

**AUTISM AND EDUCATION: A LITERATURE REVIEW ON INCLUSION EXPERIENCES**

***AUTISMO E EDUCAÇÃO: UMA REVISÃO DA LITERATURA SOBRE EXPERIÊNCIAS DE INCLUSÃO***

***AUTISMO Y EDUCACIÓN: UNA REVISIÓN DE LA LITERATURA SOBRE EXPERIENCIAS DE INCLUSIÓN***



Sandra Cordeiro de MELO <sup>1</sup>  
e-mail: sandracmello@gmail.com



Jéssica Cristina Mascarenhas FERNANDES <sup>2</sup>  
e-mail: jessicafernandesufrj.jf@gmail.com



Adriana Teixeira FERREIRA <sup>3</sup>  
e-mail: adrjulio0412@gmail.com

**How to reference this article:**

MELO, S. C.; FERNANDES, J. C. M.; FERREIRA, A. T. Autism and education: A literature review on inclusion experiences. **Revista Ibero-Americana de Estudos em Educação**, Araraquara, v. 19, n. 00, e024088, 2024. e-ISSN: 1982-5587. DOI: <https://doi.org/10.21723/riaee.v19i00.18360>



| Submitted: 15/08/2023  
| Revisions required: 14/12/2023  
| Approved: 05/03/2024  
| Published: 20/07/2024

**Editor:** Prof. Dr. José Luís Bizelli

**Deputy Executive Editor:** Prof. Dr. José Anderson Santos Cruz

<sup>1</sup> Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro – RJ – Brazil. PhD in Education, professor at the Faculty of Education at UFRJ.

<sup>2</sup> Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro – RJ – Brazil. Master in Education from UFRJ.

<sup>3</sup> Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro – RJ – Brazil. Master's student in Education at UFRJ.

**ABSTRACT:** This research aims to present experiences of inclusion of students with autism in regular school from the development of didactic-pedagogical strategies built by teachers. To this end, a Systematic Literature Review was carried out based on the Portal of Periodicals of the Coordination for the Improvement of Higher Education Personnel (CAPES) where 7 works were selected. The time frame adopted was the last five years (2018 - 2023). In the analysis of the data, made under the Content Analysis method (Bardin, 2022), it was possible to survey 3 themes: teacher education; didactic-pedagogical strategies; and schooling experiences. It is concluded that the learning of students with ASD in the regular education network is empowering, as it stimulates their social and cognitive development. Likewise, teacher training is a fundamental part of this process, as it favors the growth of intentional actions and successful strategies in pedagogical practices.

**KEYWORDS:** Inclusion in Education. Autism. Inclusion experiences. Teacher education.

**RESUMO:** Esta pesquisa objetiva apresentar experiências de inclusão de alunos com autismo na escola regular a partir do desenvolvimento de estratégias didático-pedagógicas construídas por professores. Para tanto, foi realizada uma Revisão Sistemática da Literatura com base no Portal de Periódicos da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), onde 7 trabalhos foram selecionados. O recorte temporal adotado foi o dos últimos cinco anos (2018 – 2023). Na análise dos dados, feita sob a técnica da Análise de Conteúdo (Bardin, 2022), foi possível o levantamento de 3 temáticas: formação docente; estratégias didático-pedagógicas; e experiências de escolarização. Conclui-se que a aprendizagem do aluno com TEA na rede de ensino regular é potencializadora, pois estimula seu desenvolvimento social e cognitivo. De igual forma, a formação docente é parte fundamental nesse processo, pois favorece o crescimento de ações intencionais e estratégias de sucesso em relação às práticas pedagógicas.

**PALAVRAS-CHAVE:** Inclusão em Educação. Autismo. Experiências de inclusão. Formação docente.

**RESUMEN:** Esta investigación tiene como objetivo presentar experiencias de inclusión de alumnos con autismo en la escuela regular a partir del desarrollo de estrategias didáctico-pedagógicas construidas por los docentes. Para ello, se realizó una Revisión Sistemática de Literatura a partir del Portal de Revistas de la Coordinación para el Mejoramiento del Personal de Educación Superior (CAPES) donde se seleccionaron 7 trabajos. El marco temporal adoptado fue el último quinquenio (2018 - 2023). En el análisis de los datos, realizado bajo el método de Análisis de Contenido (Bardin, 2022), fue posible relevar 3 temas: la formación docente; las estrategias didáctico-pedagógicas; y las experiencias de escolarización. Se concluye que el aprendizaje de los alumnos con TEA es potenciador, ya que estimula su desarrollo social y cognitivo. Asimismo, la formación docente es parte fundamental de este proceso, ya que favorece el crecimiento de acciones intencionales y estrategias exitosas.

**PALABRAS CLAVE:** Inclusión en la educación. Autismo. Experiencias de inclusión. Formación del profesorado.

## Introduction

Autism Spectrum Disorder (ASD) comprises a range of variations in its manifestations, its diagnosis is clinical and has been constructed over the years, with the Austrian psychiatrist Leo Kanner as its precursor. Schwartzman and Mello (1994; 2007 apud Luz; Gomes; Lira, 2017) use research in the area to discuss Kanner's study, which sought to identify cognitive delays and behavioral disorders.

Based on the 2013 American Psychiatric Diagnostic and Statistical Manual of Mental Disorders (DSM-5) Association (APA), we have a more comprehensive understanding of the disorder and its characteristics. The definition of ASD has been updated as new studies in the area emerge. In this way, the pieces fit together like a puzzle, which has become a symbol of Autism worldwide and represents its complexity. The APA (2013 apud Olivati; Leite, 2019, p. 730), presents autism as “[...] a neurodevelopmental disorder that encompasses a spectrum characterized by impairments in social interaction and communication, as well as the presence of restricted interests and repetitive behaviors.”

It is important to highlight that the DSM-5 assesses the disorder according to the level of support that the person needs, classifying it from level 1 (for those who need less support and have more autonomy) to level 3 (needs a lot of support and has little or no autonomy). It should be noted that, regardless of the level of support for the person with autism, support is always necessary (APA, 2013).

According to the North American organization *Centers of Disease Control and Prevention* (CDC, 2020), linked to the United States government, there is one case of autism for every 54 individuals. This information was published by the agency in 2020 and refers to data collection carried out in 2016 in 11 American states with children aged 8 years old, with a proportion of 4 boys for every girl. Information collected by the CDC reveals that the prevalence of autism has increased: in 2004 it was 1 case for every 166 individuals; in 2008, 1 for every 125; in 2014, 1 for every 68 and in 2018, 1 case for every 59 individuals. For the agency, these data suggest that the number of early diagnoses has increased. Soon, estimates on autism will also be analyzed in Brazil, when the results of the latest Census by the Brazilian Institute of Geography and Statistics (IBGE) are released, as determined by law 13,861/2019 (Brazil, 2019).

Regarding the guarantee of the right to education, Carneiro and Paula (2021) indicate that the National Policy on Special Education from the Perspective of Inclusive Education was a document that guaranteed access for students with ASD in the regular education network,

even before the condition be officially recognized as a disability. This right became official in 2012 with law no. 12,764, which established the National Policy for the Protection of the Rights of People with ASD, stating for legal purposes that every subject within the spectrum is considered a person with a disability, therefore their registration must be guaranteed in regular education networks (Brazil, 2012).

In this sense, all subjects in a school are involved in the inclusion process and benefit, in principle, as the environment becomes more plural. Through a democratic coexistence space, students have the opportunity to learn about differences, thus reducing the isolation of specific groups and increasing social interactions for everyone, thus “[...] talking about inclusion is thinking about everyone and act for each one [...]” (Santos; Melo, 2019, p. 820). Orth (2023) highlights that to include these students it is necessary to analyze the specificities and characteristics of each one, in order to understand their behavior, customs and preferences.

The behavior of students with ASD becomes a challenge if the difficulty of interaction is confused with the complete nullification of this ability (Silva; Gaiato; Reveles, 2012). From this perspective, schools that are concerned with establishing more inclusive processes are those that recognize diversity as something positive and that adapt to “[...] various styles and rhythms of learning [...] regardless of difficulties or [existing] differences [...]” (Orth, 2023, p. 124).

In this scenario, it is necessary to share information about the disorder and involve everyone in this process so that the environment becomes fully stimulating. For Ribeiro and Cristovão (2018, p. 505, our translation):

[...] it is necessary to create methods to include students with disabilities, however it is important to highlight that this cannot be configured as isolated work with these students. Other students need to be part of this process of including these colleagues in the classroom environment. To this end, it is important that the school plays its role in alerting everyone to the importance of inclusion, but also that the teacher carries out his work in the classroom, preparing activities that can generate learning for everyone.

Teixeira and Ganda (2019) report some difficulties that are common in people with autism, such as auditory hypersensitivity, for example. Given this situation and other challenging factors, it is necessary to seek strategies that help the development of these children and their learning, bearing in mind that students with ASD are capable of learning. Understanding the specificities of each student is crucial for the teacher's response to student behavior, resulting in more assertive actions.

In this scenario, teacher education must prepare teachers so that they are able to work with the issue of diversity, with all the learning differences that exist between students, especially those with ASD (Pinto; Guimarães, 2020).

From this perspective, the didactic-pedagogical strategies that favor the teaching-learning process of students with autism are those that use differentiated methodologies, designed and developed according to the students' abilities, as they can promote the development of learning in a more significant way. It is important to emphasize that, by proposing a new learning resource, the entire group benefits. Thus, planning may arise from the apparent difficulty of just one student, but the pedagogical strategy can be used for everyone (Orth, 2023).

In this way, the process of inclusion in education seeks to reinforce the construction of new ways of teaching, of different relationships with the proposed content, respecting and valuing the diversity that naturally exists in all classes (Orth, 2023).

The studies analyzed in this Systematic Literature Review (RSL) show that all the school's efforts to adopt didactic-pedagogical strategies, with the aim of meeting diverse needs, have achieved positive results such as, for example, greater social and cognitive development of students with autism (Aporta; Lacerda, 2018). It is important to highlight that, in these schooling experiences, all subjects involved benefit from the relationships established in an environment that is for everyone (Orth, 2023).

That said, this RSL aims to answer the following question: What are scientific articles produced in Brazil discussing when it comes to successful inclusion experiences with students with ASD in regular schools?

Therefore, the objective of this research is to present experiences of including students with autism in regular schools based on the development of didactic-pedagogical strategies constructed by teachers.

### **Methodological Path**

RSL is a type of scientific research that is “[...] composed of its own objectives, research problems, methodology, results and conclusion, not constituting just a mere introduction to larger research [...]” (Galvão; Ricarte, 2019, p. 59). To this end, according to the authors, RSL follows specific and rigorous protocols and steps in order to guarantee the transparency and reproducibility of the research so that it can be replicated by other researchers.

In this sense, RSL is capable of mapping the state of development of a given topic through the collection of scientific texts published on the subject. Furthermore, it is a tool that minimizes research bias due to the rigor of the procedures and parameters used. In this process, each author must develop their own methodological model (Faria, 2016). The methodological path adopted in this research consists of the following steps: research equations; inclusion and exclusion criteria; processing of data and results; data analysis; and survey and discussion of themes.

### Research equations

For this research, the Periodical Portal of the Coordination for the Improvement of Higher Education Personnel (CAPES) was used. This choice is justified by the fact that the Portal covers several databases in its collection, as well as presenting different types of materials, such as dissertations, books and articles.

To carry out the searches, four keywords were defined “Inclusion in Education”, “Autism Spectrum Disorder”, “teacher’s experiences” and “experiences of teachers” and two descriptors “Inclusive Education” and “Autism”. The descriptors were obtained through the Brazilian Education *Thesaurus (BRASED)* from the National Institute of Educational Studies and Research Anísio Teixeira (INEP). The use of controlled terms from a thesaurus was intended to optimize information retrieval.

It is worth clarifying that we defend, according to Santos (2013), the term Inclusion in Education <sup>4</sup>as the most appropriate to designate the establishment of more inclusive processes at school. However, in order to obtain a better result in data collection, we also include the term Inclusive Education in our research, as it is the most commonly used term, including in official documents that discuss the subject of Inclusion.

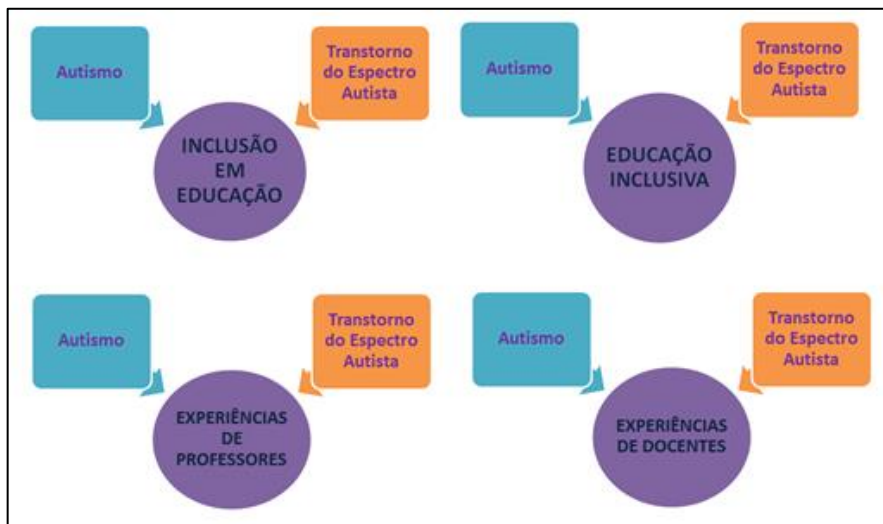
The database was collected on May 12, 2023. The time frame chosen was the last five years (2018-2023). The combinations of keywords and descriptors resulted in 8 arrangements: Inclusion in Education x Autism; Inclusion in Education x Autism Spectrum Disorder; Inclusive Education x Autism; Inclusive Education x Autism Spectrum Disorder; teacher experiences x Autism; teacher experiences x Autism Spectrum Disorder; experiences of teachers x Autism;

---

<sup>4</sup> Santos (2013) argues that inclusion is not a final state but a constant struggle for full social participation, not only for people with disabilities, but for all people in society. Thus, while Inclusion in Education is characterized as a process that opposes exclusions, Inclusive Education, on the contrary, conveys a final state character, ignoring the necessary procedural movements and struggles of the contemporary world.

experiences of teachers x Autism Spectrum Disorder. Figure 1 illustrates the combinations made:

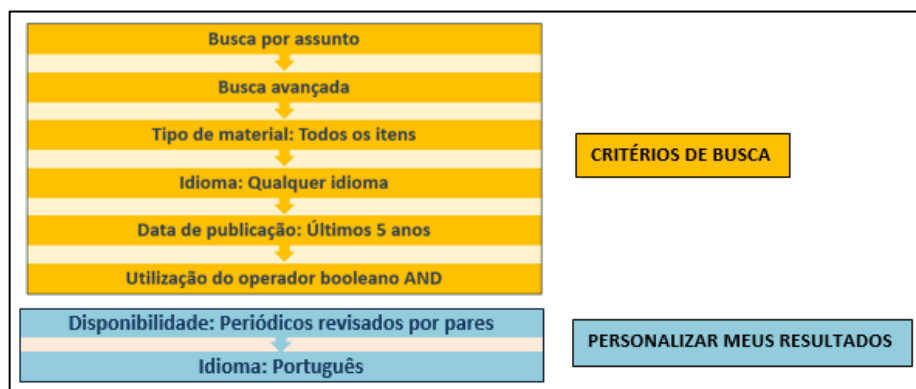
**Figure 1** – Keywords x Descriptors Combinations.



Source: Prepared by the authors (2023).

Figure 2 informs the research actions carried out on the CAPES Portal. First, the “Search Criteria” were chosen from the database and then, after presenting the results through the Portal, options were selected in the “Personalize my results” part:

**Figure 2** – Search strategies on the CAPES Portal.



Source: Prepared by the authors (2023).

## Inclusion and exclusion criteria

The inclusion criteria adopted were works that discuss experiences of including children with autism in regular schools. The exclusion criteria cover duplicate works, outside the time frame (2018-2023), that do not deal with the school environment, that are not from Brazilian Basic Education and that do not deal with inclusion experiences, arising from teaching strategies developed at the school regularly with students with autism.

## Data processing and results

We present, in Table 1, the first results obtained with the combinations of keywords and descriptors, using pre-established search strategies, as well as the application of eligibility criteria in the analysis of articles.

**Table 1** – Initial results.

Keywords x Descriptors Combinations	
Inclusion in education AND autism	147
Inclusion in education AND Autism Spectrum Disorder	167
Inclusive education AND autism	105
Education AND Autism Spectrum Disorder	118
Teachers' Experiences AND Autism	23
Experiences of teachers AND Autism Spectrum Disorder	20
Experiences of teachers AND autism	23
Experiences of teachers AND Autism Spectrum Disorder	11
<b>TOTAL</b>	<b>614</b>

Source: Prepared by the authors (2023).

Meeting one of the inclusion criteria, studies that were not peer-reviewed and in languages other than Portuguese were excluded from the CAPES Portal itself. Table 2 indicates that, of the 614 studies initially selected, 293 works remained, all of which were journal articles.

**Table 2** – Results of peer-reviewed works in Portuguese.

Keywords x Descriptors Combinations	search result	Non-peer reviewed works in other languages	TOTAL
Inclusion in education AND autism	147	73	74
Inclusion in education AND Autism Spectrum Disorder	167	92	75
Inclusive education AND autism	105	59	46
Education AND Autism Spectrum Disorder	118	64	54
Teachers' Experiences AND Autism	23	11	12

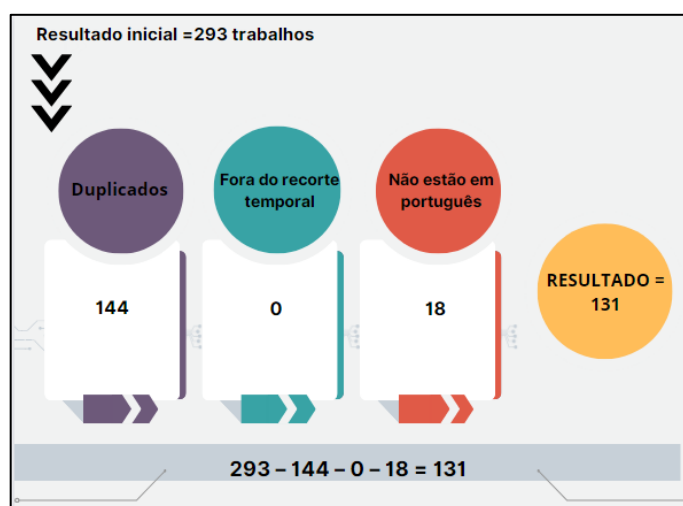


Experiences of teachers AND Autism Spectrum Disorder	20	14	6
Experiences of teachers AND autism	23	5	18
Experiences of teachers AND Autism Spectrum Disorder	11	3	8
<b>TOTAL</b>	<b>614</b>	<b>321</b>	<b>293</b>

Source: Prepared by the authors (2023).

Next, the information regarding articles from the CAPES Journal Portal was exported to the *software* EndNOTE. As indicated in Figure 3, duplicate works and those that did not correspond to the time frame (2018-2023) were then excluded. Again, it was necessary to exclude some studies that were not in Portuguese.

**Figure 3** – Partial results.



Source: Prepared by the authors (2023).

Continuing, the titles, abstracts and full texts of the articles were examined in stages. Those who did not meet the eligibility criteria were eliminated. Table 3 demonstrates the results obtained at each stage of data processing:

**Table 3 – Data processing.**

<b>Initial result = 131 articles selected</b>			
<b>Phases</b>	<b>Excluded</b>	<b>Justification</b>	<b>Selected</b>
<b>Title analysis</b>	24	- 11 articles did not discuss teaching strategies for the inclusion of autistic students. - 4 articles did not refer to regular schools. - 9 articles were not about Basic Education.	131 – 24 = <b>107</b>
<b>Analysis of abstracts</b>	80	- 64 articles did not address teaching strategies for the inclusion of autistic students. - 3 articles were not about regular school. - 5 works did not deal with Basic Education. - 8 articles did not refer to the school environment.	107 – 80 = <b>27</b>
<b>Reading the texts in full</b>	20	- 15 articles did not address teaching strategies for the inclusion of autistic students. - 1 article was not about regular school. - 4 articles were excluded because they were systematic reviews of the literature in which the eligibility criteria differ from this research, such as the time frame.	27 – 20 = <b>7</b>
<b>FINAL RESULT</b>	<b>124 excluded</b>		<b>7 selected works</b>

Source: Prepared by the authors (2023).

In Table 4 we present the selected works that met all the determined criteria. It is worth mentioning that, given the time frame adopted in this research (2018-2023), we highlight that 2 works deal with the theme of inclusion and autism specifically in the context of the pandemic<sup>5</sup>.

**Table 4 – Selected works.**

<b>ARTICLE</b>	<b>YEAR</b>	<b>TITLE</b>	<b>AUTHOR (A/AS)</b>	<b>JOURNAL</b>
<b>1</b>	2023	<b>Special education in times of pandemic: the inclusion of students with Autism Spectrum Disorder through non-face-to-face classes.</b>	Arlete Cherobini Orth	Knowledge Journal Online
				Area: Cultural Diversity and Social Inclusion
				Qualis <sup>6</sup> : B4
Access link: <a href="https://periodicos.feevale.br/seer/index.php/revistaconhecimentoonline/article/view/2713">https://periodicos.feevale.br/seer/index.php/revistaconhecimentoonline/article/view/2713</a>				

<sup>5</sup> The COVID-19 pandemic was classified on January 30, 2020 as a Public Health Emergency of International Importance (ESPII) by the World Health Organization (WHO) and, on March 11, 2020, as a pandemic. The WHO declared the end of ESPII on May 5, 2023 (Opas, 2023).

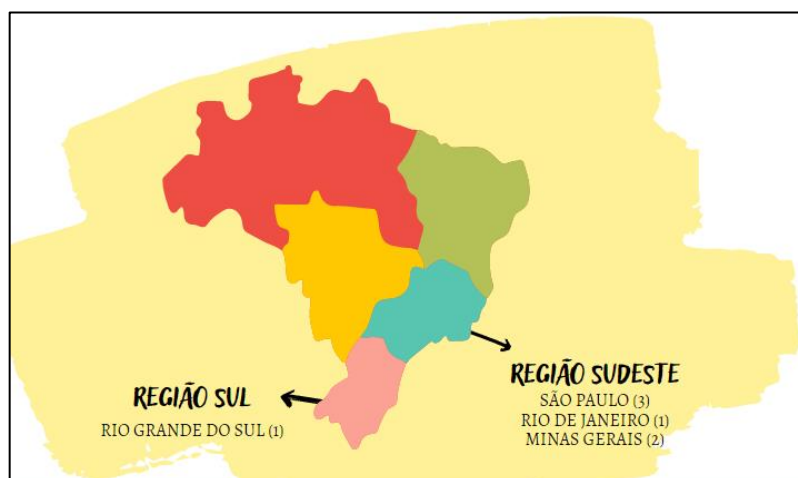
<sup>6</sup>This is the classification of journals carried out by CAPES for the four-year period 2017-2020. Available on the Sucupira Platform:  
<https://sucupira.capes.gov.br/sucupira/public/consultas/coleta/veiculoPublicacaoQualis/listaConsultaGeralPeriodicos.jsf>.

2	2021	<b>Curricular adjustments for students with autism: what is it? How to make?</b>	Henry Arnaldo Junior	Journal Insignare Scientia – RIS
				Area: Science Teaching and its interfaces
				Qualis: A4
Access link: <a href="https://periodicos.uffs.edu.br/index.php/RIS/article/view/12079">https://periodicos.uffs.edu.br/index.php/RIS/article/view/12079</a>				
3	2021	<b>Report of teaching experience in remote teaching during the pandemic with a subject with ASD.</b>	Relma Urel carbon Ram; Carla Paula 's Branches	@ambienteeducação Journal
				Area: Education
				Qualis: A2
Access link: <a href="https://publicacoes.unicid.edu.br/index.php/ambienteeducacao/article/view/1132">https://publicacoes.unicid.edu.br/index.php/ambienteeducacao/article/view/1132</a>				
4	2021	<b>The voices of those involved in the inclusion of autistic learners in Mathematics classes.</b>	Roberta Caetano Fleira; Solange Hassan Ahmad Ali Fernandes	Journal Science & Education
				Area: Human Sciences
				Qualis: A1
Access link: <a href="https://www.scielo.br/j/ciedu/a/YXzg45W8s4Mg3hWxWjzSpSK/?lang=pt#">https://www.scielo.br/j/ciedu/a/YXzg45W8s4Mg3hWxWjzSpSK/?lang=pt#</a>				
5	2020	<b>The process of building a educational material on education perspective inclusive mathematics for a autistic student.</b>	Gisela Maria da Fonseca Pinto; Amália Bichara Guimarães	Bahian Journal of Mathematics Education
				Area: Mathematics Education
				Qualis: B2
Access link: <a href="https://www.revistas.uneb.br/index.php/baeducmatematica/article/view/10317">https://www.revistas.uneb.br/index.php/baeducmatematica/article/view/10317</a>				
6	2019	<b>Inclusion and autism: report of case about working with a child in early childhood education.</b>	Maira Cristina Souza Teixeira; Danielle Ribeiro Ganda	Psychology and Health in debate
				Area: Health and Psychology
				Qualis: B1
Access link: <a href="http://psicodebate.dpgpsifpm.com.br/index.php/periodico/article/view/V5N2A9">http://psicodebate.dpgpsifpm.com.br/index.php/periodico/article/view/V5N2A9</a>				
7	2018	<b>A study on the inclusion of students with Autism Spectrum Disorder in mathematics classes.</b>	Gabriela Gomes Ribeiro; Eliane Matesco Cristovão	Mathematics Education Journal
				Area: Mathematics Education
				Qualis: A3
Access link: <a href="https://www.revistasbemsp.com.br/index.php/REMat-SP/article/view/180">https://www.revistasbemsp.com.br/index.php/REMat-SP/article/view/180</a>				

Source: Prepared by the authors (2023).

Figure 4 shows the regions of origin of the authors of the selected works, predominantly in the southeast region of Brazil. With this, one can infer the scarce scientific production produced on inclusion experiences with students with autism and the urgent need for greater discussion on the topic in all regions of the country.

**Figure 4** – Regions of origin of the authors and their studies.



Source: Prepared by the authors (2023).

The keywords most used in the works were: Autism Spectrum Disorder (3 occurrences); Inclusion (3 occurrences); Autism (2 occurrences); and Teaching Mathematics (2 occurrences).

### Data analysis

Next, in order to analyze the material collected, we present the objectives, methodologies and results of the work. Table 5 summarizes this data:

**Table 5** – Objectives, methodologies, and results.

ARTICLE	GOAL	METHODOLOGY	RESULTS
1	Investigate how schools and Early Childhood Education teachers structure their work to include students with autism in remote classes during the pandemic.	Qualitative and exploratory research. The research subjects were 9 Early Childhood Education teachers from a public school. The questionnaire was used as a data collection technique.	The teachers used technology (virtual tools such as links, videos, class recordings, etc.) taking into account the specificities of each student with autism. During this period, they needed to reinvent themselves and rely even more on family collaboration to develop their activities.
2	Report some Curricular Adjustments made by the author as a Mathematics teacher.	Qualitative research. Report of pedagogical experiences with students with autism in the Specialized Educational Assistance (AEE) resource room in Mathematics classes.	The results point to the fact that the use of visual resources such as images, illustrated books, educational games, among others, lists a list of positive strategies to advance these students' learning.
		Qualitative research. Experience report from a	

3	Report the teaching experience with a student with ASD in a public school in the pandemic context.	teacher who works in the early years of elementary school with a student with autism. The semi-structured interview was used as a data collection technique.	There was an essentially positive experience for the student's inclusion in the remote teaching model. The importance of the family-school relationship is highlighted.
4	Give voice to teachers of students with ASD, understand the meaning they attribute to the term inclusion and analyze their pedagogical practices in Mathematics classes.	Qualitative case study research. Four elementary school teachers from a private school participated. The structured interview was used as a data collection technique. Data analysis was carried out using Discourse Analysis.	The results allowed us to see that the teachers interviewed believe in the potential of their students. They all demonstrated knowledge on the topic of Inclusion and demonstrated a wide repertoire of pedagogical practices, which are used in Mathematics classes with these students.
5	Understand how the experience lived in the context of the Pedagogical Residency can influence the training of graduates for teaching in an inclusive context, specifically with students with ASD.	Qualitative and explanatory research. This is an ex - post-facto research. Report on the experience of residents of the Pedagogical Residency program in Mathematics with a student with ASD in an 8th year elementary school class. The instruments used in data collection were the field diary, records of those who attended classes and group interviews. Data analysis was carried out using Content Analysis.	As a result, it was found that getting to know students with autism and their specificities better in collective work is the best way to include these students and for the initial education of Mathematics teachers.
6	Report experience on the inclusion of a child with ASD in the 1st and 2nd period of Early Childhood Education, as well as present the activities carried out by the support professional and the impact on the development of the child with autism.	Qualitative research. Case report with a student with autism in Early Childhood Education. Bibliographical research on the topic.	The student showed greater socialization, more autonomy and progress in learning. As a result, the work also highlighted the importance of teacher education. This professional must be prepared to, through differentiated pedagogical practices, with creative and playful alternatives, seek alternatives that facilitate the learning of children with ASD
7	Understand the possibilities and limits of including students with ASD in Mathematics classes in regular basic education classrooms.	Qualitative case study research. Field research with a 7th grade class at a public school in which 2 students with ASD studied. The instruments used in data collection were the field diary, video and audio recordings. Bibliographical research on the topic.	The research showed that different strategies, such as the use of concrete materials and games, especially when associated with the skills and interests of students with autism, contribute to the learning process not only of students with ASD, but of all students.

Source: Prepared by the authors (2023).

## **Survey and discussion of themes**

For this study, Content Analysis was used (Bardin, 2022). The technique was developed as follows: after reading the selected works, analysis was carried out to identify the subjects contained and discussed in them. In this way, it was possible to group and categorize the themes into 3 main axes: teacher education; didactic-pedagogical strategies; and schooling experiences.

### **1 - Teacher education**

With regard to teacher education, the studies indicated three important points that will be discussed below: 1) the importance of education that prepares the teacher to act intentionally in the education of students with ASD, 2) knowledge of aspects related to specificities of the learning process and, 3) the issue of teacher anxiety that permeates the education of students with ASD (Arnoldo Junior, 2021; Carneiro; Paula, 2021; Fleira; Fernandes, 2021; Orth, 2023; Pinto; Guimarães, 2020; Ribeiro; Cristovão, 2018; Teixeira; Ganda, 2019).

Although Education is an intentional action, the role of the teacher becomes increasingly important when a student with ASD is involved. The principle of an educational action presupposes one who teaches and another who learns, however, in the case of a student with ASD, this is no longer obvious. It is common for teachers, distressed because they do not consider themselves capable of educating a student with possibilities that are so different from those without any disability, have difficulty understanding the student with ASD as a person who learns (Carneiro; Paula, 2021; Pinto; Guimarães, 2020; Teixeira; Ganda, 2019).

According to Teixeira and Ganda (2019. p. 134), after the work carried out with the student with autism, it was possible to observe his development. The authors highlight that “Through different pedagogical practices, the child has shown greater socialization, more autonomy and progress in their learning”. Likewise, Arnoldo Junior (2021) emphasizes the positive results with the use of visual resources in Mathematics classes. Fleira and Fernandes (2021) also highlight the positive results, but emphasize that teachers need to constantly adapt their practices in order to provide conditions that favor student learning.

The demand of students with ASD challenges the teacher to take more flexible and reflective action, focused on the context of their classroom, without ready-made recipes or defined structure. It puts you in a position to redo your practice, updating it to meet the needs of your students, with and without disabilities (Pinto; Guimarães, 2020).

Another strategy that proved to be successful was the search for activities that made sense for the autistic student. According to Teixeira and Ganda (2019, p. 130), “A careful look

from a teacher can change everything, not only for the inclusion student, but for everyone”. Thus, from the moment the teacher gets to know the student better, he or she can prepare classes with more meaningful content for them.

For Pinto and Guimarães (2020, p. 8), “[...] teacher education is, therefore, a fertile stronghold of hope and action when one intends to change educational systems so that they correspond more effectively to equity and inclusion”. The authors discuss the main themes of teacher education courses focused on inclusion: difference as a fundamental aspect for human development; teaching practice permeated by social justice; and the need to become an active and dynamic professional. In this sense, teacher education must prepare teachers so that they are able to work with the issue of diversity, with all the learning differences that exist between students, especially those with ASD (Pinto; Guimarães, 2020).

This education process, which goes beyond the individual scope of the teacher and reaches the institution as a whole, seeks to prepare not only the teacher, but the entire school/academic community for the characteristics/demands of the student with ASD (Fleira; Fernandes, 2021).

Adequate teacher education builds this more favorable environment for the student, and certainly for the school community, in addition to providing a context for exchanging experiences that expose successful actions as well as difficulties resulting from preconceived ideas of failure (Pinto; Guimarães, 2020). The problematization of these factors contributes to expanding the teacher's repertoire in daily school life and reduces anxiety situations arising from the feeling of isolation and unpreparedness (Fleira; Fernandes, 2021).

Considering the potential of adequate education, regular school presents itself as a favorable context for the education of autistic students as it contributes to their social and cognitive development, in addition to offering more advanced models of behavior that will be used throughout life of this subject (Aporta; Lacerda, 2018). According to Orth (2023, p. 125), “[...] the regular school is a space that can and should guarantee these students an inclusive education”.

Regarding the issue of teacher anxiety that permeates the education of students with ASD, Carneiro and Paula (2021, p. 442, our translation) state that:

[...] the speech 'I don't feel prepared to work with a PAEE [Special Education Target Audience] student is common in the speech of many Basic Education teachers, which reveals a changing school culture and at the same time static time.

Thus, studying the role of teacher education in the teaching-learning of autistic students in regular schools contributes to secure knowledge of the importance of the teacher's intentional action in the success of this process.

## **2 - Didactic-pedagogical strategies observed in the education of students with autism**

Considering teacher education is fundamental for the education of students with ASD, we wonder how these teachers have been carrying out their practice in regular schools. To this end, we will discuss what studies have shown about the didactic-pedagogical strategies used in the education of students with autism.

According to Orth (2023), who focused on analyzing the didactic-pedagogical strategies used by 9 teachers in non-face-to-face classes that took place during the coronavirus pandemic, the teachers revealed that they used technology, which was the main tool used at the time, to work with videos, audios, games, photos, music, among others, with the purpose of creating more playful classes and using objects that were part of the student's routine. The teachers highlighted the importance of the family-school partnership and stated that it is essential to know the student and their needs. The teachers did not specify the level of support for their students with autism.

Arnoldo Junior's (2021) experience report indicates the use of visual resources as a positive alternative for working with students with autism in the Mathematics discipline, since a common characteristic in autism is high visual acuity. Thinking in this way, the use of figures, photos, images, drawings, graphics, games, etc. was used. The author also emphasizes the importance of knowing the student, their behavioral and social patterns to align the teaching strategy more assertively, as well as stating that the improvements and adaptations made benefit not only students with autism, but all students. The study presents five students with ASD: two students with support level 1, two students with support level 2 and one student with support level 3.

Carneiro and Paula (2021) describe their experience report, in the context of the pandemic, with a student with ASD, with a level of support not specified in the study, enrolled in the initial years of Elementary School. For the authors, the result was positive, despite highlighting that remote teaching is not the most appropriate model and should not be romanticized, especially due to the great inequalities that exist in our country, but they recognize that it is an interesting movement to discuss new practices and alternatives. According to the teacher interviewed in the study, the student responded well to the virtual interaction. This



student's activities, according to the teacher, were designed and created with elements that were within the student's field of interest. The authors reinforce the importance of a good family-school relationship for the success of this process.

The study by Fleira and Fernandes (2021) indicates that mathematics teachers, who participated in the research, carried out their activities with materials adapted to meet students' preferences. The level of support from students was not mentioned in the study. The multisensory teaching approach, explored through body sensations such as smell, vision, touch, touch and movement, was approached by the teachers as an alternative for more meaningful learning. For them, colorful resources such as images, videos or concrete objects, which they can handle, are very interesting. Thus, the teaching of mathematics leaves the abstract plane and goes to the concrete, allowing visualization and understanding from a new perspective.

Pinto and Guimarães (2020) share their experience with an autistic student, with an unspecified level of support, in the Pedagogical Residency Program in Mathematics. The authors highlight the need to adapt the curriculum and activities in order to promote student development. They say that the student with autism became interested in the content of the class – measurements and angles – after the teacher used the hands of a clock that had the emblem of the football team that the student liked. Therefore, for content adaptation to be effective, many resources are not always necessary; the most important thing is paying close attention to the students' needs. Adaptations as a teaching strategy do not nullify the acquisition of new knowledge, but they value the student's knowledge on the issue, respecting the discovery of new concepts at opportune moments.

Teixeira and Ganda (2019) describe the inclusion of a child with autism, level 1 of support, in Early Childhood Education. According to the authors, the child began to develop more effectively after the intervention of the support teacher, through different pedagogical practices. The article discusses the importance of the relationship with the student's family, seeking more information about autism and knowing the student's specificities and their particular preferences. Some sensory activities may be pleasant for the student, however, others, such as touching sand, play dough and other materials of different textures, may bother them. Working with play and concrete objects can spark interest and develop learning.

The study by Ribeiro and Cristovão (2018), who also propose to analyze the inclusion of students with autism in Mathematics classes, reaffirms that differentiated strategies, such as the use of concrete materials and games, for example, designed and developed in accordance with students' skills can enable the development of learning more effectively. The level of

support provided by the two students with ASD who participated in the study was not mentioned.

Thus, in general, research indicated that there are didactic-pedagogical strategies that favor the teaching-learning process, especially in the regular context. They also pointed out that students with ASD learn better with visual and concrete resources, through pedagogical interventions personalized to each case and didactics, receiving clear instructions through short and direct sentences, repeated as many times as necessary. Visual resources can be more elaborate with the help of technology, but they can also be simple actions such as highlighting or changing key words in a lesson, helping to maintain focus on what the exercise requires. You can also attach sheets with more direct and clear instructions to a booklet, so that the student can perform the same tasks as in the class, but with instructions that facilitate understanding and the objective of the activities.

It is important to emphasize that, when proposing a new learning resource, the entire group benefits. Therefore, planning may arise from the apparent difficulty of just one student, but the pedagogical strategy can be used for everyone. The process of inclusion in education seeks to reinforce the construction of new ways of teaching, of different relationships with the proposed content, respecting and valuing the diversity that naturally exists in all classes (Orth, 2023).

### **3 - Schooling experiences of students with ASD**

The schooling of students with ASD involves their experiences in the school context, be it socialization, ambiance, learning (Fleira; Fernandes, 2021). In this sense, as the study by Ribeiro and Cristovão (2018) highlights, it is important to consider that the performance of these students will be influenced by the level of involvement of the disorder, as well as by the didactic-pedagogical and affective interventions carried out.

In such a context, differences can be considered opportunities to enrich interactions between the school community, to focus on heterogeneity as a factor that enhances diverse and stimulating pedagogical actions for the class as a whole (Santiago; Santos; Melo, 2017). However, this article aims to discuss the specific group of people with ASD and their schooling experiences.

Santos and Melo (2019, p. 820, our translation) highlight the difference between inclusion and accessibility and emphasize the conception of a more individualized practice.

[...] talking about inclusion means thinking about everyone and acting for each one, while, in addition, talking about accessibility means thinking about each person with the intention of acting for everyone. Both imply, ultimately, the effort to develop cultures, policies and practices of social justice, precisely because thinking is to promote justice for a collective, but the doing that guarantees this is non-standardized.

Successful schooling experiences presuppose an institutional movement of the school towards more inclusive cultures, policies and practices. In this sense, it is important to know what the school community believes about the presence of students with ASD in the regular context, which policies are implemented and which can be planned in order to favor their development, which practices are implemented in daily interaction with this student (Santos; Melo, 2019). Regarding the issue of school culture, Carneiro and Paula (2021, p. 441, our translation) state that:

[...] school culture is still stuck in a very limited discourse about the education of students who are the target audience for Special Education. We have been discussing and problematizing Inclusive Education for years, however it is clear that there is still a lack of knowledge about the inclusion process, seen as a 'difficult and worrying' task.

It is worth noting that the school's efforts have achieved positive results, with promising schooling experiences. Thus, the fact that the school community is diverse, in itself, already encourages coexistence and respect for different ways of being, in which all the subjects involved benefit from the relationships established in an environment that is for everyone (Arnoldo Junior, 2021; Carneiro; Paula, 2021; Fleira; Fernandes, 2021; Orth, 2023; Pinto; Guimarães, 2020; Ribeiro; Cristovão, 2018; Teixeira; Ganda, 2019).

## **Final remarks**

We reinforce the importance of inclusion in education for all and, in this study, we talk specifically about aspects related to the schooling of students with ASD, as well as the experiences reported in the literature. Studies indicate that learning for students with ASD in the regular education network is empowering, as it stimulates social and cognitive development and also offers more advanced behavioral models. This study brought together some strategies that are important for the process of inclusion in education to be better built in institutions.

As a result of this research, we highlight that students with ASD are capable of learning; teacher education cannot be neglected; there are didactic-pedagogical strategies that favor the teaching-learning process, especially in the regular context; and successful schooling experiences presuppose an institutional movement of the school towards more inclusive cultures, policies, and practices.

Teacher education is a fundamental part, as it favors the growth of intentional actions and successful strategies in relation to pedagogical practices. At the same time, adequate training for educators contributes to the structuring of a community that exchanges information and experiences about teaching practice.

The didactic-pedagogical strategies gathered here indicated that visual resources and concrete materials were the most used in the activities, in addition to the use of more direct language, emphasis on key words in the activities and other more focused interventions.

However, although the selected works present successful learning experiences, it is necessary to highlight the limitations of this research, given the scarce scientific production on the subject. The fact that the majority of studies are experience/case reports (4), referring to the subject of mathematics (4), carried out in the context of the pandemic (2), coming from authors from the south and southeast regions of the country, indicates the need for more research on the topic, covering other experiences with students with autism, with other Basic Education subjects and from all Brazilian regions.

We also highlight that some works did not mention the level of support for students with ASD who were part of their studies. Such information is essential for planning didactic-pedagogical interventions, since these actions are linked to the level of autism involvement.

To conclude, we emphasize that the school is a democratic space that must be open to all students and their differences and, although the school inclusion of students with ASD is a challenge, it is possible with assertive didactic-pedagogical strategies.

## REFERENCES

- AMERICAN PSYCHIATRIC ASSOCIATION – APA. **Manual Diagnóstico e Estatístico de Transtornos Mentais - DSM-5-TR**. Porto Alegre: Artmed, 2013.
- APORTA, A. P.; LACERDA, C. B. F. Estudo de caso sobre atividades desenvolvidas para um aluno com autismo no Ensino Fundamental I. **Revista Brasileira de Educação Especial**, Marília, SP, v. 24, n. 1, p. 45-58, 2018. Available in: <https://www.scielo.br/j/rbee/a/D7Fwj7yXGJvCPJkwPkYGWRz/?format=pdf&lang=pt>. Access: 17 May 2023.
- ARNOLDO JUNIOR, H. Adequações curriculares para alunos com autismo: o que é? Como fazer?. **Revista Insignare Scientia - RIS**, v. 4, n. 2, p. 122-134, 2021. Available in: <https://periodicos.uffs.edu.br/index.php/RIS/article/view/12079>. Access: 17 May 2023.
- BARDIN, L. **Análise do Conteúdo**. Tradução: Luís Antero Reto e Augusto Pinheiro. Lisboa: Edições 70, 2022.
- BRASIL. **Lei nº 12.764, de 27 de dezembro de 2012**. Institui a Política Nacional de Proteção dos Direitos da Pessoa com Transtorno do Espectro Autista. Brasília, DF: Presidência da República, 27 dez. 2012. Available in: [http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2012/lei/112764.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/112764.htm). Access: 07 Jan. 2023.
- BRASIL. **Lei nº 13.861, de 18 de julho de 2019**. Altera a lei nº 7.853, de 24 de outubro de 1989, para incluir as especificidades inerentes ao transtorno do espectro autista nos censos demográficos. Brasília, DF: Presidência da República, 18 July 2019. Available in: [https://www.planalto.gov.br/ccivil\\_03/\\_ato2019-2022/2019/lei/113861.htm](https://www.planalto.gov.br/ccivil_03/_ato2019-2022/2019/lei/113861.htm). Access: 07 Jan. 2023.
- CARNEIRO, R. U. C.; PAULA, C. R. Relato de experiência docente na atuação no ensino remoto durante a pandemia com um sujeito com TEA. **Revista @ambienteeducação**, São Paulo, v. 14, n. 2, p. 432–445, 2021. Available in: <https://publicacoes.unicid.edu.br/index.php/ambienteeducacao/article/view/1132>. Access: 17 May 2023.
- CDC. **Prevalência do Transtorno do Espectro do Autismo entre crianças de 8 anos - Rede de Monitoramento de Autismo e Deficiências de Desenvolvimento**, Estados Unidos, 2016. Centers for Disease Control and Prevention (CDC), EUA, 27 mar. 2020. Available in: [https://www.cdc.gov/mmwr/volumes/69/ss/ss6904a1.htm?s\\_cid=ss6904a1\\_w](https://www.cdc.gov/mmwr/volumes/69/ss/ss6904a1.htm?s_cid=ss6904a1_w). Access: 17 Jan. 2023.
- FARIA, P. M. M. **Revisão Sistemática da Literatura**: contributo para um novo paradigma investigativo. Santo Tirso, Portugal: Whitebooks, 2016.
- FLEIRA, R. C.; FERNANDES, S. H. A. A. As vozes daqueles envolvidos na inclusão de aprendizes autistas nas aulas de Matemática. **Ciência & Educação**, [S. l.], v. 27, p. 1-13, 2021. Available in: <https://www.scielo.br/j/ciedu/a/YXzg45W8s4Mg3hWxWjzSpSK/?lang=pt#>. Access: 17 May 2023.

GALVÃO, M. C. B.; RICARTE, I. L. M. Revisão sistemática da Literatura: conceituação, produção e publicação. **Revista LOGEION Filosofia da Informação**, Rio de Janeiro, v. 6, n. 1, p. 57-73, 2019. Available in: <https://sites.usp.br/dms/wp-content/uploads/sites/575/2019/12/Revis%C3%A3o-Sistem%C3%A1tica-de-Literatura.pdf>. Access: 10 May 2023.

LUZ, M. H. S.; GOMES, C. A.; LIRA, A. Narrativas sobre a inclusão de uma criança autista: desafios à prática docente. **Educación**, [S. l.], v. 26, n. 50, p. 123-142, mar. 2017. Available in: [http://www.scielo.org.pe/scielo.php?script=sci\\_arttext&pid=S1019-94032017000100007](http://www.scielo.org.pe/scielo.php?script=sci_arttext&pid=S1019-94032017000100007). Access: 03 July 2023.

OLIVATI, A. G.; LEITE, L. P. Experiências acadêmicas de estudantes universitários com Transtornos do Espectro Autista: uma Análise Interpretativa dos Relatos. **Revista Brasileira de Educação Especial**, Bauru, SP, v. 25, n. 4, p. 729-746, 2019. Available in: <https://www.scielo.br/j/rbee/a/N3sgZJb7wNHpVHv7LYkGvwL/abstract/?lang=pt#>. Access: 05 June 2023.

OPAS (Organização Pan-Americana da Saúde). **OMS declara fim da Emergência de Saúde Pública de Importância Internacional referente à COVID-19**. 5 May 2023. Available in: <https://www.paho.org/pt/noticias/5-5-2023-oms-declara-fim-da-emergencia-saude-publica-importancia-internacional-referente>. Access: 03 July 2023.

ORTH, A. C. Educação especial em tempos de pandemia: a inclusão de alunos com transtorno do espectro autista através das aulas não presenciais. **Revista Conhecimento Online**, [S. l.], v. 1, p. 119–135, 2023. Available in: <https://periodicos.feevale.br/seer/index.php/revistaconhecimentoonline/article/view/2713>. Access: 17 May 2023.

PINTO, G. M. F.; GUIMARÃES, A. B. O processo de construção de um material educacional na perspectiva da educação matemática inclusiva para um aluno autista. **Revista Baiana de Educação Matemática**, [S. l.], v. 1, p. 1-23, 2020. Available in: <https://www.revistas.uneb.br/index.php/baeducmatematica/article/view/10317>. Access: 17 May 2023.

RIBEIRO, G. G.; CRISTOVÃO, E. M. Um estudo sobre a inclusão de alunos com Transtorno do Espectro Autista na aula de matemática. **Revista de Educação Matemática**, [S. l.], v. 15, n. 20, p. 503–522, 2018. Available in: <https://www.revistasbemsp.com.br/index.php/REMat-SP/article/view/180>. Access: 17 May 2023.

SANTIAGO, M. C.; SANTOS, M. P.; MELO, S. C. Inclusão em educação: processos de avaliação em questão. **Ensaio: Avaliação e Políticas Públicas em Educação**, v. 25, n. 96, p. 632-651, 2017. Available in: <https://www.scielo.br/j/ensaio/a/3bwwy6JgWW4Cpb7NvCpvrS/?lang=pt#>. Access: 05 June 2023.

SANTOS, M. P. **Dialogando sobre inclusão em educação**: contando casos (e descasos). 1. ed. Curitiba: CRV, 2013.

SANTOS, M. P.; MELO, S. C. Interseções na gestão da acessibilidade na educação básica e no ensino superior: um ensaio omnilético. **RPGE – Revista online de Política e Gestão Educacional**, Araraquara, SP, v. 23, n. 1, p. 818-835, out. 2019. Available in: <https://periodicos.fclar.unesp.br/rpge/article/view/13008/8635>. Access: 3 July 2023.

SILVA, A. B. B. S.; GAIATO, M. B.; REVELES, L. T. **Mundo singular**: entenda o autismo. Rio de Janeiro: Editora Fontanar, 2012.

TEIXEIRA, M. C. S.; GANDA, D. R. Inclusão e autismo: relato de caso sobre o trabalho com uma criança na educação infantil. **Psicologia e Saúde em debate**, [S. l.], v. 5, n. 2, p. 125–135, 2019. Available in: <http://psicodebate.dpgpsifpm.com.br/index.php/periodico/article/view/V5N2A9>. Access: 17 May 2023.

### ***CRedit Author Statement***

---

**Acknowledgments:** To CAPES and FAPERJ for maintaining the scholarship for master's student Adriana Teixeira Ferreira.

**Funding:** This work received support from the PROEX/CAPES Program.

**Conflicts of interest:** There are no conflicts of interest.

**Ethical approval:** The work respects ethical procedures.

**Availability of data and material:** The data used to prepare the work can be found in the text itself.

**Author contributions:** All authors contributed equally.

---

**Processing and editing: Editora Ibero-Americana de Educação.**  
Review, formatting, standardization, and translation.

