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The senses of place and living space in the use of the Picture Exchange Communication System (PECS) in students with Autism, and the teaching of geography

Abstract

This research arose from the need to know the sensory characteristics of the person with autism spectrum disorder (ASD) and alternative forms of communication between the education professional and the student with autism, in order to contribute to school inclusion and the teaching-learning process of geography. The objective is to analyze the atypical characteristics of students with ASD, identifying possible stimuli for the development of their skills and producing didactic-pedagogical material that contributes to the teaching-learning process for the geography teacher and their student with autism. To this end, the methodological procedures used were bibliographic research and documentary research as a data collection technique and content analysis as well as the data analysis technique. Among the results achieved, knowledge about the autism spectrum and strategies for the inclusion and well-being of students with autism in the school environment were expanded; elaboration of models of a routine framework for orientation and communication of students with autism and of a Picture Exchange Communication System (PECS) adapted for teaching about place and living space, content of the 6th year of elementary school, as a proposal for a didactic-pedagogical resource for the teacher to use when teaching geographic science classes. The present work raises awareness about the importance of individuals living with differences in society, developing care, respect, and empathy for others.

Keywords: autism spectrum disorder, student with autism, school inclusion, geography teaching

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Introduction

The importance of geographical knowledge is due to its reflexive character, in the analysis and interpretation of the environment in which one lives. Geography interprets reality through the relationships that occur between society and nature, using its key concepts: space, landscape, territory, region, and place. The process of reflection on the reality of geographic space is considered essential and the importance of geographic education in people's lives is emphasized, as it refers to the understanding of the political, environmental, and socioeconomic dimensions of the world.[1]

Geography as a school subject

The *Base Nacional Comum Curricular* (BNCC – National Commom Curriculum Base) mentions that in the period of Elementary School II (initial years) children are in a phase of important changes (biological, psychological, social, and emotional) in their development process that reverberates in their relationships with themselves, with others and with the world. Expanding their interactions with space and their experiences for the development of orality and the processes of perception, comprehension, and representation. The articulation with the experiences lived in early childhood education and the valorization of playful learning situations is necessary for a progressive systematization of these experiences and active construction of knowledge.[2]

Within the geographical science, the BNCC proposes as an object of study and skill of the 6th year of elementary school, among others, the study of sociocultural identity, the recognition of places of living, the different and unequal uses of space. Domains that provide the basis for the construction of new knowledge, in the series itself and in subsequent ones. In other words, it is essential that the geography teacher contributes to the autonomy of the perception of the environment in which they live in their students, both in the classroom and outside of it.[2]

According to the BNCC, the teaching of Human Sciences favors students' understanding of social times and nature, as well as their relations with space. It cultivates the formation of intellectually autonomous students, capable of articulating categories of historical and geographical thought in the face of their own time, perceiving and reflecting on human experiences, based on the diversity of points of view:

> The Human Sciences should, therefore, stimulate an ethical education, a fundamental element for the formation of new generations, helping students to build a sense of responsibility to value: human rights; respect for the environment and for the community itself; the strengthening of social values, such as solidarity, participation and protagonism aimed at the common good; and, above all, the concern with social inequalities.[2]

Geographical science is understood as an opportunity to understand the world in which one lives, while it contributes to the formation of the concept of identity, through the relationship with the other and with the places lived, valuing their individuality, customs, and social memories.

In a geographical analysis, the meanings of spaces perceived, conceived, and lived, allows the recognition of objects, phenomena and places distributed in the territory and to understand their different arrangements in the geographical space, stimulating students to develop a better understanding of the world, as well as the recognition of the SELF and the feeling of belonging to the life of the family

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and the community. in a world in constant movement of objects and populations, all of which require constant communication. This teaching favors the autonomous development of each individual, making them able to intervene more responsibly in the world in which they live:

> Children's experiences in their family, social and cultural context, their memories, their belonging to a group and their interaction with the most diverse information and communication technologies are sources that stimulate their curiosity and the formulation of questions. The stimulation of creative, logical, and critical thinking, through the construction and strengthening of the ability to ask questions and evaluate answers, to argue, to interact with various cultural productions, to make use of information and communication technologies, enables students to expand their understanding of themselves, of the natural and social world, of the relationships of human beings among themselves and with nature.[2]

For Deon and Callai,[3] geography is des

cribed as the science that contributes to the development of students for their performance in society as citizens by offering learning conditions through concepts and categories of thought.

Callai[4] considers that reading the world is fundamental for everyone to be able to exercise their citizenship, since they live in society. According to the author, one way to read the world is through the reading of space, that is, the environment in which one lives, which carries in itself all the marks of men's lives and discusses the importance of learning geography in the early grades of elementary school from the reading of the world, life and living space:

> Reading the world goes far beyond cartographic reading, whose representations reflect territorial realities. To read the world is to read life, and that expresses both our utopias and the limits that are placed on us, whether in the realm of nature or in the realm of society (cultural, political, economic).[4]

In fact, geography is present in everyone's daily life, both in the living space (places) and in the geographic space (which changes over time), and it is important to understand these processes of transformations for the acquisition of knowledge by the student.

Studying geography is an opportunity to understand the world in which one lives and contributes, among other things, to the formation of the concept of identity, to the observation of the experience of individuals and the collectivity, as well as to the relationships with the places lived and in the awareness that we are subjects of history, distinct from each other.[2]

Geography should be worked with students with autism spectrum disorder in a concrete and real way, because the person with autism has a very compromised or even non-existent capacity for abstraction, which hinders their imagination and, consequently, their learning. It is important to adapt the materials with the minimum information necessary to approach the theme, always with the use of visual resources and that, preferably, are significant for the daily activities of this student.[5]

In their research, Araujo[5] identified the teaching methodology used with students with ASD in a special education institution, being the TEACCH method (addressed in section 5) and analyzed the aspects and themes of geography present in the teaching-learning process. Geography is instituted in the annual planning and established in the weekly routine of the students, the geographical aspects are limited and incorporated into the daily life of the students, to what is concrete, real, and meaningful to them. The work with notions of space, location and identification of places stands out.

To ensure the best learning and development conditions for students with autism, it is important to adopt individualized teaching plans as a working method, which allow everyone to work in a unique way. In addition, it is noticeable that the dedication and professional sensitivity in the relationship with the student with autism, a firm and directing posture, the light tone of voice with direct and clear commands, contribute to the safety and well-being in the development of this student.[5]

PECS as a possibility for the geography teacher to teach the student with autism

In addition to teaching, it is the teacher's job to create the conditions for the student to learn. Therefore, with public training policies for education professionals inserted in the curriculum of educational institutions, teachers will have the opportunity to learn how to teach their students with autism. "Learning to teach so that autistic people are taught to learn".[6]

Students with autism spectrum disorder (ASD) want to learn, develop the ability to understand and be creative, but often do not know how to do it because they already deal daily with the adversities of the spectrum, such as the (mis)control of their feelings and reactions, disapproval, isolation, even though they belong to the environment in which they are inserted:

Teaching people with any of the disorders that encompass the autism spectrum requires attention and preparation from those who perform it, in addition to important characteristics, such as involvement, patience, creativity and dynamism, which equally applies to teaching any individual.[7]

The use of PECS in the regular school classroom points to a significant improvement in pedagogical practices, as visual resources favor the understanding of many students with autism, in addition to communicative initiatives with teachers and classmates, which brings benefits to the entire school community.[8]

Therefore, the PECS was considered as a didactic resource capable of helping students with autism learn about place and living space in geographic science. As a scientific education professional who develops a teaching work based on the diversity of pedagogical resources, contributes to the teaching and learning process between teacher and student, because having different teaching methodologies and pedagogical materials, there are chances to cover a greater number of students for a more interesting and concrete learning.

In relation to students with ASD, the PECS favors learning and becomes more of a support material, forming the range of possibilities to be developed by the teacher in the classroom, expanding the possibilities of the student's protagonism and autonomy.

Therefore, we thought of the application of a PECS model adapted with the content of the 6th year of elementary school, whose theme is "Place" for the work developed by the geography teacher with their student with ASD. For the elaboration of it, it is necessary to use the following materials: sheets of *black color set* paper; scissors; glue; sheets printed with the graphic symbols referring to the elements of the content in question (which can be searched, edited, and removed from the *ARASAAC* website).

The first step was the choice of pictograms related to the content "Place" worked in the geography class, the insertion of titles or edited subtitles on the ARASAAC website or the teacher also has the option

of downloading the desired pictograms and editing them in *Word*, thus facilitating the identification of the pictograms (Figure 1).



Figure 1 Routine frame template.

Source: Author's production, 2022

The second step was to print and cut out the pictograms, leaving them ready for your use during class. Figure 2 shows a model of the representation of some places, it can be noted that there are options for the representation of "my house", "my room", "bathroom", "school", "library", "market", "cafeteria", "church", "street", among others, places that are part of the daily life of every human being, who creates affective bonds and feels belonging to such reality. For leisure places, it brings the representation of "party", "beach", "park", "swimming pool", "toy library". The pictograms related to "hospital", "wake", "cemetery", were designed to represent places where the person does not feel well, which are usually the indications of the students during classes, and because they have been more common in the lives of many individuals during the period of the COVID-19 pandemic.

The representation of the materialization of the place contributes to the process of identifying the belonging of the student with autism, becoming a method for the geography teacher to verify the reality experienced by their student, because, as already seen in this work, historically the person with autism is excluded in many environments of society, which are not prepared to receive him.

It is important that the teacher offers several representations of places, considering that each individual interprets the environment in which he lives in their own way, has their favorite places, the most frequented, the most desired, there are also places that he does not like or do not feel good, but that are part of their living space, so it becomes relevant that the student understands that the environment in which he lives contributes to the formation of their identity and citizenship.

The third step in the production of this adapted PECS was the elaboration of the alternative communication boards, with the use of materials: black *color-set* paper, scissors, glue, and printed sentences (but which can also be written by hand). On the boards, it will be possible to identify what is "place" and what is "living space" with the use of pictograms.

Figure 3 and Figure 4 shows a model of a communication board, which can be filled in by the geography teacher with the pictograms in Figure 2, when teaching the student with autism about the meaning of "place" and "living space".



Figure 2 Pictograms related to places.

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.



Figure 3 Communication board model.

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.

Figure 3 is a model of an alternative communication board to be used by the teacher in geography class to explain and represent the concepts of "place" and "living space" to the student with autism. It is important to note that each student must have his/her own alternative communication board, which can be stored in an alternative

Citation: Nora GGD, Barbosa SPS. The senses of place and living space in the use of the Picture Exchange Communication System (PECS) in students with Autism, and the teaching of geography. *MOJ Eco Environ Sci.* 2026;11(5):169–175. DOI: 10.15406/mojes.2026.11.00399

communication folder, along with other content activities. This folder is unique, personal, and non-transferable.

Figure 4 represents the complete activity, demonstrating the meaning of "place" and "living space" for the student's better understanding. It is interesting that the teacher represents the living space with the places in which the student with autism indicates that it is part of their daily life, thus emphasizing their identification with the environment in which he lives.

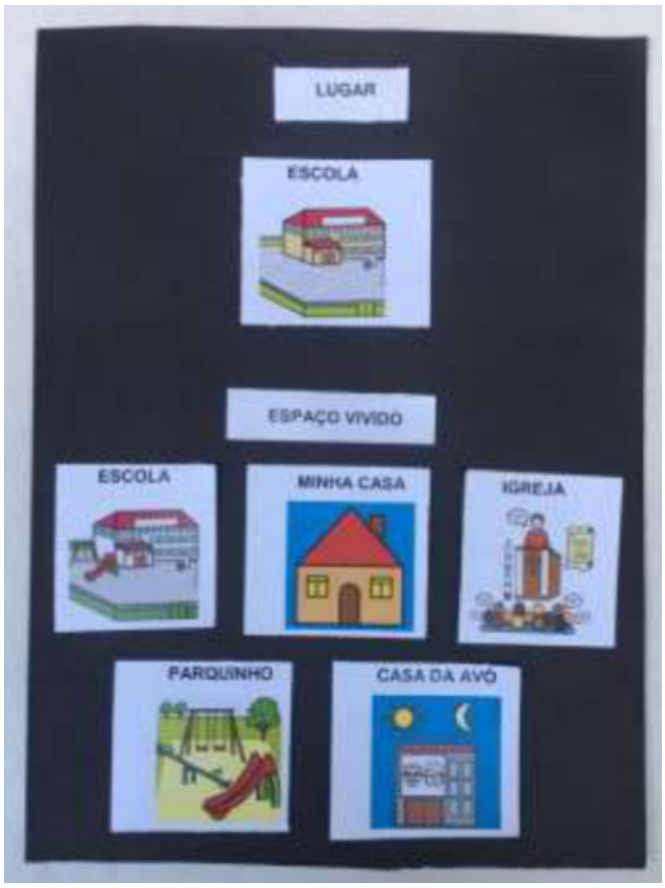


Figure 4 Activity: place and living space.

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.

Figure 5 and Figure 6 shows an example of an activity about the places that the student likes the most, the least and the place that does not feel good. The pictograms used in this communication board with the facial expressions that represent the feelings of happiness, sadness, anguish, refer them to the places where they live.

In Figure 5, the phrases "a place you like the most", "a place you like the least" and "a place you don't feel good about" are phrases from activities directed in the classroom, in dialogue with neurotypical students. Commenting and explaining about the places of experience, most of the time, becomes subjective because neurotypical students are able to refer speech or writing about a certain place to their sense of belonging, but for students with autism it is difficult to search the imagination and express the representation of their living space.



Figure 5 Communication board: places (model 1).

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.



Figure 6 Activity: places (model 1).

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.

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However, proposing the communication board with the phrases and pictograms symbolizing the feelings, facilitates their understanding and learning.

Figure 6 represents the complete activity of the student with autism, according to his/her experience and affectivity with these places. The pictograms chosen by the author are based on studies on the behaviors of people with autism. Therefore, it is an activity that, in addition to contributing to the teaching process, helps the geography teacher to get to know this student with ASD better.

Figure 7 and Figure 8 shows a second model of activity to be used in this geography class. The pictograms used represent the feelings of anger, sadness, and joy, with the phrases "Which place do you like the least?", "Which place do you not feel good?" and "What is your favorite place?" respectively.

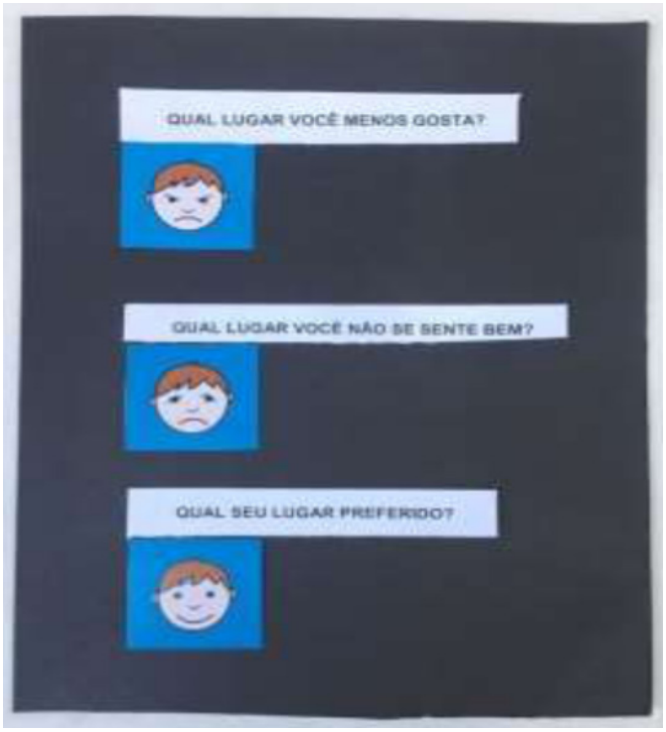


Figure 7 Communication board: places (model 2).

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.

Figure 7 represents an activity in which students with autism can relate their living space with their feelings (anger, sadness, joy), indicating the places they least like, where they do not feel well and their favorite place, which provides feelings of security, satisfaction, and tranquility. Returning to the terms "topophilia" which refers to the affective link between the person and the place, and "topophobia" attributed to the fear or repulsion of being in a certain place, the development of this activity in the classroom, using the PECS, will provide the geography teacher with the identification of the emotions of their student with autism, because the understanding that mental states result in changes in the organism, what drives the behavior will enable the teacher to help increase the ability to adapt to the environment of the student with autism.

Figure 8 represents the complete activity, hypothetically answered by the student with autism. The development of this activity in the classroom will allow the geography teacher to know the reality of the daily life of their student with autism, or to help them in the identification of their favorite places and the places in which he does not feel well, in addition to contributing to the fixation of the knowledge of geographic science debated and acquired in the classroom.



Figure 8 Activity: places (model 2).

Source: Framed by the author, based on ARASAAC (http://www.arasaac.org/), 2022.

The skill of the BNCC developed in the theme of this class of the 6th grade of elementary school on Place and Living space is described in Table 1, as well as the descriptions of the object of knowledge, of the thematic unit with the relationship of the use of the adapted PECS, which establish a contribution to the learning of the student with autism about the recognition of the places of experience and the different uses of space. Each BNCC skill is identified by an alphanumeric code, as shown in Table 1 for code EF06GE01.

The first pair of letters (EF) indicates the stage of Elementary School, the first pair of numbers (06) corresponds to the year to which the skill refers. The second pair of letters (GE) indicates the curricular component, in this case, the discipline of geography. The last pair of numbers (01) refers to the skill's position in the sequential numbering of the year.

Within the BNCC, knowledge objects are understood as contents, concepts, and processes, organized into thematic units. The thematic unit "the subject and their place in the world" presented in Table 1 is one of the five thematic units of the geography component, in which the notions of belonging and identity are focused.

Table 1 BNCC ability and the use of PECS

Skill	Knowledge unit	Thematic unit	PECS adapted with lived place & space theme
EF06GE01 – Compare modifications of the landscapes in the places of experience and the uses of these places in different times.	Socio-cultural identity	The subject and its place in the world	It's a strategy that enables the development of the skill proposed by the BNCC in students with autism, respecting their learning time.

Source: Framed by the author based on the BNCC.[2]

In the BNCC there is no specification for an approach to the development of students with autism spectrum disorder (ASD), which conditions education professionals to create methodological proposals that also serve students with autism, as well as the skills contemplate neurotypical students.

The use of PECS expands the possibilities of receptive and expressive communication in various contexts, allowing students with autism to acquire good communication skills, to express their own feelings, to comment on situations, to answer questions, being, therefore, a communication channel that complements the verbal.[9]

Kwant[10] teaches that, initially, the autistic person is a human being, and that every human being wants the same: to be happy and accepted. Every person who feels good is willing to participate and learn, and every autistic person can learn, develop, and reach the maximum of their ability. However, the teacher is the most important mediator in this process within the school environment, which is part of the living space of the student with ASD. School can become a place where this atypical student feels good, happy, accepted, and included.

Mizael and Aiello[11] reviewed foreign and Brazilian articles on the use of PECS and PECS-adapted, concluded that both are efficient in teaching communication to people with autism, and affirm that PECS is an individual teaching strategy. However, there is still a need for more spontaneous applicability and research in this area. Therefore, using the PECS adapting to the contents worked in the classroom becomes a viable possibility for the student with autism to be included and developed in the school environment.[12–23]

Findings

Autism spectrum disorder (ASD) is a very complex disorder. Everyone with ASD is unique, the education professional must understand that there is diversity and that characteristics vary from person to person. Just as neurotypical people are not all the same, as each human being has unique particularities and individual worldview.

The person with autism experiences simultaneously and intensely more than the five senses that everyone knows well and that for many is natural, identifying and understanding the sensory processing disorder can make it much easier to live in the school environment, as the teacher can lead their student with autism, reducing the number of stimuli, or controlling the situations in which sensory processing is possibly being affected.

Therefore, knowing and identifying the characteristics of autism spectrum disorder (ASD) contributes to the use of resources better applied to interaction, communication and, consequently, to the cognitive process of students with autism in the classroom.

The research exposed and discussed the increase in the number of students with autism attended in schools in Mato Grosso, however, it is understood that this number is higher than the numbers presented, because the difficulty of obtaining diagnoses is still present in society, especially for the social class with less economic resources. There is still a long way to go to recognize and make room for people with autism spectrum disorder in various social environments, including school.

Social movements and activism for the cause of autism were essential for the emergence of public policies and laws aimed at the recognition and inclusion of people with ASD. When approaching the historical process of inclusion, it's possible to observe that it has gradually entered the school space, going through a path that starts from exclusion, segregation, integration and, finally, inclusion, which still needs a close look by education professionals, agents of change in discriminatory concepts.

The reflection on the training of the regular school teacher and their role in the school inclusion of the student with autism did not obtain an in-depth analysis in this research, because there is little access to such information, practically non-existent training of these professionals aimed at serving the autistic public, it is expected that the new public education policies will insert in their projects inclusion guidelines aimed at the care of the person with autism. However, this debate became pertinent in the development of this work, providing attention to approaches that help the development of a teaching work based on humanization and respect in living with differences in our society.

It is essential that the teacher knows the profile of the student with ASD, being prepared to identify the peculiarities of this student, for this, the observation, in addition to the exchange of information with the family and considering the context in which this student is inserted and their level of understanding, facilitate the elaboration of more effective pedagogical resources for inclusion and teaching in the regular classroom, in addition to recognizing and respecting the different needs, putting into practice simple actions, some of which are described in this work, which can facilitate communication, interaction and learning of students with ASD.

Regular schoolteachers are the professionals most responsible for meaningful and inclusive learning in the school environment today, as there are no effective public policies on professional training for the inclusion of students with autism spectrum disorder (ASD) in the curriculum of educational institutions. Therefore, considering this reality, elements emerge for a deeper debate regarding the inclusion of education professionals in training and training for the teaching-learning process and inclusion of students with autism in the school environment.

For now, the adoption of a didactic focused on valuing differences and accessible to all, facilitates the development of the work of the education professional. The use of simple instruments in classes, such as the routine chart and the PECS, increases the possibilities of understanding and the pleasure of students with autism in actively participating, improving learning and well-being at school, in addition to allowing the development of BNCC skills through the evidenced capacities of this atypical student.

Considering the PECS as a resource better applied in the communication, teaching and learning process of the student with autism, the possibility of using and adapting this model of material

is significant in the result of the research, as it can facilitate the communication between the teacher and the student with autism, including them in the geography classes. making them feel part of the whole that makes up the school and, thus, contributing to their cognitive process. Every student with autism in the regular school classroom should have activities adapted to their understanding and learning needs, and their alternative communication folders.

Geography as a school subject exerts significant practice in the formation of citizens, expanding the conceptions about society and nature, contributing to the understanding of their processes of transformation. Combining the teaching of geography with inclusion strategies for students with autism, as discussed in the research, enables the establishment of bonds, as they are led to interact with others and the interpretation of social relationships.

In short, this work proposes the importance of seeking innovation in the teaching-learning process of students with autism, involving them socially in the school environment, thinking about the benefits of pedagogical practice for schooling and for the construction of socially respected and included individuals. Living with a colleague/student with autism is a good opportunity to learn about human nature and reflect on one's own behavior.

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The authors declare no conflict of interest.

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