposals, offering multiple means of representation and expression and expanding possibilities for motivation and engagement, especially among students who are themselves increasingly digital and technologically oriented. The UDL framework is not static. It is conceived as a dynamic and continuous learning experience. Its ongoing refinement is shaped by the active collaboration and feedback of researchers and educators around the world, and it is sustained by a vision of universal and open access[4].

Thus, Cerrillo-Reinoso *et al.* (2025, p. 3480) present the results of their research:

> The findings reveal that UDL-based planning, accompanied by technological adaptation resources, produces definitive increases in participation, academic achievement, and the intrinsic motivation of students with specific educational needs.

And they also indicate and emphasize that: "UDL goes beyond being a response aimed solely at disability and establishes itself as a broad framework of pedagogical innovation that benefits all students" (p. 3497). Expanding on this idea in a study on assistive technologies within UDL, Casagrande *et al*. (2024, p. 10) state:

> The connection between assistive technology and UDL is crucial for inclusive pedagogical practices, emphasizing the need to adapt learning environments and educational strategies to meet the diverse needs of students and to encourage the active participation of all learners in the teaching and learning process.

4 www.cast.org.

The material presented in this book could be aligned with the UDL Guidelines and incorporated into the planning of regular classrooms to support specific students, while also offering multiple possibilities that extend to all other classmates.

These digital resources may serve as tools for pedagogical mediation for students with autism, visual impairments, or deafness, but they can equally support learners who are inattentive, affected by ADHD, disengaged, or facing learning gaps. Assistive technologies and augmentative and alternative communication, designed for school inclusion, can also benefit students outside Special Education—such as those experiencing academic delays, those from other cultures or linguistic backgrounds, or those who process information at different paces.

Engaging with the chapters in this volume may take the reader on a journey toward high-quality Inclusive Education, where the many possibilities opened by technology become a pathway of light that connects with universalist approaches such as UDL. These possibilities may inspire teachers to develop increasingly inclusive instructional plans that respond to the richness that emerges from the diversity present in classrooms and foster autonomous learners capable of managing their own learning.

A final reflection that still needs to be addressed and implemented concerns the gaps in teacher training and the availability of technological resources. If these issues are not properly handled, they may restrict the effective advancement of inclusive education and, consequently, limit the considerations needed for planning based on the UDL framework.

Enjoy your Reading!

Eladio Sebastián-Heredero
Senior Foreign Collaborating Professor
PPGEDU/FAED - UFMS (Brasil)
https://orcid.org/0000-0003-0293-4395
http://lattes.cnpq.br/8492935603214109

References

BRYSON, J. **Universal instructional design in postsecondary setting**. Northern College, 2003. Disponível em: https://www.northerncollege.ca/leid/docs/uid.pdf. Acesso em: 12 nov. 2025.

BURGSTAHLER, S. Universal Design of distance Learning. **Information Technology and Disabilities Journal**, n.13, v. 1, 2002, p. 1-10. Disponível em: http://easi.cc/itd/volume8/number1/burgstah.html. Acesso em: 12 nov. 2025.

CASAGRANDE, K.; Vieira, L.A.; Mendes, V.E. A tecnologia assistiva e o desenho universal para aprendizagem como apoio à prática pedagógica inclusiva. **Revista InCantare**, N. x, V. 1, 2024, p. 1-13. Disponível em: https://periodicos.unespar.edu.br/incantare/index. Acesso em: 12 nov. 2025.

CEDILLO-REINOSO, R. D.; Riofrío-Girón, G. N.; Hidalgo-Santín, M. E.; Criollo-Carrión, Y. M.; Cueva Gutiérrez, N. del C.; Tapia-Bravo , P. S. Diseño Universal para el Aprendizaje y Tecnologías Inclusivas en la Atención a Estudiantes con Necesidades Educativas Específicas. **Revista Veritas De Difusão Científica**, N. 6, V. 2, 2025, Pp. 3479–3506. Disponível em: https://doi.org/10.61616/rvdc.v6i2.794. Acesso em: 12 nov. 2025.

EDYBURN, D. L. Would you recognize Universal Design for Learning if you saw it? Ten propositions for newdirections for the second decade of UDL. **Learning Disability Quarterly**, n. 33, v. 1, 2010, p 33-41. Disponível em: https://journals.sagepub.com/doi/10.1177/073194871003300103. Acesso em: 12 nov. 2025.

ROBERTS, K., Park, H., Brown, S., Cook, B. Universal Design for Instruction in Postsecondary Education: A Systematic Review of Empirically Based Articles. **Journal of Postsecondary Education and Disability**, n. 24, v.1, 2011, p. 4-18 Disponível em: https://files.eric.ed.gov/fulltext/EJ941728.pdf. Acesso em: 12 nov. 2025.

Rose, D. H., Meyer, A. Teaching Every Student in the Digital Age: Universal Design for Learning. Alexandria, VA:Association for Supervision and Curriculum Development. 2002. Disponível em: https://www.cast.org/resources/tips-articles/teaching-every-student-in-the-digital-age-universal-design-for-learning/. Acesso em: 12 nov. 2025.

SHAW, S. F., Scott, S. S., McGuire, J. M. **Teaching college students with learning disabilities**. ERIC Digest. 2001. Disponível em: http://www.ericdigests. org/2002-3/college.htm. Acesso em: 12 nov. 2025.

DIGITAL RESOURCES AS PEDAGOGICAL MEDIATION TOOLS FOR STUDENTS WITH AUTISM AND VISUAL IMPAIRMENT

Daiane Mastrangelo Tomazeti[1]

Daniel Novaes[2]

Introduction

The educational process of students with disabilities (such as Autism Spectrum Disorder (ASD) and high abilities/giftedness, as well as those with low vision and blindness) has been discussed in teacher training and social agendas. However, it was not always like this. As Jannuzzi (2012) argues, historically, people with disabilities have traditionally occupied a peripheral and marginalized position in education, often considered 'incapable' and therefore excluded from school. However, with the implementation of educational policies, this context takes on another dimension, especially with the advocacy efforts led by associations of parents and friends of the exceptional (APAEs): what was once a small movement has become widely disseminated. In this scenario, technology emerges as a didactic and pedagogical resource that can mediate the teaching-learning process and promote the active participation of all students.

However, as Novaes and Rodrigues (2024) argue, the computer or software alone is not sufficient; it is the pedagogical relationship between the teacher, the tool, and the student that transforms the technology into a meaningful instrument—that is, its use must be intentional. According to

1 Master's student in Education in the Graduate Program in Education (Stricto Sensu) at Universidade São Francisco, daiane.tomazeti@mail.usf.edu.br.

2 PhD Professor in the Graduate Program in Education (Stricto Sensu) at Universidade São Francisco, daniel.novaes@usf.edu.br.

the authors, the main problem lies in how Information and Communication Technologies (ICTs) can be effectively employed to foster interaction, stimulate engagement, and support the construction of knowledge, particularly for students with disabilities.

Although students with disabilities' access to higher education has increased, they still represent the smallest percentage at this level of education, highlighting the need for further research into practices and resources that can help with retention and success rates. The contribution of technology, when well planned and evaluated, can be decisive in promoting autonomy, learning, and active participation, overcoming barriers, and attributing new meanings to knowledge.

In view of the above, this chapter's main objective is to analyze the role of technology as a mediation instrument in inclusive education, exploring its contributions to the teaching-learning process of students with visual impairment and Autism Spectrum Disorder (ASD), in light of the historical-cultural theory of Lev Vygotsky and other contemporary scholars. In addition, this discussion is further motivated by the lack of in-depth studies on the application and evaluation of technologies in inclusive education, particularly within the Brazilian context.

Theoretical-methodological framework

Lev Semionovitch Vygotsky's theory is a central influence in several studies discussed in the literature, especially about the conception of technological platforms as mediation instruments and the importance of interaction in teaching-learning processes, both for people with and without disabilities. This perspective is reflected in the development of activities that enhance communication and motor skills.

Vygotsky's historical-cultural theory is paramount for understanding how learning occurs and contributes to individual development through social relations. This approach focuses on the importance of social contexts for learning, as well as the fundamentals of mediation and technological mediation. This idea is based on the premise that human beings' relationship with the world is not direct, but rather mediated by

auxiliary tools of human activity, such as instruments and signs.

Vygotsky's (2000) propositions related to teaching present a prospective perspective on psychological development, considering the learner's potential trajectory. This potential is characterized by functions that have already matured, and others still in the process of maturing, in a dialectical movement, in which the child, with assistance, can perform tasks that would not be possible alone; after the internalization of the concept, these tasks can be carried out independently. The child's process of imitation, even when it surpasses current capacities, is linked to this learning dynamic and to the Zone of Proximal Development (ZPD). For Vygotsky, imitation plays a central role in the process of internalization of higher psychological functions.

Such functions refer to the internal reconstruction of an initially external or social operation. This process is fundamental for the development of higher psychological functions: a sign that initially operates at the social and interpersonal level (intrapsychological plane). Higher psychological functions develop through the ongoing internalization and appropriation of instruments and signs throughout life, transforming the individual's relationship with the world and, consequently, with the self. The origin of all higher psychological processes lies not in the individual mind or brain, but in the "extracerebral" social sign systems provided by culture.

Moreover, Vygotsky (2001) emphasizes that language has an essential role in the formation of thought and individual development. According to the author, the relationship between thought and language is variable rather than constant throughout development, with distinct genetic roots that both converge and diverge. Vygotsky outlines different forms of language: external (social, for communication), egocentric (thinking aloud, serving as a transition to inner speech), and inner speech (internalized language that organizes action and enables the use of meaningful internal symbols). According to Vygotsky's experimental studies, language development proceeds through four stages: natural/primitive, "naïve psychology", use of external signs (egocentric speech), and inward growth (internalization, inner speech).

Within this framework, Vygotsky (2001) examines the developmental

processes of children with disabilities and special educational needs. He argues that children with disabilities do not possess a fundamentally different developmental or learning structure from that of other children. The basic principles of development are the same for all children, with or without disabilities; however, the limitations imposed by disability may serve as a motivating factor - a stimulus for seeking alternative pathways in carrying out activities or achieving goals.

He distinguished between primary disability - linked to an organic cause and minimally modifiable - and secondary disability, which arises as a social consequence of the primary condition and can be mitigated through social compensation. For Vygotsky (2001), the development of individuals with disabilities occurs through the social compensation of organic and psychological limitations, primarily by means of symbolic mediation.

Vygotsky (2001) argues that to study something historically is to study it in the process of change, which constitutes the basic requirement of the dialectical method. To grasp the process of development is, fundamentally, to uncover its nature and essence, for "only in movement does a body reveal what it is". Qualitative research guided by the cultural-historical approach seeks to understand phenomena in their complexity and historical becoming, examining situations in their continuous process of development. Vygotsky's (2000) analytical method, including microgenetic analysis, emphasizes the study of processes rather than objects, explanation rather than description, and addresses the problem of "fossilized behavior", which investigates the origins and dynamics of psychological processes.

Analysis and Discussions

The analyses presented in this chapter are grounded in the Vygotskian qualitative approach, which seeks to understand the complexity of phenomena in their social, historical, and cultural context. Therefore, bibliographic research was adopted for the construction of this chapter. According to Pereira (2022), this procedure is fundamental for

contextualizing the problem and for developing the theoretical framework, as it enables a comprehensive analysis of existing published materials. Therefore, relevant descriptors were systematically employed to filter publications.

The time frame adopted was the last ten years, justified by the consolidation of the Brazilian Inclusion Law. It is also important to note that foundational works within the Vygotskian tradition constitute part of the theoretical-methodological framework. Data analysis procedures relied primarily on thematic analysis, which, according to Souza (2019), enables the organization of information into categories and the identification of the needs and requirements of individuals with different profiles.

The search terms employed in the literature review included combinations such as: **"autism, visual impairment, higher education"; "autism and programming"; "autism, low vision, higher education"; "Autism, blindness, higher education".** The databases consulted were the Portal of the Coordination of Superior Level Staff Improvement (CAPES) and the Brazilian Digital Library of Thesis and Dissertations (BDTD).

The tables used in the literature review are presented below.

Chart 1: Studies selected from the CAPES Portal and the BDTD

Autism and visual impairment, and higher education			
Portal da CAPES		**BDTD**	
Total	Selected	Total	Selected
3	3	14	5

Source: Author's elaboration

Chart 2: Data from national studies retrieved from the CAPES Portal and the BDTD

STUDIES SELECTED FOR LITERATURE REVIEW					
AUTHOR	**TITLE**	**MATERIAL TYPE**	**DATABASE**	**REGION**	**YEAR**
Guimarães; Borges; Van Petten	Trajectories of Students with Disabilities and Inclusive Education Policies: from Basic to Higher Education	Article	Portal da CAPES	Southeast	2021
Lopes; Rosário; Silva	Training for the inclusion of Special Education students for teachers at the Federal University of Pará – Castanhal Campus, Brazil	Article	Portal da CAPES	North	2023
Alves; Hostins	"I made my game": a framework for children's creation of digital games	Thesis	Portal da CAPES	South	2020
Azevedo	The repercussions of meaningful social networks of students with disabilities in the context of higher education	Dissertation	BDTD	South	2017
Silva	Voices of students with disabilities in higher education: a look at themselves, at the university, and at the community	Thesis	BDTD	South	2024
Silva	Unievangélica's Accessibility and Inclusion Center: implementation and challenges along the way	Dissertation	BDTD	Midwest	2021
Guimarães	School trajectories of people with disabilities and inclusive education policies 2008-2018: from basic education to admission by quotas at UFMG	Dissertation	BDTD	Southeast	2020
Olive tree	Imagining and creating: the use of computing language in an inclusive perspective	Thesis	BDTD	Southeast	2020

Source: Author's elaboration

Chart 3: Studies selected from the CAPES Portal and BDTD

Autism and programming			
Portal da CAPES		**BDTD**	
Total	Selected	Total	Selected
6	1	27	3

Source: Author's elaboration

Chart 4: Data from national studies retrieved from the CAPES Portal and the BDTD

STUDIES SELECTED FOR LITERATURE REVIEW					
AUTHOR	**TITLE**	**MATERIAL TYPE**	**DATABASE**	**REGION**	**YEAR**
Ram	Development of end-user systems for the treatment of children with autism spectrum disorder	Dissertation	BDTD	Northeast	2018
Boza	Learning proposal in the educational intervention of autistic students using the Internet of Things (IOT)	Dissertation	BDTD	North	2023
Preuss	NIDABA: digital platform for the production of inclusive educational resources based on a tangible table	Thesis	BDTD	South	2021
Silva; Sganzerla; Geller	PARROT FRIEND – vocalizer app with activities for tea	Article	Portal da CAPES	South	2021

Source: Author's elaboration

Chart 5: Studies selected from the CAPES Portal and the BDTD

Autism and low vision, and higher education			
Portal da CAPES		**BDTD**	
Total	Selected	Total	Selected
1	1	8	0

Source: Author's elaboration

Chart 6: Data from national studies retrieved from the CAPES Portal and the BDTD

STUDIES SELECTED FOR LITERATURE REVIEW					
AUTHOR	**TITLE**	**MATERIAL TYPE**	**DATABASE**	**REGION**	**YEAR**
Araújo; Rebelo; Silva; Saints	Curricular accessibility: inclusive pedagogical practices of students in the tutoring program	Article	Portal da CAPES	North	2023

Source: Author's elaboration

Chart 7: Studies selected from the CAPES Portal and BDTD

Autism and blindness, and higher education			
Portal da CAPES		**BDTD**	
Total	Selected	Total	Selected
0	0	1	0

Source: Author's elaboration

The analysis of the literature review data reveals three main thematic axes, which illustrate the multiple ways in which technology can mediate inclusive education.

Axis 1: Assistive Technology and Tangible Learning Environments in Inclusive Education

The use of tangible tables is presented as an innovative resource in teaching and learning environments, offering dynamic interactions that foster engagement and the construction of knowledge through textual, visual, and tangible communication. Grounded in Vygotsky's socio-historical theory, this technology can be understood as an instrument of technological mediation, particularly due to its interactionist component and the centrality of mediation in the teaching and learning processes. Research in this area aims to examine the resources and functionalities that teachers in basic and special education - especially within Specialized Educational Services (SES) - require to plan and design activities for such environments.

The concept of a low-cost tangible table is particularly relevant, as it aims to ensure accessibility in public schools and to support its use for inclusive education. For this technology to be effective, three essential

components are required: the accessible tangible table itself, an authoring tool that enables educators to create, share, and use applications, and a process of teacher training for the use of tangible technologies and the production of digital materials. The development of a digital platform with these features - such as Eduba Editor and Nidaba Player - integrated with electronic puppets, educational robots, and virtual reality environments, addresses both pedagogical and accessibility demands, while also fostering cognitive activities through tangible interaction in inclusive contexts. This platform can be employed by pedagogues, psychopedagogues, and psychologists, enabling educators to design educational resources tailored to their methodologies.

Axis 2: Computing and Programming Languages in Inclusive Education (Computational Thinking)

The use of programming language and its tools has been examined as a significant mediating resource in the learning and development of higher psychological processes among children both with and without disabilities, including intellectual disabilities, autism, and high abilities/giftedness. The *Computing for All* project sought to develop a methodology for teaching and fostering computational thinking in elementary school children, with an emphasis on integrating Computer Science into school curricula.

The research underscored that the creative dimension of language in knowledge production had a significant impact on learning through imagination. Peer-to-peer interaction with programming languages proved to be crucial for human learning and development, fostering peer tutoring and collaboration to resonate between subjects, promoting meaningful learning. The development of creative activity, through interdisciplinarity involving children with different specificities and dialogical cooperation, affected the development of their experiences. Programs such as Scratch and Python were employed for teaching visual programming and developing digital games, enabling students to become protagonists of the creation process. To support this creative engagement among children both with and without disabilities, the *I made my game* framework was designed.

These approaches emphasize that technology is not a panacea, but rather a powerful tool when appropriately contextualized and effectively integrated into pedagogical practice.

Axis 3: IoT-Based Technologies and Mobile Apps for Autism and Specific Educational Needs

The application of the Internet of Things (IoT) and mobile applications constitutes a promising frontier in inclusive education, particularly for students with Autism Spectrum Disorder (ASD). Research indicates that students with ASD achieve better comprehension of content through visual and auditory information, which then guides the development of materials and prototypes that comprehend these modalities. One study evaluated an IoT-based prototype as a pedagogical resource for autistic students, aiming to enhance learning and foster interaction between teachers and students.

Teacher training is of the utmost importance when it comes to the use of these technologies, as many professionals still lack the necessary skills to address the specificities of autistic students and to ensure effective, high-quality learning. The development of such technologies must be carefully designed, with prior planning that takes into account the realities and experiences of the students.

Vocalizing applications, such as *Papagaio Amigo,* which employ Alternative and Augmentative Communication (AAC) alongside graphic and personal symbols, exemplify Assistive Technologies (AT) that facilitate communication for individuals with autism. Such technologies can help overcome the communication barriers and social isolation that these students often face. However, digital tools and didactic-pedagogical prototypes must meet the target audience's needs, enabling educational interventions that guarantee digital accessibility and foster effective learning. There remains a critical need for the development of additional tools that directly address the specificities of autism, as well as for the preparation of professionals and school environments capable of identifying and providing resources and services that expand the functional abilities of these learners.

Research on the use of IoT in education, particularly for individuals with autism, is still in its incipient and predominantly qualitative stage, indicating the need for further evaluations supported by more concrete databases in order to demonstrate the effectiveness of such applications. Interdisciplinarity constitutes a key aspect in the development of these technological initiatives.

Final Thoughts

This chapter analyzes the role of technology as a mediating instrument in inclusive education, examining its contributions to the teaching and learning of students with visual impairments and Autism Spectrum Disorder (ASD), in the light of Lev Vygotsky's historical-cultural theory and contemporary scholarship.

Throughout the chapter, we discuss digital technologies and argue that, when thoughtfully designed and implemented, they can provide transformative moments of learning — that is, the appropriation of the repertoire of cultural creations systematized in education. In this sense, the Vygotskian framework can inform and enrich current theoretical and practical reflections on the topic. However, our literature review also indicates that to effectively use technology as a means to mediate inclusive education, one must face challenges that demand concrete responses across diverse, on-the-ground school contexts. It is essential to pursue more in-depth and longitudinal studies that evaluate the effectiveness and relevance of technologies as used daily by teachers and students with diverse disabilities.

Current literature still lacks robust empirical data, especially quantitative evaluations of technological interventions tailored to people with autism and visual impairments. There is a need for more research adopting an intersectional perspective — considering the multiple layers of student identity — and centering the voices and agency of people with disabilities throughout all phases of technology design and evaluation. In addition, teacher professional development is an indispensable pillar for the effective use of technologies and the implementation of inclusive pedagogical practices. This training should go further by deepening educators' understanding of the specific learning profiles and needs of their students.

References

ALVES, Adriana Gomes; HOSTINS, Regina Célia Linhares. "EU FIZ MEU GAME": UM FRAMEWORK PARA CRIAÇÃO DE JOGOS DIGITAIS POR CRIANÇAS. **Revista Docência e Cibercultura**, [S. l.], v. 4, n. 1, p. 239–242, 2020. DOI: 10.12957/redoc 2020.50465. Disponível em: https://www.e-publicacoes.uerj.br/re-doc/article/view/50465. Acesso em: 14 jul. 2025.

ARAÚJO, Guilherme da Silva; REBELO, Alexsandro Ricardo Moreira; SILVA, Celma Rocha; SANTOS, Lúcia C. Gomes dos. Acessibilidade curricular: práticas pedagógicas inclusivas de alunos do programa tutoria. **Brazilian Journal of Development**, v. 9, n. 3, p. 12117-12126, 2023. DOI:10.34117/bjdv9n3-207. Disponível em: https://ojs.brazilianjournals.com.br/ojs/index.php/BRJD/article/view/58433. Acesso em: 16 jul. 2025.

AZEVEDO, Larissa Antonella. **As repercussões das redes sociais significativas de estudantes com deficiência no contexto do ensino superior**. 2017. 312 f. Dissertação (Mestrado em Psicologia) – Programa de Pós-Graduação em Psicologia, Universidade Federal de Santa Catarina, Florianópolis, 2017. Disponível em: https://repositorio.ufsc.br/xmlui/handle/123456789/182695. Acesso em: 14 jul. 2025.

BOZA, Danúbia de Medeiros Bezerra. **Proposta de Aprendizagem na Intervenção Educacional de Estudantes Autistas Utilizando Internet das Coisas (IOT)**. 2023. Dissertação (Mestrado Acadêmico/Profissional em Modelagem Computacional de Sistemas) – Programa de Pós-Graduação em Modelagem Computacional de Sistemas, Universidade Federal do Tocantins, Palmas, 2023. Disponível em: https://repositorio.uft.edu.br/handle/11612/6943. Acesso em: 14 jul. 2025.

CARNEIRO, Ingrid da Silva. **Desenvolvimento de sistemas por end-users para o tratamento de crianças com transtorno do espectro do autismo**. 2018. Fortaleza. Disponível em: https://biblioteca.sophia.com.br/terminal/9575/acervo/detalhe/118241. Acesso em: 14 jul. 2025.

GUIMARÃES, Maria Cecília Alvim; BORGES, Adriana Araújo Pereira; VAN PETTEN, Adriana M. Valladão Novais. Trajetórias de Alunos com Deficiência e as Políticas de Educação Inclusiva: da Educação Básica ao Ensino Superior. **Educação em Revista**, v. 27, e0059, 2021. DOI: https://doi.org/10.1590/1980-54702021v27e0059. Pesquisa com financiamento Fapemig - Fundação de Amparo à Pesquisa do Estado de Minas Gerais. Acesso em: 14 jul. 2025.

GUIMARÃES, Maria Cecília Alvim. **Trajetórias escolares de pessoas com deficiência e as políticas de educação inclusiva 2008-2018**: da educação básica ao ingresso por cotas na UFMG. 2020. 172 f. Dissertação (Mestrado em Educação: Conhecimento e Inclusão Social) – Faculdade de Educação, Universidade Federal de Minas Gerais, Belo Horizonte, 2020. Disponível em: https://repositorio.ufmg.br/handle/1843/58322. Acesso em: 14 jul. 2025.

JANNUZZI, Gilberta de Martino. **A educação do deficiente no Brasil**: dos primórdios ao início do século XXI. Campinas, SP: Autores Associados, 3ª edição, 2012. Disponível em: https://www.scielo.br/j/cp/a/kVvdYMWXxbLnbTsSP7mqSHt/?lang=pt. Acesso em 30 jul. 2025.

LOPES, Raphaella Duarte Cavalcante; ROSÁRIO, Hilda Rosa Moraes de Freitas; SILVA, Simone Souza da Costa. Formação sobre inclusão de alunos da Educação Especial para os docentes da Universidade Federal do Pará – Campus Castanhal, Brasil. **Revista Educação e Políticas em Debate**, [S. l.], v. 12, n. 3, p. 1229–1246, 2023. DOI: 10.14393/REPOD-v12n3a2023-68702. Disponível em: https://seer.ufu.br/index.php/revistaeducaopoliticas/article/view/68702. Acesso em: 14 jul. 2025.

NOVAES, D.; RODRIGUES, L. C. Mediações pedagógicas no uso do computador com um aluno com autismo na escola especial: tensões e contradições. **Germinal**: marxismo e educação em debate, [S. l.], v. 16, n. 3, p. 461–475, 2024. DOI: 10.9771/gmed.v16i3.57232. Disponível em: https://periodicos.ufba.br/index.php/revistagerminal/article/view/57232. Acesso em: 4 ago. 2025.

OLIVEIRA, Mariana Corrêa Pitanga de. **Imaginar e criar**: o uso da linguagem de computação numa perspectiva inclusiva. 2020. 150p. Tese (Doutorado em Educação, Contextos Contemporâneos e Demandas Populares) Instituto de Educação / Instituto Multidisciplinar, Universidade Federal Rural do Rio de Janeiro, Seropédica/Nova Iguaçu, RJ, 2020. Disponível em: https://rima.ufrrj.br/jspui/handle/20.500.14407/9925. Acesso em: 14 jul. 2025.

OLIVEIRA, Mariana Corrêa Pitanga de. Processos de imaginação/criação mediados pela linguagem de computação numa perspectiva inclusiva. **Revista Docência e Cibercultura**, [S. l.], v. 4, n. 1, p. 121–141, 2020. DOI: 10.12957/redoc 2020.49525. Disponível em: https://www.e-publicacoes.uerj.br/re-doc/article/view/49525. Acesso em: 14 jul. 2025.

PEREIRA, Daniel Novaes Gomes. **Por entre olhares, o humano**: processos de constituição de uma criança (com autismo) no segundo ano do ensino fundamental. 2022. Tese de Doutorado. Tese (Doutorado em Educação). Programa de Pós-Graduação Stricto Sensu em Educação, Universidade São Francisco, Itatiba.

PEREIRA, Simei Silva. **NÚCLEO DE ACESSIBILIDADE E INCLUSÃO DA UNIEVANGÉLICA**: implementação e desafios no percurso. 2021. Dissertação (Mestrado em Educação, Linguagem e Tecnologias) – Programa de Pós-Graduação Interdisciplinar em Educação, Linguagem e Tecnologias, Universidade Estadual de Goiás, Anápolis, 2021. Acesso em: 14 jul. 2025.

PREUSS, Evandro. **NIDABA**: Plataforma Digital para Produção de Recursos Educacionais Inclusivos Baseados em Mesa Tangível. 2021. 236 f. Tese (Doutorado em Informática na Educação) – Universidade Federal do Rio Grande do Sul, Centro Interdisciplinar de Novas Tecnologias na Educação, Programa de Pós-Graduação em Informática na Educação, Porto Alegre, 2021. Disponível em: https://lume.ufrgs.br/handle/10183/229757. Acesso em: 14 jul. 2025.

SILVA, Giovanna Santos da. **Processos de inclusão de alunos autistas no ensino superior**: a construção de um grupo de discussão. 2024. 164 f. Dissertação (Mestrado em Educação) – Programa de Pós-Graduação em Educação, Universidade Federal de Sergipe, São Cristóvão, 2024. Disponível em: https://ri.ufs.br/handle/riufs/20822. Acesso em: 16 jul. 2025.

SILVA, Jairo Francesco da; SGANZERLA, Maria Adelina Raupp; GELLER, Marlise. PAPAGAIO AMIGO – APLICATIVO VOCALIZADOR COM ATIVIDADES PARA TEA. **RENOTE**, Porto Alegre, v. 18, n. 2, p. 181–190, 2021. DOI: 10.22456/1679-1916.110216. Disponível em: https://seer.ufrgs.br/index.php/renote/article/view/110216. Acesso em: 16 jul. 2025.

SILVA, Suzel Lima da. **Vozes de estudantes com deficiência no ensino superior**: um olhar para si, para a universidade e para a coletividade. 2024. 266 f. Tese (Doutorado em Educação) – Programa de Pós-Graduação em Educação, Universidade Federal de Santa Maria, Santa Maria, 2024. Disponível em: https://repositorio.ufsm.br/handle/1/33487. Acesso em: 14 jul. 2025.

SOUZA, Luciana Karine de. Pesquisa com análise qualitativa de dados: conhecendo a Análise Temática. **Arquivos brasileiros de psicologia.** Rio de Janeiro. Vol. 71, n. 2 (maio/ago. 2019), p. 51-67, 2019.

VIGOTSKI, L. S. **A Construção do Pensamento e da Linguagem.** São Paulo: Martins Fontes. (Publicado originalmente como Myshlenie i rech em 1934). 2001.

VIGOTSKI, L. S. **A Formação Social da Mente**: O Desenvolvimento dos Processos Psicológicos Superiores. São Paulo: Martins Fontes. (Publicado originalmente em 1978). 2000.

VIGOTSKI, L. S. **Obras escolhidas**: A formação social da mente. 6. ed. São Paulo: Martins Fontes, 1993.

VIGOTSKI, L. S. **Fundamentos da defectologia.** São Paulo: Ática, 2001.

VIGOTSKI, L. S. **Fundamentos da psicologia do desenvolvimento**. Tradução de Nádia Aguiar Durigan. São Paulo: Martins Fontes, 2000.

VIGOTSKI, L. S. **Problemas da Defectologia,** v. 1. Organização e tradução: Zoia Prestes e Elizabeth Tunes. São Paulo: Expressão Popular. 2021.

ZÓIA, Prestes. O rigor metodológico em pesquisa bibliográfica/ The accuracy of literature research methodology. **Ensino em Re-Vista,** [S. l.], 2012. DOI: 10.14393/ER-v19n2a2012-16. Disponível em: https://seer.ufu.br/index.php/emrevista/article/view/14947. Acesso em: 14 jul. 2025.

DIGITAL DIDACTIC-PEDAGOGICAL RESOURCES IN AN INCLUSIVE PERSPECTIVE

Edjane Silva de Melo[1]
José Augusto Falcão[2]
Daniel Novaes[3]

Introduction

In this chapter, the main objective is to discuss digital didactic-pedagogical resources in relation to learning practices from an inclusive perspective for students with disabilities. It is important to highlight that this article is part of the ongoing studies developed within the Research and Study Collective on Autism, Education, and Techn(é) ologias (ARAUETÉ). The group's discussions, grounded in the Vygotskian historical-cultural framework, examine the multiple historical and social contexts in which the themes of education and inclusion are affected by the implications of digital technologies in educational environments.

In addition to these research contexts, the current educational scenario, marked by narratives of diversity and technological advancement, invites us to rethink didactic-pedagogical practices. This is because digital resources have become central in school settings, often serving as one of the few available means to address diverse learning needs. From this perspective, reflecting on inclusion requires thinking of less rigid classroom dynamics, while maintaining a commitment to the uniqueness of each school actor (Pereira, 2022).

As Novaes and Rodrigues (2024) argue, in recent decades, the

1 Master's student in Education in the Graduate Program in Education (Stricto Sensu) at Universidade São Francisco.

2 Master's student in Education in the Graduate Program in Education (Stricto Sensu) at Universidade São Francisco.

3 Faculty member of the Graduate Program in Education (Stricto Sensu) at Universidade São Francisco.

excessive use of computers as digital resources has profoundly impacted education. According to these authors, the digitalization of teaching is not always critically conceived, planned, or reflected upon, even though the contributions of inclusive education have been widely discussed across various contemporary social contexts. We understand that such discussions are rooted in the learning process and in the individual needs of students. Therefore, to discuss the advances of digital technologies and their implications for education from an inclusive perspective, it is necessary to engage in dialogue about how traditional teaching approaches continue to shape pedagogical practices.

Given this context, our theoretical foundation draws upon the following works: "Digital Times: teaching and learning with technology" by Hélio Lemes de Costa Jr (2012); "Introducing the Digital Era: Inclusion and Technology in the Educational Environment" by Dutra, Mariana; Freitas, José Antônio; Lima Camila (2004); "Digital Technologies Applied to Inclusive Education: Strengthening Universal Design for Learning" by the Rodrigo Mendes Institute (2021, IRM); "School Inclusion: What Is It? Why? How to Do It?" by Maria Teresa Eglér Mantoan (2005); "Pedagogy of Indignation: Pedagogical Letters and Other Writings" by Paulo Freire (2022); "Genesis of the Higher Psychic Functions" by Lev Vygotsky (1995); "La Colectividad como Factor de Desarrollo del Niño Deficiente" by Lev Vigotski (1997); "A Fourth Class: The Question of the Environment in Pedology", by Lev Vygotsky (2010); and "Método de investigación" by Lev Vigotski (1995).

To organize our objectives and articulate a coherent line of reasoning, our discussions were divided into two sections. In the first, we address the use of technologies in the educational context, and in the second, we discuss the teacher´s mediation in relation to technologies in the learning process of children with disabilities, from a historical-cultural perspective.

The Use of Technologies in the Educational Context for Children with Disabilities

Broadly speaking, the concept of technology is grounded in a series of scientific knowledge situated throughout human history. According to Silva (2003), such knowledge can be understood as tools and instruments that acquire meaning through human relationships. These are created and

applied to provide solutions in diverse contexts. In education, for instance, traditional technologies such as the blackboard, chalk, and didactic materials — although essential — often fail to meet the diverse demands of learning.

An educational technology, therefore, can be considered assistive if it enables students with disabilities to actively participate in the learning process — something that would otherwise be limited or non-existent without such a resource (IRM, 2021).

The concept of technology, however, remains diffuse in society: sometimes it refers to digital innovations, and at other times to be broad achievements of humanity. For us, both conceptions coexist. A pencil and writing are forms of technology, just as a computer or digital software are. What underlies these conceptions is the intentionality behind their use. As the Rodrigo Mendes Institute (IRM, 2021) affirms, "the present time can be seen as a stage for discussions on the implementation of technological innovations in education." From this perspective, discussions on inclusive education and the use of technologies demand urgent paradigm shifts in school structures and teaching practices.

Technologies such as interactive platforms, reading software, and alternative communication systems can serve as mediation tools that stimulate cognitive development within the Zone of Proximal Development (ZPD), enabling students to overcome social, cognitive, and physical barriers. From the Vygotsikian perspective (Vygotsky 1997), cognitive development and learning occur through social interactions mediated by signs and cultural instruments. Considering the specificities of disability, technological tools can thus be understood as mediators of the pedagogical relationship between student and teacher, expanding the possibilities of interaction and the construction of knowledge.

We cannot ignore that the digital resources — known collectively as Digital Information and Communication Technologies (DICT) — are increasingly embedded in our everyday lives and historical-cultural context. They play a significant role in communication, social interaction, and problem-solving. Given the diversity of technologies and their cultural possibilities, the ways of learning have also evolved. It would be of great value if these resources were better integrated into school practices as

pedagogical tools, promoting interactions among teachers, students, knowledge, and the learning process itself.

In this sense, it is of paramount importance to reflect on the learning processes of children with disabilities and their particularities, ensuring that pedagogical practices and technological tools are intentionally aligned with each student's needs. Such intentionality ensures both respect for individuality and the enhancement of the teaching-learning process.

Beyond their instrumental function, technologies can act as a bridge between teaching and learning, fostering autonomy and new knowledge of the subject in the context in which it is inserted. Even though he is not against technologies, Freire (2022) emphasizes the importance of understanding technology so that its applicability is aimed at a humanized practice, from the perspective of collective and social ethics. Thus, inclusive education cannot rely solely on digital resources — it must also involve intentional pedagogical development aimed at overcoming barriers and promoting a more humanized, dialogical, egalitarian, and welcoming education.

Consequently, technologies should not be reduced to mere behavioral regulators or forms of passive entertainment for children with disabilities. Rather, they must function as auxiliary instruments that enhance cognitive abilities and the learning experience, fostering discovery and legitimizing each student's protagonist and uniqueness through ethical and culturally relevant practices (Pereira, 2022).

When well employed, technological resources enable interaction and exchange among learners, allowing them to actively construct knowledge. Inclusion and learning, in this sense, are grounded in the recognition of individual uniqueness and dialogical exchange. Vygotsky's theories lead us to reflect on difference, equity, and dialogue as essential elements in knowledge construction, providing insight into how and with whom each subject learns.

The learning of children with disabilities — like that of all students — requires not only theoretical understanding but also intentional pedagogical action. When digital resources are integrated with theoretical foundations such as those proposed by Vygotsky, the act of teaching and learning becomes meaningful, humanized, and plural. Consequently, digital didactic resources, when articulated with theory and practice, foster

dialogical, accessible, and inclusive pedagogical practices, centered on listening and singularity, transforming the educational context into a space where all students can learn.

The teacher's mediation in the face of technologies in the learning process of the disabled child from a historical-cultural perspective

Addressing the role of the teacher, their pedagogical practices, and teaching relations from the historical-cultural perspective is crucial to understanding how these relationships influence the teaching-learning process in contemporary education.

Technological mediation, in this context, contributes significantly to the development of pedagogical competencies and emerges as a valuable tool in response to the demands of modern learning. For Costa Jr. (2012) and Miranda & Novaes (2023), technologies serve as mediating instruments that reshape learning and connect people across historical-cultural, geographical, and temporal boundaries. They promote diverse and meaningful access to information, fostering the construction of knowledge while respecting each learner's rhythm and context.

It is therefore essential to reflect on how these interactions occur within the school setting, ensuring that technology functions as pedagogical support, a bridge between student and teacher through which learning is co-constructed. Vygotsky (1997) emphasizes the need for meaningful and intentional mediation, tailored to the specific needs of students with disabilities, and for pedagogical approaches that value skills, interactions, and historical-cultural context as key factors in the development of higher psychological functions and learning.

Recognizing technology as a support for new possibilities of teaching and learning for children with disabilities requires not only technical understanding but also pedagogical planning and institutional support. Novaes and Rodrigues (2024) and Behrens (2000) argue that teachers should employ technology as an auxiliary and transformative instrument within their pedagogical practices. Similarly, sociocultural theory highlights the mediating role of tools in knowledge construction. Technological mediation — when developed through dialogue and collaboration — can foster social interaction, serve as a bridge for development, and even act as

a compensatory mechanism for children with disabilities (Vigotski, 1997; Pereira, 2022).

When used intentionally and supported by teacher mediation, digital resources enable the transition from monological to dialogical learning, where knowledge is co-created between teacher and student. This transformation allows for greater adaptation of content and teaching methods, making learning more meaningful.

To reflect on pedagogical mediation and teacher training, it is essential to discuss the real possibilities of using technologies in schools, specially in the light of the traditionalist structures that continue to guide much of contemporary education.

As Mantoan (2003, p.13) points out:

> School systems are set up from a thought that cuts out the reality that allows dividing students into normal and disabled, the modalities of education into regular and special, teachers into specialists in this and that manifestation of differences.

Still within the school context, the ways of teaching, what to learn, and how to learn, as emphasized by Mantoan (2003, p. 13), show that "the curricular teaching of our schools, organized into disciplines, isolates and separates knowledge, instead of recognizing its interrelations." From the author's comments, we understand that 'the real' need for change toward a perspective of digital 'inclusion' goes beyond teacher training and the breaking of individualistic paradigms in the teaching and learning process. It constitutes the "resignification of the role of the teacher, of the school, of education and of pedagogical practices that are common in the exclusionary context of our teaching, at all its levels" (Mantoan, 2003, p. 43).

Not far from these propositions, Novaes and Rodrigues discuss exclusionary practices. In this sense, for inclusion, teaching and learning to actually take place in the current technological scenario, it is necessary to ensure access and opportunity for all. Since the gap between the real needs of digital inclusion as a pedagogical tool and the technological and structural conditions offered in the school context — along with limitations in teacher training and in the intention to resignify pedagogical didactics — renders the execution of a global education process insufficient. Therefore, it is necessary to rethink digital technologies as tools that

support pedagogical practices in the teaching-learning process, in favor of an emancipatory education for students with and without disabilities, within the framework of the rights to equal conditions, as pointed out by Freire (2019).

Reflecting on technologies in today's society and in the education of students with disabilities is undoubtedly a relevant and urgent approach. However, technologies, as pedagogical tools, need to be analyzed from the perspective of continuing teacher education and the uniqueness of each student. Behrens (2000) suggests that the continuing education of teachers must be based on the students' learning processes and on educational evolution. Especially in the digital age in which contemporary society is immersed, teachers can restructure their practices according to students' needs and thereby create opportunities for integration and knowledge construction within the learning process. Furthermore, "the continuing education of teachers is focused on the use of DICT in pedagogical practice" (Valente, Freire, & Arantes, 2018, p. 149). It is important that teachers be prepared not only to make use of digital technological resources, but also to recognize in these tools mechanisms that stimulate and provide unique mediation and active listening for the full inclusion of students with disabilities.

In this context, reflecting on individuality as equality of learning in the educational setting, it is essential to understand the processes of development and the context of social, cultural, and historical relations that influence and affect human development. As Vygotsky (1995) points out, every process of child development goes through a stage of signification and internalization, through symbolic mediations and internalizations. These functions do not develop in isolation or purely biologically but are closely linked to social and cultural interactions. In this way, technologies combined with pedagogical practices manifest themselves as a relevant tool within the school context and for the teaching-learning process.

Regarding the use of technologies in the educational context and the development of students with disabilities, discussions permeate the questions that arise from the *whys* and are anchored in the institutional reality of the teaching practices imposed upon us. Thus, there is an urgent need for a real, qualitative, and global inclusion that, beyond merely

guaranteeing presence in an educational environment, promotes a fair and equitable education and that respects the subjective differences inherent to each individual in their social context. As highlighted by IRM (2021, p. 11), "the simple introduction of devices or resources in schools does not guarantee advances in the quality of learning or in the construction of equitable environments".

From this perspective, for the learning process to be truly evolutionary, the role of the teacher as a mediator between the child and knowledge is essential. In order for the student to become autonomous, expand their abilities, and re-signify their learning process, it is important that the teacher develop a sensitive awareness of the uniqueness of each student and restructure their practices, aiming for a more humanitarian, dialogical, and fair education that values social and cultural diversity.

Final considerations

This chapter sought to discuss digital didactic-pedagogical resources with a view to learning, from an inclusive perspective focused on students with disabilities. Considering the findings, we understand that it is necessary to rethink teacher training to move away from vertical pedagogical practices and develop strategies that encourage the use of more modern technologies within the school environment. Considering the educational context from a historical-cultural perspective, it becomes evident that there is an urgent need to re-signify both new challenges and old paradigms in favor of a transformative education that values the students' experiences, subjectivities, and the continuing education of teachers. In addition to technical knowledge, it is essential that teacher training and practices be connected to the social, technological, and historical changes of contemporary society.

Considering the particularities of the children's subjective development, the learning process, and the still outdated educational model, it is highly relevant that the use of technologies as pedagogical tools becomes a dynamic mechanism for constructing new educational strategies. These tools combined with teachers' mediation, can contribute significantly to a more effective education, as well as enable the restructuring of existing knowledge and the re-signification of new approaches, based

on the historical-cultural perspective.

Considering the transformative educational scenario and ongoing technological advances, Mantoan (2005) emphasizes that schools need to reformulate their teaching process, breaking with paradigms of marginalization regarding differences and the processes that shape students' learning. In this context, the chapter suggests an investigation into the use of technologies within the school environment and how digital didactic resources can become mediating tools in the teaching-learning process, ensuring equal access to knowledge as an inclusive strategy.

In this sense, the teacher needs to assume the role of mediator between the student and knowledge. To this end, it is imperative to understand which didactic and pedagogical resources are necessary to ensure inclusion and promote learning. This knowledge involves, beyond technical mastery, a sensitive understanding of the needs of students with disabilities and how educational resources are intentionally applied. In dialogue with the theoretical contributions of Vygotsky, in his socio-historical theory — which highlights that cognitive development occurs through social interactions and cultural mediations as the core axis of development — particularly regarding the Zone of Proximal Development (ZPD), the use of technologies, digital resources, and the intentional mediation of the teacher can become essential tools for enhancing and expanding student learning.

References

BEHRENS, Marilda. **Projetos de aprendizagem colaborativa num paradigma emergente.** *In*: BEHRENS, Marilda A.; MASETTO, Marcos T.; MORAN, José M. Novas tecnologias e mediação pedagógica. Campinas: Papirus, 2000.

COSTA JR., Hélio Lemes. **Tempos digitais**: ensinando e aprendendo com tecnologia Porto Velho, RO, Brasil: Edufro – Editora da Universidade Federal de Rondônia, 2012.

DA SILVA, José Carlos Teixeira. **Tecnologia**: novas abordagens, conceitos, dimensões e gestão. Revista Produção. V.13 n.1 2003. Disponível em: https://doi.org/10.1590/S0103-65132003000100005. Acesso em: 18 jul. 2025.

DUTRA, Mariana; FREITAS, José Antônio; LIMA, Camila**.**

Introduzindo a era digital: inclusão e tecnologia no meio educacional. Revista FT, São Paulo, v. 5, n. 2, p. 45–58, abr. 2024. Disponível em: https://revistaft.com.br/introduzindo-a-era-digital-inclusao-e-tecnologia-no-meio-educacional/. Acesso em: 15 jul. 2025.

FREIRE**, Paulo. Pedagogia da indignação**: cartas pedagógicas e outros escritos. Rio de Janeiro: Paz e Terra, 2022.

FREIRE**, Paulo. Pedagogia do oprimido**. Rio de Janeiro/São Paulo: Paz e Terra, 2019.

INSTITUTO RODRIGO MENDES. **Tecnologias digitais aplicadas à educação inclusiva:** fortalecendo o Desenho Universal para a Aprendizagem. São Paulo: Instituto Rodrigo Mendes e Instituto Unibanco, 2021. Disponível em: https://www.institutorodrigomendes.org.br/wp-content/uploads/2021/11/Tecnologias-digitais-aplicadas-a-educacao-inclusiva-IRM.pdf. Acesso em: [15 de julho de 2025].

MANTOAN, Maria Teresa Eglér. **Inclusão escolar**: o que é? Por quê? Como fazer? São Paulo: Moderna, 2005. Disponível em: https://files.cercomp.ufg.br/weby/up/211/o/INCLUSÃO-ESCOLARMaria-Teresa-Eglér-Mantoan-Inclusão-Escolar.pdf. Acesso em: 15 jul. 2025.

MIRANDA, Gilmar dos Santos Sousa; NOVAES, Daniel. O professor 4.0 e as tecnologias educacionais: democratização de acesso para quem?: *In*: Wilder Kleber Fernandes de Santana; Éderson Luís Silveira. (Org.). **Educação e Linguagens Múltiplas**: da Antiguidade à Era Digital. Vol. 1. 1.ª ed. São Carlos: Pedro & João Editores, 2023, v. 1, p. 289-302.

NOVAES, Daniel; RODRIGUES, L. C. Mediações pedagógicas no uso do computador com um aluno com autismo na escola especial: tensões e contradições. **Germinal**: Marxismo e Educação em Debate, v. 16, p. 461-475, 2024.

PEREIRA, Daniel Novaes Gomes. **Por entre olhares, o humano**: processos de constituição de uma criança (com autismo) no segundo ano do ensino fundamental. 2022. Tese (Doutorado em Educação) – Universidade São Francisco, Itatiba, 2022. Disponível em: https://www.usf.edu.br/galeria/getImage/427/8885821332712951.pdf.

VALENTE, José Armando; FREIRE, Fernanda Maria Pereira; ARANTES, Flávia Linhalis (Orgs.). **Tecnologia e educação** [recurso eletrônico]: passado, presente e o que está por vir. Campinas, SP: NIED/UNICAMP, 2018. 406 p. Publicação digital (e-book) no formato PDF. Disponível em: Portal NIED/UNICAMP. Acesso em: 21/07/2015.

VIGOTSKI. L. S. Método de investigación. *In:* VYGOTSKI, L.S. **Obras Escogidas III.** Madri: Visor, 1995, p. 47-96.

VIGOTSKI, L. S. **Quarta aula**: a questão do meio na pedologia. Psicologia USP, São Paulo, v. 21, n. 4, jan. 1935/2010, p. 681-701. https://doi.org/10.1590/s0103-65642010000400003.

VIGOTSKI. L. S. El problema del desarrollo de las funciones psíquicas superiores. *In:*VYGOTSKI, L.S. **Obras Escogidas III.** Madri: Visor, 1995, 383p. (disponível em: https://drive.google.com/drive/folders/1YMiW-40SkwauS-fJYNje8J9aYRsxqIAy.

VIGOTSKI, L. S. La colectividad como factor de desarrollo del niño deficiente. *In*: VIGOTSKI, L. S. **Obras Escogidas, vol. V**, Madrid: Visor, 1997, pp.213-234.

ASSISTIVE TECHNOLOGY, REFLECTING ON SPECIALIZED EDUCATIONAL SERVICES IN CHILDHOOD

Eromi Izabel Hummel[1]
Alex Sandro Pires de Lima[2]
Fludualdo Talis de Paula[3]

1. Introduction

Discussing the role of assistive technology in Specialized Educational Services (AEE) during childhood expands the understanding of inclusion and challenges the limited view that its use is confined to overcoming physical or functional barriers. Assistive technology should not be regarded merely as a technical aid, but as a pedagogical means that enhances children's active participation in processes of communication, socialization, imagination, and learning. This perspective invites a profound reflection on how technological innovation can reshape educational experiences—transcending mere functionality to encompass the dimensions of subjectivity and identity construction.

Childhood, as a stage characterized by discovery, play, and multiple forms of expression, demands from educators a sensitive and broadened perspective. Children are, by nature, explorers and creators of worlds, employing gestures, vocalizations, drawings, and, above all, play as their primary means of interpreting and engaging with reality. In this sense, AEE

1 Prof. Dr. Eromi Izabel Hummel, Course: Assistive Technology – Strategies and Resources. PROFEI / UNESPAR. E-mail: erohummel@gmail.com. CV: http://lattes.cnpq.br/0729013084742634.

2 Master's student in Inclusive Education – PROFEI / UNIFESP.. E-mail: sandro.pires@unifesp.br. CV: http://lattes.cnpq.br/8602111508028071.

3 Master's student in Inclusive Education – PROFEI / UNIFESP.. E-mail: fludualdo.talis@unifesp.br. CV: http://lattes.cnpq.br/0078701583891740.

during childhood must consider the specificities of child development, acknowledging that children communicate, learn, and interact in diverse ways—often through non-verbal, symbolic, or sensory languages. The multifunctional resource room, an essential environment for AEE, must therefore be re-signified: not as a mere laboratory for interventions, but as a space for creation, exploration, and the construction of autonomy—particularly for children with disabilities or Autism Spectrum Disorder (ASD). Within this environment, assistive technology, when used pedagogically and humanely, can open new pathways for interaction and the flourishing of potential.

Traditionally, assistive technology has been conceived from a compensatory perspective, emphasizing "disability" and the notion of "technical aid" as a means to overcome it. A more contemporary and inclusive approach, however, positions assistive technology as a catalyst for opportunities—a cultural mediator that enables children to transcend barriers and fully participate in the educational experience. The challenge lies in integrating these resources so that they not only ensure accessibility but also foster creativity, autonomy, and personal expression, while respecting each child's individual pace and learning style. This requires a view that moves beyond the instrumental, embracing the playful and aesthetic dimensions of childhood, as well as the complex psychosocial networks that underpin development.

This theoretical essay seeks to critically examine the role of assistive technology in childhood, with a focus on practices developed within the context of Specialized Educational Services. It aims to understand how such resources contribute to strengthening communication, play, and child autonomy—fundamental elements in the teaching and learning process within AEE. The discussion is anchored in theoretical frameworks related to childhood, inclusive education, and the specialized knowledge that underpins pedagogical practice, with the goal of unveiling the multiple layers of meaning that assistive technology can add to the experience of children with disabilities, thereby promoting a truly inclusive and emancipatory education.

2. Methodology

This essay is characterized as a critical and reflective theoretical study grounded in bibliographic research. The adopted approach seeks to move beyond the mere description of concepts, proposing an in-depth and interdisciplinary analysis of the relationships between Specialized Educational Services (AEE), childhood, and assistive technology. The argument develops through the articulation of diverse theoretical frameworks that address school inclusion in early childhood, the pedagogical use of assistive technologies within AEE, and the specialized teaching knowledge required in this complex process.

The reflection is anchored primarily in the understanding of the pedagogical knowledge necessary for the effective use of assistive technology in AEE, as discussed by Hummel (2015), who emphasizes the importance of educators' continuous training and adaptability. In addition, it considers the principles of inclusive education according to Mantoan's (2015) contributions, who advocates for a school that embraces all learners, recognizing diversity as a core value. The methodological orientation also incorporates the conception of childhood as a stage of multiple languages—valuing communication in its various forms, play, and interaction as essential dimensions of learning and child expression—as postulated by authors such as Kramer (2003) and Oliveira (2002).

The bibliographic research encompassed works by renowned authors in the fields of Special Education, Inclusive Education, and Childhood Studies, including Pletsch (2010), Bersch (2012), and Rossetti-Ferreira (2012). Their perspectives contribute to constructing a robust theoretical framework contextualized within the Brazilian reality. The critical analysis of these texts enabled a dialogue between theory and practice, fostering a more sensitive, inclusive, and effective approach to specialized early childhood education. Therefore, this essay does not merely compile information but seeks to produce original knowledge through the synthesis and critical interpretation of references, stimulating academic debate, and proposing new perspectives for the inclusion of children with disabilities.

3. Theoretical Foundation

3.1 Specialized Educational Services in Childhood

Specialized Educational Services (AEE) constitute a complementary and/or supplementary support to general education, designed to meet the specific educational needs of students with disabilities, global developmental disorders, or high abilities/giftedness (Resolution CNE/CEB No. 4/2009, Articles 4 and 5). The objective of AEE is not to replace regular schooling, but rather to enhance students' development and learning through the provision of pedagogical and accessibility resources. In early childhood, AEE assumes distinctive characteristics, as it must take into account the particularities of child development—such as playfulness, imagination, creativity, and the multiplicity of expressive languages inherent to this stage of life—which are fundamental to the construction of knowledge and the formation of subjectivity.

Brazilian legislation—particularly the *National Policy on Special Education from the Perspective of Inclusive Education* (Brazil, 2008) and the *Brazilian Inclusion Law for Persons with Disabilities* (*Statute of Persons with Disabilities*, Brazil, 2015)—guarantees the right of access to Specialized Educational Services (AEE), preferably within regular schools, in multifunctional resource rooms. These legal provisions not only safeguard the universal right to education but also acknowledge the relevance of pedagogical practices that respect students' individualities and promote educational equity from the earliest school years. The inclusive perspective challenges segregationist models, affirming diversity as an intrinsic and constitutive value of the educational process.

Professionals working in Specialized Educational Services (AEE) must undergo specific and continuous training to develop pedagogical strategies that promote children's access, retention, participation, and learning. As Mantoan (2011) emphasizes, school inclusion requires a paradigm shift in which diversity is understood as a source of enrichment rather than as a problem to be corrected or a deficit to be compensated for. In this context, the AEE teacher must act as a sensitive mediator, capable of recognizing children's multiple forms of expression and learning, and of designing flexible and adapted curricula that respond to their individual

needs and potentialities. Their role is essential in dismantling the attitudinal and pedagogical barriers that persist within the school environment.

The school, in turn, must operate as a democratic and welcoming space where all children are guaranteed the right to meaningful learning and full social participation. According to Pletsch (2010), regular schools must acknowledge and value AEE as an integral component of their pedagogical project, fostering collaborative work among mainstream teachers, AEE educators, and families. Such collaboration materializes through co-teaching practices and the formulation of a *Specialized Educational Service Plan* (PAEE), which genuinely guides the child's holistic development, reinforces the contributions of all parties involved, and ensures the continuity and coherence of pedagogical actions.

3.2 Language, Communication, and Play as Axes of Child Learning

Language in childhood manifests itself in plural forms and is not limited to verbal expression alone. Children communicate through gestures, facial and bodily expressions, sounds, drawings, scribbles, spontaneous movements, and, above all, through play. This diversity of manifestations reflects the complexity of the child's world and the multiplicity of ways through which knowledge is constructed and shared. As Kramer (2003) observes, childhood is, by its very nature, a period of experimentation, creation, and invention of languages, in which every gesture, sound, or trace carries a unique and potent meaning. Consequently, inclusive schools must recognize and value these multiple modes of communication as legitimate and powerful dimensions of the learning process, broadening the concept of literacy beyond conventional notions of reading and writing.

In this context, play is more than a spontaneous activity or mere pastime: it constitutes a fundamental right of the child, a primary form of expression, and a privileged pathway for constructing knowledge and subjectivity. Oliveira (2002) emphasizes that play in childhood is not simple entertainment but an essential activity for physical, emotional, social, and cognitive development, functioning as both a rehearsal for adult life and a laboratory for experimenting with roles and situations. Through play, children explore the world, test limits, negotiate meanings, and develop social skills in an intrinsically motivated and meaningful way.

Within the sphere of special education, play also emerges as an invaluable pedagogical mediation tool, fostering interaction, learning, and the development of autonomy in children with disabilities. Through playful activity, the child not only exercises their abilities but also finds ways to express desires, frustrations, and joys—often even before mastering verbal language. Play thus becomes a powerful vehicle for inclusion, enabling all children to share experiences and establish meaningful relationships that transcend communication and attitudinal barriers.

The school's Pedagogical-Political Project (PPP) must incorporate these perspectives, recognizing that learning in childhood occurs through meaningful, sensory, and interactive experiences. As Rossetti-Ferreira *et al.* (2012) argue, the curriculum must remain open to diverse forms of learning, and play should be intentionally planned as an inclusive pedagogical strategy. This involves creating spaces and times not only for free play but also for mediated and structured play, guided by clear pedagogical objectives—always respecting each child's spontaneity, rhythm, and initiative.

Learning in childhood extends beyond the acquisition of formal content; it encompasses processes of subjectification, coexistence, identity formation, and the expression of individuality. A pedagogical practice that truly respects childhood must engage in active listening, value children's initiatives, and recognize their multiple intelligences, including those expressed through resources and interactions mediated by assistive technologies. The challenge lies in constructing environments where communication flows freely in all its forms and where play operates as the driving force of discovery, learning, and development.

3.3 Assistive Technology and School Inclusion

Assistive technology encompasses a broad set of resources, methodologies, strategies, practices, and services designed to promote functionality and enable the participation of people with disabilities. Its primary purpose is to expand the functional abilities of individuals with disabilities or reduced mobility, fostering autonomy, communication, mobility, and social participation across all dimensions of life (Law No. 13.146/2015, art. 3, III).

In early childhood education, the adoption of assistive technology must be guided by the specific needs and potentials of each child, in accordance with the principles of inclusion that value diversity and aim to eliminate barriers to participation and learning. Rather than a generic or standardized application, its use demands individualized consideration that respects developmental specificities, sensory preferences, and communicative forms characteristic of early childhood.

According to Bersch (2012), assistive technology should not be conceived as an end in itself—that is, as an isolated technological artifact—but as a mediating instrument that ensures the right to participation and learning. Within the school environment, this perspective implies the integration of technological resources into the pedagogical routine naturally and functionally, avoiding the segregation or isolated use of such devices. The goal is to ensure that assistive technology becomes an organic component of educational practice, promoting accessibility while stimulating creativity, interaction, and autonomy.

The aim is to promote the shared use of resources whenever possible, encouraging interaction among children and reinforcing the understanding that technology represents an extension of human capabilities—an element accessible to and beneficial for all.

The inclusive school must incorporate the planned and contextualized use of assistive technology into its pedagogical project. This process requires the active involvement of the entire teaching staff, Specialized Educational Services (AEE), and school management in the selection, adaptation, and evaluation of the resources employed, ensuring their suitability to both individual and collective needs. According to Mantoan (2015), inclusive education demands that schools continuously reorganize themselves, moving beyond standardized, inflexible, and segregationist models. It is therefore essential to construct pedagogical practices that are flexible, dialogical, and democratic, in which assistive technology operates as an integrating element of the educational process—rather than a marker of difference.

When conceived as an epistemic instrument of pedagogical mediation, assistive technology emerges as a catalyst for more equitable and responsive school practices that acknowledge and value the

singularities of students with disabilities. Far from constituting an autonomous or isolated solution, its effective implementation requires planned, continuous, and institutionally supported integration. This, in turn, presupposes the inclusion of accessibility-oriented teacher training within the school's Pedagogical-Political Project (PPP). Without such collective commitment, the use of these resources tends to remain limited to sporadic and fragmented initiatives, often dependent on the individual efforts of isolated educators, thereby undermining the consolidation of a coherent and sustained training framework.

Assistive technology encompasses a broad spectrum of resources, ranging from augmentative and alternative communication (AAC) systems, adapted educational software, special keyboards and mice, and electronic magnifiers, to accessible digital books, inclusive toys, and mobility or physical accessibility supports (e.g., ramps, elevators). These tools must be integrated into the curriculum in an intentional and articulated manner, supporting not only cognitive development but also sensory (visual, auditory, tactile), emotional (self-esteem, confidence), and social (interaction with peers and adults) dimensions of learning.

The presence of assistive technology in schools transcends the notion of technical accessibility; it constitutes a potent pedagogical instrument for realizing the right of all children to a quality education that is attuned to diversity and committed to promoting full citizenship. By facilitating communication, interaction, and participation, assistive technology empowers children with disabilities to assume an active role in their learning and school experiences, thereby transforming the school into a genuinely inclusive environment—one that fosters belonging, autonomy, and holistic development.

4. Reflecting on specialized educational services in childhood

The articulation between theory and practice in Specialized Educational Services (AEE) during childhood reveals both the complexity and the richness inherent in the inclusion process. When integrated with pedagogical sensitivity and intentionality, assistive technology transcends its merely instrumental role, becoming a catalyst for the child's holistic

development. It is in the everyday dynamics of practice—in the dialogue among multiple forms of knowledge and in authentic human interactions—that the transformative potential of these resources is truly realized.

The Mainstream Classroom Teacher and Collaborative Construction: The effectiveness of Specialized Educational Services (AEE) and the integration of assistive technology in early childhood education fundamentally depend on the collaborative partnership between the AEE teacher and the regular classroom teacher. As Mantoan (2011) emphasizes, inclusion is not an act of benevolence but a right that requires the reorganization of the school as a collective and systemic endeavor. This entails that mainstream teachers must be receptive to understanding the specificities of each child with a disability, while also embracing the strategies and resources proposed by AEE professionals. Assistive technology should not be perceived as the exclusive responsibility of specialists but rather as a pedagogical tool capable of benefiting all students in the classroom, fostering participation and promoting universal accessibility. The continuous exchange of knowledge, collaborative observation, and shared planning are indispensable for constructing a curriculum that is genuinely responsive to diversity.

A Broadened Perspective of AEE in Childhood: When directed toward childhood, Specialized Educational Services (AEE) must move beyond purely clinical or compensatory models. The objective is not to "rehabilitate" or "correct" but to enhance the child's intrinsic capacities during a formative and intensely developmental stage. As Pletsch (2010) emphasizes, this approach must value the multiplicity of languages and the centrality of play in the learning process. Within this framework, assistive technology should be integrated into play, sensory exploration, and non-verbal communication, enabling the child to interact with the world on their own terms, constructing meanings and expressing themselves freely. Consequently, AEE professionals must adopt a clinical-pedagogical perspective that comprehends the child as a whole, articulating emotional, social, and cognitive dimensions in a holistic and humanizing manner.

Collaborative AEE and the Support Network: The effectiveness of Specialized Educational Services (AEE) is significantly enhanced when supported by a collaborative network that includes not only teachers but

also families, health professionals, specialists from related fields, and the broader community. The family constitutes the primary partner in this process, as it holds the most comprehensive understanding of the child's history, routines, and singularities. Continuous dialogue and the sharing of information are essential to ensure the continuity of interventions and the alignment of pedagogical and familial expectations. Within this framework, assistive technology serves as a bridge between school and home, enabling learning and communication tools to extend beyond the classroom and fostering the child's autonomy across different contexts. Drawing on Hummel's (2025) conception of teaching knowledge, the educator emerges as a key articulator of this support network—one capable of mobilizing diverse resources and integrating interdisciplinary knowledge to promote meaningful and inclusive educational practices.

The Multifunctional Resource Room as a Creative Hub: The multifunctional resource room must be re-signified—from a space of individualized and isolated care to a dynamic center for experimentation, creation, and the collective construction of knowledge. Within this environment, assistive technology can be explored in creative, adaptive, and collaborative ways, allowing children to actively participate in shaping their learning experiences. As Bersch (2012) emphasizes, assistive technology should be understood as a means for participation rather than an end in itself. Consequently, the resource room should foster the manipulation of diverse materials, the invention of new uses for them, and meaningful interactions among children with and without disabilities, thereby promoting social inclusion and the exchange of experiences. It becomes, therefore, a space for project-based learning where curiosity and imagination flourish—mediated by technological devices that expand each child's possibilities for action and expression.

Assistive Technology, Beyond the Technical Device: As discussed throughout this essay, assistive technology extends far beyond devices or software; it represents a comprehensive concept that encompasses the adaptation of materials, the development of pedagogical strategies, and the thoughtful structuring of learning environments. In the context of childhood, this perspective goes beyond digital augmentative and alternative communication (AAC), encompassing analog boards, adapted

toys, sensory games, and low-cost resources. Central to its implementation is the pedagogical intentionality that underpins its use—aimed at fostering communication, engagement in play, and the child's autonomy, while respecting their individuality and unique ways of learning and interacting. Rossetti-Ferreira *et al.* (2012) underscore that development is realized through interaction, and assistive technology should serve as a facilitator of these meaningful interactions.

Analog and Digital Resources: Synergy and Complementarity: There is no dichotomy between analog and digital resources in assistive technology for childhood; rather, they function complementarily. The tactile, manipulative, and concrete sensory experiences offered by analog resources are irreplaceable in child development. At the same time, digital resources, such as adapted educational software, communication applications, and interactive games, provide new possibilities for engagement, personalization, and access to information, overcoming physical and cognitive barriers. The intelligent integration of both types of resources creates richer and more adaptable learning environments, allowing children to transition seamlessly between concrete and virtual experiences, exploring the world in diverse ways.

Interactions and Play as Axes of Assistive Technology: Assistive technology is most effective when it fosters meaningful interactions and supports play. Oliveira (2002) highlights play as the fundamental language of childhood. Therefore, the selection and adaptation of resources must prioritize their potential to promote play, creativity, and socialization. For instance, an adapted toy or a playful communication application can open channels for the child to express themselves, negotiate, create narratives, and engage with peers, thereby integrating fully into classroom dynamics and social life.

A Focus on Childhood and the Individual: Moving beyond conventional paradigms requires adopting a radically child-centered perspective that views the child as a subject of rights and a protagonist in their development. This perspective emphasizes the child's uniqueness, potential, and individual ways of interacting with the world, rather than focusing solely on "disability." When applied in this way, assistive technology becomes an instrument for expanding the child's freedom

and agency, rather than a corrective tool. Kramer (2003) underscores the importance of respecting the temporal and linguistic particularities of childhood, and assistive technology can serve as an ally in understanding and valuing these forms of expression.

Creating Scenarios and Opportunities: This perspective calls on educators, particularly those in AEE, to become designers of experiences and creators of meaningful learning scenarios. This requires identifying individual needs, adapting the environment, selecting appropriate assistive technology resources, and, above all, generating opportunities for children with disabilities to actively participate, experiment, make mistakes, learn, and develop their full potential. It is an invitation to pedagogical innovation, to boldly reimagine solutions, and to challenge outdated conceptions of disability and inclusion—constructing an education that is genuinely transformative and celebrates the richness of human diversity.

5. Conclusion

The critical reflection on Specialized Educational Services (AEE) in childhood and the use of assistive technology demonstrates that inclusion transcends the mere physical presence of a child with a disability in school. It constitutes a complex and dynamic process that requires a profound re-signification of pedagogical practices, teaching knowledge, and the very conception of childhood and learning. This essay has highlighted that assistive technology, when understood as a mediator of development and participation rather than as a mere "technical aid," can open new horizons for communication, expression, and play—essential elements in every child's formation.

Reiterating the central points, AEE in childhood must be intrinsically connected to the playful universe and the multiple languages of children. Collaborative interaction among mainstream classroom teachers, AEE specialists, families, and the wider community is fundamental to constructing an inclusive educational ecosystem. The multifunctional resource room, far from being an isolated or compensatory space, should serve as a laboratory for creation, experimentation, and co-construction of knowledge, where analog and digital resources complement one another to provide personalized learning opportunities. A humanized perspective

that values each child's potential and recognizes their singularity underpins any truly inclusive pedagogical intervention.

Assistive technology, therefore, emerges as a powerful instrument to enhance participation and autonomy, supporting sensory, auditory, visual, and kinesthetic development in a holistic and meaningful manner. Its effectiveness, however, is intrinsically dependent on robust and continuous teacher training, which equips educators not only to operate technological devices but, above all, to harness their pedagogical potential and adapt them to the unique needs, interests, and modes of engagement of each child. As Hummel (2015) emphasizes, the quality of inclusive education is inseparable from the depth and sophistication of the AEE teacher's professional knowledge.

Finally, public policies in Brazil must be continuously strengthened and rigorously implemented, ensuring not only access to assistive technology but also the infrastructure, resources, and institutional support required for its effective integration into everyday school life. Inclusive education in childhood is an investment in the future, fostering a more just, equitable, and sensitive society attuned to human diversity. Breaking paradigms and innovating with intentionality and originality are essential to cultivating an education that celebrates each child's singularity and empowers them to become protagonists of their own learning journey.

References

BERSCH, R. Introdução à tecnologia assistiva. [Introduction to assistive technology]. **Tecnologia Assistiva**, v. 1, n. 1, p. 1-15, 2012.

BRASIL. **Ministério da Educação. Secretaria de Educação Especial**. Política Nacional de Educação Especial na Perspectiva da Educação Inclusiva. [National Policy on Special Education from the Perspective of Inclusive Education]. Brasília: MEC/SEESP, 2008.

BRASIL. **Ministério da Educação. Conselho Nacional de Educação**. Câmara de Educação Básica. Resolução n.º 4, de 2 de outubro de 2009. Institui as diretrizes operacionais para o atendimento educacional especializado na Educação Básica, modalidade educação especial. [Resolution n° 4, of October 2, 2009. Establishes the operational guidelines for specialized educational services in Basic Education, special education modality. Brasília: MEC, 2009.

BRASIL. **Lei nº 13.146, de 6 de julho de 2015.** Institui a Lei Brasileira de Inclusão da Pessoa com Deficiência (Estatuto da Pessoa com Deficiência). [Law nº 13.146, of July 6, 2015. Establishes the Brazilian Inclusion Law for People with Disabilities (Statute of Persons with Disabilities). Brasília: Senado Federal, 2015.

HUMMEL, E. I. Saberes Docentes para o Uso de Tecnologia Assistiva no Atendimento Educacional Especializado. [Teaching Knowledge for the Use of Assistive Technology in Specialized Educational Services]. **Informática na Educação**: teoria e prática, v. 18, n. 2, p. 81-92, 2015.

KRAMER, S. **A infância e sua singularidade**. [Childhood and its singularity]. Rio de Janeiro: Editora Cátedra, 2003.

MANTOAN, M. T. E. **Inclusão Escolar**: O que é? É fundamental? Qual o impacto? [School Inclusion: What is it? Is it fundamental? What is the impact? São Paulo: Moderna, 2015.

OLIVEIRA, V. B. (Org.). **O brincar é a criança do nascimento aos seis anos**. [Play and the child from birth to six years]. Petrópolis, RJ: Vozes, 2002.

PLETSCH, M. D. A escolarização de alunos com deficiência intelectual: um estudo na rede municipal de ensino do Rio de Janeiro. [The schooling of students with intellectual disabilities: a study in the municipal education network of Rio de Janeiro]. **Revista Brasileira de Educação Especial**, v. 16, n. 3, p. 339-354, 2010.

ROSSETTI-FERREIRA, M. C. *et al.* Os desafios da educação inclusiva: a escola, a universidade e a formação de profissionais. [The challenges of inclusive education: the school, the university, and the training of professionals]. **Psicologia**: Teoria e Pesquisa, v. 28, n. 4, p. 417-426, out./dez. 2012.

EVALUATION OF STUDENTS WITH AUTISM SPECTRUM DISORDER (ASD) ACROSS THE COGNITIVE, EXECUTIVE-FUNCTION, AND CONATIVE DOMAINS

Paula Carolei[1]

Alice Maria Ferreira[2]

Alex Sandro Pires de Lima[3]

1. Introduction

The educational assessment of students with Autism Spectrum Disorder (ASD) in Brazilian basic education too often adheres to normative models that prioritize cognitive performance, thereby neglecting dimensions essential to holistic development. [In Brazil, basic education encompasses early childhood education, elementary school, and high school – broadly equivalent to K-12 in the United States.]. This theoretical-analytical article addresses this gap, arguing that a truly inclusive assessment must rest on a three-dimensional framework integrating the cognitive, executive, and conative domains. Through critical engagement with authors such as Hoffmann (2014), Vygotsky (1993), Feuerstein (1991), and Mantoan (2006), and in alignement with Brazilian legislation – e.g., the Brazilian Law for the Inclusion of Persons with Disabilities (Law 13.146/2015) and the National Policy on Special Education from the Perspective of Inclusion Education (Decree 6.571/2008) – this article deconstructs exclusionary assessment practices. Therefore, it proposes

1 Prof. Dr. Paula Carolei, Course: Educational Design – PROFEI / UNIFESP. E-mail: pcarolei@gmail.com. CV: http://lattes.cnpq.br/0778199387503922.

2 Master's student in Inclusive Education – PROFEI / UEPG. E-mail: 240205201028@uepg.br.

3 Master's student in Inclusive Education – PROFEI/ UNIFESP. E-mail: sandro.pires@unifesp.br. CV: http://lattes.cnpq.br/8602111508028071.

a conceptual model for assessing students with ASD (Levels 1 and 2 of support), detailing indicators and pedagogical strategies for each of the three domains. It concludes that the articulation of these dimensions, operationalized through instruments such as the Individualized Education Plan (IEP) [In the US, this is a legally mandated document under the Individuals with Disabilities Education Act (IDEA), outlining specific educational goals and services for students with disabilities] and the use of assistive technologies, enables the overcoming of the deficit model and framing assessment as an act of pedagogical justice that aknowledges and enhances the individual's singularities.

The consolidation of inclusive education in Brazil, supported by legal frameworks such as the Brazilian Inclusion Law (Brasil, 2015) [Law 13.146/2015, a comprehensive federal law that guarantees the rights of persons with disabilities, fostering inclusion, similar in scope to the Americans with Disabilities Act (ADA) and the Section 504 of the Rehabilitation Act in the US], challenges schools to transform deeply rooted practices. Furthermore, learning assessment emerges as a field of tension, in which classificatory and normative models have historically produced exclusion.

For students with Autism Spectrum Disorder (ASD), this tension becomes even more pronounced, as traditional assessment practices, often centered on measuring content acquisition, are insufficient to capture the complex and individualized ways in which these students learn, interact, and express knowledge. In light of this, the present article proposes a reconfiguration of assessment perspectives for students with ASD (Levels 1 and 2 of support), advocating a three-dimensional analytical model that encompasses cognitive, executive, and conative dimensions.

Through a critical theoretical review, this work seeks to: a) analyze the limitations of traditional assessment paradigms; b) substantiate the relevance of the three domains for a comprehensive understanding of the student; and c) present practical guidelines for ethical and pedagogically powerful assessment. It is argued that only by articulating these three dimensions does assessment transcend its classificatory function to become an instrument for promoting learning and full participation.

2. Methodology

This qualitative, theoretical-analytical study is situated within the field of educational research, focusing on inclusive assessment practices for students with Autism Spectrum Disorder (ASD), specifically those classified at Levels 1 and 2 of support, according to the DSM-5 criteria (APA, 2014).

The methodology adopted is grounded in an interpretive systematic literature review, following the guidelines proposed by Gil (2022) and Marconi and Lakatos (2017). It encompasses both classical and contemporary authors whose contributions are fundamental to understanding school assessment from an inclusive perspective. The works of Jussara Hoffmann (2014), Reuven Feuerstein (1991), Lev Vygotsky (1993), Paulo Freire (1996) and Maria Teresa Eglér Mantoan (2006), were selected and analyzed, along with normative documents such as the Brazilian Inclusion Law for Persons with Disabilities (Brasil, 2015) [Law 13.146/2015], the National Policy on Special Education from an Inclusive Education Perspective (Brasil, 2008) [Decree 6.571/2008, a key policy guiding inclusive education in Brazil], and the Curricular Guidelines for Basic Education [equivalent to the K-12 education guidelines].

The selection of these references is justified by their theoretical support for constructing a concept of assessment that is processual, mediating, and dialogical, thus overcoming the meritocratic and classificatory logic predominant in traditional school practices. The proposed model was delineated through the theoretical articulation of three domains—cognitive, executive, and conative—forming an assessment framework that regards the student as a whole, emphasizing the identification of potential, pedagogical mediation, and the promotion of functional learning.

Accordingly, specific indicators were defined for each domain, associated with assessment strategies aligned with the principles of inclusive education, such as the use of portfolios, participant observation, and assistive technologies. This process involved a critical examination of practices reported in the literature, which enabled the development of an operational conceptual framework that can be adapted by teachers within the context of Basic Education.

3. Three-Dimensional Assessment for Students With Asd

For assessment grounded in an Inclusive Perspective, a transition from exclusionary practices to inclusive approaches is imperative, demanding an epistemological rupture. Such transformation requires a profound reconfiguration of how assessment is conceived, since, from an Inclusive Perspective, it is sustained by three conceptual pillars: the overcoming of the normative paradigm, reliance on legal frameworks, and the comprehension of ASD specificities through theories that emphasize mediation.

Concerning the Formative Paradigm and Ethical Dialogue, the critique of traditional assessment models stands out as one of the most influential voices, as articulated by Jussara Hoffmann (2014). The author contends that assessment should be an investigative and mediating act, whose purpose is not to decree success or failure, but to sustain the learning trajectory. This notion of *assessment for promotion* shifts the emphasis from outcomes to processes, valuing sensitive listening and continuous pedagogical planning.

Complementarily, Freire (1996) confers an ethical-political dimension upon the act of assessing, conceiving it as a dialogical and humanizing practice committed to the student's autonomy and emancipation. For students with ASD, whose forms of communication and expression may differ from conventional norms, adopting a Freirean perspective entails recognizing and legitimizing their multiple voices.

Regarding the Legal Framework and the Centrality of the IEP, Brazilian legislation—particurlarly the *National Policy on Special Education from the Perspective of Inclusive Education* (Brasil, 2008) [Decree No. 6.571/2008] and the *Brazilian Law for the Inclusion of Persons with disabilities* (Brasil, 2015) [Law No. 13.146/2015, which secures the rights of persons with disabilities, akin the ADA and Section 504] —establishes the right to an inclusive educational system that ensures not only appropriate accommodations but also access to assistive technologies. This legal directive challenges the culture of standardization, as Mantoan (2006) argues, since inclusion presupposes flexible curricula and assessment practices; it is neither pedagogically sound nor equitable to assess students

with disabilities and their individual learning paces using identical criteria. In this context, the *Individualized Education Plan* (IEP) [In the U.S., a legally mandated document under IDEA ensuring a Free Appropriate Public Education (FAPE)] emerges as a strategic instrument that materializes this right, articulating the efforts of general education, Specialized Educational Support (AEE) [*Atendimento Educacional Especializado*, a supplementary Brazilian service analogous to special education], and families to define goals, strategies, and assessment criteria aligned with each student's needs and potential.

About Mediation and Development in Neurodiversity, assessing students with ASD requires theoretical frameworks that elucidate how learning occurs under atypical developmental conditions. Vygotsky's (1993) historical-cultural theory introduces the concept of the *Zone of Proximal Development* (ZPD), which is fundamental for inclusive assessment. From this perspective, assessment entails identifying not only what the learner has already mastered but also what they can accomplish with the support of a mediator. Likewise, Reuven Feuerstein's (1991) theory of *Structural Cognitive Modifiability* posits that cognitive functions are capable of transformation through Mediated Learning Experience. Assessment, therefore, should not be a static snapshot but a dynamic, dialogical process that informs and guides mediation, rendering the world more comprehensible and accessible to the learner.

3.1 A New Perspective: Three-Dimensional Assessment for Students with ASD

To transcend a fragmented understanding of the student with Autism Spectrum Disorder (ASD), it is essential to integrate the dimensions that shape the individual's relationship with knowledge and with the surrounding world. Accordingly, this study proposes an assessment that articulates three interrelated domains: cognitive, executive, and conative.

Cognitive Domain: Beyond Decoding

The cognitive domain encompasses the acquisition and application of knowledge, as well as the processes of language, memory, and reasoning. Among individuals with ASD, this profile is frequently heterogeneous. It

may include advanced mechanical memorization skills (rote memory) or the ability to decode words (hyperlexia) without necessarily achieving functional comprehension.

Assessment Indicators:

- **Functional comprehension:** Does the student apply acquired knowledge across varied contexts and move beyond literal repetition?
- **Generalization:** Are skills acquired in one context (e.g., the AEE room [Specialized Educational Support room]) effectively transferred to others (e.g., general education classroom, playground)?
- **Expressive and receptive communication:** How does the student convey what they know? Do they use speech, gestures, or Augmentative and Alternative Communication (AAC)? All modes of expression must be recognized and valued.

Assessment Strategies:

- **Portfolios:** Compile a range of students' productions (drawings, texts, photographs, videos) that demonstrate progress, creativity, and personal expression.
- **Participant observation:** Systematically document the students' performance in everyday situations, prioritizing the functional application of knowledge.
- **Assistive Technology:** Employ resources such as communication boards and screen readers to minimize motor or speech barriers (Bersch, 2017).

Executive Functions: The Foundation for Autonomy and Authorship

Executive functions encompass planning, organization, time management, inhibitory control, and cognitive flexibility—acting as the "conductor" of the brain (APA, 2014). In students with ASD, difficulties in these areas directly influence both academic and social performance. Through Paulo Freire's (1996) lens, the promotion of autonomy must be accompanied by the cultivation of authorship, enabling the learner to assume an active role in their intellectual, artistic, or multimodal production. This entails creating opportunities for students to design, elaborate, and revise texts, images, videos, or other expressive materials,

engaging in dialogue with peers and educators to refine and expand their ideas.

Assessment Indicators:

- **Task initiation and sequencing:** Does the student initiate activities autonomously and follow the necessary steps to completion?
- **Flexibility and inhibitory control:** Does the student adapt to changes in routine and maintain focus despite potential distractions?
- **Organization:** Does the student plan and organize effectively?
- **Authorship:** Is the student able to produce original works (texts, images, videos) that convey personal meaning? Do these productions show evidence of development based on feedback and dialogue?
- **Autonomy:** Does the student still require constant mediation, or do they already demonstrate partial independence in the learning process?

Assessment Strategies:

- **In-context assessment:** Observe the student while they engage in authorial projects that demand planning and organization.
- **Visual supports:** Employ and monitor the use of routine schedules, checklists, and visual sequencers, documenting the gradual reduction in dependence on these tools.
- **Mediation analysis:** Map the levels of support required (verbal, gestural, physical) and plan for their progressive reduction, in alignment with the Zone of Proximal Development (Vygotsky, 1993).
- **Collaborative and revised productions:** Promote opportunities for the student to express personal ideas, receive feedback, and revise their work, thereby fostering authorship and autonomy.

Conative Domain: The Engine of Learning

The conative domain encompasses motivation, desire, interests, relationships, and attitudes. Among students with ASD, restricted interests (*hyperfocus*) and challenges in social interaction can significantly influence engagement in learning activities.

Assessment Indicators

- Engagement and motivation: Which topics elicit the student's interest? Is there evidence of initiative in activities aligned with these interests?
- Bonds and interaction: How does the student relate to peers and teachers? Do they demonstrate a sense of belonging within the group?
- Emotional self-regulation and resilience: How does the student cope with frustration or unexpected situations? Are they able to seek support appropriately when needed?

Assessment Strategies

- Interest mapping: Incorporate the student's hyperfocus topics as meaningful entry points into curricular content.
- Active listening: Conduct structured interviews with the family and engage in dialogues with the student, respecting and validating their preferred modes of communication.
- Analysis of social interactions: Observe the student's behaviors during both structured (e.g., group activities) and unstructured (e.g., recess) moments, identifying barriers and opportunities for inclusion (Mantoan, 2006).

4. Conclusion

Reconfiguring assessment constitutes an essential step toward transforming the school into a genuine space for embracing neurodiversity. More than a judgmental instrument, assessment must become a moment of encounter—one that seeks not to classify, but to guarantee each student the inalienable right to learn, to belong, and to develop fully. It is well known that the inclusion of autistic students in Brazilian schools remains fragile, hindered by structural limitations, insufficient teacher preparation, and, consequently, inadequate pedagogical practices. In this context, the three-dimensional assessment model proposed here aims to render inclusion more effective and meaningful by attending to the learning specificities of autistic students and, consequently, fostering the consolidation of their autonomy.

Referências

AMERICAN PSYCHIATRIC ASSOCIATION. **Manual diagnóstico e estatístico de transtornos mentais – DSM-5**. Porto Alegre: Artmed, 2014.

BERSCH, R. **Comunicação alternativa**: recursos e estratégias para a inclusão. Porto Alegre: Ação Educativa, 2017.

BRASIL. Ministério da Educação. Secretaria de Educação Especial. **Política Nacional de Educação Especial na Perspectiva da Educação Inclusiva.** Brasília: MEC/SEESP, 2008.

BRASIL. **Lei n° 13.146, de 6 de julho de 2015.** Institui a Lei Brasileira de Inclusão da Pessoa com Deficiência (Estatuto da Pessoa com Deficiência). Brasília: Congresso Nacional, 2015.

FEUERSTEIN, R. **A modificabilidade cognitiva estrutural.** São Paulo: SENAC, 1991.

FREIRE, P. **Pedagogia da autonomia:** saberes necessários à prática educativa. São Paulo: Paz e Terra, 1996.

GIL, A.C. **Como elaborar projetos de pesquisa.** 7 ed. São Paulo: Atlas, 2022.

HOFFMANN, J. **Avaliar para promover**: as setas do caminho. Porto Alegre: Mediação, 2014.

MANTOAN, M. T. E. **Inclusão escolar:** o que é? Por quê? Como fazer? São Paulo: Moderna, 2006.

MARCONI, M. A.; LAKATOS, E. M. **Metodologia do trabalho científico**: projetos de pesquisa/pesquisa bibliográfica/teses de doutorado, dissertações de mestrado, trabalhos de conclusão de curso. São Paulo: Atlas, 2017.

VYGOTSKY, L. S. **A formação social da mente:** o desenvolvimento dos processos psicológicos superiores. São Paulo: Martins Fontes, 1993.

THE USE OF TECHNOLOGY IN SUPPORT OF MONITORING THE LEARNING PROGRESS OF DEAF STUDENTS

Nivea Cristina Lopes Cardoso[1]

Michelle de Oliveira Luna[2]

Marcio Hollosi[3]

Introduction

We live today in a thoroughly technological society. Our children and teenagers are immersed from birth in a media-saturated world, surrounded by a variety of technological and digital resources. Computers, cell phones, video recording tools, voice recorders, cameras, and research tools, to name but a few, are all part of students' daily lives. But what about the teachers?

Nowadays, teachers often interact with children and adolescents who know much more about using these technologies than the adults themselves, revealing a clear generational gap. Many educators from previous generations struggle with digital tools, often failing to incorporate them into their professional practices.

Technology, when viewed as both a tool and a resource, can greatly support educators in their daily activities.

Bearing this in mind, this chapter aims at highlighting the importance

1 School Supervisor at the Municipal Government of São Paulo, Master's student in the Graduate Program in Education and Health in Childhood and Adolescence, Federal University of São Paulo (UNIFESP). E- mail: lopes.nivea@unifesp.br

2 Municipal Special Education Teacher, Master's student in the Graduate Program in Education and Health in Childhood and Adolescence, Federal University of São Paulo (UNIFESP). E-mail: moluna10@unifesp.br.

3 PhD Professor in the Graduate Program in Education and Health in Childhood and Adolescence and in the Professional Master's Program in Inclusive Education, Federal University of São Paulo (UNIFESP). E-mail: hollosi@unifesp.br.

of tracking student learning throughout their educational journey, and exploring how technology can assist teachers—especially those working in Special Education, specifically in schools for the deaf.

A Brief History of Technology in Education

When we think of technology, we often picture iPods, smartphones, and the state-of-the-art Artificial Intelligence (AI). However, technology has been reshaping our reality for quite some time.

According to Kenski (2012, p. 22), "the term 'technology' refers to much more than machines. The concept encompasses the entirety of what the human mind has been able to create throughout history, including how these creations are used and applied." Mantoan (2015) reminds us that social changes cannot be ignored by educational institutions.

What we observe today in schools is a disconnection between teachers and students when it comes to media technologies. Nevertheless, considering all the responsibilities that fall upon teachers, would it not be logical to use such tools to support their work, or even to help manage an educational system or network? Bruzzi (2016) states that the first educational technology emerged in 1650 with the Horn-book, a wooden board with printed materials used to help children with literacy. However, the real technological boom occurred during industrial capitalism, when society's new structure demanded changes in social practices—among them, the creation of schools for the children of factory workers. In his text, Bruzzi cites several technologies introduced to education at that time: the magic lantern (a slide projector) in 1870, the chalkboard in 1890, and the pencil, invented in 1900. And who remembers the mimeograph? It was created in the 1940s, the same decade that saw the emergence of the pen and the typewriter. The computer would arrive later, around the 1980s.

Although some teachers already take advantage of digital resources, many still do not use them regularly—possibly because they do not see themselves as proficient with such tools or don't recognize them as part of their professional duties.

Nonetheless, the pandemic changed everything, placing educators in a unique position: they were now required to use technology to teach. This

scenario unveiled the lack of preparation and distance from technological tools, which had previously played a minor role in instruction. Despite resistance and insecurity, the digital era has now firmly entered the classroom.

In 2025, even with some progress, it remains necessary to expand and enhance the use of digital tools. Many school networks already use systems and platforms to gather data, assign grades and feedback throughout the learning process, and offer resources that support teachers in developing students' academic progress.

Technology Today

According to the IBGE (Brazilian Institute of Geography and Statistics), around 185.4 million people over the age of 10 used the internet in 2022. The Information and Communication Technology (ICT) module of the National Household Sample Survey (PNAD) shows that 98.4% of students in private schools used the internet, compared to 89.4% in public schools. Among seniors, internet use rose to 62.1% of the population that year.

The survey also showed that mobile phones are the primary device used for internet access, accounting for 98.9% of usage.

Today, almost anything can be done on a smartphone—from simple messaging to professional transactions, banking, streaming music, movies, videos, entertainment apps, and more. However, access to these resources depends on having an internet connectivity and the necessary digital literacy to operate tools effectively.

There is an urgent need to integrate digital tools into teachers' daily routines. Such resources can enhance student engagement and optimize the time teachers spend on administrative tasks.

School and Technology

Although Teachers' roles are clearly defined by law, the reality of their daily work is far more complex when considering the multiple responsibilities that occur before, during, and after teaching in the classroom.

The teaching profession also includes participation in the development of the school's Pedagogical Political Project (PPP), ensuring educational quality in line with national guidelines. That includes planning

lessons, defining objectives and goals aligned with the school's PPP and current legislation; monitoring students' learning; developing strategies to support student's progress; collaborating with school leadership in planning and follow-up; identifying barriers to learning and proposing solutions; evaluating student progress; and maintaining accurate records, among many other duties.

Given the breadth of these responsibilities, teachers must be highly organized. Among the most significant tasks is monitoring student learning, which typically takes the form of descriptive records or assigned grades. This requires a careful and individualized approach, especially in educational systems where much of the documentation is still physically—handwritten, time-consuming, and subject to loss or damage.

While technology is closely associated with tools and devices, its cultural role in education can help organize teachers' professional routines. According to Vygotsky (2000, p. 24), cultural development occurs in three stages: "for itself, for others, and for oneself." Thus, even though the transition is slow, digital technology in education may be shifting to a stage where it serves as a true facilitator of the teaching process.

Special Education and Deaf Students

It becomes an even more complex matter when discussing students or schools designated under Special Education, since the specific needs of this population are not always taken into account when planning and assessment procedures.

Typically, an educational system's curriculum is structured based on legal guidelines and theoretical frameworks that assume a majority of students without disabilities. As a result, teachers often base their pedagogical organization on those principles, which may exclude or marginalize minority groups.

When it comes to deaf education, the scenario is even more concerning. While to ensure these students have access to an adapted educational structure, such adaptation is often either superficial or entirely neglected by school systems. In reality practice, this reflects a long-standing social detachment from the Deaf community—often rendering them invisible within society. Inclusion, ends up functioning as exclusion.

Deaf education reflects a struggle for the existent recognition of individuals who possess unique characteristics, are capable, and must have their rights respected—including the right to a quality education. Therefore, tracking and documenting student learning is essential.

> Both special and regular schools must reorganize and improve the services provided to their students. It is crucial to advocate for change, and support movements that aim to radically reform educational institutions. Schools must break free from complacency, and inclusion—especially when it comes to students with disabilities—is the driving force behind this transformation (Mantoan, 2007, p.27).

When assessing a student, the evaluation is typically grounded in curriculum objectives, pedagogical principles, and general developmental expectations. These processes tend to be similar for most students. However, when evaluating students with disabilities—especially deaf students—unique challenges emerge.

In recent years, deaf education has undergone methodological changes, but these discussions remain limited to professionals and families who are directly involved. Society at large remains underinformed, and this lack of awareness is reflected in school systems.

In Brazil, based on Law of Guidelines and Bases of National Education (LDB, Law No. 9394/96) and the Brazilian Inclusion Law (LBI, Law No. 13.146/2015), every student with a disability must have an Individualized Education Plan (IEP), also known as a Personalized Educational Service Plan. This document outlines the barriers preventing students' access to the school curriculum and learning in general, and identifies specific educational needs, thus promoting inclusion. More specifically, in the case of deaf students enrolled in regular schools, the law guarantees the right to a Brazilian Sign Language (Libras) interpreter.

Assessment and the Use of Technology

> assessment involves a cooperative, guiding, and interactive dimension, in which the outcomes achieved throughout the collaborative work between teacher and students are compared with expected results in order to identify progress, detect challenges, and redefine teaching plans. (Brito & Silva, 2019, p. 783)

Assessment is a fundamental component of the pedagogical process and the assurance of students' progress. It is through indicators of student development that the teacher makes instructional decisions and revises plans.

For example, when a teacher offers learning opportunities during class and observes student development, they can then design new activities based on these observations. However, if these observations are not documented, crucial information may be lost, undermining the quality of support provided. For Special Education, maintaining IEP records and learning action plans is critical. The observational records about students' learning progress must be well-organized in order to support the planning of future interventions.

Deaf education has been built through spaces of interest—by committed professionals and some families. Although the right to access and remain in school is now guaranteed, we propose a deeper reflection on what quality and permanence truly mean in this context.

Typically, schools within an education system or network follow established guidelines regarding curriculum and assessment. Teachers are expected to present results that comply with these guidelines.

In schools for the deaf, this is no different—but a more specific approach is needed. Issues such as communication barriers, language delays, and curriculum gaps, often mean that the proposed curriculum for a given grade level cannot be fully implemented, as students may lack the necessary background knowledge. Continuous assessment is essential for identifying and responding to these needs. Haydt (1988, p. 14) argues that:

> Education has not only changed its teaching methods—becoming more active—but has also transformed its approach to assessment. Previously, assessment was selective, used only for classify and promoting students from one grade or level to another. Today, assessment plays new roles. It serves as a diagnostic tool and a way to determine how effectively learning objectives are being achieved.

Therefore, assessment must be a continuous act, requiring the educator to pay close attention to each student's development. A well-constructed tool that supports analysis and highlights patterns over time can be extremely helpful in this complex task. As Libâneo (1994) states "Assessment is a complex task that goes beyond tests and assigning grades. It plays pedagogical and didactic roles by analyzing results and mediating between them and the parameters of educational achievement".

According to the IBGE, around 5% of Brazil's population was diagnosed as deaf in 2023—approximately 10 million people. Deaf education represents a movement for recognition and rights, seeking to honor linguistic diversity and the use of Brazilian Sign Language (Libras) as a primary means of communication.

Even though access to education is legally guaranteed, it is of the utmost importance to ensure that deaf students' learning is consistently monitored—especially within schools for the deaf. How do these students graduate from middle school? How many continue on to high school? How many enroll in college?

It is crucial that teachers systematically and effectively track the learning paths of deaf students—producing a clear picture of each student's academic performance and, based on this, designing strategies that promote learning and overcome challenges. This type of action may play a decisive role in ensuring that students not only stay in school but thrive. One can say that technology can simplify and enhance this process, improving the quality of educational records and making sure that monitoring is actually carried out.

The Document: Learning Mapping Tool

Considering the context described above—and, more importantly, the right to quality education for all—we propose the use of a document designed to track the academic progress of students in Special Education, with a focus on deaf students. We refer to this document as the **"Learning Mapping Tool."**

The creation of this tool was to meet the specific needs of this group and showcase its importance to: Present the academic development of each student; Identify the student's current learning level, based on the curriculum adopted by the educational network; Detect content areas that students are struggling with and analyze the surrounding context; and evaluate whether the proposed curriculum aligns with the students' realities and, if not, determining the need to review the curriculum for this group.

About the Document

The Learning Mapping Tool is designed as a continuous tracking document that records individual student information in order to support

pedagogical actions and learning assessments. It enables teachers to identify each student's level of knowledge, highlight difficulties, and plan strategies to promote progress.

The document is based on the existing educational curriculum, which outlines learning objectives by grade or cycle. It is divided into two parts: **Student Information:** This section includes personal data and relevant information related to the student's academic performance. **Curriculum Objectives and Performance Monitoring:** This section lists all the learning goals outlined in the curriculum of the educational network. Teachers, guided by the pedagogical coordinators, indicate the student's progress by using a color-coded system based on a legend provided within the tool.

The information collected through this mapping document serves as the foundation to create an action plan and organize teaching strategies—ensuring that each student's needs are addressed. The map provides both an individual and group overview of the learning process.

Usage Guidelines

The document can be used on various digital platforms. In view of the fact that it is meant to be continuously updated, we chose to build it as an Excel spreadsheet stored in the cloud. The file is integrated into the school network's system so that teachers can access and update it from any device.

The cloud-based format allows easy access and completion from anywhere, while school administrators can also monitor the data. This way, the program becomes a resource for collective analysis, encouraging discussions around teaching strategies and student learning.

To optimize teachers' time and support comprehensive analysis, we designed a legend of performance indicators to be used alongside the curriculum learning objectives. These indicators allow educators to track and visualize student progress more clearly.

What we are proposing is a qualified approach to monitoring learning—not only to guarantee access to education but also promoting student retention through clear, ongoing documentation of deaf students' academic development within the educational system.

In addition, this tool can support broader analyses related to other school documents such as lesson plans, assessments, and school council reports.

Preliminary Guidelines for the Use of the Document:"

1. O ACOMPANHAMENTO DAS APRENDIZAGENS

Considerando:
- A Escolas Municipais de Educação Bilíngue para Surdos;
- A garantia de direitos dos estudantes matriculados;

Apresentamos o documento que deverá ser utilizado pela Equipe Escolar, com o objetivo de apresentar e acompanhar o desenvolvimento dos estudantes.
Tomamos como base os objetivos de aprendizagens indicados no Currículo da Cidade.
Orientamos que a Equipe docente, acompanhada pela Coordenação Pedagógica, preencha a planilha abaixo, seguindo as seguintes indicações:

- os registros devem seguir a legenda de cores apontando o desenvolvimento dos estudantes;
- cada coluna refere-se a um bimestre;

Estudante - 1º ano | Libras | LP | MT

Some learning objectives indicators of the curricular component for Sign Language:

LIBRAS

1º ano - Ciclo de Alfabetização

ESTUDANTE:

Legenda -
Objetivo Alcançado - A / Objetivo em Construção - C / Objetivo Não Alcançado - N

ACOMPANHAMENTO DAS APRENDIZAGENS

Código	Objetivo de Aprendizagem e Desenvolvimento (OAD)	1ºBI	2º BI	3ºBI	4ºBI
(EF01LS01)	Consolidar aspectos pragmáticos do contato comunicativo - direcionamento da atenção e contato de olho (toque no ombro como forma de chamamento, antecipação do sinal antes de apresentar o objeto, piscar a luz) na interação com o professor e com os outros estudantes				
(EF01LS02)	Explorar as habilidades de percepção e discriminação visual por meio de imagem (detalhes em objetos, fotos, desenhos, identificação de diferenças entre figuras, jogos dos sete erros).				
(EF01LS03)	Explorar as habilidades de percepção e discriminação visual na identificação de traços da Libras com atividades de jogo da memória em Língua de Sinais e telefone sem fio adaptado para a realidade da criança surda				

Some learning objectives indicators of the curricular component for written Portuguese:

LÍNGUA PORTUGUESA

1º ano - Ciclo de Alfabetização

ESTUDANTE:

Legenda -
Objetivo Alcançado - A / Objetivo em Construção - C / Objetivo Não Alcançado - N

ACOMPANHAMENTO DAS APRENDIZAGENS

Código	Objetivo de Aprendizagem e Desenvolvimento (OAD)	1ºBI	2º BI	3ºBI	4ºBI
(EF01LPS01)	Reconhecer o alfabeto em Língua Portuguesa				
(EF01LPS02)	Explorar capas de livros, já lidos pelo professor, reconhecendo título, ilustrador, autor e editora				
(EF01LPS03)	Explorar nomes em listas de campos semânticos diversos (nomes próprios, títulos de livros, brincadeiras, agenda do dia, tabelas, entre outros).				

Some learning objectives indicators of the curricular component for Mathematics:

MATEMÁTICA

1º ano - Ciclo de Alfabetização

ESTUDANTE:

Legenda -
Objetivo Alcançado - A / Objetivo em Construção - C / Objetivo Não Alcançado - N

ACOMPANHAMENTO DAS APRENDIZAGENS

Código	Objetivo de Aprendizagem e Desenvolvimento (OAD)	1ºBI	2º BI	3ºBI	4ºBI
EF01M01	Reconhecer a utilização de números no seu contexto diário como indicador de quantidade, ordem, medida e código.				
EF01M02	Formular hipóteses sobre a leitura e escrita numérica, incluindo números familiares e frequentes.				
EF01M03	Contar a quantidade de objetos de coleções (fixas ou móveis) e apresentar o resultado por registros verbais e/ou simbólicos e/ou registros numéricos.				

Final Considerations

This document arises from a pressing demand: The fragile process of tracking the learning progress of deaf students. We believe this issue is directly linked to ensuring their permanence in education.

The instrument we present—although still in an initial phase of development—demonstrates the need to carefully monitor and value the abilities students develop throughout their education. Considering the numerous responsibilities teachers face and the specific needs of students in Special Education, we believe that technology can support educators in several key areas: Saving teachers' time; Providing more accurate and faithful documentation of student performance; Enabling class-wide, grade-level, and system-wide analysis; Storing records securely and efficiently through digital platforms. Furthermore, it is important to emphasize that this tool does not aim to assess curriculum content for deaf students directly. Rather, it serves as a structured process for monitoring their learning withthe use of technology.

For this initiative to succeed, educational systems must be updated, placing student learning at the center of all planning procedures. Teachers must also be trained—and retrained—based on social realities, cultural contexts, and above all, the individuals they serve. And for this mission, media technology can be a powerful ally.

References

BRASIL. Ministério da Educação – Mantoan, Maria Teresa Eglér. **Fazer valer o direito à educação no caso de pessoas com deficiência.** Programa Ética e Cidadania: construindo valores na escola e na sociedade. MEC, 2007.

BRITO, Michelle de; SILVA, Suely Gomes da. **Avaliação da Aprendizagem**: Para Além da Verificação dos Resultados, 2019.

BRUZZI, Demerval Guilarducci. **Uso das tecnologias, da história à realidade**, 2016. Acesso dia: 18/07/2025

HAYDT, R. C. C. **Avaliação do Processo Ensino-Aprendizagem.** São Paulo: Ática, 1988.

KENSKI, Vani Moreira. **Educação e tecnologias**: Um novo ritmo da informação, 8th ed., Campinas: Papirus, 2012.

LIBÂNEO, José Carlos. **Didática**, 13th ed., São Paulo: Cortez, 1994.

MANTOAN, Maria Teresa Eglér. **Inclusão escolar – O que é? Por quê? Como fazer?** São Paulo: Summus, 2015.

VIGOTSKI, Lev Semionovich. 1929 Manuscript. **Educação e Sociedade**, São Paulo, v. 21, n. 71, p. 21-44, July 2000. Acesso em: 9 maio 2025.

AUGMENTATIVE AND ALTERNATIVE COMMUNICATION FOR SCHOOL INCLUSION

Luana Alves Santos[1]
Darlene Glória Maria Tourinho Costa[2]
Marisa Sacaloski[3]

Introduction

Augmentative and Alternative Communication (AAC) is a set of techniques and resources used to assist the communication of individuals who experience difficulties with verbal expression (Isaac, 2011). This methodology is crucial for people with conditions that may limit speech, such as cerebral palsy, autism, or other disorders that affect the ability to communicate. AAC ranges from basic methods, such as the use of gestures and images, to more advanced technologies, such as communication software available on tablets or smartphones (Montenegro *et al.*, 2021; Coelho *et al.*, 2015), and can be divided into two main branches: Augmentative Communication and Alternative Communication.

Augmentative communication involves strategies and resources that complement and enhance the speech of individuals who already possess some verbal ability but encounter obstacles in expressing themselves clearly and completely (Wallis *et al.*, 2017). The goal, in this case, is to support and improve the effectiveness of communication, ensuring that these individuals can express themselves as effectively as possible. Alternative

1 Speech-Language Pathologist, Specialist in Speech and Language at the Federal University of São Paulo (UNIFESP) – Paulista School of Medicine.

2 Faculty member of the Early Childhood Education Center – Escola Paulistinha de Educação, Federal University of São Paulo (UNIFESP).

3 Faculty member of the Professional Master's Program in Inclusive Education – PROFEI – Federal University of São Paulo (UNIFESP).

communication, on the other hand, is used to fully replace speech with other methods, such as gestures, visual symbols, or assistive technologies (Afonso, Maia & Meneses, 2019; Moraes *et al.*, 2019).

To ensure effective communication, visual tools can be used, organized on printed boards containing pictograms and images, as well as communication programs with eye-tracking systems or voice-generating devices, enabling users to express themselves efficiently (Carniel *et al.*, 2018; Coelho *et al.*, 2015). Another classification is based on the level of technology employed: low-tech resources—such as communication boards with symbols— and high-tech resources— such as mobile applications and computer-based communication systems. This differentiation is important because the choice of AAC type must be adapted to the individual needs of the user, their abilities, and the environment in which communication will take place (Sierra & Okimoto, 2020; Cardoso, Lopes & Adão, 2021).

In the school context, AAC is essential to facilitate learning and active participation of students, promoting richer and more meaningful interaction with peers and teachers. However, one of the main obstacles associated with AAC is its negative perception, since there is a mistaken belief that AAC is only a solution for people with severe disabilities or for those incapable of learning to communicate verbally. This can lead to the underestimation of users' abilities and potential. Such stigma can create additional barriers, including the lack of adequate support and resistance to implementing new technologies and communication methods.

Professionals and family members may struggle to recognize the benefits of AAC due to prejudices and misconceptions about its effectiveness and complexity (Romano & Chun, 2018). There is a tendency to associate AAC with permanent incapacity or the inhibition of speech development, instead of recognizing it as a tool that can enhance communication and foster inclusion.

This chapter aims to demystify the concept and use of AAC in educational settings.

Development

Method: Initially, a literature review was conducted based on the guidelines of the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Liberati *et al.*, 2009). Only articles published between January 2000 and July 2024, available in Portuguese and/or English, and retrieved from indexed scientific databases (PubMed, Virtual Health Library, and SciELO) as well as university libraries' repositories, were included.

The keywords used were: "Augmentative and Alternative Communication," "Language Development," "Non-verbal Communication," "Intervention," and "Professional-Family Relationships" in Portuguese and their corresponding terms in English.

The selection of studies was carried out in three stages: first, by reading the titles (838) and selecting the initial set of articles (231); then, by reading the abstracts (127); and finally, by analyzing the full texts (43). A total of 43 general articles were obtained, and for this chapter, those that specifically addressed people with disabilities and issues related to education were selected (34).

In the final stage of the review, the collected data were systematized and critically analyzed to correlate the perceptions identified in the literature with the available theoretical and scientific foundations. To illustrate the practical application of AAC in educational settings, a brief case report describing the use of AAC by an elementary school teacher was included.

Results and Discussion: The categorization of the studies was carried out according to the predominance of the themes discussed, focusing on the three main types of barriers identified in the literature: material, individual, and environmental/social, considering the aspects that impact the educational context.

Before addressing these barriers, it is important to recall that, within the social sphere, AAC plays a crucial role in promoting inclusion and interaction between individuals with communication difficulties and their peers (Moraes *et al.*, 2020).

Among the main beneficiaries of AAC in school settings are:

- **Individuals with ASD (Autism Spectrum Disorder):** These students may present significant challenges in communication and social interaction. AAC can facilitate the expression of needs and emotions, promoting social inclusion and peer interaction (Filgueira *et al.*, 2023). Moreover, it can support the signaling of routines that foster adherence and predictability, which are essential for ensuring a sense of safety and reducing anxiety, thereby preventing emotional dysregulation in students.
- **Individuals with Cerebral Palsy (CP):** Since this condition can affect motor function and coordination, it often results in communication difficulties. In this sense, AAC has proven effective in helping individuals with CP develop communication competencies, promoting verbal expression, social interaction, and supporting learning (Miranda *et al.*, 2021).
- **Individuals with Neuromuscular Disorders:** For these individuals, AAC can provide effective communication alternatives through assistive technologies that enable the preservation of communication abilities even as physical functions decline (Galli, Oliveira & Deliberato, 2009).
- **Children and adults with language disorders:** Whether caused by developmental delays or specific linguistic conditions, these individuals can benefit from AAC as a means to enhance language development and facilitate effective communication (Light & McNaughton, 2014).

Barriers to the Use of AAC (Romano & Chun, 2018)

Material Barriers: Material barriers refer to the limitations associated with the costs of acquisition, maintenance, transportation, and handling of AAC resources, whether high or low-tech. Even materials considered low-cost require constant adaptation and adjustment to keep pace with the specific needs and communicative development of users over time. This need was evidenced in a study that combined PECS with video modeling in a child with Down syndrome (Rodrigues, Campos & Almeida, 2015), where the data suggested that the preparation and maintenance of these

resources can represent a significant expense, which in some contexts may become an obstacle to AAC adherence. Printed and laminated cards were used as the main resource, and the organization of these materials required continuous planning and frequent updates according to the participants' progress and vocabulary expansion during the intervention. These aspects highlight the need for financial and logistical investment by caregivers and/or professionals (Buratto *et al.*, 2012; Mendonça *et al.*, 2023).

The Picture Exchange Communication System (PECS), which uses printed figures and simple communication folders, can be implemented even in school environments with limited resources. Successful interventions are possible with low-cost materials, provided they are methodologically well-structured and validated by those involved (Rodrigues & Almeida, 2020).

Beyond the challenges related to low-tech materials, there are also concerns about the cost of high-tech assistive resources, with 50% of speech-language pathologists and 10% of families and/or caregivers of AAC users reporting cost as a barrier (Romano & Chun, 2018). Eight studies indirectly addressed this issue, discussing voice-output devices, specialized software, adapted tablets, and comparisons between high- and low-tech systems. Although these studies did not directly quantify costs, many pointed out that the use of advanced technologies requires high initial investment, ongoing technical support, periodic software updates, and, in some cases, training for both users and communication partners to ensure proper use.

A case study on the transition from a paper-based board to a tablet communication app in a young woman with cerebral palsy required the purchase of the device and physical adaptations using orthoses to facilitate touchscreen access. Furthermore, the success of the intervention was linked to system customization, user training, and caregiver mediation, aspects that involve continuous investment of time and resources. The same study showed that replacing the paper board with the Vox4All® app promoted greater communicative autonomy but required prior training and accessibility adaptations to ensure functional and sustained use (Petroni *et al.*, 2018).

A systematic review of AAC methods in children with cerebral palsy

highlighted that, although high-tech solutions broaden communicative possibilities, their implementation still faces obstacles such as unequal access, the need for specialized technical knowledge, and structural barriers in Brazilian educational and clinical contexts (Miranda *et al.*, 2021).

A study on AAC use in children with ASD revealed that despite the growing adoption of tablet-based resources, their cost and the need for continuous technical support still represent significant obstacles, especially for families in situations of socioeconomic vulnerability (Montenegro *et al.*, 2023). Thus, although promising, their effectiveness depends on sustainable use and equitable access.

In addition to economic issues associated with high-tech materials, another material barrier identified in the literature is the difficulty of transporting and handling AAC resources. In the study conducted by Romano & Chun (2018), this factor was reported as a limitation by 20% of speech-language pathologists and 30% of families and caregivers, suggesting that aspects such as weight, fragility, size, or constant maintenance requirements may compromise mobility and consistent use of devices.

Individual Barriers: Individual barriers involve aspects related to users' linguistic and cognitive abilities, as well as their personal acceptance of AAC use. These barriers are frequently cited in the AAC literature, especially regarding linguistic and cognitive factors that may limit understanding, application, and generalization of communication resources. Such barriers are linked to users' neurological, intellectual, or behavioral conditions, which may impair symbolic processing, working memory, joint attention, and other prerequisite skills for functional use of alternative communication.

Montenegro *et al.* (2021) showed that although linguistic-cognitive impairments are present in children with Autism Spectrum Disorder, they do not represent insurmountable obstacles to AAC implementation. The participating child, who had only three spoken words in their repertoire and exhibited cognitive challenges such as low joint attention, showed significant language gains after an intervention using the aBoard app. AAC enabled sentence construction, spontaneous system use, and the acquisition of more complex communicative functions. The app's visual and auditory stimuli were essential to these results, reinforcing that, when

AAC is properly adapted to a child´s individual needs, it can promote meaningful progress even in severe cases.

Togashi & Walter (2016) addressed the linguistic-cognitive challenges faced by students with ASD using the Adapted PECS approach. The student exhibited significant impairments in both linguistic and cognitive skills. Still, the AAC system was customized to their needs within the school environment, involving a reduction in PECS phases and a focus on contextualized content. The intervention demonstrated that, even with cognitive limitations, assistive technology facilitated the association between symbols and meanings and supported the child's communication. Progress was evident through the generalization of communicative skills into the regular classroom environment, reinforcing that cognitive and linguistic difficulties, though real, do not prevent AAC adherence.

In more complex contexts — such as the study by Afonso *et al.* (2019) with individuals with multiple disabilities and deafblindness — highly personalized approaches were required, involving multisensory stimuli and continuous support strategies. These findings show that the combination of multiple cognitive limitations may demand more sophisticated resources and extended intervention periods.

Thus, the literature indicates that cognitive deficits alone do not preclude AAC use, as shown in studies like Moreschi & Almeida (2012), in which an adolescent with an intellectual disability demonstrated significant progress in functional communication after PECS intervention. Eskelsen *et al.* (2009) also recognized that linguistic-cognitive aspects can represent important barriers to AAC adherence and progress when systems are not appropriately implemented for each case. Chun (2010) emphasized that the success of alternative communication depends less on the severity of cognitive impairments and more on the quality and consistency of support offered to the user.

Navarro *et al.* (2020) revealed that linguistic-cognitive difficulties can initially act as barriers to language development in children with Late Language Emergence (LLE). However, their findings demonstrated that these limitations do not prevent the effective use of AAC. On the contrary, introducing AAC promoted substantial improvements in verbal production and functional communication among participants.

Environmental and Social Barriers: These barriers primarily involve the attitudes and knowledge levels of communication partners, the myths surrounding AAC use, and practical challenges related to time and mediation in daily life. Among these, the preference for or reliance on other forms of communication instead of AAC often emerges as an obstacle to its effective implementation. Such preferences may be expressed by families, teachers, caregivers, or even users themselves, and are frequently associated with the perception that gestures, facial expressions, conventional writing, or spontaneous pointing are more "natural," less stigmatizing, or easier to use in daily contexts. Although this barrier was identified in five studies, it was rarely addressed as the main focus, usually appearing as contextual information or as a limitation to full AAC adherence.

Guarda & Deliberato (2006), in their analysis of narrative construction by a nonspeaking student using AAC, argued that other forms of communication—such as gestures, graphic symbols, and vocalizations—are essential in therapeutic contexts. These modalities complement verbal expression and support language development, expanding the student's communicative repertoire. The authors emphasized that nonverbal communication can be as rich and meaningful as speech. When adequately adapted — with appropriate resources, trained partners, and a supportive environment — these forms of communication can enhance AAC adherence rather than compete with it.

Another environmental barrier identified by Romano & Chun (2018) is the dependence on family members as interpreters of AAC users' communication. While this mediation is often necessary in transitional contexts or during the initial implementation stages, it can become limiting if it hinders the development of communicative autonomy or reinforces unilateral mediation.

An individualized AAC program with a nonspeaking child with cerebral palsy was analyzed in three contexts — home, school, and clinic. It was observed that families and communication partners often acted as "translators" of the user's communicative intentions. Although this mediation was essential at first, partner training proved crucial to avoid underestimating the child's abilities and to promote more independent communication. Thus, interventions that directly involve caregivers and

focus on user autonomy tend to yield more effective and sustainable outcomes (Manzini *et al.*, 2019).

Eliminating this environmental barrier requires not only technical training for families, but also strategies centered on user autonomy, encouraging decision-making, self-expression, and active participation in daily life using their own communicative resources.

A lack of AAC knowledge is another environmental barrier identified in the literature. This includes not only limited technical knowledge, but also insufficient practical preparation and awareness among health professionals, educators, caregivers, and family members who interact directly with users.

Studies such as Tetzchner *et al.* (2005) demonstrated that although the inclusion of AAC users in regular preschool environments is both possible and promising, it often encounters obstacles stemming from the lack of knowledge among teachers, peers, and professionals. The benefits of AAC are fully realized only when the environment is properly adapted and when communication partners — especially adult mediators and speaking peers — are adequately trained. Many interactions only succeeded after teachers learned to model AAC use and teach peers to use gestures and symbols. Adults' initial difficulties in mastering AAC strategies and the need for continuous professional development reinforce that insufficient knowledge and lack of specialized training are major obstacles to effective AAC implementation.

Nunes, Barbosa & Nunes (2021) analyzed AAC use with students with ASD in school environments and highlighted deficiencies in the use of visual resources by teachers, indicating limited AAC knowledge. In many cases, initial teacher education did not adequately cover the subject, leading professionals to develop empirical and fragmented knowledge without a solid theoretical foundation. There is an urgent need for continuing education that addresses not only the technical use of AAC resources but also their broader communicative and pedagogical purposes.

In family settings, lack of knowledge manifests in both underuse of AAC resources and misconceptions about their applicability. Walter & Almeida (2010) evaluated the effects of an AAC training program for mothers of adolescents with autism and found that, before the intervention,

participants did not understand AAC as a structured communication system and believed its use was restricted to clinical or school settings. After the training, there was a significant increase in the frequency and quality of AAC use in everyday family life.

Almeida, Pisa & Lamônica (2005) applied Adapted PECS with a child with athetotic cerebral palsy, and the intervention's success was directly linked to active family involvement and school staff training.

One of the most persistent myths surrounding AAC use—in clinical practice as well as in family and school contexts—is the belief that its introduction may inhibit or delay natural speech development. Although this misconception has been debunked in scientific literature, it remains a significant barrier to early and consistent AAC adoption, particularly among caregivers and professionals with limited familiarity with AAC principles.

Montenegro *et al*. (2022) investigated the impact of a robust AAC system on the communication of a child with ASD using the DHACA method over 24 sessions. Results showed significant gains in receptive, expressive, and behavioral communicative skills. AAC use contributed to oral language development and increased sentence complexity, without inhibiting speech.

Branson & Demchak (2009) analyzed 12 studies on AAC use with infants and young children with disabilities, highlighting consistently positive outcomes in communicative development. The authors emphasized the effectiveness not only of AAC itself, but also of combining different modalities — such as unaided AAC (gestures and signs) and aided AAC (PECS and voice-output devices) — which was associated with faster learning and expanded lexical repertoires.

Although the study by Evaristo & Almeida (2016) did not directly address the extent to which the bel.

Experience Report

In 2022, a child with intellectual disability and limited oral communication abilities entered the second grade of a public elementary school. In order to provide appropriate support, the classroom teacher sought to learn more about the child's condition so that she could assist

him in the best possible way throughout the school year and contacted the school's educational speech-language pathology team to discuss the case.

Since the school did not have specific materials to meet the students' needs and inclusion in the school context was a priority, the use of AAC was introduced to establish routines and support the child's requests. Initially, photographs of different school environments were used, and later, drawings were associated with written words. To facilitate communication, a visual chart of the student's daily routine was created on the classroom wall, enabling him to follow and better understand school activities.

Other activities were also adapted using concrete, tactile materials. Customized resources were created with cardboard, colored pencils, clothespins, and handmade geometric toys, among others. Recognition of body parts was also practiced through the use of drawings.

As this was the second year of elementary school — an early literacy stage — activities began focusing on letter recognition using the letters in his own name, color identification, and recognition of geometric shapes, always emphasizing sensory and visual exploration. These strategies culminated in the successful recognition and writing of his own name.

Throughout the year, the child progressively acquired knowledge in a meaningful and contextualized way, showing clear academic and communicative progress. He increasingly participated in the proposed activities and was able to communicate his basic needs through picture exchange, as well as understand and follow the classroom routine in which he was included.

Conclusion

This systematic review highlighted that Augmentative and Alternative Communication (AAC) is an effective and potentially transformative tool for promoting functional communication and the social inclusion of people with disabilities. However, its implementation still faces significant barriers of various types — material, individual, social, and environmental. Among them, the following stand out: lack of knowledge among professionals and families; the cost of high- and low-tech assistive materials; linguistic-cognitive difficulties and limited user acceptance; reliance on other forms of communication; family members acting as interpreters; the persistent myth

that AAC inhibits speech; and the insufficient understanding of the role and purpose of alternative communication.

The findings reinforce that factors often perceived as limiting—such as users' linguistic-cognitive deficits or the use of other forms of communication modalities—should not be interpreted as definitive barriers, but rather as aspects requiring personalized adaptations, continuous support, and active listening from communication partners. Conversely, barriers such as the lack of understanding by family members and the costs associated with adapting or maintaining AAC resources proved to be recurrent and to have significant impacts on adherence and consistent use.

It became evident throughout this review and the experience report that the success of AAC implementation does not depend on a single isolated element, but on an articulated set of interdependent factors. The effective adoption and functionality of AAC are directly related to the use of systems tailored to each user's specific needs, the consideration of their individual preferences, and the selection of resources appropriate to their cognitive, sensory, and motor profiles. Above all, the active and conscious involvement of communication partners is essential. The participation of family members, educators, and other professionals, as well as a shared understanding of the AAC´s role and objectives, proved fundamental to ensuring that communicative resources are not only accessible but also meaningful and consistently used across the diverse contexts of daily life.

References

AFONSO, I.; MAIA, F.; MENESES, R. F. Intervention with augmentative and alternative communication in multiple disabilities and deafblindness: a systematic review. **Communication Disorders**, Oct. 28, 2019. DOI: https://doi.org/10.23925/2176-2724.2019v31i3p394-410.

ALMEIDA, M. A.; PIZA, M. H. M.; LAMÔNICA, D. A. C. Adaptation of the picture exchange communication system in a school context. **Pro-Fono: Journal of Scientific Update**, v. 17, n. 2, p. 233–240, 2005. DOI: https://doi.org/10.1590/s0104-56872005000200012.

BRANSON, D.; DEMCHAK, M. The Use of Augmentative and Alternative Communication Methods with Infants and Toddlers with Disabilities: A Research Review. **Augmentative and Alternative Communication**, v. 25, n. 4, p. 274–286, Nov. 3, 2009. DOI: https://doi.

org/10.3109/07434610903384529.

BURATTO, L. G.; ALMEIDA, M. A. DE; COSTA, M. DA P. R. DA. Alternative Communication Program readapted for a Kaingang adolescent. **Paidéia**, v. 22, n. 52, p. 229–240, Aug. 2012. DOI: https://doi.org/10.1590/S0103-863X2012000200009.

CARDOSO, E.; LOPES, A.; ADÃO, M. Inclusive practices in context: actions of accessible communication in Portugal and Brazil. **Ibero-American Journal of Studies in Education**, p. 2990–3004, Dec. 30, 2021. DOI: https://doi.org/10.21723/riaee.v16iesp.4.16063.

CARNIEL, A. *et al.* The use of augmentative and alternative communication to support the dialogue of people with intellectual disabilities. **Brazilian Journal of Applied Computing**, v. 10, n. 1, p. 53–65, May 1, 2018. DOI: https://doi.org/10.5335/rbca.v10i1.7678

CHUN, R. Y. S. Meaning-making processes of aphasic users of supplementary and/or alternative communication. **Journal of the Brazilian Society of Speech-Language Pathology**, v. 15, n. 4, p. 598–603, Dec. 2010. DOI: https://doi.org/10.1590/S1516-80342010000400021.

COELHO, Y. *et al.* **CAApp**: A Mobile Augmentative and Alternative Communication Application for People with Severe Motor Disabilities. p. 151–160, July 20, 2015. DOI: https://doi.org/10.5753/sbcas.2015.10375.

COIMBRA, T. M. *et al.* Expanded Alternative Communication in Amyotrophic Lateral Sclerosis: Technology in Favor of Rehabilitation. **Archives of Health Sciences**, v. 25, n. 3, p. 22, Dec. 20, 2018. DOI: doi.org/10.17696/2318-3691.25.3.2018.1054.

ESKELSEN, M. W. *et al.* Introduction and development of the use of alternative communication in Angelman Syndrome: case study. **CEFAC Journal**, v. 11, n. 2, p. 228–236, May 15, 2009. DOI: https://doi.org/10.1590/S1516-18462009005000033.

EVARISTO, F. L.; ALMEIDA, M. A. Benefits of the Adapted-PECS Program for a Student with Cerebral Palsy. **Brazilian Journal of Special Education**, v. 22, n. 4, p. 543–558, Dec. 2016. DOI: https://doi.org/10.1590/S1413-65382216000400006.

FILGUEIRA, L. M. DE A. *et al*. Development of a participatory research strategy involving autistic people with different levels of support. **Ciência & Saúde Coletiva**, v. 28, n. 5, p. 1501–1512, maio 2023. DOI:

https://doi.org/10.1590/1413-81232023285.15282022.

GALLI, J. F. M.; OLIVEIRA, J. P. DE; DELIBERATO, D. Introduction of supplementary and alternative communication in therapy with aphasic patients. **Journal of the Brazilian Society of Speech-Language Pathology**, v. 14, n. 3, p. 402–410, 2009. DOI: https://doi.org/10.1590/S1516-80342009000300018.

GUARDA, N.; DELIBERATO, D. Characterization of utterances of a non-speaking student user of supplementary communication resources during story construction. **Brazilian Journal of Special Education**, v. 12, n. 2, p. 269–288, Aug. 1, 2006. DOI: https://doi.org/10.1590/S1413-65382006000200009.

ISAAC – **About AAC**. Available at: https://isaac-online.org/english/about-aac/. Accessed on Aug. 12, 2024.

JOHNSON, J. M. *et al*. Perspectives of speech language pathologists regarding success versus abandonment of AAC. **Augmentative and Alternative Communication**, v. 22, n. 2, p. 85–99, Jan. 2006. DOI: https://doi.org/10.1080/07434610500483588.

LIBERATI, A. *et al.* The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. **PLoS Medicine**, v. 6, n. 7, p. e1000100, July 21, 2009. DOI: https://doi.org/10.1371/journal.pmed.1000100.

LIGHT, J.; MCNAUGHTON, D. Communicative Competence for Individuals who require Augmentative and Alternative Communication: A New Definition for a New Era of Communication? **Augmentative and Alternative Communication**, v. 30, n. 1, p. 1–18, Mar. 2014. DOI: https://doi.org/10.3109/07434618.2014.885080.

MANZINI, M. G. *et al*. Alternative Communication Program for a Child with Cerebral Palsy and their Communication Partners: A Multiple Probe Design Study. **Brazilian Journal of Special Education**, v. 25, n. 4, p. 553–570, Dec. 2019. DOI: https://doi.org/10.1590/s1413-65382519000400002.

MENDONÇA *et al*. Application of Augmentative and Alternative Communication to stimulate communicative intention and cognition in patients with Autism Spectrum Disorder. **CEFAC Journal**, v. 25, n. 5, Jan. 1, 2023. DOI: https://doi.org/10.1590/1982-0216/20232556823.

MIRANDA, V. S. G. DE *et al*. Augmentative and Alternative Communication and Language Skills of Children with Cerebral Palsy: A Systematic Review. **Brazilian Journal of Special Education**, v. 27, 2021.

DOI: https://doi.org/10.1590/1980-54702021v27e0007.

MONTENEGRO, A. C. DE A. *et al.* Contributions of alternative communication to the development of communication in a child with autism spectrum disorder. **Audiology - Communication Research**, v. 26, July 26, 2021. DOI: https://doi.org/10.1590/2317-6431-2020-2442.

MONTENEGRO, A. C. *et al*. Development of communication skills in an adolescent with autism, using alternative communication: a case report. **CEFAC Journal**, v. 25, n. 3, Jan. 1, 2023. DOI: https://doi.org/10.1590/1982-0216/202325311122s.

MONTENEGRO, A. C. DE A. *et al.* Use of a robust alternative communication system in autism spectrum disorder: a case report. **CEFAC Journal**, v. 24, n. 2, 2022. DOI: https://doi.org/10.1590/1982-0216/202224211421.

MORAES, M. K. R. *et al.* Utilization of alternative and augmentative communication resources by patients with amyotrophic lateral sclerosis. **Manual Therapy, Posturology & Rehabilitation Journal**, [s. l.], p. 1–12, 2019. DOI: https://doi.org/10.17784/mtprehabjournal.2019.17.723.

MORESCHI, C. L.; ALMEIDA, M. A. Alternative communication is a procedure for developing communicative skills. **Brazilian Journal of Special Education**, v. 18, n. 4, p. 661–676, Dec. 2012. DOI: https://doi.org/10.1590/S1413-65382012000400009.

NAVARRO, I. I. *et al.* Using AAC to unlock communicative potential in late-talking toddlers. **Journal of Communication Disorders**, v. 87, p. 106025, Sept. 2020. DOI: https://doi.org/10.1016/j.jcomdis.2020.106025.

NUNES, D. R. DE P.; BARBOSA, J. P. DA S.; NUNES, L. R. DE P. Alternative Communication for Students with Autism at School: A Literature Review. **Brazilian Journal of Special Education**, v. 27, 2021. DOI: https://doi.org/10.1590/1980-54702021v27e0212.

PETRONI, N. N.; BOUERI, I. Z.; LOURENÇO, G. F. Introduction to the use of the Tablet for Alternative Communication by a Young Woman with Cerebral Palsy. **Brazilian Journal of Special Education**, v. 24, p. 327–342, 2018. DOI: https://doi.org/10.1590/S1413-65382418000300002.

PINA, S. *et al.* Augmentative and Alternative Communication in Ventilated Patients: A Scoping Review. **Brazilian Journal of Nursing**, v. 73, n. 5, 2020. DOI: https://doi.org/10.1590/0034-7167-2019-0562.

RODRIGUES, V.; CAMPOS, J. A. DE P. P.; ALMEIDA, M. A. Use of PECS associated with video modeling in a child with Down Syndrome. **Brazilian Journal of Special Education**, v. 21, n. 4, p. 379–392, Dec. 2015. DOI: https://doi.org/10.1590/S1413-65382115000400005.

RODRIGUES, V.; ALMEIDA, M. A. Implementation of PECS Associated with Point-Of-View Video Modeling in Early Childhood Education for Children with Autism. **Brazilian Journal of Special Education**, v. 26, n. 3, p. 403–420, July 2020. DOI: https://doi.org/10.1590/1980-54702020v26e0092.

ROMANO, N.; CHUN, R. Y. S. Supplementary and Alternative Communication in the perception of family members and speech-language pathologists: facilitators and barriers. **CoDAS**, v. 30, n. 4, July 19, 2018. DOI: https://doi.org/10.1590/2317-1782/20162017138.

SIERRA, I. D. S.; OKIMOTO, M. L. L. R. Adapted Seating Classification System (CAA) based on the International Classification of Functioning (ICF). **InfoDesign - Brazilian Journal of Information Design**, v. 17, n. 1, p. 18–34, Apr. 30, 2020. DOI: http://dx.doi.org/10.51358/id.v17i1.713.

TETZCHNER, S. VON *et al.* Inclusion of children in regular preschool education using supplementary and alternative communication. **Brazilian Journal of Special Education**, v. 11, n. 2, p. 151–184, Aug. 2005. DOI: https://doi.org/10.1590/S1413-65382005000200002.

TOGASHI, C. M.; WALTER, C. C. DE F. The Contributions of the Use of Alternative Communication in the Process of School Inclusion of a Student with Autism Spectrum Disorder. **Brazilian Journal of Special Education**, v. 22, n. 3, p. 351–366, Sept. 2016. DOI: https://doi.org/10.1590/S1413-65382216000300004.

WALLIS, S.; BLOCH, S.; CLARKE, M. Augmentative and alternative communication (AAC) training provision for professionals in England. **Journal of Enabling Technologies**, v. 11, n. 3, p. 101–112, Sept. 18, 2017. DOI: https://doi.org/10.1108/JET-10-2016-0023.

WALTER, C.; ALMEIDA, M. A. Evaluation of an expanded alternative communication program for mothers of adolescents with autism. **Brazilian Journal of Special Education**, v. 16, n. 3, p. 429–446, Dec. 2010. DOI: https://doi.org/10.1590/S1413-65382010000300008.

UNIVERSALIST MEDIATIONS IN THE SCHOOL REINTEGRATION OF STUDENTS RETURNING FROM HOSPITAL EDUCATION

Jéssica Daniele Alegria Arca[1]
Marcio Hollosi[2]

1. Introduction

The transition from Hospital Education to Regular Education constitutes a complex and multifaceted process that demands careful reflection on school inclusion practices. As highlighted by Silva *et al*. (2023), based on Ebersold (2020), the so-called Egocentric Approach presents limitations by positioning the student as the exclusive focus of public action, centering on their singularities and restricting the potential for collaboration among other agents, such as family members and education professionals from both the original school and hospital classes. This approach, by reducing inclusion to the individual sphere, compromises the implementation of contextualized and equitable pedagogical practices, relegating collaboration to a bureaucratic requirement that rarely engages with the student's lived reality.

In this context, universalist principles — such as the Polycentric Approach and, in practical terms, Universal Design for Learning (UDL) — emerge as theoretical-methodological frameworks capable of facilitating

1 Master's student in Inclusive Education – PROFEI – at the Federal University of São Paulo. Specialist in Psychopedagogy with an Emphasis on Special Education, in Literacy and Reading, and in History and Culture of Brazil. Holds undergraduate degrees in Pedagogy and History. Teacher in Youth and Adult Education. E-mail: jessica.alegria@unifesp.br. Lattes CV: http://lattes.cnpq.br/7079121231427929.

2 Professor, PhD, in the Professional Master's Program in Inclusive Education – PROFEI – Federal University of São Paulo, and in the Graduate Program in Education and Health – Unifesp. E-mail: hollosi@unifesp.br. Lattes CV: http://lattes.cnpq.br/0009306878714171.

the school reintegration of students returning from hospital education, as they recognize the student in their plurality and promote practices that connect different social actors. Thus, this chapter aims to analyze how such principles can contribute to mitigating structural and attitudinal barriers, fostering the realization of a genuinely inclusive education.

2. Universalist principles as facilitators of the transition from hospital to regular schooling

The Egocentric Approach can be understood as one that places the student at the center of public action, focusing pedagogical practices exclusively on them, without considering the other agents who could contribute to school inclusion, such as family members and support professionals (Silva *et al.*, 2023 apud Ebersold, 2020). This perspective views the student primarily through their difficulties, rather than their potential, and tends to treat them as the only subject with specific educational needs within the group. Furthermore, by rigidly structuring collaboration among those involved through legal norms, spontaneity and creativity — fundamental to developing personalized and flexible solutions — are compromised, turning collaboration into a bureaucratic obligation detached from the student's real context and needs.

Image 1 – An egocentric approach focused solely on one student in a shared responsibility relationship between Health, Education, and family

Source: Silva *et al.* (2023).

In the transitional context addressed in this chapter, this perspective proves even more problematic, as the reintegration of chronically ill students into regular education requires an articulated approach that transcends the egocentric view and recognizes the complexity of the inclusion process. Collaboration between Hospital Education and Regular Education professionals is essential to ensure successful reintegration. Such collaboration must be dynamic and continuous, going beyond formal or normative obligations to establish open and fluid dialogue among professionals, considering that these "[…] are skills built throughout the work and must always aim at a single objective among professionals" (Capellini; Zerbato, 2019, p. 40).

Communication between educational teams must be structured to promote a constant exchange of information, experiences, and pedagogical strategies, ensuring that the student is understood in all their dimensions. Collaboration cannot be limited to a one-way process, where only regular teachers adapt to the student's reality: "[…] considering that it is not possible for a single professional to master all methodologies to meet the specificities of each student, working in partnership can be a very valuable path to favor learning." (Capellini; Zerbato, 2019, p. 34). Therefore, it must also involve contributions from Hospital Education teachers, health professionals, families, and other community actors. This process of exchange and mutual listening is fundamental so that, upon returning to regular education, the student is not seen solely through their specificities, but recognized for their potential as a learner capable of active participation within the school environment.

Marchesan *et al*. (2009) corroborate this by affirming that when chronically ill students engage in school activities, they distance themselves — at least momentarily — from the illness, reducing its discomforts. Thus, reintegration should not be seen as a mechanical process, but one that demands sensitivity, flexibility, and a responsive pedagogical approach. Communication between the hospital and regular education professionals must be guided by a collaborative vision, where each actor plays an essential role in curricular flexibility, activity planning, and the creation of inclusive environments. Communication must be constant, shared, and oriented toward the student's holistic well-being, not only considering their

singularities but also fostering the development of their potential, aligned with the perspective of an inclusive, responsive, and plural education.

> The relationship between the regular school and hospital classes (regular school teachers and hospital teachers), when bilateral, allows patient students to continue their studies, reintegrating into the school context after discharge without major harm. However, this relationship has not been effectively established, so hospital education tends not to achieve the expected results, due to the barrier caused by this lack of communication and connection between the parties involved (Borba *et al.*, 2020, p. 5).

The inclusion of students with chronic illnesses or long-term health conditions cannot be reduced to merely addressing their immediate educational needs; it must be seen as an opportunity to strengthen the bond between educational institutions and social support networks, which include, among others, family members and health professionals.

> Gonçalves and Valle (1999) also highlight additional factors that contribute to school dropout among children with chronic illnesses: lack of awareness among school professionals about the student's condition, absence of pedagogical support from hospitals, families´ unawareness of the child's rights to receive pedagogical care, lack of communication between school and hospital, and, finally, the student's own demotivation resulting from their condition of separation (Santos, 2001, p. 74).

When these various agents work in a coordinated and conscious manner, a solid support network is created — capable of promoting authentic school inclusion and the humane reintegration of chronically ill students.

Thus, overcoming the Egocentric Approach and all that is intrinsic to it — such as: "[…] the lack of training and preparation of professionals involved, the limited participation of the families, and the difficulty of creating a support network that fosters dialogue among professionals from different fields, especially education and health" (Luiz *et al.*, 2008, *apud* Mendes; Vilaronga; Zerbato, 2014, p. 39) — emerges as a necessity for advancing school inclusion. Only through effective and fluid collaboration among all those involved — Hospital Education, Regular Education, health professionals, families, and other partners — will it be possible to provide

quality education that values each student's potential and promotes their integral development.

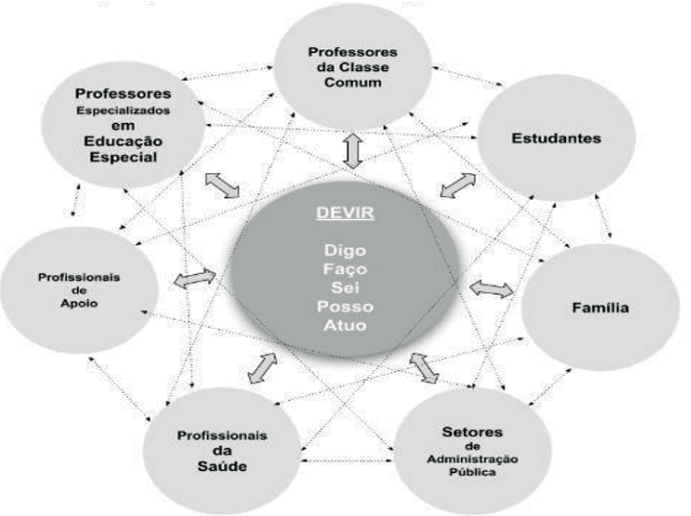
On the other hand, new perspectives — such as UDL (along with collaborative teaching[3] and multi-tiered[4] support systems) — belong to the Polycentric Approach, in which all resources are focused on enhancing learning for all students. The Polycentric Approach places the student's developmental process at the center of public action, moving away from a defect logical view[5] that emphasizes individual difficulties. Within this perspective, the person is seen as a being in constant evolution, capable of growth and learning like anyone else, provided they receive the necessary pedagogical, technical, human, and financial resources. It considers the multiple ways of acting, communicating, and learning, respecting different temporalities, learning paces, and forms of communication that validate the educational process (Silva *et al.*, 2023, p. 7).

3 Mendes, Vilaronga, and Zerbato (2014) differentiate collaborative work from collaborative teaching (co-teaching). The former refers to the articulation among education professionals through joint planning, exchange of knowledge, and shared pedagogical responsibility. The latter concern emphasizes the joint performance of two teachers in the same classroom (generally the regular classroom teacher and the teacher of Specialized Educational Assistance – SEA). In this study, the notion of collaborative work is adopted, focused on the interprofessional construction of structured collaborative networks and inclusive practices.

4 Zerbato and Mendes (2021) state that, in this multi-tiered support system, content and interventions are offered at different levels of intensity, according to the specific educational needs of each student.

5 According to Vygotsky (1983), cited by Ruppel *et al.* (2021, p. 12), his studies provoked a revolution in the concepts of Special Education that predominated in the old defectology, which viewed disability negatively, considering people as less capable. This perspective resulted in social segregation and in the application of intelligence tests with a quantitative focus, denying the possibility of learning, social interaction, and individual development.

Image 2 – A Polycentric Approach: A Source of Interdependence Among All Actors Responsible for the Teaching-Learning Process of Students



Source: Silva *et al.* (2023).

Applied to the reintegration of chronically ill students with disabilities into the school environment, this approach highlights the essential role of communication between hospital and regular education professionals to ensure that students are seen in their entirety — not only for their specificities but also for their potential and capacity for development. The Polycentric Approach, by emphasizing continuous development and resource adaptation to each student's needs, requires effective and collaborative communication among all agents involved: teachers from both modalities, health professionals, and families.

> The construction of educational scenarios that legitimize access, accessibility, and the process of making access[6] possible requires decentralized, polycentric, multisectoral, cooperative, and collaborative sharing of responsibilities involving managers, teachers, students (with and without disabilities), interdisciplinary and multiprofessional teams, and families (Silva *et al.*, 2023, p. 10).

6 According to Silva *et al.* (2023), *access* refers to mere presence within spaces; *accessibility* denotes the possibility of using such spaces with autonomy and safety; and *accessibility* or *inclusion* entails active participation, legitimized within social and educational practices.

Communication between the hospital and regular education teams should, therefore, be guided by a constant exchange of information, with a focus on curricular personalization and flexible pedagogical strategies. This exchange should include monitoring of activities carried out in the hospital context that can be integrated into the student's return to regular schooling, as well as the adaptation of methods and resources to meet the student's health conditions. In this regard, Zerbato and Mendes (2018) affirm that meaningful changes in pedagogical praxis require the collaboration of support networks, adequate didactic resources, and ongoing professional development for educators.

Curricular integration between hospital and regular education is a central element in the successful reintegration of chronically ill students into the school environment. It should not be limited to a simple alignment of content, but rather encompass a shared approach, accepted and applied by both educational teams, considering the students' specificities, learning pace, and individual needs. "The polycentric accessibility approach, therefore, involves a collective openness to the dissolution and re-signification of elements that constitute the social psyche in processes of collaboration and cooperation" (Silva *et al.*, 2023, p. 10).

The exchange of information regarding the student's progress, pedagogical adaptations implemented during hospitalization, and necessary adjustments for their return to school is essential to ensure that the student remains integrated within their learning context.

> Whatever the individual's conditions emphasized by various theories, studies, and practices, there is a possibility that, in the condition of being hospitalized, they act actively and cooperatively in the environment in which they are inserted, provided they are afforded experiences that facilitate exchanges—linguistic, motor, intellectual, among others—and that the outcomes of these exchanges are assessed based on possibilities rather than limits of any kind (Medeiros, 2020, p. 16).

Curricular integration between educational modalities is an indispensable strategy to ensure that chronically ill students can resume their learning process with minimal loss. It is essential to recognize the importance of curricular communication, because: "[...] the curriculum is place, space, territory. The curriculum is a power relation. The curriculum

is a trajectory, journey, itinerary. [...] The curriculum is text, discourse, document. The curriculum is an identity document" (Silva, 2010, p. 150).

Another relevant aspect of the Polycentric Approach—which directly reinforces the need for communication among professionals—is respect for students' communicative forms. Children and young people with chronic illnesses or long-term conditions often face additional challenges in expressing their needs and feelings, requiring flexible communication strategies. These may include the use of assistive technologies, psychological support, or other resources that facilitate student interaction and participation in school activities. For the return to regular classes to be meaningful and satisfying, education professionals must establish affective relationships, be prepared to apply appropriate methodologies, and remain aware of the students' health conditions and medical histories (Freitas & Ortiz, 2005).

The Polycentric Approach, therefore, promotes an Inclusive Education that considers the diversity of learning rhythms, forms, and needs of each student. In the context of reintegrating chronically ill students, this implies that Hospital and Regular Education should not be viewed as separate spheres, but as interconnected components of an integrated system aimed at the student's continuous development, with an emphasis on potential rather than limitation.

> [...] Decentralizing inclusive practices through a polycentric approach allows us to reflect on the realization of quality education provision, in contrast to traditional schooling, which imposes standardized student profiles and resists paradigm shifts. Practices centered solely on the student and focused on barriers are neither effective nor efficient. It is necessary to create spaces for reflection on inclusive educational practices aimed at ensuring accessibility for all students with special educational needs, legitimizing collaborative and cooperative work within the school context for the entire community (Silva *et al.*, 2023, p. 11).

Fluid and effective communication among professionals in both areas is, therefore, an essential element to ensure that all pedagogical, technical, and human resources necessary for the student's reintegration are mobilized in a coordinated and integrated manner, guaranteeing them a learning trajectory that respects their particularities and promotes their full development. By adopting this approach, it becomes possible to ensure that students receive a quality education that respects their differences and

enhances their abilities, making the educational process more inclusive, humane, and meaningful.

2.1 Universal Design for Learning: A Tool for the Inclusion of Chronically Ill Students After Hospital Education

In recent years, Inclusive Education has gained traction, promoting an educational model that values differences and seeks to mitigate barriers, offering equitable opportunities for all students, regardless of their specific educational needs. Education for all does not merely entail flexibilizing the environment, but requires creating a system that accepts, supports, and values differences.

With the Convention on the Rights of Persons with Disabilities (UN, 2006), a significant shift occurred from the medical model to the social model of disability, which no longer views disability as something to be corrected and instead recognizes it as a characteristic to be respected within a social context. Disability comes to be conceived "WITH persons with disabilities" rather than "ABOUT them." This opens space for new inclusive educational perspectives that seek to ensure that all students—respecting their individual needs—can learn and develop fully, without exclusions. Education, therefore, must be structured to serve everyone, in the broadest sense.

The contemporary educational scenario is characterized by a continuous search for pedagogical methods that meet student diversity, respect their singularities, and promote an inclusive environment. Among the most complex challenges for the educational system is the inclusion of chronically ill students—with congenital disabilities or disabilities related to the worsening of the medical condition—who have gone through prolonged periods of Hospital Pedagogical Care and return to Regular Education. Thus, "UDL has emerged as a powerful force for changes in attitudes and in varied strategies of options for teaching everyone" (Silva *et al.*, 2023, p. 4), offering a universalist, flexible teaching model that can be essential to ensuring the continuity of learning for these students.

Students with chronic illnesses face significant obstacles, such as frequent interruptions to learning due to hospitalizations, medical treatments, and consequent emotional implications. Returning to regular

education after hospital education can be a challenging process for both the student and teachers, as accumulated learning gaps and difficulties reintegrating into the school environment require a differentiated and responsive pedagogical approach.

In this context, UDL offers a set of guidelines aimed at creating inclusive and accessible learning environments for all students, regardless of their specific educational needs. By applying UDL principles, teachers can develop pedagogical practices that more effectively meet the needs of chronically ill students, ensuring that they experience belonging in the school environment and can learn meaningfully, without reductionism or access to a "minimum curriculum out of commiseration" (Covic & Oliveira, 2017). This section aims to explore how UDL can be an effective tool in the inclusion of these—and of all—students.

The Universal Declaration of Human Rights (1948) emphasizes the right to education as fundamental to human and social development. In the current educational context, there is a growing need for dialogues and practices that promote inclusion, attend to student diversity, and consider both their specificities and potential.

In this sense, Mantoan and Prieto (2006) point out that inclusion presupposes a shift in educational perspective: it should not be restricted only to students with disabilities but should more broadly embrace everyone, so that all can fully develop their potential.

UDL presents itself as a means of promoting barrier-free education. According to the Center for Applied Special Technology (CAST), the American research center that developed UDL in the 1990s, this pedagogical tool:

> [...] provides a framework for teachers and other specialized professionals in the development of practices and strategies that focus on accessibility, both in physical and in services terms, in the search for educational pathways for learning without barriers (CAST UDL Book Builder, 2013).

The LBI (Law No. 13.146, of July 6, 2015), in its Article 3, item II, defines universal design as "the conception of products, environments, programs, and services to be used by all people, without the need for adaptation or specific design, including the resources of assistive technology," thus reinforcing the inclusive principle in all social areas. This definition

reaffirms the commitment to inclusion in all areas of society, aligning with UDL principles, which seek to guarantee full access and participation for all in the educational process.

UDL is grounded in principles that recognize diversity and promote personalized learning through the flexibilization of methodologies, tools, and materials. This approach aims to shift the educational system toward accessibility and the active encouragement of interaction for everyone in the learning process.

According to Sebastián-Heredero *et al.* (2022), UDL's foundations directly dialogue with classical educational theories, such as those of Piaget, Vygotsky, Bruner, and Bloom, which emphasize the importance of understanding how people learn and of recognizing singularities within the educational process:

> The UDL approach is also related to the concepts described by Piaget, Vygotsky, Bruner, and Bloom, who in their studies were concerned with the teaching and learning process, contributing to the understanding of how learning takes place, to the recognition of individual differences, and to the pedagogy necessary amid student diversity (Sebastián-Heredero *et al.*, 2022, p. 16).

The assumptions underpinning UDL are based on neuroscience, as illustrated in the figure below:

Image 3 – The Brain and Learning

Meyer, Rose & Gordon (2014), *apud* Sebastián-Heredero *et al.* (2022, p. 17).

Meyer, Rose, and Gordon (2014), cited by Sebastián-Heredero *et al*. (2022), emphasize that, through the activation of these brain areas, effective learning can be ensured. For this to occur, teaching organizations must include multiple means of presenting content (Representation), varied ways for students to express themselves (Action and Expression), and structures that promote students' active participation in the learning process (Engagement).

The first guideline, Representation (the "what" of learning), entails the need to offer multiple ways of presenting information and content. This means that teachers must employ different pedagogical strategies that meet the varied preferences and needs of students.

The second guideline, Action, and Expression (the "how" of learning), refers to the importance of providing multiple ways for students to demonstrate their understanding and skills. This approach allows each student to leverage their own strategies of learning, promoting autonomy. In this context, digital tools and assistive technologies play a crucial role, as they provide diverse resources that facilitate the expression of ideas and the completion of tasks in alternative ways. Through these technologies, students can choose the most appropriate form to communicate and interact with content—whether through texts, videos, presentations, or other formats that best meet their needs and preferences. Moran (2012) corroborates this by stating:

> Digital technologies today are many, accessible, instantaneous, and can be used to learn anywhere, anytime, and in multiple ways. What makes the difference is not the apps, but having them in the hands of educators, administrators (and students) with an open and creative mind, capable of inspiring, of making others dream, of motivating. Interesting teachers design interesting activities, record engaging videos. Effective teachers can communicate warmly with their students through any app, platform, or social network (Moran, 2012, p. 1).

Finally, the Engagement guideline (the "why" of learning) emphasizes the importance of motivating and involving all students in the learning process, creating a collaborative and inclusive environment that respects individual differences and fosters participation and interaction. In this regard,

> It is observed, in the school context, that few teachers and support professionals have had the opportunity to receive training and practice collaborative skills. Therefore, in addition to the voluntary intention of professionals to work collaboratively (since it is not possible to force professionals to work in partnership), training and development of these skills are necessary for the success of collaborative work (Capellini & Zerbato, 2019, p. 48).

According to Sebastián-Heredero (2020), the implementation of UDL reflects a paradigm shift in education, which, in addition to curricular flexibilization, represents a commitment to equity, where learning barriers are removed and the potential of all students is fostered. In this same perspective, Alves, Ribeiro, and Simões (2013, apud Zerbato & Mendes, 2021, p. 4) corroborate Sebastián-Heredero (2020) by stressing that UDL is not merely about planning curricular flexibilization or differentiated activities for students with specific educational needs, used exclusively by them—it is the opposite. This design calls for the construction of universal practices in order to provide the same material for all students, as a way of contributing to learning regardless of singularities.

Inclusive Education has been strengthened, seeking a model that values differences and offers equal opportunities to all students. The UN Convention (2006) re-signifies disability, shifting from viewing it as something to be corrected to recognizing it within a social context.

Thus, the implementation of UDL in the return of chronically ill students to Regular Education can significantly transform their learning experience. By providing more accessible, personalized, and engaging education, UDL contributes to smoother and more successful reintegration.

Through the personalization of teaching, UDL allows the curriculum to be flexible to meet each student's specific needs, ensuring that all can access and process the content fully. This personalization is crucial for chronically ill students, as it offers learning options that respect their health conditions. Thus, "[...] inclusive schools are those that give shape to old ideals of providing truly personalized education, ensuring that such qualification is not reduced to empty and worn-out words of educational discourse" (Paniagua, 2007, p. 13).

Regarding the support for social and emotional development, this universalist approach contributes to strengthening students' socioemotional

competencies. By integrating the whole class into the learning process in a more inclusive and respectful way, UDL helps to strengthen relationships between chronically ill students and their peers, while promoting empathy and respect for diversity, reinforcing students' confidence in their own abilities.

The flexibility in learning pace provided by UDL allows students to recover potential gaps functionally left by Hospital Education, without the demand to keep up with an accelerated pace. This transition between the two educational contexts is facilitated by the multiple presentations of content and by the use of technologies that help make learning more accessible and interactive.

The application of UDL guidelines in the process of reintegrating chronically ill students into school constitutes a sound strategy to ensure a gradual pedagogical recovery, responsive to the specific educational needs of each student. After all:

> Students differ in how they perceive and comprehend information presented to them. For example, people with sensory disabilities (blindness or deafness), learning difficulties (dyslexia), linguistic or cultural differences, and other diversities may require different ways of accessing content. Others may simply process information more quickly or efficiently through visual or auditory means than through printed text. Moreover, learning and transfer occur when multiple forms of presentation are used, as this allows students to make internal connections as well as connections between concepts. In short, there is no single ideal means of presentation for all students. Therefore, providing multiple options of presentation is essential (Sebastián-Heredero *et al.*, 2022, p. 36).

By promoting educational environments that respect different learning rhythms and modes, UDL strengthens student agency and rebuilds autonomy and self-esteem as students return to school activities. Thus, implementing its principles is fundamental for realizing the right to inclusive, equitable, and quality education.

3. Conclusion

Considering the challenges faced by chronically ill students throughout their school trajectory, the implementation of UDL principles and guidelines emerges as a powerful alternative for consolidating responsive and inclusive

pedagogical practices. By fostering multiple possibilities of engagement, access, and expression, UDL challenges traditional teaching models based on homogenization, allowing the school to become a space capable of welcoming and nurturing the potential of all its members.

Curricular flexibilization and the adaptation of learning rhythms make it possible to overcome or mitigate the gaps left by Hospital Education and to gradually and effectively rebuild the bond with the regular school environment. This reconstruction encompasses social, cognitive, and emotional dimensions, which are essential for students to regain confidence in their ability to learn and to develop fully.

Therefore, applying UDL principles contributes to the consolidation of an educational environment that values diversity as a constitutive principle of pedagogical practice, rather than as a sporadic or compensatory adaptation. In this sense, the school reintegration of chronically ill students transcends the individual dimension and must be understood as part of the institution's collective commitment to equity and social justice. By ensuring that all students can participate fully and meaningfully in school activities, the school contributes to the construction of more equitable educational trajectories, aligned with the principles of Inclusive Education, reaffirming its social mission to form citizens capable of coexisting, learning, and transforming the reality in which they are situated.

References

BORBA, M. S. *et al*. **Escola regular e atendimento pedagógico hospitalar**: um vínculo mais que necessário. Maceió: Conedu, 2020. Disponível em: https://editorarealize.com.br/editora/anais/conedu/2020/5fca4ff390913_04122020120419.pdf. Acesso em: 20 jun. 2025. [*Regular school and hospital pedagogical care: a more than necessary bond*]

BRASIL. **Lei n. 13.146/2015**. Lei Brasileira de Inclusão. Brasília: Senado Federal, 2015. [*Brazilian Inclusion Law*]

CAPELLINI, V. L. M. F.; ZERBATO, A. P. **O que é ensino colaborativo?** São Paulo: Edicon, 2019. [*What is collaborative teaching?*]

CAST. **Diretrizes de Design Universal para Aprendizagem versão 3.0**. 2024 (Online). Disponível em: https://udlguidelines.cast.org. Acesso em: 2 dez. 2024. [*Universal Design for Learning Guidelines version 3.0*]

CAST UDL BOOK BUILDER. **Book Builder**. *Homepage.* 2013 (Online). Disponível em: http://bookbuilder.cast.org/. Acesso em: 11 dez. 2024.

COVIC, A. N.; OLIVEIRA, F. A. de M. **O aluno gravemente enfermo**. São Paulo: Cortez, 2017. [*The severely ill student*]

FREITAS, S. N.; ORTIZ, L. C. M. **Classe Hospitalar**: caminhos pedagógicos entre saúde e educação. Santa Maria: EUFSM, 2005. [*Hospital Class: pedagogical pathways between health and education*]

SEBASTIÁN-HEREDERO, E. S. Diretrizes para o Desenho Universal para a Aprendizagem (DUA). **Revista Brasileira de Educação**, Bauru, v. 26, n. 4, p. 733-768, 2020. Disponível em: https://www.scielo.br/j/rbee/a/F5g6rWB3wTZwyBN4LpLgv5C/?format=pdf&lang=pt. Acesso em: 19 nov. 2024. [*Guidelines for Universal Design for Learning (UDL)*]

SEBASTIÁN-HEREDERO, E. S.; PRAIS, J. L. S.; VITALIANO, C. R. **Desenho Universal para a Aprendizagem (DUA)**: uma abordagem inclusiva. São Carlos: Castro, 2022. [*Universal Design for Learning (UDL): an inclusive approach*]

MANTOAN, M. T. E.; PRIETO, R. G. (orgs.). **Inclus**ão **escolar**:pontos e contrapontos. São Paulo: Summus, 2006. [*School inclusion: points and counterpoints*]

MARCHESAN, E. C. *et al*. A não-escola: os sentidos atribuídos à escola e ao professor hospitalares por pacientes oncológicos. **Psicologia: Ciência e Profissão, Brasília,** v. 29, n. 3, p. 476-493, 2009. Disponível em: https://doi.org/10.1590/S1414-98932009000300005. Acesso em: 19 fev. 2025. [*The non-school: meanings attributed to the hospital school and teacher by oncology patients*]

MEDEIROS, J. L. G. Atendimento educacional em ambiente hospitalar: estruturação, funcionamento e políticas implementadas. **Educação**, Santa Maria, v. 45, e14, p. 1–20, 2020. DOI: https://doi.org/10.5902/1984644440325. Disponível em: https://periodicos.ufsm.br/reveducacao/article/view/40325. Acesso em: 15 de maio de 2025. [*Educational provision in the hospital environment: structure, functioning, and implemented policies*]

MENDES, E. G.; VILARONGA, C. A. R.; ZERBATO, A. P. **Ensino colaborativo como apoio à inclusão escolar**: unindo esforços entre educação comum e especial. São Carlos: EdUFSCar, 2014. [*Collaborative teaching as support for school inclusion: uniting efforts between general and special education*]

MORAN, J. **Tecnologias Digitais para uma Aprendizagem Ativa e Inovadora**. Em: MORAN, J. *Educação que Desejamos: novos desafios e como chegar lá.* 5. ed. Campinas: Papirus, 2012. Disponível em: http://www2.eca.usp.br/moran/wp-content/uploads/2017/11/tecnologias_moran.pdf. Acesso em: 19 out. 2024. [*Digital technologies for active and innovative learning*]

ORGANIZAÇÃO DAS NAÇÕES UNIDAS. **Convenção sobre os Direitos das Pessoas com Deficiência e seu Protocolo Facultativo**. Nova York: ONU, 2006. Disponível em: https://www.un.org/disabilities/documents/convention/convoptprot-brazilianportuguese.pdf. Acesso em: 19 jan. 2025. [*Convention on the Rights of Persons with Disabilities and its Optional Protocol*]

PANIAGUA, G. Uma resposta educativa à diversidade. **Pátio – Educação Infantil**, v. 5, n. 14, jul./out. 2007. [*An educational response to diversity*]

RUPPEL, C.; HANSEL, A. F.; RIBEIRO, L. Vygotsky e a defectologia: contribuições para a educação dos estudantes com deficiência nos dias atuais. **Revista Diálogos e Perspectivas em Educação Especial**, Marília, v. 8, n. 1, p. 11-24, jan./jun. 2021. Disponível em: https://revistas.marilia.unesp.br/index.php/dialogoseperspectivas/article/view/10599/8285. Acesso em: 15 ago. 2025. [*Vygotsky and defectology: contributions to the education of students with disabilities today*]

SANTOS, C. F. Alunos com enfermidades crônicas como sujeitos da Educação Inclusiva: discussões acadêmicas na pós-graduação em Educação e Saúde. *In:* MALHEIRO, C. A. L.; VIESBA-GARCIA, E. (orgs.). **Papo de Professores**: educação especial e inclusiva contra as desigualdades. Diadema: V&V, 2021. p. 71-87. ISBN 978-65-88471-37-1. Disponível em: https://www.researchgate.net/profile/Maria-Candida-Del-Masso/publication/357011800_Escola_para_todos_um_caminho_possivel/links/624a2e1521077329f2f04a01/Escola-para-todos-um-caminho-possivel.pdf. Acesso em: 15 de maio de 2025. [*Students with chronic illnesses as subjects of Inclusive Education: academic discussions in graduate programs in Education and Health*]

SILVA, T. T. **Documentos de identidade**: uma introdução às teorias do currículo. 3. ed. Belo Horizonte: Autêntica, 2010. [*Identity documents: an introduction to curriculum theories*]

SILVA, A. S. G.; ROMANO, S.; CABRAL, L. S. A. Acessibilidade policêntrica: contribuições para além das práticas inclusivas centralizadoras. **Olhar de Professor**, Ponta Grossa, v. 26, p. 1–15, e-21657.054, 2023. Disponível em: https://doi.org/10.5212/OlharProfr.v.26.21657.054. Acesso em: 27 jun. 2025. [*Polycentric accessibility: contributions beyond centralizing inclusive practices*]

ZERBATO, A. P.; MENDES, E. G. Desenho universal para a aprendizagem como estratégia de inclusão escolar. **Educação Unisinos**, v. 22, p. 147-155, 2018. Disponível em: http://revistas.unisinos.br/index.php/educacao/article/view/edu.2018.222.04/60746207. Acesso em: 10 mar. 2024. [*Universal design for learning as a strategy for school inclusion*]

ZERBATO, A. P.; MENDES, E. G. O desenho universal para a aprendizagem na formação de professores: da investigação às práticas inclusivas. **Educação e Pesquisa**, São Paulo, v. 47, e233730, 2021. Disponível em: https://doi.org/10.1590/S1678-4634202147233730. Acesso em: 14 abr. 2025. [*Universal design for learning in teacher training: from research to inclusive practices*]

ABOUT THE EDITORS

JÉSSICA ALEGRIA ARCA

Teacher in the Youth and Adult Education Program at the Municipal Education Network of Santo André and author of several books in the field of Inclusive Education. She holds degrees in Pedagogy and History and is a specialist in Psychopedagogy with an emphasis on Special Education, Literacy and Reading, and History and Culture of Brazil. Master's degree in Inclusive Education (PROFEI) from the Federal University of São Paulo (UNIFESP) and PhD candidate in the Graduate Program in Education and Health in Childhood and Adolescence at the same university.

E-mail: jessica.alegria@unifesp.br
Lattes: http://lattes.cnpq.br/7079121231427929

DANIEL NOVAES

Daniel Novaes is a professor in the master and doctoral Program in Education (Stricto Sensu) at the University of São Francisco (USF). He completed postdoctoral research in Education, Culture, and Subjectivity at the Federal University of São Carlos and another postdoctoral fellowship in Teacher Education, Teaching Work, and Educational Practices (USF–CAPES, Academic Solidarity Program). He holds a PhD and a Master's degree in Education from the University of São Francisco (USF–CAPES), a postgraduate degree in Special Education

with an emphasis on Intellectual Disability from Padre Anchieta University Center, and a Bachelor's degree in Pedagogy from Paulista University (PROUNI). Leader of the Research Group and Study Collective on Autism, Education and Technologies – ARAUETÉ ando member of the Interinstitutional Network of Researchers in Human Development, Education, and Special Education in Vygotsky (REPEDE).
E-mail: daniel.novaes@usf.edu.br
Lattes: http://lattes.cnpq.br/7451805891926069

MARCIO HOLLOSI

PhD in Education and Health Sciences. Associate Professor at the Federal University of São Paulo (UNIFESP), School of Philosophy, Languages, and Human Sciences (EFLCH) – Guarulhos Campus, Department of Languages. Faculty member of the Graduate Program in Education and Health in Childhood and Adolescence and of the Graduate Program in Inclusive Education (PROFEI), both at UNIFESP. He holds a Master's degree in Educational Sciences, a specialization in Special and Inclusive Education with an emphasis on Hearing Impairment, and Bachelor's degrees in Pedagogy and Libras (Brazilian Sign Language). Researcher and Leader of the GEICS – Research Group on Deaf Identity and Culture (CNPq). Member of the ILCAE – Linguistic Inclusion in Educational Activity Scenarios Group (PUC-SP) and of the International Collaboratory for Leadership in Universally Designed Education (INCLUDE).
E-mail: hollosi@unifesp.br
Lattes: http://lattes.cnpq.br/0009306878714171

INDEX

A
Accessibility 5, 7, 8, 20, 21, 22, 42, 44, 47, 48, 49, 81, 98, 99, 100, 102, 103, 110
AEE 41, 42, 43, 44, 45, 47, 48, 49, 52, 53, 59, 60
ASD 3, 13, 14, 22, 23, 42, 55, 56, 57, 58, 59, 60, 61, 80, 82, 83, 85, 86
Assessment 55, 56, 57, 58, 59, 61, 62, 68, 69, 70
Assistive 9, 31, 41, 42, 43, 46, 47, 48, 49, 50, 51, 52, 53, 56, 57, 58, 78, 80, 81, 83, 87, 100, 102, 104
Autism 10, 17, 19, 21, 22, 23, 77, 85, 91, 92
Autonomy 5, 14, 32, 42, 46, 47, 48, 50, 51, 53, 58, 60, 61, 62, 81, 84, 85, 98, 104, 106

C
Child 15, 33, 35, 36, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 80, 82, 83, 84, 86, 87, 91, 92, 96
Childhood 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 55
Collaborative 45, 49, 50, 69, 95, 97, 98, 100, 104, 105, 107
Communication 10, 14, 15, 20, 22, 31, 41, 42, 43, 45, 46, 48, 49, 50, 51, 52, 58, 60, 62, 70, 71, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 96, 97, 98, 99, 100
Cultural 5, 14, 16, 23, 29, 30, 31, 33, 35, 36, 37, 42, 59, 68, 74, 106
Curriculum 7, 46, 48, 49, 68, 69, 70, 71, 72, 74, 99, 100, 102, 105, 109

D
Digital resources 10, 29, 30, 31, 32, 34, 37, 51, 52, 65, 66
Digital technologies 5, 9, 23, 29, 30, 34
Disabilities 7, 11, 13, 14, 16, 18, 21, 23, 29, 30, 31, 32, 33, 34, 35, 36, 37, 42, 43, 44, 46, 48, 50, 52, 54, 56, 58, 59, 68, 69, 78, 79, 83, 86, 87, 88, 89, 98, 101, 102, 106, 109
Disability 9, 16, 31, 42, 49, 51, 52, 69, 83, 86, 97, 101, 105
Diversity 5, 7, 10, 29, 31, 36, 43, 44, 45, 47, 48, 49, 52, 53, 71, 100, 101, 102, 103, 106, 107, 109

E
Education 5, 10, 13, 14, 17, 18, 19, 20, 22, 23, 29, 30, 31, 32, 33, 34, 35, 36, 42, 43, 44, 46, 47, 48, 49, 52, 53, 54, 55, 56, 57, 59, 60, 66, 68, 69, 70, 71, 72, 74, 79, 85, 92, 93, 94, 95, 96, 97, 98, 99, 100, 102, 105, 106, 108, 109

Educators 9, 21, 23, 41, 43, 45, 48, 52, 53, 61, 65, 66, 72, 74, 85, 88, 99, 104

G
Guidelines 8, 9, 53, 56, 57, 67, 68, 70, 79, 102, 106

I
Inclusion 5, 8, 10, 18, 29, 34, 35, 37, 41, 43, 44, 46, 47, 48, 49, 50, 52, 56, 58, 62, 69, 78, 79, 80, 85, 87, 93, 94, 95, 96, 98, 101, 102, 103, 108, 110
Inclusive 5, 6, 9, 10, 14, 18, 19, 20, 21, 22, 23, 29, 30, 31, 32, 33, 36, 37, 42, 43, 44, 45, 46, 47, 48, 50, 52, 53, 54, 55, 56, 57, 58, 59, 94, 95, 96, 97, 100, 101, 102, 104, 105, 106, 108, 110
Interaction 14, 21, 22, 31, 32, 33, 42, 43, 46, 47, 48, 51, 52, 61, 62, 78, 79, 80, 97, 100, 103, 104
Interactions 20, 31, 32, 33, 35, 37, 46, 49, 50, 51, 62, 85

K
Knowledge 7, 14, 20, 21, 30, 31, 32, 33, 34, 35, 36, 37, 42, 43, 44, 45, 49, 50, 52, 53, 56, 59, 60, 70, 72, 82, 84, 85, 87, 97

L
Language 15, 18, 21, 46, 51, 59, 70, 80, 81, 82, 83, 84, 86, 87, 90, 92
Learning 5, 7, 9, 10, 11, 13, 14, 15, 16, 20, 21, 22, 23, 29, 30, 31, 32, 33, 34, 35, 36, 37, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 56, 57, 58, 59, 61, 62, 66, 67, 68, 69, 70, 71, 72, 73, 74, 78, 80, 86, 95, 97, 99, 100, 101, 102, 103, 104, 105, 106, 107, 109, 110
Literature 14, 17, 20, 23, 27, 57, 79, 82, 83, 85, 86

M
Mediation 10, 14, 16, 20, 30, 31, 33, 34, 35, 36, 37, 46, 47, 57, 58, 59, 61, 81, 84

P
Patients 90, 91, 108
Planning 9, 10, 22, 33, 49, 58, 60, 61, 67, 68, 70, 74, 81, 95, 97, 105

R
Reintegration 94, 95, 96, 98, 99, 100, 105, 107
Resources 5, 9, 10, 11, 14, 19, 20, 21, 22, 29, 30, 31, 32, 34, 35, 36, 37, 42, 44, 46, 47, 48, 49, 50, 51, 52, 53, 60, 65, 66, 67, 77, 78, 80, 81, 82, 83, 84, 85, 87, 88, 90, 91, 97, 99, 100, 102, 104
Right 44, 45, 47, 48, 49, 58, 59, 62, 69, 70, 71, 102, 106

S

School 5, 6, 10, 13, 21, 22, 23, 29, 31, 33, 34, 35, 36, 37, 43, 44, 45, 46, 47, 48, 49, 50, 52, 53, 54, 55, 57, 62, 67, 68, 69, 70, 71, 72, 78, 79, 81, 83, 84, 85, 86, 87, 88, 93, 94, 95, 96, 98, 99, 100, 102, 105, 106, 107, 108, 110
Skills 14, 22, 33, 45, 60, 82, 83, 86, 91, 95, 104, 105
Student 5, 11, 13, 23, 29, 31, 32, 33, 34, 35, 36, 37, 41, 55, 56, 57, 58, 59, 60, 61, 62, 65, 66, 67, 68, 69, 70, 71, 72, 74, 83, 84, 87, 90, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 108
Students 5, 6, 7, 8, 9, 10, 11, 13, 14, 18, 19, 20, 21, 22, 23, 29, 30, 31, 32, 33, 34, 35, 36, 37, 44, 48, 49, 54, 55, 56, 57, 58, 59, 60, 61, 62, 65, 66, 67, 68, 69, 70, 71, 72, 74, 78, 80, 83, 85, 87, 94, 95, 96, 97, 98, 99, 100, 101, 102, 104, 105, 106, 107, 109

T
Teachers 10, 18, 20, 22, 23, 32, 33, 34, 35, 36, 45, 49, 52, 57, 62, 65, 66, 67, 68, 71, 72, 74, 78, 84, 85, 95, 96, 97, 98, 102, 104, 105
Technologies 5, 7, 8, 9, 10, 14, 21, 22, 23, 29, 30, 31, 32, 33, 34, 35, 36, 37, 43, 46, 56, 57, 58, 65, 66, 77, 78, 80, 81, 100, 104, 106, 109
Technology 7, 8, 9, 10, 13, 14, 20, 21, 23, 30, 31, 32, 33, 41, 42, 43, 46, 47, 48, 49, 50, 51, 52, 53, 66, 68, 71, 74, 78, 83, 102
Training 10, 13, 21, 22, 23, 34, 36, 43, 44, 48, 53, 54, 81, 84, 85, 86, 92, 96, 105, 110

U
UDL 5, 7, 8, 9, 10, 11, 93, 97, 101, 102, 103, 105, 106, 107, 108

V
Vigotski 30, 34
Vygotsky 5, 14, 15, 16, 20, 23, 30, 31, 32, 33, 35, 37, 55, 57, 59, 61, 68, 97, 103, 109, 112

EDITORA
SCHREIBEN