ATTENTION TO SELF AND TO OTHERS IN THE EXPERIENCE OF AUTISTIC CHILDREN WITH THE AVENTURA ESPACIAL GAME

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ABSTRACT: This work analyzes how children with autism spectrum disorder transform modes of attention to self and forms of interaction in the direct experience in which they play with games built for mental health. This is a qualitative intervention research and the methodological procedures involve an organization with monitoring of game workshops and the analysis of the participants' self-narratives. The context of the experience involves children who are assisted at the Centro de Atenção Psicossocial Infantil [Child Psychosocial Care Center], located in the city of Mossoró-RN and their families, who participate on the program Oficinando em Rede [Networked Workshops] at the Universidade Federal Rural do Semi-Árido. Regarding research instruments, we highlight the researcher's logbook, the transcription of self-narratives recorded in the meetings with family members and children, footage of workshops with the children for later observation of the ways of coordinating interactive processes in the direct work of the researchers using the Aventura Espacial [Space Adventure] game. Workshops are a research tool, as they enable the construction of an experience that favors the transformation of cognitive and subjectivation processes, the learning and caring in the process and the interaction with

subjects on the autism spectrum. As a result, we can understand that interacting and playing with the Aventura Espacial game favors the emergence of interactive processes and the communication of children diagnosed with autism.

Keywords: Attention processes, Autism spectrum disorder, Interaction, Mental health, Digital games.

A ATENÇÃO A SI E AO OUTRO NA EXPERIÊNCIA DE CRIANÇAS AUTISTAS COM O JOGO AVENTURA ESPACIAL

RESUMO: Este trabalho analisa como as crianças com transtorno de espectro autista atualizam modos de atenção a si e as formas de interação na experiência direta em que brincam com os jogos construídos para a saúde mental. A pesquisa é qualitativa, na forma da pesquisa-intervenção e os procedimentos metodológicos envolvem a organização com acompanhamento de oficinas de jogos e a análise de autonarrativas dos participantes. O contexto da experiência envolveu crianças que são atendidas no Centro de Atenção Psicossocial Infantil, localizado na cidade de Mossoró-RN e seus familiares, integrantes do Programa Oficinando em Rede da Universidade Federal Rural do Semi-Árido. Como instrumentos, destacamos o diário de bordo da pesquisadora, a transcrição de autonarrativas gravadas nos encontros com familiares e com as crianças, filmagens de oficinas com as crianças, para posterior observação dos modos de coordenar processos interativos no fazer direto dos pesquisadores com o emprego do jogo aventura espacial. Oficinas se colocam como ferramenta de pesquisa, ao possibilitar a construção de uma experiência que favorece a atualização de processos cognitivos e de subjetivação, aprendizagem e cuidados no percurso e convivência com sujeitos que apresentam o transtorno de espectro autista. Como resultados, pudemos compreender que a interação e o brincar com o jogo Aventura Espacial favoreceu a emergência de processos interativos e a comunicação de crianças diagnosticadas com autismo.

Palavras-chave: Processos da atenção, Transtorno de espectro autista, Interação, Saúde mental, Jogos digitais.

LA ATENCIÓN A UNO MISMO Y AL OTRO EN LA EXPERIENCIA DE LOS NIÑOS AUTISTAS CON EL JUEGO AVENTURA ESPACIAL

RESUMEN: Este trabajo analiza cómo los niños con trastorno del espectro autista actualizan los modos de atención al yo y las formas de interacción en la experiencia directa en la que juegan con juegos construidos para la salud mental. La investigación es cualitativa, en forma de investigación-intervención y los procedimientos metodológicos implican la organización con seguimiento de talleres de juegos y el análisis de las autonarraciones de los participantes. El contexto de la experiencia involucró a los niños que son atendidos en el Centro de Atención Psicosocial para Niños, ubicado en la ciudad de Mossoró-RN y a sus familias, integrantes del Programa Oficinando em Rede de la Universidade Federal Rural do Semi-Árido. Como instrumentos, destacamos el cuaderno de bitácora del investigador, la transcripción de la autonarrativa registrada en los encuentros con los familiares y los niños, la filmación de los talleres con los niños, para una mayor observación de las formas de coordinar los procesos interactivos en la acción directa de los investigadores con el uso del juego aventura espacial. Los talleres se sitúan como una herramienta de investigación, para posibilitar la construcción de una experiencia que favorezca la actualización de los procesos cognitivos y de subjetivación, el aprendizaje y el cuidado en el transcurso y la convivencia con individuos con trastorno del espectro autista. Como resultados, pudimos entender que la interacción y el juego con el Space Adventure favorecieron la aparición de procesos interactivos y de comunicación de los niños diagnosticados de autismo.

Palabras clave: procesos de atención, trastorno del espectro autista, interacción, salud mental, juegos digitales.

INTRODUTION

This work presents an intervention research in which we discuss attention to self and interaction processes in the experience of children with autism spectrum disorder who play with the game Aventura Espacial [Space Adventure].

It is important to clarify that the development of the game and its application with autistic children, followed by its validation by education and mental health professionals, family members and by the direct observation of one of the authors, are research actions developed along with the community extension program entitled "Oficinando em Rede" at the Universidade Federal Rural do Semi-Árido, located in Mossoró/RN - Brazil.

Started in 2012, this program articulates extension, research and teaching projects, in partnership with communities and educational and mental health services in Mossoró RN, Brazil and surrounding cities. The common denominator of these projects is the experimentation of different technologies and languages - information and communication technologies, painting, photography, theater, cirandas , games in services that receive children, young people and adults who live in different circumstances of mental disorders and/or psychic suffering.

We can consider the participants' engagement in the construction of the proposal as a methodological principle that is common to the different projects, placing information and communication technologies and different expressive languages at the service of the subjects' self-enunciation, making them protagonists in the weaving of networks favored by the multiple languages.

In this article, we discuss the development of the Aventura Espacial game and its integration with the work with children on the autism spectrum. We are interested in understanding how a game, built after three years of direct experience with children, can affect and transform ways of directing attention to self and interacting. It is important to emphasize that the research group - Linguagens, Cognição e Tecnologias [Languages, Cognition and Technologies] - CNPQ, in which the authors participate, is dedicated to the study, observation and analysis of the intervention research experience that involves children and young people with autism spectrum disorder, focusing on the cognitive processes of attention and interaction in different situations of play and games.

In this study, we consider clues from the cartographic method in order to follow the movements of inventive cognition, the actions that emerge in the children's experience and refer to attention to self and to others. The context of the experience we analyze is the development of the Aventura Espacial game, followed by its application with the participation of 2 children and their families during workshops at the Psychosocial Care Center for Childhood and Adolescence (CAPSi), located in the city of Mossoró-RN, Brazil.

The research procedures are those that refer to the development of the game and those that involve its application.

The game is conceived from an ontology, a concept that is perceived differently by the areas of computer science and by the studies in the biology of knowing. For computer science, ontology is related to the formal description of concepts, through which we arrive at the description of the items that compose the game, its users and the creation of profiles that are used by the intelligent agents. These act in order to suggest changes in the interface and in the difficulty of the game for children and young people, who play in an environment that promotes mental health. According to Humberto Maturana's Biology of Knowing, we present the "ontology of reality", in which we put (reality) in parentheses because we understand that a reality emerges differently for each observer player involved in the experience of playing.

In this direction, we link the work of setting up the game with the direct experience of three of the authors of this article who played directly with children diagnosed with autism. The other authors collaborate in the work of creating the game and in the reflections on mental health.

The writings in logbooks support the development of the game and report the children's actions, modes of attention functioning and ways of interacting in the game workshops.

The application and analysis of the game is proposed as a qualitative research procedure, in which we adopt the following actions: composition of the researchers' logbook, filming, transcription of self-narratives recorded in meetings with children/families, organization of workshops with the Aventura Espacial game. All this extensive empirical material was transcribed and analyzed using the clues of the cartographic method and the contributions of the biology of knowing. We registered in the writings: concerns, emotions, actions when playing, questions that the participants asked themselves. We observed transformations related to ideas, actions and emotions in the experience.

The reflection on the experience is based on the Biology of Knowing by Humberto Maturana and Francisco Varela, studies in which these biologists dedicate themselves to the cognitive processes of knowing and living, with emphasis on explanations on conservation and change in human living; Gilbert Simondon, physicist and philosopher who builds a powerful work on the human journey in its relationship with technical objects, with a special interest in the processes of psychic and collective individuation and the individualization of technical beings. The theoretical network also comprises: recent works on game development in the field of Computer Science, transdisciplinary studies and the cognition movements in the experience of subjects with autism spectrum disorder in the field of Social Psychology.

The empirical context of this research involves the participation of two children with ASD and their families. They accepted our invitation to participate in workshops and meetings that are fundamental for us to learn how the computer game we developed can transform processes of attention and interaction.

One of the authors of this article was guided by two other authors in the development of the Aventura Espacial game in his Postgraduate research. His work was built after 3 and a half years of direct and weekly experience playing with children at CAPSi, writing and composing logbooks and creating an ontology that prioritizes the potential of children with autism and their unique ways of acting in the experience of playing with the author.

It is important to highlight that all the authors are dedicated to working directly with children and are part of the Oficinando em Rede Program in Mossoró. Direct and weekly action involving computer games and children is part of the activities in our studies.

The question that we bring up to discussion in this article is: - How do children with ASD, assisted at CAPSi in Mossoró-RN, transform attention and interaction processes when playing with the Aventura Espacial game?

CHILDREN, AUTISM AND DIFFERENCES IN LIVING

Biologists and scholars of cognition Maturana and Varela (1995, p.252) clarify that human beings configure ways of living and knowing by acting through multiple forms of language. Everything we do as humans, we do in language. And actions in language are weaved in the continuous intertwining of emotions and ways of acting, always doing language. We embrace this perspective that allows us to observe and analyze how children with ASD coordinate behaviors in game situations and how they transform ways of directing attention to themselves and to others when interacting.

Gilbert Simondon (1989), a French physicist and philosopher, supervised by Georges Canguilhem in his doctoral thesis, helps us to understand how we couple ourselves to technologies and produce processes of human individuation and individualization of technical, non-human objects. The author discusses how we are able to act on ourselves and, in this process of acting, we are producing transformations in the ways of being-feeling-coexisting in the world. He questions the models that establish positions for subjects, in which the causes for given ways of being in the world are sought, functioning as principles that define states of being. In our work, we highlight the different ways of living and knowing of children with autism spectrum disorder.

The perspective of the Biology of Cognition favors our understanding of the movements of cognition, just as Simondon's work expands the reflection on the processes of psychic and collective individuation.

We start from the premise that we, as human beings, are born as loving beings, in the sense that we need the care of others in order to continue living, given the fragility of a baby. In the course of human experience, we can continue to accept our biology, strengthening behaviors of collaboration and love, or as we have been experiencing in everyday life, deny our constitutive biology and compete with each other. The fundamental metaphor for the understanding of human living, for Humberto Maturana, are behaviors. And to better understand behaviors, it is necessary to observe the emotion that supports the language actions. Loving, therefore, is behavior in which I recognize the other as legitimate in coexistence, with their own way of acting and communicating. In these relationships, there is collaboration, care, and learning.

To focus more closely on the interaction with autistic children, we make use of a set of works, such as those by Carlos Gadia, Tuchman and Rotta (2004, p. 86), that explain autism as "a complex developmental disorder, defined from the point of view of behavior, with multiple etiologies and varying degrees of severity".

In our country, there's a document entitled "Atenção psicossocial a crianças e adolescentes no SUS, tecendo redes para garantir direitos" [Psychosocial care for children and adolescents in the SUS, weaving networks to guarantee rights] that presents autism as a condition of an yet undefined etiology that commonly settles in the first three years of life, being characterized by an impairment in social interaction, socio-communicative development and by restricted and repetitive patterns of behavior, interests and activities. (Brazil, 2014).

We know that, in Brazil, the autism spectrum disorder started to compose the political agenda of inclusive education and health, with experiences carried out in different child care devices. Ordinance No. 336/2002 establishes the CAPSi as a privileged facility for psychosocial care for children with autism, within the scope of the Unified Health Service (SUS), according to Brazil, 2015.

In this context, Law No. 12,762/2012 is a milestone in the process of inserting demands related to autistic people on the agenda of public policies in the country. The enactment of this law instituted the Política Nacional de Proteção dos Direitos da Pessoa com Transtorno do Espectro Autista [National Policy for the Protection of the Rights of Persons with Autism Spectrum Disorder] (Brazil, 2012). These achievements indicate that the demands for policies directed to subjects with autism are complex, plural and conflicting in nature, thus requiring the substitutive services to commit to the qualification of the care offered to autistic subjects and their families (Lima et al., 2017).

It is pertinent to pay attention to the need for a diversity of offers that promote learning and care, in addition to deepening studies on how autistic children build their ways of interacting. In this direction, we question the different manifestations and diagnostic practices that crystallize positions for subjects, often setting patterns of behavior and reproduction of immediate responses. The documents "Caderno Humaniza SUS" [Humaniza Sus Handbook] in Brazil and "Linha de cuidado para a atenção às pessoas com transtornos do espectro do autismo e suas famílias na rede de atenção psicossocial do sistema único de saúde" [Line of care for people with autism spectrum disorders and their families in the psychosocial care network of the unified health system] highlight and provide orientations on this necessary care, pointing out that we need to be attentive in order to accompany the autistic subject in their actions and welcome their different ways of being in the world (Brasil, 2015).

Nogueira et al. (2015) clarify that the view on subjects with ASD needs to consider that the experience of this disorder does not occur statically. The interactions of children with ASD in the social setting configure modes of action in language, and they deal in institutions with different practices and understandings on autism.

Carvalho and Nunes (2016) consider that children with autism face language and social interaction difficulties and point out that their insertion in a society immersed in the context of information technology and virtual interactions is a challenge. Thus, digital games have been used as a form of intervention and treatment, considering that this type of playful activity provides, according to some scholars, the development of cognitive, communication and language skills (Souza & Ruschival, 2015).

Keller (2013) points out that technology can be understood as a potentiator of the cognitive/subjective process. Thus, a new technological coupling transforms the ways in which the experience and the processes of attention to self and interaction take place.

Resuming our reflection that considers the work of Gilbert Simondon on how this human-machine coupling happens, it is essential to highlight that, in his thesis on the ways of individuation of the human being and the individualization of technical objects, the scientist expands the understanding of the relationships that are established between societies, technical cultures, thinking and ways of living. Simondon builds a philosophical conception of the individual, criticizing the principles supported by the atomist and hylomorphic schools. He clarifies that, in ancient atomism, the principle of individuation would correspond to an atomic unit, consisting of a nucleus of stable permanence, which resists and subsists by itself (Simondon, 1995, p.22). When questioning hylemorphic thinking, the author states that its dualism is not sustainable, that is, he questions the thesis in which the individual would be the result, or the compound engendered solely by the matter/form pair (p. 22). These two perspectives operate with the existence of a principle of individuation – the atom and the matter/form compound, respectively – without any relation or essential link with the actual process of individuation, without any concrete relationship between what happens in the flow of historical becoming in which we become human.

When investigating the genesis of the individual and the processes of individualization of technical objects, in order to articulate them with human thinking and societies, the author does not accept the thesis of an already constituted and fixed individual, as a starting point for the explanation of this genesis. Rather, it is about conceiving the generation of the individual from the individuation process that constitutes it. For Simondon, human beings are capable of acting on themselves and, in this acting, they are reconfiguring their processes, the human becoming. For the author, the individual is constituted in processes of psychic and collective individuation, experiences phases of being and acts on oneself, seeking to deal with their problems and solve them. There is only one "pre-individual reality" (Simondon, 1995, p. 23) which, according to the philosopher, contains forces from which the emergence of a singularity that manifests itself as a system is possible, and, for it to occur, these forces inside the system need to be in a relationship of tension (p. 23). This being is capable of lagging "in relation to itself", resolving itself by lagging itself. It is a process rich in potential, in which not only the individual appears, but so does "the individual-environment pair" (p.23).

We arrive at a new understanding, inspired by this author, on how we are configuring the human experience, in the midst of this set made up of culture, thinking, societies and technologies. In this perspective, our discussion directed to the interactive processes of autistic children in the experience with digital games starts from the understanding that, when being with autistic children and seeking to build ways of interacting, caring, learning, the approach in which they can be simply classified is not supported. This is also valid for common practices that fix them in a given position, almost always highlighting difficulties instead of the human being's potential.

By accepting the establishment of diagnoses and the affirmation of everything that we are not capable of doing, we have narratives and practices that strengthen the isolation and/or the medicalization of children, behaviors and ideas that do not favor the construction of forms of interaction and coexistence.

Another great scientist that we seek to bring to our reflection on children, games and cognitive and subjective transformations is Nise da Silveira. The Brazilian psychiatrist was the author of a set of theories, practices and policies aimed at facing the modus operandi of biomedical psychiatry, proposing another method and treatment for the work with subjects in suffering or with disorders. She integrated arts, languages and interactive processes, therefore, a particular understanding of the human condition (Magaldi, 2018, p.6). In our research, we highlight from the work of Nise da Silveira the notion of - catalytic affection - and the proposition of workshops that open space for free expression through different modes of expression in language. By granting an interview to Luiz Gonzaga Pereira dos Santos, Nise discusses essential issues that we can interconnect in the reflection on practices and research on the interaction and attention processes of children with Autism Spectrum Disorder, by indicating as a method the offering of different modes of expression, being by their side and studying the constructions that are

carried out. The author warns about our own mental health states and care when we are interacting with children:

> The pedagogue should be aware of their own mental state to see where the difficulties they encounter with the children entrusted to them come from. It may well be that they are the unconscious cause of wrongdoing. Therefore parents and teachers are called to know themselves, to educate themselves. Methods, old and new experiences in the field of education have depended and will always depend, in the first place, on those who lead them (SILVEIRA, 1981, p. 154).

We know that different approaches are present in the experience aimed at the care and learning of children with ASD in educational and mental health institutions. Children interact with practices that consider autism an abnormality and a disorder to be modulated and corrected. In this perspective, the emphasis is on actions aimed at disciplining behaviors and controlling emotions. However, our experience with children takes place from the perspective of care and trust in the notion that everyone can establish ways of coexistence and interaction.

Children with ASD, as every human being, conserve and transform ways of living and knowing in the conversation networks in which they participate.

Autism and different theoretical perspectives

In clinical practice, in which one of the authors works, we perceive in the parents' narratives the anguish surrounding the knowledge on the "diagnosis of Autism Spectrum Disorder". Families express concern and understand the diagnosis as a label that would make it impossible for their children to interact/communicate and follow the many expectations that family, school, among other institutions, have of them.

Cunha and Mello (2017, p. 193) clarify that the "21st century stands out for the urgency in relation to the formulation of diagnoses, in which the phenomena of everyday life and childhood itself acquire the status of disease or disorder". In relation to the psychopathologies of children and adolescents, this issue appears in the diffusion and trivialization of acronyms that name children and adolescents through sets of signs and behaviors.

Severo and Dimenstein (2009, p.60) state that "it is increasingly recurrent the pathologization of life regarding what escapes the established ways of living, emerging new diagnostic categories, always more flexible, more permeable, with the power to capture the most tenuous differences from the norm". In this context, the psychiatric diagnosis is closely related to the norms disseminated by society, presenting itself as a scientific categorization of that which deviates from this norm.

We understand human life as a constant becoming, therefore, the observation, the listening and the study of children's actions and modes of interaction requires a true anamnesis in which the subjects' histories are understood and, when thinking about interactive processes and coexistence with autistic children, it is necessary to consider the multiple relationships that make up their lives. In this direction, it is necessary to deal with those who are in charge of the processes of learning and caring in education and mental health, so that we can promote interactive processes and coexistence between children.

Expanding the understanding of autism

Different areas of knowledge, especially those with a clinical bias, have been historically concerned with explaining possible etiologies and understandings in relation to subjects with autism. At the same time, the subjects themselves have spoken out about their own ways of knowing and living. Temple Grandin dedicates herself in productions and lectures to discuss autism from her unique trajectory and experience.

Oliver Sacks (2006, p. 60), a brilliant neuroscientist, in his work "An Anthropologist on Mars" explains that Temple Grandin was born around 1947, in Massachusetts, United States. "From her first months, Temple was already different from most children: at six months old she started getting stiff in her mother's arms; at ten she started scratching her". When presenting the story of Temple Grandin, Sacks highlights that:

> At the age of three, Temple was taken to a neurologist; the total lack of speech, coupled with stereotypical interests and apparent disinterest in social relationships, led to the diagnosis of severe autism, and the doctor suggested that a lifetime hospitalization would be necessary. However, Temple's mother did not allow her to be hospitalized, and insisted on educating her, if not by the means considered normal, then by the means possible to her. (SACKS, 2006, p.66).

Temple Grandin, as a subject who lives a singular experience with Autism Spectrum Disorder, points us to clues of great importance for understanding the processes of attention, communication and interaction of autistic subjects. Throughout her life, she has dedicated herself to research on autism, questioning and problematizing the diagnosis that, to a large extent, addresses generalist labels and classifications to autistic subjects. In her work "The autistic brain: thinking across the spectrum" (Grandin, 2015, p. 127), the author invites us to reflect that "from the beginning, doctors did not know how to treat autism. Would the origin of these behaviors be biological or psychological? Were these behaviors brought into the world by these children? Or was it the world that had installed them? Was autism a product of nature or nurture?"

Morocco (2017, p.80), highlights that: "It is because of the diversity of the particular functioning of each subject that no contemporary science can explain the origin or a definitive etiology of autism, as is the desire of many professionals who are involved with these subjects". The reasons for this non-response or permanently partial response is related to the complexity of the aspects involving the issue of autism.

In this context, Temple Grandin (2015, p.57), when questioning the diagnostic classifications produced for autism, raises important questions:

> [...] autism and other developmental disorders continue to be diagnosed according to the disastrous behavioral profiling system of a book entitled DSM (GRANDIN 2015, p. 57).

> [...] Unlike diagnosing a strep throat, the criteria for detecting autism change with each edition of the DSM. I want to warn parents, teachers and therapists to avoid holding onto labels. They are not accurate. I beg you: do not allow a child or an adult to be defined by a DSM label (GRANDIN 2015, p. 56).

The manual referenced above expresses that autism is included within the outline of "Neurodevelopmental Disorders". The DSM-5 (2014, p.31) states that:

> Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviors used for social interaction, and skills in developing, maintaining, and understanding relationships. In addition to the presence of restricted and repetitive patterns of behaviors, interests or activities.

We understand that this diagnosis should not be a "codename" for autistic subjects. It is necessary to understand that the manuals work with a vision of "standardization" of "typical" behaviors and, according to the norm, what escapes this reference tends to be considered "deficit". We understand that there are countless possibilities of being and this implies different ways of operating with language, communication and interaction.

We then started to expand our research projects towards a direct experience with autistic children and decided to create games aimed at favoring attention and interaction processes.

THE AVENTURA ESPACIAL GAME

The Aventura Espacial game was developed by one of the authors in his Master's research linked to the Graduate Program in Computer Science. It results from an experience in which he interacted with autistic children since 2013, a period during which he participated in university extension activities through the Oficinando em Rede Program from Mossoró at CAPSi. In addition to playing games, he recorded the events of the workshops in logbooks. Weekly, he reflected on the experience with teachers and other students involved in the program. Considering this context, he built the game "Aventura Espacial" [Space Adventure], a serious game that takes into account the cognitive processes of attention and interaction. The game was developed with an adaptive interface, aimed at children and young people with autism spectrum disorder.

The game uses ontology, a formal description of concepts, to define what the game is and who the user is. From these definitions, game profiles are created that will be used by intelligent agents to suggest changes in the interface and in the game's difficulty to the user in order to work on attention and interaction.

As a basic mechanic, we have the flight of aircraft that travel a path with obstacles throughout the levels. They can shoot to clear obstacles. In addition, it has mechanics of obstacles moving from one side of the screen to the other, components organized in different ways from one level to another.

The game levels begin with an interface and difficulty configuration based on the user's profile, in which the interface elements may or may not be enabled. These elements make up the alert monitor, animations, sounds and music, tonality and also the difficulty degree, such as: shooting limit, speed of shots and obstacles and duration of the level. As the player interacts with the game, these conditions can be changed with the help of an agent that checks, from time to time, the state of the game and asks if there are any changes necessary for the user. The changes made are stored and linked to the user, being used as parameters for the next changes. The condition for finishing the game is to go through all levels. The following images illustrate the screens present in the game.

Fig. 1 Ship Selection Screen - Individual mode

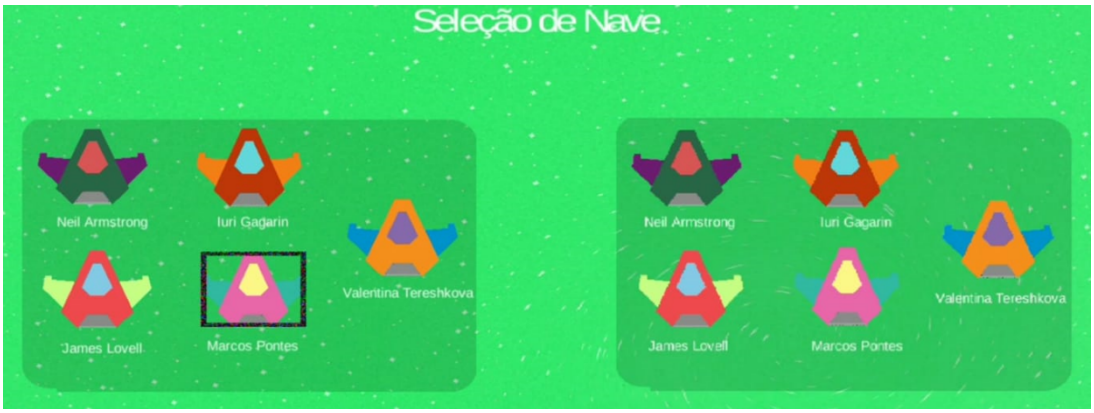

Fig. 2: Ship Selection Screen - Cooperative mode

Fig. 3: Level selection

The experience of playing the game "*Aventura Espacial*" can be individual or cooperative. In the figures that follow, we have the game screens in motion.

Fig. 4: Individual game

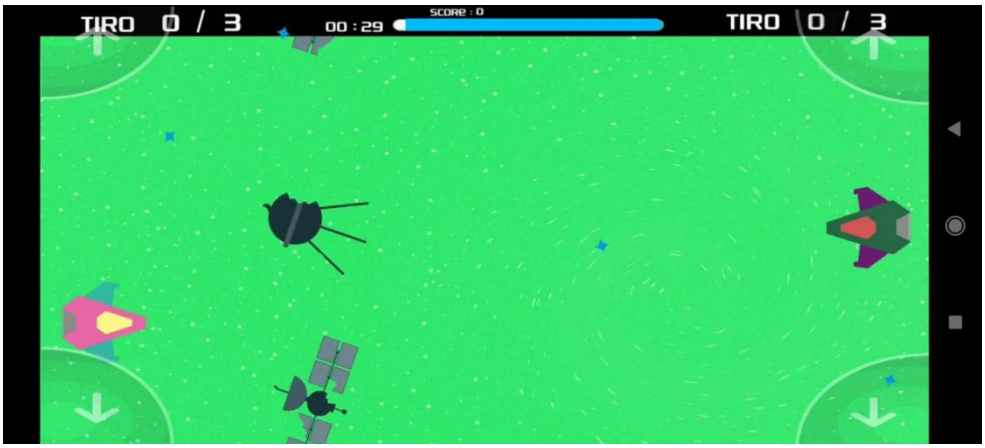

Fig. 5: Cooperative game

Source: Rodrigues (2018, p. 48)

Workshops with autistic children: the game and forms of interaction

After the development of the game, we started to apply it and observe, for further analysis, the interaction and the different actions of the children. We were also able to talk to their family members. In this study, we aim to map the transformations observed in the interaction processes established by autistic children in the experience with the Aventura Espacial game.

The research was carried out at CAPSi (Centro de Atenção Psicossocial Infantil) [Child Psychosocial Care Center] located in the city of Mossoró-RN, Brazil and, as we stated before, 2 autistic children who are monitored at CAPSi and are part of the Oficinando em Rede program; 2 family members of the children and 1 professional participate on the study. In this research, we name the participants Lucas and Alice. Lucas is 12 years old and has been in treatment since the age of 5. Alice is 6 years old and has been accompanied by the institution since the age of 4.

By using workshops as a methodological strategy, we are in agreement with Spink et al. (2014), when they emphasize that workshops are spaces with a critical potential for the expression of meanings, allowing the visibility of arguments, positions, but also displacements, construction and contrast of versions and, therefore, privileged occasions for analysis of the processes of subjectivation.

The development of the workshops, in this context, is mediated by the use of the Aventura Espacial game, with the use of video recording as a methodological procedure. Honorato et al. (2006) apud Macedo et al (2004, p.16) clarify:

> [...] filming reveals itself as another instrument that, instead of "freezing" moments, seeks to capture them in a different way - it brings integrated sounds, image and movement [...] which tends to favor the unveiling of the intricate network that constitutes the production of meanings.

Honorato et al. (2006, p.6) indicate that video recording is a rich tool with regard, specifically, to research with children, as it is important in the research "to record so many intricacies, so many details, so many relationships and then look into them. There are sayings that are not orally pronounced; sayings that are not captured by a tape recorder and are lost without a record".

After the experiences favored by the workshops, a commented analysis of the recurrences and what emerges as a distinction in the children's actions is carried out, seeking to understand how the Aventura Espacial game affects interactive and attention to self processes in the experience of the participating children.

THE MOVEMENTS OF COGNITION IN CHILDREN'S EXPERIENCE WITH THE AVENTURA ESPACIAL GAME

In the first workshop, intended for introducing the children to the "Aventura Espacial" game, only Lucas was present. Alice's mother sends a message before the beginning of the workshop, saying that her daughter had been vaccinated and had some reaction symptoms, so she couldn't attend.

We continued the workshop with Lucas who, when arriving at the Oficinando em Rede program room, said he wanted to show us a video on Youtube. Lucas notices the presence of the author and developer of the game and asks: "Hi Rafael, did you create the game?" Rafael says yes, and Lucas says: "I thought only the internet created games". The first author then states that Lucas could play the Aventura Espacial game and he says yes, but first he needed to open Youtube.

Thus, Lucas approaches the computer, opens Youtube and types the following phrase in the search bar: "The Adventures of Captain Underpants". We didn't know Captain Underpants and Lucas said: "have you never seen it? It plays in movie theaters and in internet commercials".

The following are records of the experience written in the logbook:

> *When talking about the Captain Underpants animation, Lucas says: I also make Captain Underpants comics, when I copy I am the creator. And he emphasizes: I copy when I'm creative. He chooses a video of Captain Underpants 4 and says that he will pause it on the images he wants to copy. And he says: later I want to know the game, I hope it's difficult, a game for 12 year olds. We said that when he finished the comic he was making, we could get to know the game. He remains in the workshop very attentive to the drawing he was making, making the movement of looking at the computer screen and at the paper. He shows a lot of skill with drawings, he can reproduce the video image richly and with agility. When finishing his drawing, he asks if he still has time to play. We answer yes. While he continues to make his drawing, although he remains very attentive to the computer screen, at various times he takes the initiative to talk about the story of Captain Underpants and his drawing. (Excerpt nº 1 - Logbook)*

When completing the drawing, Lucas shows it and asks, "What do you think?" The author says she thinks it is amazing. He then says: "now let's start the game, is there enough time"? Following the workshop, Lucas starts experimenting with the Aventura Espacial game. Regarding this moment:

> *Lucas selects the ship of his choice and starts the game. He demonstrates an understanding of the purpose of the game, its rules and procedures. He completes the levels quickly and when he gets to level two, he tells us that the game is too easy. (Excerpt nº 2 - Logbook)*

We highlight that with each completed level, the game's difficulty increases and aspects of the scenario change. The game demands a lot of attention to the screen and agility in launching the shots to take down the ships. Considering this issue, we realized that Lucas, while playing the game in individual mode, even though being very focused, performs interactions.

> *He asks questions about how many levels the game has and asks if there'll still be time to draw. We explain that the game has 10 levels and each level has its degree of difficulty. Upon completing the 6th level, Lucas gives the tablet to Rafael and asks if he can paint the drawing he had made. He starts to paint his comics drawing Minutes later, Rafael invites him to play in co-op (when the screen is split to be shared by two players). Lucas then puts the painting aside a little and accepts the invitation to play the Aventura Espacial game. (Excerpt nº 3 - Logbook)*

When playing in co-op, Lucas again states that the game is too easy. I explain that, since we changed from playing solo to playing in co-op, we would need to go back to the first levels. He expresses that he doesn't want to go back from the start because it would take too long. And he still needs to finish his painting.

On this issue, I highlight that I observed during the workshops that Lucas shows restlessness and concern related to the time spent in the workshops. He repeats several times if there's still time or how much time is left before he leaves. I think that this attitude reveals a fear of not being able to complete the activity he started, specifically related to the drawings he makes in the workshop, demonstrating how important it is for him to finish his art. I realized that the creative process revealed through the drawings and comics he makes is, for Lucas, a form of language and self-expression and also a way of interacting with others. After finishing the drawings, he wants to exhibit them, usually on a mural at CAPSi or taking them with him to show his production to his family.

Following is the record of the experience written in the logbook:

> *Continuing with the workshop, after finishing the painting of his short comics, Lucas shows us and says: "Now, yes, it is a masterpiece!". He adds that he wants to take this drawing home to "show everyone why I love comics". The Capsi professional asks if she can take the drawing to show other people at Capsi and he says she could make a copy. She asks to make a copy on the printer so he can leave the copy on the wall and take the colored drawing home. (Excerpt nº 4 - Logbook)*

From this experience, I could see a change in Lucas' posture. In other workshops he drew, painted, and when asked if he wanted to take the drawing home or keep it, the answer was that I could have it. However, this time he spoke with admiration and enthusiasm of his drawing, to the point of wanting to show it to his family. At the end of the workshop, Lucas asks me to record a video where he will introduce himself and say that he was the author of the drawing. He positions himself for the video, holds up his drawing and says "this drawing, who made this drawing of the comics is me, my name is Lucas (says his full real name) and today is 2019".

This self-narrative allows us to observe important movements of authorship and autonomy, changes in the way of directing attention to self in the relationship with others. He interacts and positions himself towards what he wants to do. In the experience of autistic children in institutions, this movement is transformative, in the sense of being autonomous in living and interacting. And Lucas acts so as to trust his own creative potential, recognizing the beauty and art expressed in his painting.

I highlight that, when they were invited to play Aventura Espacial, I explained to Lucas and Alice that they could have the workshop time extended. I understand that children could resist the invitation to change the path they had been following in the workshops. Before starting the research, they already had their favorite games and activities to do in the Oficina Do em Rede program.

Thus, we consider the care and also the respect for the subjectivity of each participant, playing with the games chosen for this research has always been an invitation and not an imposition.

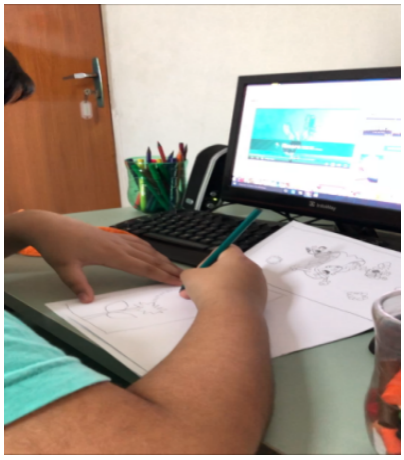

Fig. 6: a) The moment of the drawing being made

Fig. 6: b) Drawing made by Lucas in the workshop of the game *Aventura Espacial*

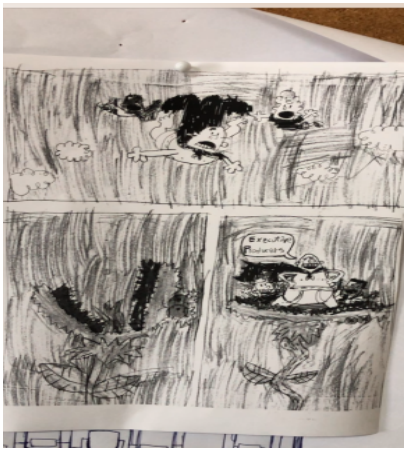

Fig. 6: c) Copy of the drawing displayed on the mural in the workshop's room.

In the second workshop, following the proposal of the Aventura Espacial game, Alice was present and asked when she arrived: “Where is the tablet?”. We walk to the table and she has already touched the start button and moves her fingers between applications. At this moment, one of the authors talks to her and says that she brought a game called “Aventura Espacial”, inviting her to play it. Still concentrating on the movement of swiping through the installed apps and games, Alice says: “no no, I don't want this game”. Until then Alice had not yet seen the game itself, she seemed to be resistant to looking at an yet unknown game, or to changing the workshop's flow:

> *Opens the “Talking tom” game and says: look, it's Tom. One of the authors remembers that she knows that she really likes this game, but that she has a different game to show. Alice says: “no, not a new game! I'm already playing." We respect this choice and the author who runs the workshop interacts with her about Tom's game for a few minutes. During the workshop, she notices several moments when she opens the play store and looks at the list of games to download. At another time, we approach another tablet with the start screen of the Aventura Espacial game open, Alice then approaches it and plays it. She remained very focused on the game for 6 levels. When the next level starts, she also shifts her attention to the other tablet opened in the game Angry Birds Rio (Alice had already played this game in other workshops) at first, she divides her attention between the two games, slides her left hand to click on the 7th level of the Aventura Espacial game and with the right hand she starts the Angry Birds game. Then she goes on playing just the birds game. After a few minutes, she returns to the Aventura Espacial game. At the end of the workshop, she asks for paper and paints to paint, draws a sun and then starts mixing colors and says: “I like to mix colors”. Although being attentive to painting, Alice also directs her gaze to the game Aventura Espacial and demonstrates that she wants to do two activities together again: playing and painting. When I say it's almost time for the workshop to end, Alice gets excited and says: "no no, I'm still going to play the spaceships". (Excerpt nº 5 -Logbook)*

Regarding the workshop described above, we consider that Alice sometimes demonstrates resistance when she is invited to insert a new and different activity into her routine. However, even with this attitude, we noticed interest and desire to play the Aventura Espacial game, which she called the spaceship game.

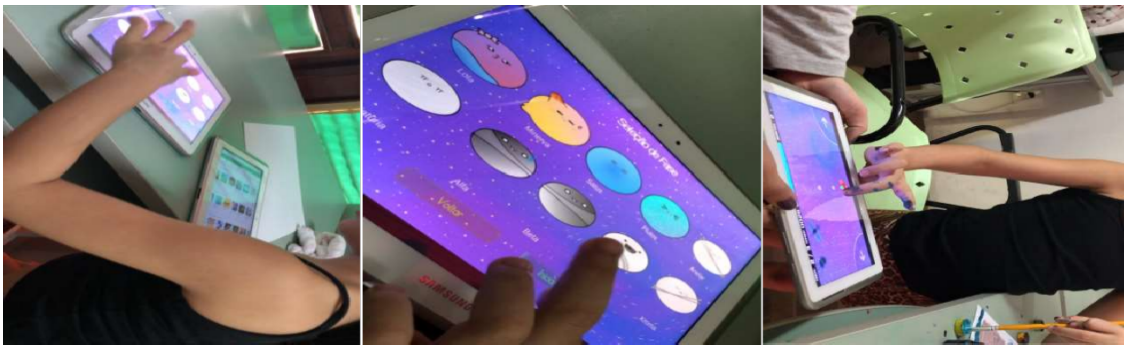

Fig. 7: Record of Alice in the workshop.

In the third workshop with the Aventura Espacial game, Lucas arrives first, enters the room to say good morning and asks if there's paper and pencils. We answered yes and that we could also play the Aventura Espacial game with the tablet. He suggests playing two levels of the game and then drawing a picture:

> *We play the Aventura Espacial game in co-op mode, where we share the same tablet to play together. We play two levels and Lucas asks to open youtube, to see an image and make a drawing. He tells me he wants to do the same as the video. I suggest that he can create and make the drawing as he imagines it to be. Lucas reinforces that he needs to copy it the way it is in the youtube video. The chosen video is an episode of The Adventures of Captain Underpants. He asks for a yellow craft sheet because the screen he wants to draw is yellow. He asks the author who runs the workshop if she has already watched the video of "captain underpants - the series". She says no and he says: "ah.. just write it on youtube, captain underpants - the series". The author who applies the game asks what the story of Captain Underpants is like and he says: "he is a superhero, kind of fat, bald and he has a cape and every day all he does is replacing all the red capes, he has super strength, he is fast and has an unlimited underpants launcher, I saw it in the cinema in the year of 2017, the annoying part is that there are commercials before the movie starts". (Excerpt nº 5 - Logbook)*

In the next workshop, Alice arrives and asks where the tablet is. We showed her and told her that the tablet is open in the spaceship game and invited her to play. She approaches and starts the game. She plays for a few minutes, gets to the 5th level. In that time, she says that the ships are colorful and demonstrates that she likes the color of the game's screens. She later opens the game Angry Birds and also plays Talking Angela. At another point in the workshop, we once more invite her to play Aventura Espacial, but Alice does not accept to change games and remains very focused on Talking Angela - the virtual kitten game.

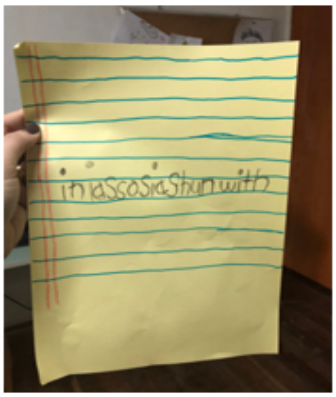

Fig. 8: a) and

Fig. 8: b) Drawings made by Lucas

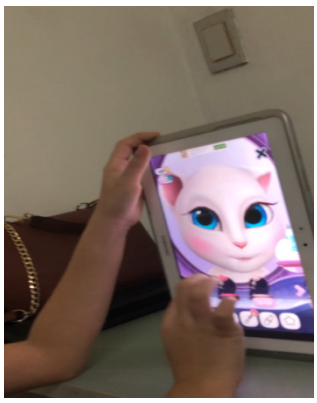

Fig. 8: c) Alice playing the Talking Angela game.

In the following topic, we discuss the narratives of family members around issues relevant to the research.

The path of children as they play in the oficinando em rede program workshops: narratives of family members

For the moment of listening to the family members of the children participating in the research, we sought to ask questions that refer to the objectives of our study: I- Understanding the processes of interaction/communication and attention and II- Dialoguing about possible changes in the ways of coordinating the children's behaviors due to the experience with digital games. Lucas' father and Alice's mother participated in this meeting and conversation.

Narratives on the children's interaction/communication processes

In this topic, we gather the parents' narratives that present the children's story in relation to aspects that involve interaction, attention and communication with others:

> *Workshop presenter: Can you tell me a little about Lucas' interaction with people, family members, other teenagers, children...*
>
> *Participant: Lucas, today he is another child. When he started to participate in CAPSi. Back there, right at the beginning, he was very different, he didn't interact with other children, he didn't speak, he had a lot of difficulties in several basic tasks. After he started at CAPS he is another child, the interaction, diction improved, of course the challenges still remain, but he has advanced a lot.*
>
> *Workshop presenter: What are the greatest challenges you face?*

> *Participant: So.. the greatest challenge is in terms of relationship. He asks if one day he's going to date, if one day he's going to get married, if he's going to have a family and we try to explain to him that it's not that he won't make it, we explain to him that he can achieve everything in his life, but everything at the right time. First he will study, work and then see this issue and then he says: ok daddy.*
> *(Excerpt nº 7 - Dialogue with a Workshop presenter - Lucas' father narratives)*
>
> *Workshop presenter: Can you tell me about Alice, how she interacts, communicates with you, with other people..*
>
> *Participant: Alice has improved a lot regarding communication and social interaction. I cannot say that it is a specific therapy, I believe that it is a set of therapies that have contributed to her improvement. Nowadays she expresses herself much better, before even the intonation, everything she said instead of affirming it, she said it asking, even with the intention of affirming, she couldn't discern it, it was always as if she had asked. And nowadays she has improved communication a lot, she does things that she didn't do, like the behavior of narrating. When people do something, she comes to tell me what people are doing. She has improved a lot in this regard, not only saying the essential needs, but in a simple way she is telling me aspects about what happens in her routine. In a very simple way, she can do it very briefly, but not even that before, right... before when I tried to talk to her, she was uncomfortable, she even put her hand on my mouth, sometimes she tried to run away, she didn't want this communication. This distressed me a lot. Before, she used to talk a lot to repeat the lines of a cartoon, but not with the communicative intention of establishing dialogue. Nowadays, sometimes we are eating something and she comments that she is enjoying it, she smells it and she comments about the smell she is smelling, she asks questions about the smell. She used to live very isolated and today she has changed (her mother gets emotional and cries).*
> *(Excerpt nº 7 - Dialogue with a Workshop presenter - Alice' mother Narratives)*

The parents' narratives highlight changes in the way their children interact and communicate. Lucas' father emphasizes that his son's trajectory at CAPSi contributed significantly to advances in the way he interacts and communicates. He points out that now the son "is another child", considering that, before being attended at CAPSi, Lucas "did not speak and had many difficulties in basic tasks".

When talking about Lucas' experience in ``Oficinando em Rede", his father says that his son identifies a lot with the project. I highlight the excerpt of his speech where he expresses that the activities developed by Lucas in the workshop do not remain only in the workshop space, but that he shares his productions with his parents and family: "So he comes here on the day of the workshop, he does it here and when he gets home he wants to continue, right… he's been talking to me about what he does in the workshops, talking about drawings and games".

Alice's mother also notices that her daughter "has improved a lot in terms of communication and social interaction". She points out that she attributes this improvement to the "set of therapies". She highlights that Alice used to be quite resistant to having conversations, she even put her hand over her mother's mouth in an attempt to prevent communication because, for her, it was uncomfortable. She adds that Alice's previous way of communicating was to "repeat the lines of a cartoon, but not with the communicative intention of establishing dialogues". I notice the mother's emotion when she says that nowadays Alice comments that she is enjoying something she eats, "she smells it and she comments about the smell she is smelling, she asks questions about the smell, she used to live very isolated and today she has changed ".

Alice's mother highlights that her interest in her daughter participating in the Oficinando em Rede Program arose from the knowledge that Alice would be able to spend more time doing activities and also from realizing how much her daughter is interested in technology.

FINAL CONSIDERATIONS

From the development of this research, we are able to expand the understanding of the experience of children with Autism Spectrum Disorder, considering the workshop environment as a valuable space for exchanges, communication, interaction and attention to self and others. We use the Aventura Espacial game as a tool.

The study involves holding workshops with children on a weekly basis and listening to the narratives of parents and professionals who accompany them. The desire that moves this project is related to observing and analyzing the processes of attention and interaction of the participating subjects, understanding the ways in which they transform such processes when playing. Through digital game workshops with children and through the analysis of their parents' narratives, we can observe that they were able to transform the ways of coordinating behaviors related to attention to self and to others.

We observe changes regarding attention and communication during the period in which we played with them. In the initial months of the research, Alice and Lucas, each in their own way, showed resistance to dialogue and interaction with other workshop participants. The invitation to interaction, the catalytic affection and the care and attention to their movements during the workshops caused changes in their behavior.

In a more recent analysis, we noticed in the children the emergence of spontaneous speeches and comments on the activities they developed. We also emphasize the perception of more expressiveness when communicating, such as expressions of joy and laughter. We highlight as the relevance of this research the construction of spaces of intervention in education with the integration of games that invite for the activation of attention to self and others in interactions.

What interests us is to take the question into our hands and follow the clues to distinguish how subjects transform attention and interaction processes.

When thinking about the guiding question of this work: "How do autistic children interact in the experience of workshops with digital games", we highlight how singular and complex this interaction process is for autistic subjects. We learned not to reinforce "standardizing" postures that, sometimes, compare the interaction processes of autistic subjects with those of non-autistic subjects and understand that "they do not interact correctly".

Understanding the human being in its complexity implies considering that there are several possibilities for interaction and communication. The issues that involve the transdisciplinary field that interconnects education, technologies and mental health are promising and we will continue to dedicate ourselves to it. There are still many questions left in order for us to reach a coexistence in which autistic subjects feel accepted and treated in a way that accepts their potential in social institutions.

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Author contribution

Jordanya Reginaldo Henrique e Karla Rosane do Amaral Demoly:

conceptualization, methodology, software, data curation, writing-original draft preparation, Visualization, Investigation.

Karla Rosane do Amaral Demoly e Maria de Fátima de Lima das Chagas: supervision.

Jordanya Reginaldo Henrique, Karla Rosane do Amaral Demoly, Rafael de Almeida Rodrigues e Yákara Vasconcelos Pereira: software, validation.

All authors: Writing-Reviewing and Editing.

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conceitualização, metodologia, software, curadoria de dados, escrita - preparação de rascunho original, visualização, investigação.

Karla Rosane do Amaral Demoly e Maria de Fátima de Lima das Chagas: supervisão.

Jordanya Reginaldo Henrique, Karla Rosane do Amaral Demoly, Rafael de Almeida Rodrigues e Yákara Vasconcelos Pereira: software, validação.

Todos os autores: Redação-Revisão e Edição.

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PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

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Pesquisador: Karla Rosane do Amaral Demoly

Instituição Proponente: UNIVERSIDADE FEDERAL RURAL DO SEMI-ÁRIDO - UFERSA

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DADOS DO PROJETO DE PESQUISA
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