Cadernos Brasileiros de Terapia Ocupacional
Brazilian Journal of Occupational Therapy

ISSN 2526-8910

Original Article

Assistive Technology categories and devices used by Brazilian occupational therapists with children with autism spectrum disorder

Categorias e dispositivos de Tecnologia Assistiva aplicados a crianças com transtorno do espectro autista por terapeutas ocupacionais brasileiros

Kétlin Cristina Ferreira[a], Luciana Bolzan Agnelli Martinez[a]

[a]Universidade Federal de São Carlos – UFSCar, São Carlos, SP, Brasil.

How to cite: Ferreira, K. C., & Martinez, L. B. A. (2026). Assistive Technology categories and devices used by Brazilian occupational therapists with children with autism spectrum disorder. *Cadernos Brasileiros de Terapia Ocupacional*, *34*, e4054. https://doi.org/10.1590/2526-8910.cto412840542

Abstract

Introduction: This study investigates the use of Assistive Technology (AT) by occupational therapists in services for children with Autism Spectrum Disorder (ASD). Recognized by the World Health Organization as a facilitator of functioning and independence, AT constitutes a field of knowledge applied to different populations and contexts, including childhood. **Objective:** To identify the categories of AT addressed in the practice of occupational therapists with children with ASD and to survey the strategies and devices most often recommended and/or implemented with this population, with an emphasis on children's occupations. **Methodology:** This was a descriptive, cross-sectional survey study with non-probabilistic Virtual Snowball Sampling and the participation of 37 Brazilian occupational therapists. Data were collected through an electronic form developed for this study. **Results:** The most frequently used categories were "Aids for Daily Living and Practical Life" (97.3%) and "Augmentative and Alternative Communication" (83.8%). The main resources identified were visual cues and self-regulation strategies in play; adaptations of materials and specific furniture in education; and visual cues, changes in task performance strategies, and adapted furniture in Activities of Daily Living. **Conclusions:** The study highlights the relevance of AT for children with ASD and the variety of assistive strategies and devices recommended by Brazilian occupational therapists to promote engagement in meaningful childhood occupations. AT should be appropriated by professionals seeking to promote these children's independence and autonomy. Further studies may provide more detailed information on these strategies and devices and expand the generalizability of the findings.

Keywords: Occupational Therapy, Self-Help Devices, Autism Spectrum Disorder, Activities of Daily Living.

Received on 11 Feb. 2025; 1st Revision on 25 Feb. 2025; Accepted on 11 Feb. 2026.

Resumo

Introdução: Este estudo investiga a aplicação de Tecnologia Assistiva (TA) por terapeutas ocupacionais no atendimento a crianças com Transtorno do Espectro Autista (TEA). Reconhecida pela Organização Mundial da Saúde como elemento facilitador da funcionalidade e da independência, a TA constitui uma área de conhecimento aplicada a diferentes públicos e contextos, incluindo a infância. **Objetivo:** Identificar as categorias de TA abordadas na prática de terapeutas ocupacionais com crianças com TEA e mapear as estratégias e os dispositivos mais indicados e/ou implementados com esse público, com ênfase nas ocupações infantis. **Metodologia:** Pesquisa de levantamento, descritiva e transversal, com amostragem não probabilística por Bola de Neve Virtual e participação de 37 terapeutas ocupacionais brasileiras. Os dados foram coletados por meio de formulário eletrônico elaborado para esta pesquisa. **Resultados:** As categorias mais utilizadas foram "Auxílios para a Vida Diária e Vida Prática" (97,3%) e "Comunicação Aumentativa e Alternativa" (83,8%). Os principais recursos identificados foram pistas visuais e estratégias de autorregulação, no brincar adaptações de materiais e mobiliários específicos, na educação; e pistas visuais, mudanças nas estratégias de execução e mobiliários adaptados, nas Atividades de Vida Diária. **Conclusões:** O estudo evidencia a relevância da TA para crianças com TEA e a variedade de estratégias e dispositivos assistivos indicados por terapeutas ocupacionais brasileiras para favorecer o engajamento em ocupações significativas da infância. Conclui-se que a TA deve ser apropriada por profissionais que buscam favorecer a independência e a autonomia dessas crianças. Novos estudos poderão detalhar melhor tais estratégias e dispositivos e ampliar a generalização dos resultados.

Palavras-chave: Terapia Ocupacional, Tecnologia Assistiva, Transtorno do Espectro Autista, Atividades Cotidianas.

Introduction

WHO understands Assistive Technology broadly, encompassing knowledge, products, systems, and services aimed at maintaining or improving people's functioning and independence (Smith et al., 2018). Assistive devices are included among the Environmental Factors of the biopsychosocial model proposed by WHO (Organização Mundial da Saúde, 2003) and, like the other components, act on the individual's functioning and may serve as facilitators when they are implemented according to each person's actual needs. Assistive Technology may therefore be understood as a field of knowledge applied in different contexts, with different populations and age groups (Brasil, 2007; Bastos et al., 2023), including children with Autism Spectrum Disorder (ASD), with the aim of promoting greater participation and engagement in various situations (World Health Organization, 2022).

Considering the different support needs of children with ASD and the importance of monitoring their development, the Brazilian Ministry of Health recognizes the need for diversified intervention strategies and approaches focused on social inclusion. In this context, the individualized implementation of assistive strategies and devices may minimize functional limitations and foster the child's active participation in the meaningful of childhood (Agnelli Martinez & Lourenço, 2022).

According to the American Occupational Therapy Association (Associação Americana de Terapia Ocupacional, 2020), occupations are activities imbued with meaning and are

directly linked to the interaction between context and subject. Occupational therapy values and considers people's interaction with the environment and the occupations in which they engage so that interventions are directed toward occupational performance (Folha & Della Barba, 2020). Thus, with the aim of supporting engagement in occupations such as play, education, and self-care activities, the use of Assistive Technology resources by children with ASD may occur in family and school contexts, promoting inclusion and enhancing mediation in the child's learning process (Pacienza & Pereira, 2021; Proença et al., 2019). The growing recommendation of assistive device use in occupational therapy clinical practice, associated with the everyday demands of children with ASD, includes, for instance, the use of imaging systems to assist with daily activity routines, improve attention, and expand participation (Agnelli Martinez & Lourenço, 2022).

WHO mentions varied examples and purposes for the application of Assistive Technology for persons with ASD, such as robotic solutions to assist with activities of daily living (ADLs), especially for interaction and encouragement; devices to assist communication; facilitators for navigation in virtual environments—for example, when cognitive difficulties are present, images and symbols may be used to assist navigation in text-heavy virtual environments; resources for time management; support for the transition from school to working life; and resources to facilitate productivity at work (World Health Organization, 2022). When used appropriately, assistive resources may even help reduce the use of medication by children and contribute to their development (Pacienza & Pereira, 2021), although these are not the primary objectives of their application.

Given the variety of applications, strategies, and assistive devices, the International Organization for Standardization (ISO) proposed, through ISO 9999 (International Organization for Standardization, 2016), an important classification of Assistive Technology resources. This classification was structured into classes, subclasses, and divisions consisting of a code, a title, and, when necessary, an explanatory note. Within this classification, there are classes and subclasses intended for national applications, as well as subclasses reserved for international assistive products. The class titles were created to establish common, general usage, whereas the subclass titles provide more specific descriptions (International Organization for Standardization, 2016). Although ISO 9999 was created to assist the construction of an international Assistive Technology classification framework, some authors, such as Galvão Filho (2009), argue that it does not encompass everything that may fall under Assistive Technology, since this field includes more than products and devices.

A commission of European Union countries prepared the document Empowering Users Through Assistive Technology (Andrich, 1999), which presents a classification called HEART, in which Assistive Technology is associated with the concept of Universal Design. In the United States, there is a National Classification System for Assistive Technology Devices and Services, which differs from ISO because it presents the concept and description of services, as well as an organized description of resources (Bersch, 2017).

To categorize Assistive Technology, this research adopted a Brazilian classification, updated by Bersch (2017), developed from other classifications and composed of 12 categories that point to functional objectives and involve different activities and situations. This classification was used in Interministerial Ordinance 362 (Brasil, 2012), which addresses the credit line for the acquisition of Assistive Technology goods and services (Bersch, 2017). Thus, considering the applicability of this classification to the Brazilian context and its alignment with the proposal of this study, its categories were used during the development of the data collection instrument, as well as in the analysis of the results.

Although there is evidence of the benefits of Assistive Technology for children with ASD, many studies are focused primarily on learning and education, and the applied technologies are not always named and understood as part of the field of Assistive Technology. Considering the role of occupational therapy both in the field of Assistive Technology and in rehabilitation and interventions for children with ASD, this research sought to gather data on the application of assistive devices with this target population. Therefore, this study aimed to identify the Assistive Technology categories addressed in the practice of Brazilian occupational therapists working with children with ASD and to survey the strategies and assistive devices most often recommended and/or implemented by these professionals.

Method

Type of study

This was a descriptive, cross-sectional survey study with a quantitative approach, aimed at obtaining data from the characteristics or opinions of a specific population group. Surveys comprise investigations whose data are described analytically and, when possible, with generalization of the results (Giolo, 2009; Mineiro, 2020). The descriptive purpose adopted here is mainly characterized by presenting data or phenomena, but not explaining them, and its results provide support for the formulation of hypotheses that lead to further research (Andrade & Theobald, 2020).

Sampling and dissemination

The target population for data collection consisted of Brazilian occupational therapists working with children with ASD. To reach professionals from different regions of the country as broadly as possible, the Virtual Snowball non-probability sampling model was adopted (Costa, 2018), beginning with the sending/presentation of the access link to an electronic questionnaire via email or social media (Costa, p. 21, 2018). The body of the message included the invitation to participate in the research and a request that it be forwarded or shared with the recipient's contact network as a viral dissemination strategy, in which the interested person becomes a vector of that content and is willing to share it with other susceptible individuals (Qualman, 2011).

Thus, the study was publicly disseminated through a digital visual invitation, following the guidelines for research procedures in virtual environments (Brasil, 2021). Dissemination occurred only after submission of the study to the Research Ethics Committee of the Federal University of São Carlos (UFSCar), and it was approved under CAAE 74315823.1.0000.5504, in compliance with the provisions of CNS Resolution No. 510 of 2016, CNS Resolution No. 466 of 2012, and Operational Standard No. 001 of 2013 of the National Health Council, of the National Research Ethics Commission, which addresses ethics in research involving human beings.

To reach all regions of the country, an invitation letter was sent to the 18 Regional Councils of Physical Therapy and Occupational Therapy, CREFITOs, listed on the website of the Federal Council of Physical Therapy and Occupational Therapy (COFFITO), as well as an email to COFFITO itself, the Brazilian Association of Occupational Therapists (ABRATO), and the National Network of Education and Research in Occupational Therapy (RENETO).

The sample consisted of 37 volunteer professionals from 11 Brazilian states, with a greater concentration of participants in the states of São Paulo, 43.2%, and Minas Gerais, 16.5%. Data collection lasted four months, from July to October 2024.

For data collection to be possible, the participant's first access occurred through the research link to the Informed Consent Form (ICF), together with an invitation containing the conditions for participation in the study, through the Google Forms platform, and acceptance gave continuity to the subsequent sections available in the questionnaire.

If accepted, the following screen immediately began the section characterizing the participating professional, as well as the collection of data related to the study.

Preparation of the data collection instrument

To construct the research questionnaire, it was necessary to conduct a brief literature review in the main means of data dissemination, CAPES journals, SciELO, Medline, and Google Scholar, on the use of Assistive Technology strategies and devices with the ASD population.

To make it possible to conduct an organized survey of all assistive categories and devices recommended in clinical practice by the professionals, the electronic form presented different sections, one for each occupation.

To identify and map the assistive resources related to each occupation, it was decided to offer several response options, as well as a free-text field at the end of each section, presented as an optional open-ended question. These fields were created to enable participants to provide examples of or better describe the type of resource selected or to mention other devices not covered by the items presented, beyond the response options provided. The development of the instrument was guided by the Occupational Therapy Practice Framework: Domain and Process (Associação Americana de Terapia Ocupacional, 2020), and four occupations were selected for investigation regarding assistive resources: Play, Education, Social Participation, and Activities of Daily Living (ADLs).

A pre-test was conducted with four experts in the field, occupational therapists with knowledge of both clinical practice and teaching, referred to as questionnaire evaluation judges. A simulated completion of the instrument was conducted, and afterward they analyzed and assessed the following aspects: content, language, sequence, format, and length, leaving suggestions for improving the questionnaire.

After the necessary adjustments were made, the content was reviewed by the research team, resulting in the final version of the data collection instrument, whose link was sent together with the invitation during public dissemination, with the ICF on the first page.

The collected data were tabulated and organized in Microsoft Excel® spreadsheets, and a descriptive statistics analysis was conducted, which allowed the researchers to synthesize a series of values and obtain an overall view of their variation through tables, graphs, other visual resources, and the descriptive measures themselves.

Results

Characterization of the participants

The study included 37 participants, predominantly between 20 and 40 years of age, corresponding to more than 75% of the sample, whereas the remaining participants were between 41 and 60 years of age. Regarding years since graduation, that is, completion of the occupational therapy degree, 32.4% of the participants indicated 1 to 5 years, 37.8% indicated 6 to 15 years, and 29.7% indicated 16 to 30 years.

As for graduate education, 78.4% of the participants had some type of graduate-level education: 56.8% had completed a *lato sensu* graduate program, and 21.6% had completed a *stricto sensu* graduate program, with 16.2% of the participants holding a master's degree and 5.4% holding a doctoral degree.

To understand where these occupational therapists work, one of the questions, concerning service settings, included more than one response option, considering the possibility that a professional might be affiliated with more than one setting. In this regard, the data showed that 25 of the 37 participants worked in private clinics, 14 worked in the private sector, and the remaining professionals were distributed across NGOs, specialized centers, APAEs[1], ASD associations, specialized rehabilitation centers, and mainstream schools, with no participant selecting the option of special school. As for years of professional experience with the ASD population, 48.6% had worked for 1 to 5 years, 24.3% for 6 to 10 years, and 27% for 11 to 30 years.

Areas related to the participants' specialization and the number of professionals with education specifically related to ASD were also identified. Thus, 24.3% of the participants had education in Applied Behavior Analysis (ABA), 21.6% mentioned courses in sensory integration, and 24.3% indicated specializations related to rehabilitation, Assistive Technology, and ASD in general.

Assistive Technology categories recommended for children with ASD

Most participants (91.9%) worked with children with ASD between 1 and 12 years of age, whereas 8.1% reported working with children between 7 and 12 years of age. These data indicate that the population assisted was varied, with no predominance of a specific age group. Thus, the childhood occupations presented were broadly able to encompass what would be expected across these ages.

Considering the wide variety of resources and strategies that compose the field of Assistive Technology, the participants were asked to indicate which categories, among those established by Bersch (2017), were most frequently recommended in work with children with ASD. In this respect, the data highlighted two categories: "Aids for Daily Living and Practical Life" (97.3%) and "Augmentative and Alternative Communication" (83.8%). The graph in Figure 1 shows the distribution of the Assistive Technology categories identified by the participants.

Assistive Technology devices recommended for children with ASD from the perspective of occupational therapists

Occupation: "Play"

Addressing the occupation of play and its main Assistive Technology recommendations, the following information was identified: 72% of the participants recommended the use of resources and strategies to facilitate communication, 78% used visual cues, and 78% mentioned the provision of self-regulation spaces. As shown in Figure 2, other items were also selected and associated with the occupation of play, although in smaller numbers.

[1] APAE stands for Association of Parents and Friends of Persons with Disabilities, a group of Brazilian nonprofit organizations that provide educational, health, and social assistance services to this population".

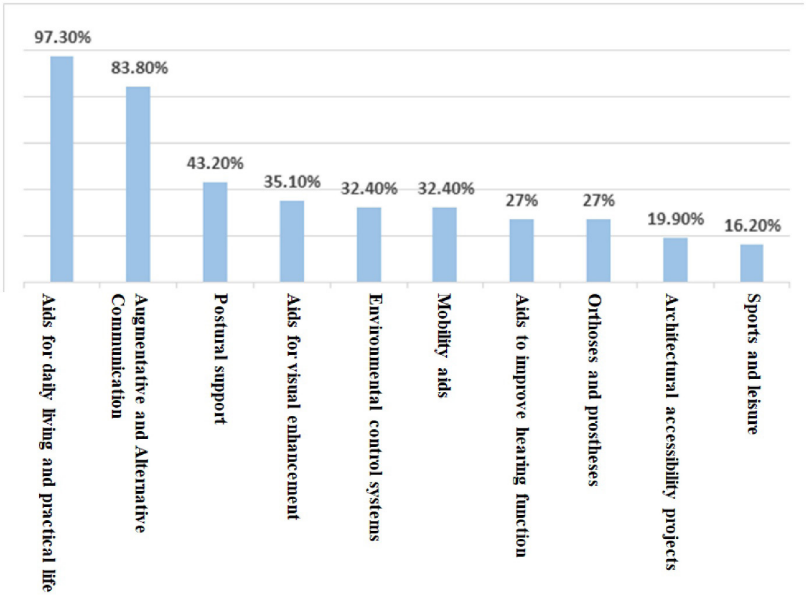

Figure 1. Assistive Technology categories involved in the clinical practice of the participating professionals working with children with ASD.

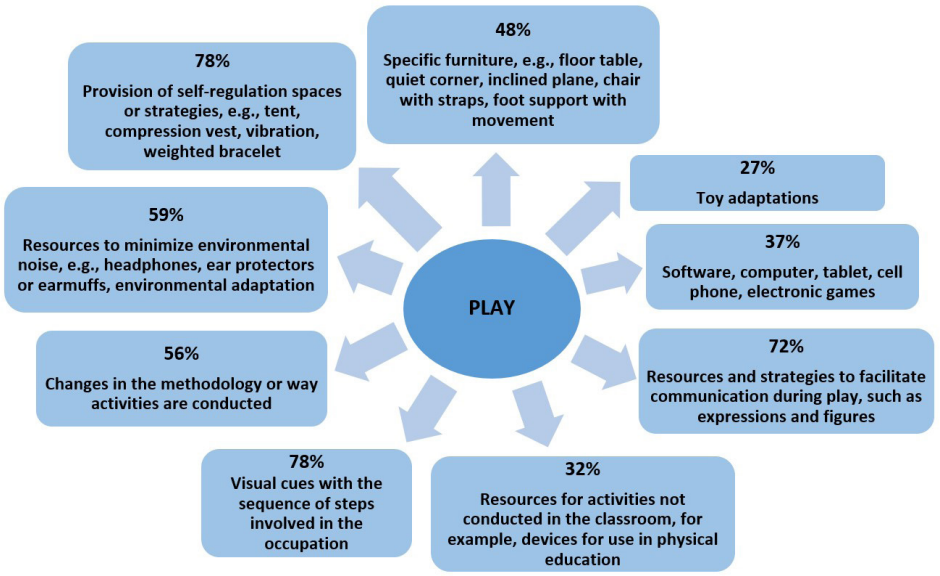

Figure 2. Visual map of Assistive Technology related to the occupation of play.

Occupation: "Education"

Concerning education, all the reference items included in the questionnaire were selected, as shown in Figure 3, and this was the occupation that stood out most in relation to the preparation of school materials, 83%; recommendation of specific furniture, 75%; changes in methodology, 70%; and provision of self-regulation spaces, 70%.

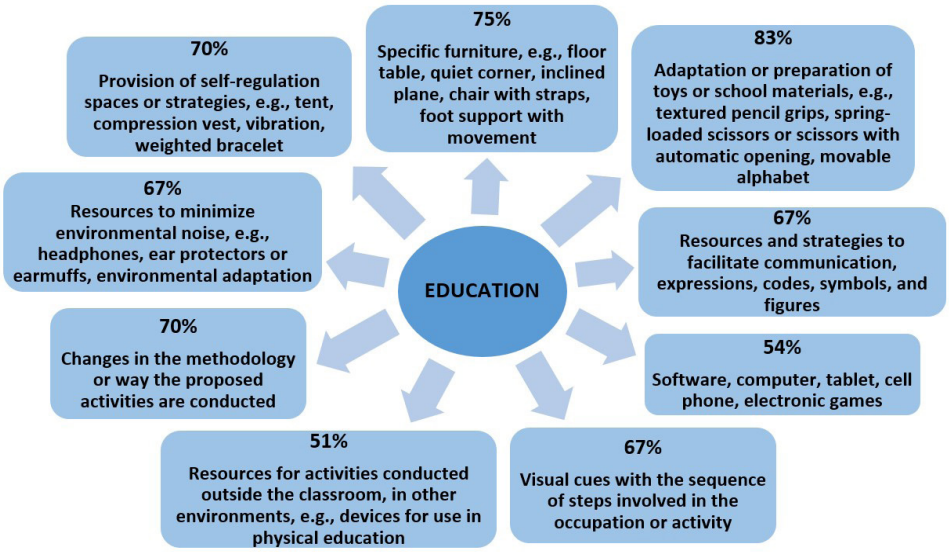

Figure 3. Visual map of Assistive Technology related to education.

With regard to the Assistive Technology items exemplified in the open-ended question, the following items stood out: visual cue, routine board, communication board, elastic foot support, chewelry, and grip adapters.

Occupation: "Social Participation"

For the occupation involving social participation, the most frequently selected item was the use of resources and strategies to facilitate communication (75%), whereas the least frequently recommended item was the adaptation and/or preparation of toys or materials (16%). Resources to minimize noise and visual cues were selected by 67% of the participants, and each professional could select more than one option. Other items were also recommended, although less often, such as software, specific furniture, self-regulation space, changes in methodology, and resources and/or equipment for use in other environments.

Occupation: "Activities of Daily Living (ADLs)"

As the occupation involving ADLs includes different activities, such as bathing, hygiene, eating, and dressing, the results seek to associate the Assistive Technology devices mentioned with the activities for which they were identified by the participants.

Table 1 presents the devices associated with bathing and hygiene activities according to the number of responses.

It is evident that, for bathing and hygiene activities, the use of visual cues, changes in how the activities are performed, resources to facilitate communication, and specific furniture showed the highest recommendation percentages.

The use of non-slip mats and variation in sponge texture or handle length were the resources that appeared most specifically for these activities. Still regarding the examples mentioned, modifications to shampoo and soap were also cited, as well as dispensing containers, unscented products, the provision of liquid soap in pump-top containers, and other variations in soap use, such as soap attached to or placed inside the sponge, soap in pantyhose, etc.

Table 1. Assistive Technology devices recommended for bathing and hygiene activities.

Assistive Technology	Bathing	Hygiene
Strategies		
Visual cues with the sequence of steps	**81%**	**91%**
Changes in performance or strategy (e.g., verbal commands about the body, combing hair in the shower)	**72%**	**83%**
Communication resources and strategies (e.g., sounds, symbols, communication board)	**67%**	**81%**
Provision of self-regulation spaces and strategies (e.g., silent haircut kit, tactile resources, music)	**51%**	**54%**
Devices		
Specific furniture and adaptations (e.g., toilet seat reducer, foot support, bathtub, shower chair)	**62%**	**83%**
Bathing utensils and accessories (e.g., long-handled sponge, non-slip mat, soap adaptations)	**59%**	**37%**
Oral hygiene utensils and accessories (e.g., electric toothbrush, toothpaste dispenser, floss holder)	**18%**	**72%**
Hygiene utensils and accessories (e.g., adapted diapers, replacement of toilet paper)	**21%**	**56%**
Software/computer/tablet/cell phone/electronic games (for predictability or actions)	**24%**	**43%**
Hair-combing utensils and accessories (e.g., comb or brush with handle or long grip)	**18%**	**29%**

Source: Prepared by the authors.

For the eating activity, 86% of the participants indicated changes in the method or strategy used to perform it; 70% reported the need for cup or mug adaptations; 67% cited utensil adaptations; 67%, plate adaptations; and 67% indicated resources and strategies to facilitate communication during eating. The least frequently recommended items were software, self-regulation spaces, and specific furniture (Figure 4).

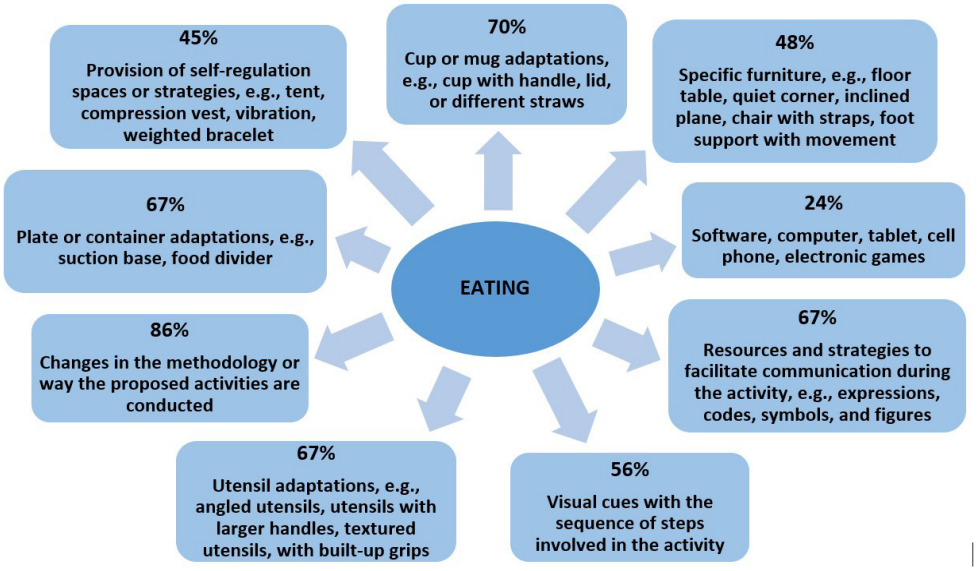

Figure 4. Visual map of Assistive Technology for the eating activity.

When asked, through the open-ended questions, about examples or specifications of eating-related strategies and devices, the participants mentioned the use of adapted utensils, such as cutlery with built-up grips, cups with straws, handles, and/or cutouts, and plates with raised edges and/or dividers. Most comments highlighted the recommendation of changes in the strategies used during the eating process, including the use of a large ball, known as a Pilates ball or Swiss ball, instead of a chair; the use of a balance disc on the chair seat; greater predictability regarding food and mealtime; as well as environments free of distracting elements during eating.

Finally, in the activity of dressing and undressing, the item with the highest recommendation was the use of visual cues (86%), and the least frequently recommended item was the one related to the use of specific furniture (29%). Modifications to footwear were mentioned by 78% of the participants, and the recommendation of clothing items with specific characteristics, such as looser clothing and elastic adjustments, was reported by 64% of the sample. Still regarding dressing, resources to facilitate communication during the activity (64%) and self-regulation strategies (64%) were identified.

Discussion

Considering the child population, especially children at developmental risk or with disabilities, Assistive Technology is often the first step toward full development, access to education, participation in sports, and other life situations (World Health Organization, 2022). Different types of assistive resources enable children to explore the world around them, establish relationships and social interaction, engage actively and functionally in play and household tasks, in addition to facilitating situations related to education (Agnelli Martinez & Lourenço, 2022; Murchland & Parkyn, 2010; World Health Organization, 2022).

Childhood is a period favorable to new learning and marked by considerable adaptation to environmental demands, thus presents a high likelihood of success in the implementation of assistive devices, provided that adequate support and follow-up are available. In the case of children with disabilities, including those with ASD, the target population of this study, assistive resources should be implemented early, considering the importance of keeping the child active and seeking solutions that minimize functional limitations and expand autonomy (Agnelli Martinez & Lourenço, 2022). In children with ASD, early intervention is essential to reduce impairments and limitations (Syriopoulou-Delli & Gkionta, 2020), and all intervention possibilities should be explored from an early stage, including Assistive Technology, which has increasingly been recognized and applied to this population. This research identified a substantial number of participants who work with children with ASD in early childhood, including through the recommendation of Assistive Technology.

When the recommendation of Assistive Technology resources and strategies in occupational therapy is discussed, their implementation is commonly associated with therapeutic processes involving specific physical and/or neurological dysfunctions. However, this study offered a view of a strong association between Assistive Technology and ASD, in line with recent observations by the World Health Organization (WHO) in its initiative called Global Cooperation on Assistive Technology (GATE), directed toward Global Research, Innovation and Education in Assistive Technology (GREAT) (World Health Organization, 2022).

The literature indicates that children with disabilities may benefit from various technologies capable of promoting positive changes and improving engagement in

different occupations, fostering autonomy and independence (Agnelli Martinez & Lourenço, 2022; World Health Organization, 2022). The findings of this study also indicated the application of Assistive Technology devices related to different occupations of children with ASD, all of them with a high rate of varied responses, with emphasis on the occupations of education and ADLs.

The data from this research, in which education was one of the occupations with the highest recommendation of Assistive Technology devices for children with ASD, support current studies involving this population (Syriopoulou-Delli & Gkionta, 2020; Yang et al., 2024). The resource most frequently recommended for this occupation, mentioned by 78.3% of the participants in this study, was the adaptation and/or preparation of different school materials (built-up grips, spring-loaded scissors, movable alphabet, routine board, among others), followed by specific furniture (floor table, quiet corner, inclined plane, foot support, etc.), recommended by 70.2% of the professionals. These findings support other studies that also indicate that Assistive Technology in the educational context is not restricted to electronic devices and communication resources, but mainly includes simple resources and adapted materials (Ratuchne et al., 2024; Silva & Amparo, 2023). One of the studies analyzed, for example, the use of an object-book by students with ASD in the classroom and identified increased interest, autonomy, and social interaction among the children in that context (Silva & Amparo, 2023).

On the other hand, several international studies addressing Assistive Technology in association with the school inclusion process emphasize the use of software and robots, pointing to advances in robotics and their contribution to learning (Huijnen et al., 2017; Huijnen et al., 2019; Kim et al., 2013; Pennisi et al., 2016; Syriopoulou-Delli & Gkionta, 2020). Other studies, including Brazilian research, also frequently indicate the use of software that specifically supports communication in learning and in the inclusion process across different school stages, from early childhood to elementary education (Belitzki, 2020; Collette et al., 2019; Fonseca & Schirmer, 2020; Rodrigues, 2022). These data are consistent with the results of this study because, although this item did not receive the greatest emphasis in this occupation, it was cited by 54% of the participating occupational therapists, who reported recommending the use of software, computers, tablets, cell phones, and other electronic devices to expand the participation of children with ASD in education.

The analysis of the results concerning the occupation of play indicates that the Assistive Technology recommendations made by the participants were predominantly related to self-regulation strategies, more than to adaptations in play activities and toys themselves. In the context of this research, such strategies do not have a rehabilitative character, nor are they restricted to improving performance components or merely providing sensory stimuli. Thus, the introduction of self-regulation strategies, as an Assistive Technology resource, aims to expand the child's functioning in different situations and support engagement during play, understood as a meaningful occupation for child development.

Beyond play, considering the importance of independence and autonomy in self-care processes present in the occupation involving ADLs, the results of this study contribute to a discussion in the literature about the concern among families of children with ASD regarding autonomy and independence in basic everyday activities. In this regard, Schaaf et al. (2014) identified that parents of American children with ASD place independence in everyday activities among the main goals of the intervention process. In this sense, the assistance needs of the child with ASD may alter the care dynamic, so that many family members also need to assume the role of caregivers, supervising everyday activities or performing them for the child, which creates overload (Misquiatti, 2015).

In this study, some activities stood out among ADLs as important situations for the implementation of Assistive Technology in children with ASD, with personal/toileting hygiene receiving the greatest emphasis, followed by bathing. Bertolotto et al. (2024) state that, in most cases, difficulty related to personal/toileting hygiene is associated with sphincter control and the process of achieving independence in toilet use, leading to the need for facilitating strategies.

According to the literature, children with ASD present some difficulties in this toilet training process, such as difficulty understanding commands, skills related to toilet paper use, difficulty dressing and undressing, communication difficulties, and difficulties with urine and feces elimination. Additionally, they present rigid routines, sensory changes, and cognitive rigidity, which may be associated with a lack of understanding of the personal/toileting hygiene process (Bertolotto et al., 2024).

In this investigation, the Assistive Technology resources most frequently recommended by the participants for hygiene and bathing activities were visual cues with the sequence of the steps involved, supporting the findings of Soutinho et al. (2020), who also mention communication systems, scheduled routines, clothing planning, and the constant use of praise.

Considering the Brazilian classification of Assistive Technology selected for this research and the 12 categories presented by Bersch (2017), the most frequently selected category was "Aids for Daily Living and Practical Life", followed by the category of "Augmentative and Alternative Communication". These results highlight and reaffirm the importance of everyday activities for the families of children with ASD. Moreover, within the scope of Assistive Technology, the results of this study regarding the second most frequently recommended category support the findings of other research, which point to how often alternative communication resources have been developed for persons with ASD (Avila et al., 2013).

Despite the increase in the number of studies in the field, there are difficulties in combining the existing projects and initiatives related to Assistive Technology, especially those involving its application in children with ASD, and the field still requires more discussion and more scientific evidence to support its implementation (Bastos et al., 2023). This may be achieved through the continuation of this study and other research that examines the topic in greater depth and offers methodological quality.

Final Considerations

This study reaffirms the importance of Assistive Technology in intervention processes with children with ASD and identifies the recommendation of a variety of assistive strategies and devices for this population, recommended by Brazilian occupational therapists and implemented to promote better engagement in meaningful childhood occupations.

Despite the small sample, considering the Brazilian territory, it was possible to identify the existence of diverse demands for occupational therapy with regard to the recommendation and implementation of Assistive Technology resources, in a combined manner and directly related to the occupations for which they are intended, involving both devices and products as well as strategies and methodologies.

Among the occupations investigated, education stands out, with the highest recommendation of assistive resources by the professionals, followed by ADLs, with emphasis on hygiene and bathing activities. The category with the highest level of involvement by the participants was "Aids for Daily Living and Practical Life", followed by "Augmentative and Alternative Communication".

It is further concluded that Assistive Technology, as a powerful field of knowledge for occupational therapy, should be increasingly appropriated by occupational therapists working with ASD in the country who seek independence and autonomy for these children.

The study limitations are related to the difficulty of reaching Brazilian professionals and, consequently, to the small sample. On the other hand, data collection was low-cost and provided a realistic overview of the existing needs regarding Assistive Technology applied to ASD, from the perspective of occupational therapists.

The importance of continuing studies with a larger number of participants in this field is emphasized, which would enable a representative sample with potential for generalization of the data obtained. New studies are suggested to detail more clearly the strategies and the technical specifications of the assistive devices recommended, including the functional and occupational purpose associated with each recommendation. The identification of gaps in the Brazilian Assistive Technology market and of possibilities for development and innovation may also be investigated, with emphasis on the needs presented by children with ASD and occupational therapists, to broaden the discussion regarding the aspects and variables involved in this triangulation among occupational therapy, Assistive Technology, and autism spectrum disorder.

Despite the challenges, the objectives were achieved, and the data produced strengthen knowledge production in the field, given that there are few data in the Brazilian literature, while also contributing to the investigation of professional practice.

References

Agnelli Martinez, L. B., & Lourenço, G. F. (2022). Apontamentos sobre Tecnologia Assistiva (TA) para a prática da terapia ocupacional na infância. In M. O. Figueiredo (Ed.), *Terapia ocupacional no ciclo de vida da infância: histórico, proposições atuais e perspectivas futuras* (1. ed., pp. 81-95). São Paulo: Memnon.

Andrade, S. M. O., & Theobald, M. R. (2020). O desenho - Natureza da pesquisa: quantitativo, qualitativo e tipologias de pesquisa. In S. M. O. Andrade & G. E. Pegolo (Eds.), *A pesquisa científica e saúde: concepção, execução e apresentação* (2. ed., p. 129). Campo Grande: Editora UFMS.

Andrich, R. (1999). *Empowering users through Assistive Technology.* Recuperado em 11 de fevereiro de 2025, de https://www.independentliving.org/docs1/eustat99.html

ASSOCIAÇÃO AMERICANA DE TERAPIA OCUPACIONAL – AOTA. (2020). *Estrutura da prática da terapia ocupacional: domínio & processo.* Bethesda: AOTA.

Avila, B. G., Passerino, L. M., & Tarouco, L. M. R. (2013). Usabilidade em tecnologia assistiva: estudo de caso num sistema de comunicação alternativa para crianças com autismo. *Revista Latinoamericana de Tecnología Educativa*, *12*(2), 115-129.

Bastos, P. A. L. S., Silva, M. S., Ribeiro, N. M., Mota, R. S., & Galvão Filho, T. (2023). Tecnologia assistiva e políticas públicas no Brasil. *Cadernos Brasileiros de Terapia Ocupacional*, *31*, 1-17. https://doi.org/10.1590/2526-8910.ctoao260434011.

Belitzki, V. L. S. O. (2020). *O uso dos softwares de comunicação para a aprendizagem de crianças com Transtorno do Espectro Autista (TEA) nos anos iniciais do ensino fundamental* (Trabalho de conclusão de curso). Universidade Tecnológica Federal do Paraná, Curitiba.

Bersch, R. (2017). *Introdução à Tecnologia Assistiva.* Recuperado em 11 de fevereiro de 2025, de https://www.assistiva.com.br/Introducao_Tecnologia_Assistiva.pdf

Bertolotto, M. G., Pfeifer, L. I., & Sposito, A. M. P. (2024). Treinamento esfincteriano de crianças com transtorno o espectro autista: vivências, dificuldades e estratégias auxiliares. *Physus: Revista de Saúde Coletiva*, *34*, 1-21. https://doi.org/10.1590/s0103-7331202434083en.

BRASIL. (2007). *Ata da VII Reunião do Comitê de Ajudas Técnicas (CAT).* Recuperado em 11 de fevereiro de 2025, de https://www.assistiva.com.br/Ata_VII_Reuni%C3%A3o_do_Comite_de_Ajudas_T%C3%A9cnicas.pdf

BRASIL. (2012). Portaria Interministerial nº 362, de 24 de outubro de 2012. Dispõe sobre o limite de renda mensal dos tomadores de recursos nas operações de crédito para aquisição de bens e serviços de Tecnologia Assistiva destinados às pessoas com deficiência e sobre o rol dos bens e serviços. *Diário Oficial [da] República Federativa do Brasil*, Brasília, seção 1.

BRASIL. Comissão Nacional de Ética em Pesquisa – CONEP. (2021). *Orientações para procedimentos em pesquisas com qualquer etapa em ambiente virtual.* Recuperado em 11 de fevereiro de 2025, de https://www.gov.br/conselho-nacional-de-saude/pt-br/camaras-tecnicas-e-comissoes/conep/legislacao/cartas-circulares/carta-circular-no-1-de-3-de-marco-de-2021.pdf/view

Collette, D., Brix, A., Brennan, P., DeRoma, N., & Muir, B. C. (2019). Proloquo2Go enhances classroom performance in children with autism spectrum disorder. *OTJR: Occupation, Participation and Health*, *39*(3), 143-150. https://doi.org/10.1177/1539449218799451.

Costa, B. R. L. (2018). Bola de neve virtual: o uso das redes sociais virtuais no processo de coleta de dados de uma pesquisa científica. *Revista Interdisciplinar de Gestão Social*, *7*(1), 1-20.

Folha, D. R. S. C., & Della Barba, P. C. S. (2020). Produção de conhecimento sobre terapia ocupacional e ocupações infantis: uma revisão de literatura. *Cadernos Brasileiros de Terapia Ocupacional*, *28*(1), 227-245. https://doi.org/10.4322/2526-8910.ctoAR1758.

Fonseca, J. T. R., & Schirmer, C. R. (2020). Tecnologia Assistiva: aplicativos para dispositivos móveis, uma contribuição tecnológica para aprendizagem de crianças autistas. *Revista Educação e Cultura Contemporânea*, *17*(51), 155-175. https://doi.org/10.5935/2238-1279.20200105.

Galvão Filho, G. T. A. (2009) Tecnologia Assistiva: de que se trata? In G. J. C. Machado & M. N. Sobral (Eds.), *Conexões: educação, comunicação, inclusão e interculturalidade* (pp. 207-235). Porto Alegre: Redes Editora.

Giolo, J. (2009). Métodos de survey: teoria e prática na pesquisa. *Revista Espaço Pedagógico*, *16*(1), 167-170.

Huijnen, C. A. G. J., Lexis, M. A. S., Jansens, R., & de Witte, L. P. (2017). How to implement robots in interventions for children with autism? A co-creation study involving people with autism, parents and professionals. *Journal of Autism and Developmental Disorders*, *47*(10), 3079-3096. https://doi.org/10.1007/s10803-017-3235-9.

Huijnen, C. A. G. J., Lexis, M. A. S., Jansens, R., & de Witte, L. P. (2019). Roles, strengths and challenges of using robots in interventions for children with autism spectrum disorder (ASD). *Journal of Autism and Developmental Disorders*, *49*(1), 11-21. https://doi.org/10.1007/s10803-018-3683-x.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION – ISO. (2016). *ISO 9999: assistive products for persons with disability: classification and terminology*. Genebra: ISO.

Kim, J., Park, S., & Lee, H. (2013). Assistive technology for children with disabilities: a systematic review. *Journal of Rehabilitation Research*, *45*(3), 123-134.

Mineiro, M. (2020). Pesquisa de survey e amostragem: aportes teóricos elementares. *Revista de Estudos em Educação e Diversidade*, *1*(2), 284-306. https://doi.org/10.22481/reed.v1i2.7677.

Misquiatti, A. R. N. (2015). *Tecnologia assistiva e comunicação alternativa: estratégias para a inclusão escolar.* São Paulo: Editora Memnon.

Murchland, S., & Parkyn, H. (2010). Using assistive technology for schoolwork: the experience of children with physical disabilities. *Disability and Rehabilitation. Assistive Technology*, *5*(6), 438-447. https://doi.org/10.3109/17483107.2010.481773.

ORGANIZAÇÃO MUNDIAL DA SAÚDE – OMS. Centro Colaborador. (2003). *Classificação Internacional de Funcionalidade, Incapacidade e Saúde (CIF).* São Paulo: EDUSP.

Pacienza, P., & Pereira, A. (2021). *Tecnologia assistiva e educação inclusiva: desafios e perspectivas.* São Paulo: Cortez.

Pennisi, P., Tonacci, A., Tartarisco, G., Billeci, L., Ruta, L., Gangemi, S., & Pioggia, G. (2016). Autism and social robotics: a systematic review. *Autism Research*, *9*(2), 165-183. https://doi.org/10.1002/aur.1527.

Proença, M. F., Moraes Filho, I. M., Santos, C. C. T., Rodrigues, T. P. R., Cangussu, D. D. D., & Souto, O. B. (2019). A tecnologia assistiva aplicada aos casos de Transtorno do Espectro do Autismo (TEA). *Revista Eletrônica Acervo Saúde*, (31), 1-13. https://doi.org/10.25248/reas.e541.2019.

Qualman, E. (2011). *Socialnomics: como as mídias sociais estão transformando a forma como vivemos e fazemos negócios.* São Paulo: Saraiva.

Ratuchne, P. A. O., Munhoz, M. L. L., Barby, A. A. O. M., Silva, R. T. M., & Scariott, G. C. (2024). Estudo de revisão sobre a Tecnologia Assistiva no ensino de crianças com Transtorno do Espectro Autista (TEA). *Ensino & Pesquisa*, *22*(1), 116-130. https://doi.org/10.33871/23594381.2024.22.1.9107.

Rodrigues, M. S. (2022). *Tecnologia assistiva sob a ótica da infância: aplicativo Teachh.me e o transtorno do espectro autista* (Dissertação de mestrado). Universidade Estadual Paulista "Júlio de Mesquita Filho", Marília.

Schaaf, R. C., Benevides, T., Mailloux, Z., Faller, P., Hunt, J., van Hooydonk, E., Freeman, R., Leiby, B., Sendecki, J., & Kelly, D. (2014). An intervention for sensory difficulties in children with autism: a randomized trial. *Journal of Autism and Developmental Disorders*, *44*(7), 1493-1506.

Silva, M. H. F., & Amparo, F. V. S. (2023). Recursos pedagógicos adaptados & autismo: outros caminhos de mediação da aprendizagem. Revista Brasileira de Educação. *Cultura e Linguagem*, *7*(13), 48-79.

Smith, R. O., Scherer, M. J., Cooper, R., Bell, D., Hobbs, D. A., Pettersson, C., Seymour, N., Borg, J., Johnson, M. J., Lane, J. P., Sujatha, S., Rao, P., Obiedat, Q. M., MacLachlan, M., & Bauer, S. (2018). Assistive technology products: a position paper from the first global research, innovation, and education on assistive technology (GREAT) summit. *Disability and Rehabilitation. Assistive Technology*, *13*(5), 473-485. https://doi.org/10.1080/17483107.2018.1473895.

Soutinho, R. S. R., Corrêa, A. G. D., & Blascov-Assis, S. M. (2020). Controle esfincteriano em crianças com Transtorno do Espectro do Autismo. In A. G. Seabra & E. H. M. Brum (Eds.), *Estudos interdisciplinares em saúde e educação nos distúrbios do desenvolvimento* (pp. 139-150). São Paulo: Universidade Presbiteriana Mackenzie.

Syriopoulou-Delli, C., & Gkionta, E. (2020). Review of assistive technology in the training of children with autism spectrum disorders. *International Journal of Developmental Disabilities*, *66*(2), 101-112.

WORLD HEALTH ORGANIZATION – WHO. United Nations Children's Fund – UNICEF. (2022). *Global report on assistive technology.* Geneva. Recuperado em 11 de fevereiro de 2025, de https://www.unicef.org/oman/reports/global-report-assistive-technology

Yang, Q., Liang, D., Lu, H., Gong, S., & Feng, H. (2024) *Surprising performances of students with autism in classroom with NAO Robot.* Recuperado em 11 de fevereiro de 2025, de https://arxiv.org/abs/2407.12014

Author's Contributions
Kétlin Cristina Ferreira: study conception and design; problematization and conceptualization; fieldwork and data collection; organization of sources and analyses; active participation in the discussion of the results; writing and formatting of the manuscript. Luciana Bolzan Agnelli Martinez: study conception and design; problematization and conceptualization; analyses; active participation in the discussion of the results; review and approval of the final version of the manuscript; submission and management of the article process. All authors approved the final version of the text.

Data Availability
The data supporting the results of this study are available from the corresponding author upon request.

Corresponding author
Luciana Bolzan Agnelli Martinez
e-mail: luagnelli@ufscar.br

Section editor
Profa. Dra. Beatriz Prado Pereira