

Teaching Environmental Science to Children with Autism Spectrum Disorder: Including Environmentally Autistic Early Childhood Education

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ABSTRACT

We will present the results of a research that sought to (i) understand the difficulties that children with Autism Spectrum Disorder (ASD) have about the Teaching of Environmental Sciences and, along with this, (ii) aimed to highlight possibilities to promote environmental inclusion in the midst of teaching and learning processes linked to the Early Childhood Education of these students. ASD is characterized by neurological disorders in which the subject has difficulties in communication, social interaction and sensory alterations. The methodology adopted – academic activities prior to the preparation of our educational product – were linked to (i) bibliographic research and (ii) semi-structured interviews with which we collected information from teachers who work with autistic children. This work is justified by the help to educators interested in including autistic students environmentally; thus, the public served by it was composed of: (a) teachers of children with ASD and (b) autistic children taught by them. We found that teachers have some inaccuracies about what ASD is and its implications in the teaching and learning process of autistic children, especially with regard to Environmental Sciences. Because of this, we developed an instructional "folder" capable of assisting them in this process.

Keywords: Inclusive Education; TEA; Environmental education; Autism; Special education; Educational Product; Instructional Folder.

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1 INTRODUCTION⁵

Autism Spectrum Disorder (ASD) encompasses a set of neurodevelopmental disorders called communication and interaction difficulties, capable of manifesting sensory alterations, stereotyped/stereotypical behaviors, and restricted/focused interests. Its manifestation is very diverse and its signs, although commonly present in childhood, can only appear when social demands exceed the limits of the capacities of the subject with this disorder (Schmidt *et. al.*, 2016). It is known that people with ASD have several particularities and, among them, we have certain impairments in communication, certain difficulties in social interaction and, in some cases, the execution of restricted and/or repetitive activities (Silva; Silva; Asfora, 2015). The autistic spectrum has a diverse range, so these are some of its manifestations, in view of a wide possibility of conditioning affected by this disorder.

The particularities presented by people with different characteristics, combined with the development of a non-specific pedagogical practice, complexifies the work of adequate pedagogical-educational intervention for these students, thus causing the insecurity of the teachers who work with these children (Barberini, 2016). In this sense, school and teaching are a fundamental resource to enrich the social experiences of children with ASD, thus providing opportunities for interaction and contributing to the development of new learning (Nunes; Azevedo; Schmidt, 2013).

The National Policy on Special Education in the Perspective of Inclusive Education (Brasil, 2008) determines that students with ASD, such as those with disabilities and high abilities/giftedness, should be included in the regular school system, receiving Specialized Educational Care (SES) in the after-school period. Thus, the importance of children with autism being included from Early Childhood Education arises; the latter, apprehended as a space for the integral development of the child, that is, a locus of playing, imagining, questioning and learning through the interaction between children of the same age group, being able to favor communication, social interaction and learning in general (Silva; Silva; Asfora, 2015).

The Environmental Education proposal aims, attributed to Elementary School, the construction of transversal environmental knowledge; and this is provided for in the National Curriculum Parameters – PCNs, in the BNCC (National Common Curricular Base) and, in Paraná, in the CREP (Curriculum of the Paraná State Network). In a way that responds to this legislation, it is evident that the school must offer effective means for the student to understand the natural and human facts, adopting postures and behaviors, caring, preserving all manifestations of life on the planet (Brasil, 1997).

⁵ The master's thesis, remodeled here and published in article format, is available at: <<https://dci.uem.br/profciamb/publicacoes/dissertacoes/>>, accessed on: 02/03/2024.

Having Environmental Education as a right of autistic children – and of everyone – it is necessary to undertake pedagogical practices that facilitate the development and interaction of these children with ASD. In this sense, there is a need to treat Inclusive Environmental Education as an instrument to help the inclusion of autistic children. It is in line with this purpose that we propose the research reported in this article. In view of the specificities and rights of children with ASD, it would be feasible to build an educational folder aimed at the instrumentalization of teachers, thus facilitating the environmental inclusion of these students, as the production of a specialized educational folder can provide greater guidance/preparation to teachers of students with ASD. The research presented here was justified by the need to give these autistic children an understanding of environmental issues, after all, Environmental Education is a right of all. The National Policy on Environmental Education is a fundamental and constant part of national education, being present, in an articulated way, at all levels and modalities of formal and non-formal education (Brasil, 1999). In addition, it is an audience that needs to be educated environmentally, as it is known that Environmental Education is something that needs to be taught from the first years of age.

Environmental Education needs to be developed as an integrated, continuous and permanent educational practice at all levels and modalities of Formal Education (Brasil, 1999). It is crucial to contribute to the development and learning of children with autism, so that they can have more effective reflexes in the future. In this sense, we are moving towards the consolidation of the idea already mentioned: Environmental Education is a right of all; therefore, the work served a very specific audience and on two fronts: (i) children in Early Childhood Education with ASD and, at the same time, (ii) assisting/training teachers interested in environmentally including their autistic students in Early Childhood Education. In this sense, our study was also relevant, in addition, it constituted an important educational product capable of helping teachers interested in promoting Environmental Education with autistic people. Equipping these educators is an urgent activity, precisely because, currently, there is a significant lack of pedagogical didactic materials aimed at Environmental Education that meet this niche: teachers and children, from Early Childhood Education, linked to ASD.

The general objective of our work was to understand the difficulties that autistic children have about the process of teaching environmental concepts that promote sustainability and, along with this, to constitute inclusion strategies related to the purposes of Environmental Education: an educational product capable of guiding teachers interested in their enterprise. Specifically, we seek: 1) to build a bibliographic survey about ASD correlated to Inclusive Environmental Education for Autistic People; 2) conduct semi-structured interviews with basic education teachers who work with autistic people to collect data about the development of pedagogical-environmental actions in the midst of teaching actions undertaken with autistic people; 3) to raise educational strategies related to Environmental Sciences for autistic people and include them in an instructional folder; 4) consequently, make an

instructive folder for teachers of Inclusive Early Childhood Education to work on concepts of Environmental Education with autistic people from two to five years of age⁶.

2 THEORETICAL FOUNDATION

A first aspect to be developed is linked to the bibliographic research which, in turn, provides a wide range of information through the use of ideas, concepts, theories, knowledge and knowledge immersed in numerous publications; it contributes to the construction, or to the better definition of the conceptual framework that involves the proposed object of study (Gil, 1994 *apud* File; Mito, 2007). This part of our study is based on a literature review, whose intention is associated with pedagogical proposals and practices of Environmental Education that help teachers who work with autistic children from two to five years old. Offering in a purposeful way (folder), pedagogical actions of teaching and stimulation that develop the perception of the senses of the child with autism, in order to identify the role and potentiality of Environmental Education in this process (Romita; Ribeiro, 2020).

2.1 AUTISM AND EDUCATION: ASD AND ITS RELATIONSHIP WITH SCHOOL

Autism spectrum disorder (ASD) comprises, most of the time, a set of early-onset neurodevelopmental disorders, characterized by impairment of social and communication skills, as well as stereotyped behaviors (stereotypies). Although defined by these main symptoms, the phenotype of patients with ASD can vary greatly, ranging from individuals with severe intellectual disability (ID) and poor performance in adaptive behavioral skills, to people with normal or higher intelligence quotient (IQ), who lead independent lives (Oliveira; Sertié, 2017). ASD, or simply autism, is a neurodevelopmental disorder, which means that certain neurological functions do not develop in the corresponding brain regions of people affected by it; A complex condition with many factors that contribute to also varied risk symptoms.

Many of the neurological functions found in people with autism appear when the child is very young (usually appear before the age of 3). The name Autism Spectrum Disorder offers us an idea of the breadth and diversity that exists (Gaiato, 2018) within this process. The alterations present in people with autism, typically before the age of three, bring multiple and variable impacts in noble areas of human development such as in the field of communication, social interaction, learning and adaptation capacities. According to Santos (2011, p. 10 *apud* Teodoro; Godinho; Hachimine, 2016), autism affects a person's ability to communicate, establish relationships, and respond appropriately to the environment around them.

⁶ The study linked to this article correlates with the following Sustainable Development Goals (SDGs): i) SDG4: 4.1, 4.2 and 4.7; ii) SDG10: 10.2 and 10.3; iii) SDG13: 13.2; iv) SDG15: 15.2; v) SDG 16: 16.b.

Children with ASD often have difficulties in physical and communicational interactions with family, peers, and society; they do not take care of elements that children are commonly interested in; they have difficulty interacting "naturally"; and object to responding to social interactions. Not being interested in what others say or having obstacles in understanding non-verbal language, for example, can make up the autistic spectrum. Safeguarding specific typologies of facial expressions, gestures, eye signs, head and hand movement can also be linked to the possibilities of autistic characteristics.

Sometimes, an autistic child has difficulty adapting to different social situations, such as sharing toys, changing/reorienting/disorganizing their daily lives, and participating in imaginary/abstract games⁷. Certain children with autism also have limited interests and repetitive patterns, such as recurrent or stereotyped movements (with objects or in bodily and spoken language). For example: picking up a car, turning and turning the wheels, instead of playing as expected by putting it on the ground; or reacting sensitively and exaggeratedly to environmental stimuli, such as sounds, textures, movements, noises, smells, lights and brightness (Gaiato, 2018). Given autistic children have changes in pain sensitivity. In ASD, children can have several characteristics and if one of them causes damage, it must be immediately monitored by a multidisciplinary team (doctors, pedagogues, psychopedagogues, physiotherapists, psychologists, etc.) (Gaiato, 2018).

A person with ASD sometimes has difficulties in the behavioral and cognitive areas; It can be characterized by behavioral rigidity, rigorism of thought, amplitude and/or restriction of imagination, ritualistic actions, obsessive behaviors and the absence of "make-believe" games, after all, they may not recognize objects imaginatively and entirely. In verbal language, as well as in non-verbal language, children with ASD may present a comprehensive form different from the usual patterns, in this way, they would safeguard a repetitive and stereotyped language, not being able to start and maintain conversations (Brites; Brites, 2019). Many autistic people have relationship difficulties, after all, they cannot interact to understand social rules. Because of these specificities, it is necessary to find strategies to mitigate the limits in their socio-educational development; if this objective is ignored, we consequently have losses in the relationship with other people and in communication skills and, above all, in the acquisition of certain knowledge necessary for social integration (Marinho; Merkle, 2009).

⁷ According to Jean Piaget (1896-1980 *apud* Gallahue; Ozmun; Goodway, 2013), children from two to seven years old, during the preoperative thinking stage, present the beginning of the development of cognition, thus beginning to adjust new experiences to previous thought patterns in order to expand social interest and the continuous investigation of their own world. At this stage of development, the child acquires mastery in specific tasks and takes responsibility for himself and his world, that is, they understand that life has a purpose and discover that with greater mobility they are no different from adults in their environment, thus, they begin to improve their language, expanding their own fields of imaginative activity (imagination) (Erikson, 1963-1980, *apud* Gallahue; Ozmun; Goodway, 2013). At this point in human development, the two- to five-year-old child is potentially forming and building knowledge, as well as procedurally acquiring and manipulating abstract concepts. However, when ASD is correlated with the childhood formation of a child of this maturational stage, the process is differentiated and, as we have seen, the multiplicity of aspects linked to the disorder also offers a great variation in the stages of formation of an autistic student who is aged from two to five years.

Integration in school education in Brazil – through inclusion – is a political, cultural, social and pedagogical action that aims to guarantee the right of all students to be together, to learn and to participate (Brasil, 2007). However, specialized educational actions for students who require inclusion cannot be underestimated/subordinated/inferiorized. The function of the Specialized Educational Service (SES) is to identify, develop and organize didactic and accessibility resources to remove barriers to the full participation of students in public and private schools, taking into account their accessibility needs. The activities carried out by these students in the SEA classroom must be differentiated from what is done in the regular classroom; not substitutes for schooling, but complementing and/or reorganizing the student's learning process (Brasil, 2007).

Sending autistic students to school does not mean that they are included; but from the perspective of inclusive education, they have access within the scope of the National Policy on Special Education; in addition to an important right to humanization, we must also aim at schooling linked to the deepening of the socialization (if not sufficient) of this student (Azevedo, 2017). In this phase – Early Childhood Education from two to five years of age –, playing, access to different forms of communication, enrichment of physical, emotional, cognitive, psychomotor and social stimulation, and living with differences favor interpersonal relationships (respect and appreciation of children): this is further amplified when we think about autistic children and their very varied needs. The inclusion paradigm directly reflects the need for teachers to consider inclusion and diversity in their pedagogical practices, observing the particularities of each individual and seeking different resources and teaching methods to educate⁸.

The school is the main socio-educational environment for children in Early Childhood Education; they spend a few hours a day there and have many friends – living shared experiences – who are not found anywhere else; It is an environment full of teaching and sensory stimulation, which is crucial for their development. Often, when we have the opportunity to observe children with autism at school, we realize that they rarely engage in group activities; We often see them isolated in a corner of the room, presenting the different handling/use of certain objects. An autistic child has the ability to learn, but they do it differently: understanding the difficulties and potentialities of each child is the biggest challenge for autistic teachers (which can reflect on the life/socio-educational trajectory of these children). The motivation of children with autism in schools is very important, not only because of the learning opportunities provided by the school environment, but also because of the broad social interaction, where children of the same age meet in the same place and can participate in different activities (which awaken educational, content, and social skills) (Gaiato, 2018).

⁸ According to Cunha: "An inclusive classroom is prepared to receive the typical student or with special educational needs. That is why pedagogical development materials must have properties that meet the diversity of students" (Cunha, 2013, p. 31, *apud* Silva; Silva; Asfora, 2015).

According to Teixeira and Gaiato (2018), the teacher plays a very important role in communication with children with ASD because he constantly observes the characteristics of his students. Due to the specificities of children with ASD, their inclusion provokes frequent discussions about possible forms of intervention at school⁹. In this sense, it is necessary for the teacher to have knowledge about the characteristics of each student with ASD in order to build the classes and, thus, foster their school integration (Ferraioli; Harris, 2011 *apud* Cabral; Marin, 2017). This process needs to be supported by the school, so that the teacher does not feel incapable or frustrated with the development of his work (Castro, 2005 *apud* Cabral; Marin, 2017). We emphasize, once again, that our educational product can help in this process with regard to the possibility of conveying content related to Environmental Education for students with ASD in an adapted way.

2.2 ENVIRONMENTAL EDUCATION: OVERVIEW

The Curricular Guidelines for Environmental Education (EE) must be developed in an integrated, interdisciplinary and continuous way – promoting transversality – in all stages of education (from basic education to higher education). Based on what the Brazilian legislation recommends, it is possible to think that there are different forms of EE actions that favor training and guarantee possibilities of harmonious coexistence with the environment (Brasil, 2012). In this sense, Environmental Education needs to be a constant practice in schools for the acquisition of new knowledge; It must take place in a practical way in the place where the student lives/socializes, taking into account the way of life, the region and the particularities of each individual. The student must look at the reality in which he is inserted and thus propose measures that contribute to the conservation of the environment and to sustainability (Brasil, 2007). EE should not happen in isolation, but in an interdisciplinary and transversal way; such a panorama requires human beings to assimilate multiple environmental knowledges; even sporadically specialized, environmental knowledge seeks to break with fragmented knowledge, typical of specialization, thus aiming to have a global view of the world around it (Brasil, 2007).

The student needs to have an integral knowledge of what he is learning in all fields and areas of knowledge (Brasil, 2007). In Early Childhood Education and at the beginning of elementary school, it is important to emphasize awareness of children's perception, interaction, care, and respect for nature and diversity. Taking into account the fact that it is in Early Childhood Education that children begin their learning – such as sharing, internalizing rules, managing frustrations, among others, essential for

⁹ The sooner they interact with their friends, for the authors, the more effective their interventions can be. Children with autism may express adaptive behaviors at school, such as self-harm and stereotyped behaviors. These behaviors are exacerbated in group settings; this can disrupt learning and put children at greater risk of social exclusion, hindering progress and access to traditional educational programs (Teixeira; Gaiato, 2018).

living in society – it is understood that encouraging the appreciation and respect for diversity and the environment will reflect on their future actions. In this context, we see the need to work on EE from the early years of age, so that the child has contact with nature and natural resources, understanding their finitude and scarcity. This discourse should be part of the students' lives so that they can acquire perceptions predisposed to the conservation of the environment (that is, the possibility of building a discourse in favor of sustainability) (Brasil, 2010).

2.3 EDUCATIONAL RIGHTS OF AUTISTIC CHILDREN

According to the Persons with Disabilities Regulation No. 13,146 of 2015: "Persons with disabilities are people with long-term physical, mental, intellectual, sensory disabilities who interact with various barriers that may prevent them from fully participating, being socially effective" (Brasil, 2015). Therefore, from a legal and rights point of view, autism is a disability. This definition supports the argument that, like the disabled, people with autism have access to a series of safeguards to help them and ensures that families seek help in the most diverse areas of health, education, social assistance, work, markets/consumption, taxation and incentive to research and dissemination of information for this population in general. In Brazil, the guarantees and legal rights of these people are described in four documents: the Child and Adolescent Law (ECA/1990) and the Law of Inclusion/Persons with Disabilities (2015), Berenice Piana Law (2012) (Brites; Brites, 2019).

In all these documents there are provisions that govern and serve as parameters for institutions to serve and shelter people with disabilities and their families, providing real opportunities to achieve "conditions of equity" in the most diverse places, such as: priority service in queues and waiting places, school support, training and updating of professionals, modernization of service systems, among others. In education, the autistic child has the right to attend regular public and private schools and have a "support teacher" in the municipal and state education network, in which the schools have to adapt and provide the necessary resources for the autistic person to have access. Access to all rights is achieved with a medical report, attesting to the diagnosis, bringing in its content information that will direct a better understanding of what autism is and ensure the rights of people who have it (Brites; Brites, 2019).

2.4 ENVIRONMENTAL EDUCATION AND AUTISM

The importance of the Teaching of Environmental Sciences and EE – areas of knowledge that need to be developed and disseminated as a right – is linked to the promotion of human awareness as an integral part of the natural environment of a society, leading to a sense of socio-environmental belonging; it seeks to develop environmental awareness, respect ourselves, others, the environment

and, most importantly, to reflect on our role in the *habitats* in which we live (Silva, 2018 *apud* Romita; Ribeiro, 2020).

In this way, Environmental Education and its teaching help to break down barriers created by prejudice and can be thought of as integrating in different educational spaces (formal education, inclusive education, non-formal education and informal education) (Romita; Ribeiro, 2020). This is because Environmental Education, when well developed, takes into account the subjective aspects of scientific knowledge and life, including the social representations that students build throughout their socio-educational trajectory.

Environmental concerns force societies to seek new ways of thinking and behaving to meet human needs, ensuring ecological sustainability (Oliveira; Rodrigues, 2007). According to Article 225 of the Federal Constitution of 1988, Environmental Education must be promoted at all levels of education and in raising awareness among the population for the protection of the environment; as a cross-cutting theme, it should be an aid in the inclusion of children with autism, integrating students into learning, enabling them to experience the natural environment (Almeida; Monteiro, 2014 *apud* Lima; Morong, 2017).

It is believed that the Teaching of Environmental Sciences in child development and in the inclusion of individuals with ASD can be a strong methodological differential related to the schooling process of these subjects, after all, autism is understood as a characteristic and requires students to see beyond this disorder. That is, to see autistic people primarily as people with their own desires and desires, believing in their own abilities, thus enabling self-knowledge and stimulation of their own environment and/or the senses provided by education (Romita; Ribeiro, 2020).

3 MATERIAL AND METHODS

3.1 SEMI-STRUCTURED INTERVIEWS: APAE MOREIRA SALES-PR

The research reported here developed semi-structured interviews in the Association of Parents and Friends of the Exceptional (APAE) in the municipality of Moreira Sales-PR. This qualitative action was felt as necessary based on empirical experiences (the author works in the aforementioned school). Our study has an exploratory-descriptive character and sought to identify exploitable issues, constitute relevant variables and define hypotheses. To collect the essential data for the research, in April 2023, the participants of this study conducted a semi-structured interview mediated by a script with open questions¹⁰, addressing, above all, the problem studied: students with ASD and the Teaching of Environmental Sciences.

Semi-structured interviews, as a technique, offered greater flexibility to the researcher who could: "1) reask questions; 2) reformulate the questions differently if the interviewee does not understand them; 3) certify that it has been properly understood" (Fontana; Rosa, 2021, p. 233). According to Gil (2002), this type of interview is conducted "by relation to points of interest that the interviewer explores throughout his course" and, in addition, it needs to be developed in two phases: "the specification of the data that is intended to be obtained and the choice and formulation of the questions" (p. 52). Our interviews were mediated by an interview script, as well as authorized by the interviewees.

3.2 TARGET AUDIENCE AND LOCUS OF THE RESEARCH

In general, our target audience was composed of teachers linked to Special Education at APAE in Moreira Sales-PR who work with autistic children from two to five years of age. This school operates in the Special Education modality, serving students with multiple and intellectual disabilities (among them, children with ASD from Moreira Sales-PR). The teachers who work there are from the State and Municipal Network, with specific training in Special Education and with courses in the area of autism. The participating school safeguards a multi-professional team in the care of students. The research was authorized by the Regional Education Center of Goioerê-PR and by the aforementioned institution.

3.3 INSTRUCTIONAL BROCHURE: OUR EDUCATIONAL PRODUCT

The educational folder is a printed instructional didactic resource – physically or digitally – that serves as learning material to promote knowledge in a localized way in order to fill any knowledge gap. It also helps to select content in an orderly manner, develop educational strategies (planning tools

¹⁰ The script of our interviews can be found in the appendices of the dissertation already mentioned. Available at: <<https://dci.uem.br/profciamb/publicacoes/dissertacoes/>>. Accessed on: 03/02/2024.

that set goals to be achieved), and identify essential instructional resources. In this research reported here, the folders will function as educational products deriving/derived from our work.

In general, they are informative and educational materials on the most diverse topics, so they must comply with the following points for their construction: 1) the adequacy to the target audience; 2) clear and objective language; 3) the light and attractive look; 4) and the reliability of information (Giordani; Pires, 2020). For a folder to fulfill its duty, it is essential to establish a favorable dialogue with its readers. Therefore, its preparation must consider the use of a language (verbal and imagery) that effectively communicates with this target audience. When preparing it, authors and illustrators must consider the socioeconomic and cultural profile of their readers (Giordani; Pires, 2020).

The work underlying this article had the instructional folder as an educational product allied to inclusion, thus seeking to expand the knowledge of educators affected by ASD about Environmental Education and its teaching. Therefore, we developed this material so that autistic teachers, from two to five years of age, have the possibility of favoring and environmentally stimulating the senses, social interaction, cognitive skills and communicative skills of their students. This folder was developed and sought to offer subsidies that stimulate the development of environmental activities aimed at the inclusion of autistic individuals, as well as to promote better knowledge about the disorder and information that helps in their educational practices.

4 TEACHERS' PERCEPTION OF ENVIRONMENTAL EDUCATION: CONTRIBUTIONS TO AUTISTIC LEARNING

Our semi-structured interviews were applied to five teachers (identified by the acronyms PF1, PF2, PF3, PF4 and PF5). Their profile can be found in the following table:

CHART 1 – PROFILE OF THE INTERVIEWEES.

SUBJECT	TRAINING	SPECIALIZATION	WORKING TIME IN INCLUSIVE EDUCATION
PF1	Letters/Pedagogy	Special education	16 years
PF2	Pedagogy	Special education	5 years
PF3	Geography/Pedagogy	Special Education/Clinical Psychopedagogy	18 months
PF4	Physical education	Special education	18 months
PF5	Geography/Pedagogy	Special Education/School Guidance	6 years

SOURCE: prepared by the authors.

The perception of the teachers according to our analyses evidenced a certain lag/imprecision about the understanding of what ASD is and, more importantly, the strategies linked to the promotion of the teaching of Environmental Education among autistic people; in general terms, the teaching of environmental sciences, in the locus studied, is summarized as "environment week". In detail, the

analyses of the semi-structured interviews will be deepened below. It is worth mentioning that at the end of the interviews, the answers were transcribed to facilitate the analysis of the data and relate them to theoretical questions of the research. For a better understanding, we divided the analysis process into three axes¹¹.

4.1 KNOWLEDGE ABOUT AUTISM AND PRACTICE WITH AUTISTIC CHILDREN

Knowledge about ASD is a challenge faced by many teachers, education professionals and the entire society that serves/interacts with this public. PF1 defines the concept of autism as "something difficult to deal with that requires a lot of knowledge in the area to try to enter their world, in order to be able to help and work on the intellect; for PF4, this disorder is "something little known and studied that needs to be more supported". However, professionals often have limited or mistaken information about autism, which can lead to stigmatization and difficulties in interacting with autistic children. It is crucial that there is greater awareness and education so that people better understand what autism is and how to deal with these children effectively. Health professionals, educators, and the community at large can play an important role in disseminating accurate information about autism. This includes understanding the specific needs of autistic children, how to adapt the environment to promote their inclusion, and how to use appropriate communication strategies to improve interaction. In the case analyzed and as we observed in our literature reviews, ASD is not limited to intellectual dimensions and its spectrum is too broad.

4.2 IMPORTANCE OF ENVIRONMENTAL EDUCATION

Environmental Education plays a fundamental role in the lives of all people, including those on the autistic spectrum. Through awareness and teaching about the importance of environmental conservation, Environmental Education can help improve the quality of life of autistic people, promoting their well-being and development. Environmental Education provides a valuable opportunity for autistic people to connect with the world around them. For the interviewees, the teaching of Environmental Education: "PF1 – It is very important to work with all students, essentially with their families; FP2 – yes, it is necessary with everyone; PF3 – Raising awareness of care for the environment is important; PF4 – Yes, it is important; PF5 – Yes, I consider it very important because this work of awareness and appreciation of our environment should not have discrimination, it should be aimed at all students, and autistic students when worked are well disciplined in this regard".

Many autistic people have specific interests and may develop a special passion for animals, plants, or ecosystems. By learning about the importance of environmental conservation, they can

¹¹ The transcripts of the interviews and broader analyses of them can be found in the dissertation already mentioned. Available at: <<https://dci.uem.br/profciamb/publicacoes/dissertacoes>>. Accessed on: 03/02/2024.

channel their energy and curiosity into these areas, which provides them with a sense of purpose and belonging. In addition, Environmental Education can also help autistic people develop social and communication skills. Thus, they provide an inclusive learning environment, where they can feel valued and integrated into society. This preamble is important to be characterized, after all, none of the interviewees expressed it in this holistic perspective¹² in their answers.

In their answers, the teachers, when asked about their evaluation of environmental education with Early Childhood Education and autistic students, stated: "PF1 – Constantly emphasize the conservation of the environment, I believe it starts at home in the first years of life; PF3 – Teaching how to take care of the environment; PF4 – Precarious; PF5 – I evaluate as essential an education focused from early childhood education on changes in attitudes and conservation of the environment; PF1 – I work here at APAE in all the classes I attend; PF3 – yes, in raising awareness of the environment, taking care of the environment; PF4 – Only in Environment Week; PF5 – Yes, from the small teachings on how to take care of the classroom, throw the garbage correctly, open and close the tap, among other daily attitudes". The notes of the participants in this research show shortcomings in the understanding of what the Teaching of Environmental Sciences is, properly of EE, especially because they observe/consider these two educational processes in a more restricted way; that is, different from what was agreed by experts in the field.

4.3 LACK OF PRACTICAL MATERIALS RELATED TO EA

The lack of dynamic materials on autism has been a growing concern in areas such as Education and Health. Although there are many theoretical resources available, such as books and academic articles, there is a significant shortage of practical materials that can help parents, caregivers, and professionals deal with the specific needs of autistic individuals, thus impacting teaching practice¹³. The answers of the interviewees, regarding the need for instructional materials, go in this direction: "PF1 – At School there are some materials according to the student's needs; PF2 – No, I look on the internet; PF3 – Evaluation of the ABA method / and teaching methodologies; PF4 – Sometimes yes; PF5 – Yes, still little, but I could have more access.

¹² As observed in the following answers/statements: "PF1 – It is to take care of the environment and publicize in all possible means the non-deforestation, fires and clandestine hunting; PF2 – Environmental education that develops skills and modifies attitudes towards the environment; PF3 – Teach students to take care of the environment, not to throw garbage on the ground and on the streets; PF4 – Preserve nature and not pollute; PF5 – I understand it as an education focused on changes in attitudes and values for a quality life".

¹³ Regarding the teaching practice of EE with autistic people, the interviewees stated: "PF1 – It is worked orally, slides, demonstration of images, walk in the ecological park and with a panel made by them; PF2 – It is worked on in practice; PF3 – Work on caring for the environment, recycling; PF4 – Within the subjects, something involving environmental education is always worked on; PF5 – Always focused on raising awareness among students, of economy, preservation, all to the extent of the understanding and reach of our students".

This lack of practical materials makes it difficult to understand and provide adequate support for people with ASD and this was highlighted by our interviewees. Specialized materials would help, according to them, to overcome "PF1 – The lack of knowledge about, in all social sectors"; or even, to: "PF2 – to raise awareness in society; FP3 – Have more training for teachers to understand and know how to deal with challenges; FP4 – understand that they also deserve to be understood and attended; PF5 – It would be to provide an education for all, without distinctions and that is adapted to meet all their special needs. Accept the autistic child as he is, without wanting to abruptly change his behaviors and his routine, that is, acceptance of the different".

Often, parents and caregivers face daily challenges regarding communication, social interaction, and the execution of daily skills of their autistic children. Practical materials, such as step-by-step guides, sensory activities and adapted teaching strategies, would be extremely useful to assist in these aspects (as the participants of our research proposed). Along with this, the availability of practical materials could also contribute to the awareness and inclusion of autism in society; in addition to overcoming certain difficulties and barriers, such as those pointed out by the interviewees: "PF1 – The lack of preparation of teachers, because, no matter how much training they have, the practice is challenging, but achievements are emerging and they are sometimes already able to understand and meet the established crises; PF2 – Behavioral; FP3 – Understand each child in their specificities; PF4 – I believe that there is a lack of knowledge from all parties, we have to try to study, be attentive; PF5 – The behaviors that are presented".

According to the participants of the research, such materials would help their activities too much¹⁴: "PF1 – Yes, it would, although the degree of autistic people varies greatly; PF2 – Absolutely; PF3 – Yes, that way I would have content already organized to carry out the activities; PF4 – Absolutely; PF5 – it would help, but I consider practical activities to be more functional."

As you can see, materials are welcome; however, they should safeguard given specificities, which are: "FP1 – Improve and provide the basis for how to work with the theme; PF2 – Theoretical and practical coverage; PF3 – Practical material, with simple activities; PF4 – Dynamic activities and illustrations; PF5 – Practical material". It was seeking to meet these interests that we developed our educational product, a folder called "Teaching Environmental Sciences to People with ASD: Including Environmentally Autistic Immersed in Special Education/Early Childhood Education (2023)".

¹⁴ Together, we highlight that our product also met what the interviewees consider productive as strategies for improvement and search for teaching actions with autistic people: "PF1 – As I am in search of knowledge, I will seek support with those who already have greater knowledge; FP2 – Create bonds, use objective language, privilege skills and the individual; PF3 – Seek more to understand and improve my strategies; PF4 – Adaptation to the contents using simple order so that students have understanding; PF5 – To make the content more flexible and adapt to their needs, using simple and clear, objective orders and privileging their skills".

Available at: <<https://oercommons.org/courses/produto-sobre-o-tea-1-pdf>>. Accessed since: 08/11/2023.

5 EDUCATIONAL PRODUCT

The development of educational products – technological technical products (TTP) aimed at education – is one of the stages of *stricto sensu graduate programs* in the professional modality, as guided by the Coordination for the Improvement of Higher Education Personnel (CAPES). This process aims to build networks between the knowledge generated by academic research and the demands of society. The starting point of the Educational PTT is in the identification of educational and/or socio-educational problems and in the search for solutions to them (contributions to the community) (Rosa; Batista, 2021). Thus, the instructional folder – educational result/product of the research reported here – aims to provide information, instructions and strategies for educators to promote the inclusion of autistic children in EE, enabling the understanding and positive development of their skills.

Our educational folder, designed to assist teachers who work with autistic people from two to five years of age, assists educators who face difficulties in finding materials related to their practices, to make their classes more dynamic. The material exposes a brief description of ASD and its characteristics, presenting suggestions for literature related to the theme, after all, they offer information and help to develop a more comprehensive understanding, contributing to awareness and reducing the stigma associated with autism; that is, a way of forging knowledge that is more appropriate to the specificities of students with ASD.

This instructional folder also publishes a lecture on EE and ASD, highlighting that this area of knowledge should be integrated transversally, providing autistic students with an understanding of everyday environmental issues (Almeida; Silveira, 2020). In addition, our PTT suggests educational practices and adaptations in EE so that teachers can work in their classes. According to Ziraldo (2013), autistic people should be respected, be integrated/included in the social environment and have their potential, talents and aptitudes recognized, thus generating contributions to society. If creatively used and readapted, the material we make and the practical-educational actions intrinsic to it can be used in other stages of Elementary Education in the Early Years.

6 FINAL CONSIDERATIONS

The research reported here aimed to contribute to the educational and environmental inclusion of autistic children through a greater instrumentalization of their teachers. We emphasize how much we have to advance in the sense of taking Environmental Education to Early Childhood Education and Special Education. We highlight the importance of establishing new concepts and socio-educational

relationships with autistic people, so that this public qualifiably achieves social and, especially, school inclusions. In this way, we emphasize the imperative of articulating teachers who believe in the amplified/full inclusion of autistic children, thus building paths and strategies – in each class, each day – so that Environmental Education is transmitted/transmitted to all subjects who, by right, belong to it.

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