TECNOLOGIA ASSISTIVA E EDUCAÇÃO: ANÁLISE DE APLICATIVOS COMO FERRAMENTA NO ENSINO E APRENDIZAGEM DE CRIANÇAS COM AUTISMO

ASSISTIVE TECHNOLOGY AND EDUCATION: ANALYSIS OF APPLICATIONS AS A TOOL FOR TEACHING AND LEARNING CHILDREN WITH AUTISM

TECNOLOGÍA DE ASISTENCIA Y EDUCACIÓN: ANÁLISIS DE APLICACIONES COMO HERRAMIENTA PARA LA ENSEÑANZA Y EL APRENDIZAJE DE NIÑOS CON AUTISMO

https://doi.org/10.56238/sevened2025.021-040

Danielly Tobelem Maués Ferreira, Renan Carvalho Barros, Edgar Ferreira Cardoso, Maiara Pacheco dos Passos, Enilvan de Jesus Costa da Silva, Romualdo Júnior Moura Favacho

ABSTRACT

In this research, an analysis was made of the applications EduEdu, Matraquinha, Mita and Rotina Divertida, seeking to observe whether these apps can be used in the teaching and learning process of students with Autistic Spectrum Disorder (ASD), taking into account the educational needs, that contribute to the development of a child, through games and recreational activities, which strengthen cognitive capacity, the communication process, fun interaction and organization of daily tasks. Therefore, to promote this research, authors ARAGÃO; JUNIOR and ZAQUEL (2019) who contribute to research on the use of applications in the education of children with ASD, so that the study carried out on this type of technology, contributed to the construction of the methodology, which shows through a system of notes , the applications that have the resources mentioned in the table prepared, offering the teacher data to choose the best app for what he wants, which made it possible to conclude that these applications can be very useful in the child's schooling, since they are more playful for the eyes, in addition to being accessible and practical, however, the teacher must be aware of the student's needs, analyzing which application best fits their particularities.

Keywords: Autism. Assistive technology. Teaching methodology. Apps.

RESUMO

Nessa pesquisa foi feita uma análise acerca dos aplicativos EduEdu, Matraquinha, Mita e Rotina Divertida, buscando observar se esses apps podem ser utilizados no processo de ensino e aprendizagem de alunos com Transtorno do Espectro Autista (TEA), levando em consideração as necessidades educacionais, que contribuem para o desenvolvimento de uma criança, por meio dos jogos e atividades lúdicas, que fortalecem a capacidade cognitiva, o processo de comunicação, interação diversão e organização de tarefas diárias. Portanto, para fomentar essa pesquisa utilizou-se como referencial teórico os autores ARAGÃO; JUNIOR e ZAQUEL (2019) que contribuem com pesquisas acerca do uso de aplicativos na educação de crianças com TEA, de modo que o estudo feito sobre esse tipo de tecnologia, colaborou para a construção da metodologia, que mostra por meio de um sistema de notas, os aplicativos que possuem os recursos citados na tabela elaborada, oferecendo ao professor dados para a escolha do melhor app para o que ele deseja, o que possibilitou concluir que estes aplicativos podem ser muito uteis na escolarização da criança, visto que são mais lúdicos aos olhos, além de serem acessíveis e práticos, porém

o professor deve estar atento a necessidade do aluno, analisando qual aplicativo se encaixa melhor nas suas particularidades.

Palavras-chave: Autismo. Tecnologia assistiva. Metodologia de ensino. Aplicativos.

RESUMEN

En esta investigación, se hizo un análisis de las aplicaciones EduEdu, Matraquinha, Mita y Rotina Divertida, buscando observar si estas aplicaciones pueden ser utilizadas en el proceso de enseñanza y aprendizaje de los estudiantes con Trastorno del Espectro Autista (TEA), teniendo en cuenta la educación necesidades, que contribuyen al desarrollo del niño, a través de juegos y actividades recreativas, que fortalecen la capacidad cognitiva, el proceso de comunicación, la interacción divertida y la organización de las tareas diarias. Por lo tanto, para promover esta investigación, los autores ARAGÃO; JUNIOR y ZAQUEL (2019) quienes aportan a la investigación sobre el uso de aplicaciones en la educación de niños con TEA, por lo que el estudio realizado sobre este tipo de tecnología, aportó a la construcción de la metodología, la cual muestra a través de un sistema de apuntes. Se elaboraron las aplicaciones que cuentan con los recursos mencionados en la tabla, ofreciendo al docente datos para elegir la mejor app para lo que quiere, lo que permitió concluir que estas aplicaciones pueden ser de gran utilidad en la escolarización del niño, ya que son más lúdicas para los ojos, además de ser accesible y práctico, sin embargo, el profesor debe estar atento a las necesidades del alumno, analizando qué aplicación se adapta mejor a sus particularidades.

Palabras clave: Autismo. Tecnología asertiva. Metodología de enseñanza. Aplicaciones

INTRODUCTION

Assistive technologies bring a series of products, equipment, methodologies, strategies, practices and services that can be useful in the teaching and learning process within schools. Thus, establishing a dialogue on the subject, and showing more current technologies that are easily accessible, becomes essential, so that new teaching practices emerge that meet educational needs, since many of these technologies are already used in schools to provide a more dynamic and attractive teaching for students with disabilities.

Aiming at the current scenario where technology is in the palm of the hand through cell phones, we searched for a more modern and practical teaching tool that could be added to the teacher's dynamics, in this sense the applications are an excellent tool, because in addition to being easily accessible, they influence a modern education and use the child's knowledge in the digital universe in a more useful way in the educational process.

Therefore, through some research carried out, it was noticed that there are already some scientific productions focused on the use of apps in the teaching and learning of children with Autism Spectrum Disorder (ASD), as in the case of the article developed by the authors (ARAGÃO; JUNIOR; ZAQUEU, 2019) with the theme "The use of applications to assist in the development of children with autism spectrum disorder", which aims to show the technological tools that can be used in favor of children with ASD as facilitators in the development of various skills.

Therefore, in order to contribute to these researches, this article aims to analyze the EduEdu, Matraquinha, Mita and Rotina Divertida apps, seeking to observe if these apps can be used in the teaching and learning process of students with Autism Spectrum Disorder (ASD), taking into account the educational needs that contribute to the development of a child.

AUTISM SPECTRUM DISORDER (ASD)

Currently, there are significant numbers of children diagnosed with Autism Spectrum Disorder (ASD) in lower elementary schools, (AUTISM AND REALITY, 2020) "The prevalence of people with ASD has been progressively increasing over the years. In 2004, the number released by the CDC was 1 in 166. In 2012, this number was 1 in 88. In 2018, it rose to 1 in 59. In the latest CDC publication of 2020", however, many education professionals are unaware of this disorder, even having difficulty working with students who have it. Thus, before discussing the theme of this research, it is necessary to know what autism is.

> According to the DSM-IV-TR, Autistic Disorder (ED) is characterized by a clinical condition in which impairments in social interaction, non-verbal behaviors (such as eye contact, posture and facial expression) and communication (verbal and non-verbal) prevail, and there may be delay or even absence of language. (KHOURY, TEIXEIRA, CARREIRO, SCHWARTZMAN, RIBEIRO and CANTIERI, 2014, p.09).

However, according to the 2014 book "Behavioral management of children with Autism Spectrum Disorders in conditions of school inclusion", the acronym (ASD) autism spectrum disorder was not always used by textbooks to classify this disorder, as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) and the International Statistical Classification of Diseases (ICD-10) used the nomenclatures, Pervasive Developmental Disorder (PDD) and Pervasive Developmental Disorder (PDD). However, the most used term is ASD, since this term encompasses three disorders related to PDD or PDD, these are: Autistic disorder, Asperger's disorder and pervasive or pervasive developmental disorder without other specification.

For a better identification of this disorder, the ICD-11 is used, which is the international statistical classification of diseases and health-related problems, determining the coding and classification of diseases, being an important epidemiological tool of the medical code. Therefore, autism spectrum disorder is classified in the ICD-11 by code (*6A02*), also taking into account its subdivisions.

Therefore, according to ICD-11 code *6A02*:

> *6A02.0* – Autism Spectrum Disorder without Intellectual Developmental Disorder and with mild or no functional language impairment. All individuals must meet the criteria for ASD, not have Intellectual Developmental Disorder, with only mild or no impairment in the use of language/functional communication, either through speech or through other communicative resources (such as images, textual, signs, gestures or expressions).

In the classification made in code *6A02.1:*

> *6A02.1* – Autism Spectrum Disorder with Intellectual Developmental Disorder and with mild or no functional language impairment. All individuals must meet the criteria for ASD and Intellectual Development Disorder associated with mild or no impairment in the use of language/functional communication, either through speech or through another communicative resource (such as images, textual, signs, gestures or expressions).

Due to the new guidelines and the replacement of the *F84.0* code by *6A02*, autism spectrum disorder has new subdivisions related to the presence or absence of intellectual and behavioral impairment of functional language. In this sense, codes *6A02.2*, *6A02.3* and *6A02.5* show the intellectual development and functional language that are part of the new subdivisions.

Therefore, according to *codes 6A02.2:*

> *6A02.2* – Autism Spectrum Disorder without Intellectual Developmental Disorder and with impaired functional language. All individuals must meet the criteria for ASD, not have Intellectual Development Disorder, but there is a marked impairment in language/functional communication in relation to what is expected for their age group, either through speech (not being able to use more than isolated words or simple sentences), or through other communicative resources (such as images, signs, gestures or expressions).

According to the ICD-11, in code *6A02.3* there is a disorder in intellectual development and impaired functional language, while in code *6A02.5* there is an intellectual development disorder and absence of functional language, that is, the difference is that in the first code mentioned the person with autism has difficulties in communicating spontaneously or expressing their desires and needs in an understandable way, in the second, the functional language appears absent. Thus, according to the ICD-11:

> *6A02.3* – All individuals must meet the criteria for ASD and Intellectual Development Disorder associated with marked impairment in functional language/communication in relation to what is expected for their age group, either through speech (not being able to use more than isolated words or simple sentences), or through another communicative resource (such as images, signs, gestures or expressions).
> *6A02.5* – Autism Spectrum Disorder with Intellectual Developmental Disorder and absence of functional language. All individuals must meet the criteria for ASD and Intellectual Development Disorder associated with the absence of repertoire and use of language/functional communication, either through speech or through another communicative resource.

Both the ICD-10 and the ICD-11 consider autism as a developmental disorder, the difference is that in the first all types of autism were incorporated into a single classification (ASD) autism spectrum disorder, while in the ICD-11, all its subcategories are specified. In the DSM-5 Diagnostic and Statistical Manual of Mental Disorders, which is in its fifth edition, made by the American Psychiatric Association defines autism as a "disorder on the spectrum" that can be measured based on its severity.

It is important that health, education and family professionals work together to offer specialized care to people with ASD, in order to promote their development and improve their quality of life. The teaching process must be adapted to the person's abilities and needs, considering their profile, interests, limitations, and potentialities França et al (2022). It is necessary to offer care that fosters the acquisition of skills and the improvement of global development. In addition, it is important to stimulate self-esteem and the development of socialization, as these are important areas for the well-being and development of the person with ASD. Therefore, according to França et al (2022, p. 03):

> "Due to the peculiar characteristics, which vary from person to person, the learning process of the person with ASD requires methodological adaptations that transpose

> the traditional teaching methods, since it constitutes a great challenge for family and professionals and is necessary to overcome barriers to guarantee the right to access, permanence and meaningful learning and generation of quality of life".

Therefore, based on the understanding of what autism is according to DSM-5, and its subdivisions, shown in the ICD-11, which make it possible to assess the type of autism along with its educational needs, the topic below seeks to discuss the use of apps as a teaching tool for children with ASD.

3 USE OF APPS AS A TEACHING TOOL FOR CHILDREN WITH ASD

Before discussing the importance of apps as a teaching and learning process resource for children with autism spectrum disorder, it is interesting to understand a little about assistive technology, since the use of *Apps* fits among these technologies.

> "Assistive Technology is an area of knowledge, with an interdisciplinary characteristic, which encompasses products, resources, methodologies, strategies, practices and services that aim to promote functionality, related to activity and participation, of people with disabilities, disabilities or reduced mobility, aiming at their autonomy, independence, quality of life and social inclusion". (SEDH, 2009, p.9).

Therefore, if technology facilitates the daily lives of individuals, on the other hand, assistive technology not only facilitates, but also enables people with disabilities to perform tasks that for others, may be something simple, thus, according to (RADABAUGH, 1993 apud BERSCH, 2017, p. 2) "for people without disabilities, technology makes things easier. For people with disabilities, technology makes things possible." The fact is that it is necessary to look at new technologies with a little more "visionary spirit", that is, to see everything that these new resources can provide to individuals without being afraid to use them to their advantage.

In the case of apps, as they are a more accessible and attractive tool, they are a great option for use, because according to (LUCIAN and STUMPF 2019, p.44) "Many of the apps on the market are intended to facilitate the development of children, including autistic children, since they have communication and socialization problems". This type of resource is easily understood by autistic children, as they have playful characteristics, with interactive activities, use of sounds, images and animations, which satisfy the needs of this audience and at the same time help in learning and communicative and social development Lucian and Stumpf (2019), and can help autistic children to perform better in specific areas.

In addition, it is also possible to use adaptable applications for teaching specific content and for the development of skills. In this sense, according to (ARAGÃO; JUNIOR and ZAQUEL 2019, p. 48) "Thus, mobile technological tools, such as the Tablet and

Smartphone, can be used as facilitators of the teaching and learning process in favor of the development of these children with ASD". With regard to specific content, mobile technology can be used to teach mathematics, Portuguese, English, for example, with educational games that can be accessed from anywhere.

Therefore, it is perceived that mobile technology can be used as a facilitator for the development of children with ASD, as it allows access to educational content, offers tools for the development of specific skills and also enables a collaborative environment for learning.

> "Applications have a form of language that is capable of accumulating verbal and non-verbal information, using multimedia resources, such as audio, video, animations, static and moving images, which enable user interaction through digital interfaces". (LUCIAN and STUMPF 2019, p.44).

Finally, it is important to remember that special education should have as its main focus the overall development of the child, with technology being only a resource to assist in this process. "The dynamics of games linked to mobile technology draw attention in a differentiated way, providing a link between the skills necessary for the development of these children and the use of technology" (ARAGÃO; JUNIOR and ZAQUEL 2019, p. 55).

In this sense, knowing the student before applying any teaching method is essential, especially when it comes to students with ASD, who have difficulty giving them something new and out of what is predictable, for this reason assistive technologies are important for these individuals, especially digital ones, as they can be more easily manipulated, in addition to having practicality and being more attractive. Aiming at the above, the following topic shows how the applications can be used as a teaching and learning tool for children with autism, since each of the applications can be inserted according to the child's needs.

METHODOLOGY USED FOR RESEARCH

The research on the applications that can be used to facilitate the teaching and learning process of children with ASD was done in a qualitative bibliographic way, so that we sought to research in blogs, websites, YouTube videos, among others, about apps aimed exclusively at children with autism. Therefore, some applications were downloaded, which individually do not meet the specificities of the child, only with a combination between them, something that will be demonstrated in the course of this research.

Thus, after the research carried out, four (4) applications that best fit the proposal of this study were selected, so the applications EduEdu, Matraquinha, Mita and Rotina Divertida were selected. From this, and in order to collect more information about the apps,

we sought to enter the websites of the platforms of each application and google *play*, to find information about the activities, graph, structure, visual resources, stimuli, interface, among others.

Therefore, in order to obtain more meaningful data, it was necessary to download the applications and use them, making it possible to identify whether the use of these technologies is feasible for children with autism spectrum disorder. All Apps were downloaded for free from the play store and free of charge after use, but some of them have the paid version, which is optional for the user, another important point is that they all have a good rating by parents and other users.

Therefore, the methodology of this research was structured so that first, it is understood what each application is, showing information taken from the websites of the platforms of the Apps along with the interface, then, the characteristics of the Apps and the activities that each one has according to their respective platforms are exposed, finally, considerations were made about the applications and their importance for autistic children.

Finally, a table was prepared with the most important items to be evaluated in this survey in order to observe whether all apps meet these requirements. For this evaluation, a mechanism of scores from 1 to 5 was developed for each requirement mentioned, so that each score means: 1-non-existence; 2- it has insufficiently; 3- it has a form of difficult access; 4- It has easy access, but little developed and 5- completely satisfies use.

THE EDUEDU APP

According to the app's website;

> From a brief evaluation, EduEdu identifies what the child needs to improve and creates personalized activities to ensure school success. Throughout the year, EduEdu follows the child's evolution, monitoring their progress and generating new activities. The material is dynamic and fun, including a variety of activities, games, songs, and texts. (EDUEDU, 2022).

Image 1: EduEdu application interface.

Source: Android list, 2022.

CONSIDERATIONS ABOUT THE EDUEDU APP, AND ITS IMPORTANCE FOR CHILDREN WITH AUTISM

The first important point that needs to be understood is that not only the app should be used during the teaching and learning process of the child with autism, the proposal is that the app be used as a complement to curricular activities, remembering that the student should always participate in the joint activities proposed by the teacher.

As EduEdu has a series of dynamic games that work in the area of Portuguese language and mathematics, the regent teacher together with the support professional, can use the App as a didactic resource for when the student refuses to do the activities or for when he is tired of doing an exercise, in this case, EduEdu should be presented to the student as a game and not as an activity, so that he feels stimulated to learn while playing.

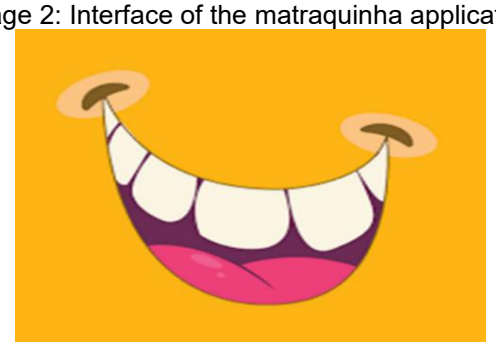
It should be noted that EduEdu is not an application aimed exclusively at children with autism, but the features that the app has make it more attractive to children with ASD, because in addition to having a colorful interface with different characters, the application shows dynamic and educational games that increase the degree of difficulty according to the student's performance, At the end of the activities, a report is also made available that describes how the child's development is going.

THE MATRAQUINHA APP

According to the app's website,

> Matraquinha is an alternative communication app for autistic people to convey desires, emotions and needs. The operation is done through cards that, when clicked, make a voice reproduce what they want to convey. (GOOGLE PLAY, 2022)

Image 2: Interface of the matraquinha application.



Source: Matraquinha, 2022.

CONSIDERATIONS ABOUT THE MATRAQUINHA APP AND ITS IMPORTANCE FOR AUTISTIC CHILDREN

In certain degrees of autism, children have a lot of difficulty in communication, so they cannot express what they are feeling or even their basic needs and desires, in this case the matraquinha application would be of great help, as it enables the student's communication, allowing the teacher to become aware of the child's emotions or what he wants to express.

The matraquinha application has an interface with few colors and the interaction is done through stickers that, when clicked, emit a sound according to what is being shown in the image, for example, if the student is bothered by the noise in the room, he can click on the sticker that shows the character bothered and with his hands covering his ears, Soon the application will emit a sound saying that the place is very noisy, this would allow the teacher to be aware of your discomfort and take some steps to help you.

In this case, so that the student does not become dependent on the application whenever he needs to establish communication, it is advisable that the school support teacher encourages the child to always repeat what is being said by the application, because in this way the teacher can create an interaction mechanism where the student tries to guess what the image is trying to express before clicking so that it emits the sound.

THE MITA APP

According to the apps for education website;

> MITA is a specific early intervention application for children with autism, developmental delay or learning difficulties. The app includes interactive and intelligent tasks designed to help children learn how to mentally put together various objects, a skill that has been proven to achieve great improvements in learning in general. Success with MITA can result, over time, in significant improvements in the child's overall development, specifically in terms of language, attention, and visual skills. (APPS FOR EDUCATION, 2020)

Image 3: Mita app interface.

Source: Google play, 2022.

CONSIDERATIONS ABOUT THE MITA APP AND ITS IMPORTANCE FOR AUTISTIC CHILDREN

mita is an excellent app for children with autism who have great cognitive difficulty, especially for those who cannot identify objects, size, space and distance. The App has a simpler configuration than EduEdu, but still, it provides the child with some playful activities that entertain and at the same time stimulate student learning, the application also analyzes the child's mood.

In the case of children with autism, the app enables early intervention, especially in those who have a significant developmental delay, the tasks included in the app are interactive and should be presented to the child as a game to complement the activities done by the head teacher.

Using Mita both in the classroom and at home can result in significant improvements in a child's overall development, specifically in terms of language, attention, and visual skills. By identifying the student's progress, the teacher can learn about the benefits that the application is providing to the student.

THE FUN ROUTINE APP

According to the website (GOOGLE PLAY, 2022);

> The Fun Routine Application seeks to help parents with children who have some form of difficulty understanding tasks that are daily, such as children with Autism (ASD). With the help of this tool, it is possible to organize the child's daily tasks, where he himself can view and mark his tasks as completed, simulating the task board.
>
> The app is educational and encourages communication. It is quite simple, which makes it very easy to use, both for the guardian and the child to visualize their tasks.

Image 4: Fun routine app interface.

Source: Google play, 2022.

CONSIDERATIONS ABOUT THE FUN ROUTINE APP AND ITS IMPORTANCE FOR CHILDREN WITH AUTISM

It is known that the child with autism needs to follow a routine due to the need for predictability, as the anticipation of events makes him feel safer, so the fun routine application is ideal for this case, as it can be used both at home in basic daily tasks, such as brushing teeth or having lunch, as well as at school for the student to fulfill the activities stipulated by the institution or the teacher.

This application is not aimed exclusively at children with autism, but it can be very useful in the elaboration of the child's routine, as the APP allows the user to manage the routine by creating tasks according to their day-to-day needs, it also rewards with stars and medals, when the activity is carried out within the stipulated time and always warning through alarms when it is time to complete a certain task.

In a classroom context, this application could be used by the teacher as a tool to stimulate and encourage daily activities, the student's entire routine from activities done at home to school tasks are registered on the student's cell phone or tablet, in this way the teacher can have access to all the information regarding the child's routine, This would strengthen the link between school, family and society, as it would allow the teacher to know more about the routine and possible mood swings of his student, and the family would have access to the child's routine and behavior at school.

Table - Numerical evaluation of the applications according to educational aspects

plications	Stimulates reading and writing	Emotional and affective	Exercises reasoning and mathematicians	Stimulates communication	Dynamic and interactive games	Positive reinforcement behaviorism	Modify activities according to the child's progress	Stimulate student se disciplin and organizati
Eduedu	**5,0**	**5,0**	**1,0**	**3,0**	**5,0**	**3,0**	**5,0**	**1,0**
atraquinha	**4,0**	**5,0**	**3,0**	**5,0**	**1,0**	**2,0**	**2,0**	**1,0**
Mita	**3,0**	**5,0**	**5,0**	**3,0**	**5,0**	**5,0**	**4,0**	**1,0**
un routine	**1,0**	**5,0**	**2,0**	**3,0**	**1,0**	**4,0**	**4,0**	**5,0**

Source: Authored by the authors

According to the analyses made, not one of the applications mentioned individually meets all educational needs, with regard to the teaching and learning process of children with ASD, because as it is possible to see in the table above, in an evaluation from 1 to 5 not one of the applications were well evaluated, reaching an average of five in all aspects mentioned in the table, since in some criteria the score is very low, showing that the App does not have these elements or does, but they are poorly developed.

In the case of the EduEdu and Matraquinha applications, reading and writing are exercised, the first for providing a dynamic environment with games and educational characters that stimulate the child, and the first exercises are simple and involve the recognition of vowels and consonants, as the student performs well the activities become more difficult so that their intellect is challenged, In the second app, these features are worked on in a more subtle way, through words and images, the app also teaches the alphabet. However, the other two apps had a negative evaluation, since the *Mita* and Fun Routine apps do not develop these skills.

However, with regard to the exercise of logical and mathematical reasoning, only the Mita application was able to demonstrate a good performance, because in its games a drag-and-drop mechanism and distance of objects are worked, which exercise logical reasoning, while the teaching of mathematics occurs through the notion of quantity and presentation of numbers, on the other hand, Matraquinha also presents the numbers, but in the exercise of logical reasoning and in the elaboration of dynamic games the app leaves something to be desired. In the other applications, the evaluation was low, as neither one of them nor one of the activities meets these requirements.

With regard to emotions and affectivity, all the apps mentioned have a socio-emotional space that recognizes the student's emotions and then names them, something that generates an approximation of the child with the adult. Unlike the stimulus of the student's self-discipline and organization, which are only well developed by the fun routine app.

Another very relevant point that was observed and analyzed is the importance of positive reinforcement or behaviorism, which encourages the student to continue the activities, in this sense three of the applications mentioned presented this mechanism, and the EduEdu and Mita apps, work this scheme at the end of their games, in the case of the fun routine the award is made with stars at the end of a well-done activity, so that he can

later win a weekly medal. According to the performance in the activities or games, the same applications mentioned modify the degree of difficulty according to the child's progress.

Finally, it can be said that communication is also stimulated by all the apps mentioned, but on a regular basis in EduEdu, Mita and Fun, unlike Matraquinha which has a great rating, since this app was created precisely for this purpose.

CONCLUSION

From the understanding of how important assistive technology can be for the teaching and learning of children with autism spectrum disorder, it was observed that the applications can be a more modern and attractive tool, because in addition to being easily accessible, they can be easily downloaded from the *play store*, they also have practicality in their use, that is, the teacher would not need to spend hours producing recreational activities, since he could use the activities of the application in his teaching methodologies.

Another important point is that each of the selected applications can be adapted according to the needs of each student, for example if the student has language difficulties, the teacher should opt for the Matraquinha application to stimulate communication, but if the child has a more advanced cognitive development, the ideal is to use EduEdu. Therefore, it will be up to the teacher, together with the school support professional, to identify the needs of the child with ASD, in view of their level of autism and their particularities.

Therefore, it is concluded that, according to the research carried out, the most efficient applications in the teaching and learning process of children with autism are: EduEdu, Matraquinha, Mita and Rotina Divertida, because each of these applications has a specific characteristic, and that they can fit into different methodologies.

REFERENCES

1. Aragão, M.; Júnior, J.; Zaqueu, L. The Use Of Applications To Assist In The Development Of Children With Autism Spectrum Disorder. Olhares & Trilhas, Uberlândia, V. 21, N. 1, P. 1-14, Jan./Apr. 2019.

2. Bersch, R. Introduction To Assistive Technology. Porto Alegre: [S.N.], 2017. Available At: Https://Www.Assistiva.Com.Br/Introducao_Tecnologia_Assistiva.Pdf. Accessed On: 18 Out. 2022.

3. Icd-10. International Statistical Classification Of Diseases And Related Health Problems. Version 1.6c. [S.L.]: [S.N.], 1998. Available At: Http://Www.Datasus.Gov.Br/Cid10/Downlouad.Htm. Accessed On: 19 Out. 2022.

4. Fernandes, F. Tea In Icd-11: What Changes? Autism And Reality, 14 Jan. 2022. Available At: Https://Autismoerealidade.Org.Br/2022/01/14/Tea-Na-Cid-11-O-Que-Muda/. Accessed On: 20 Out. 2022.

5. França, F. Et Al. Educational Applications As Pedagogical Support For Autism Spectrum Disorders: An Integrative Review Of Brazilian Productions In The Period From 2017 To 2022. Research, Society And Development, V. 11, N. 9, E44211932076, 2022.

6. Abcd Institute. Literacy Without Difficulty. Eduedu, 2022. Available At: Https://Www.Eduedu.Com.Br/?Gclid=Eaiaiqobchmiiaskv8oa_Aivuufiab1hmwbfeaayasaaegj7s_D_Bwe. Accessed On: 12 Dec. 2022.

7. Khoury, L.; Teixeira, M.; Carreiro, L.; Schwartzman, J.; Ribeiro, A.; Cantieri, C. Behavioral Management Of Children With Autism Spectrum Disorders In Conditions Of School Inclusion: Guidance Guide For Teachers. São Paulo: Memnon, 2014.

8. Lucian, B.; Stumpf, A. Analysis Of Applications Aimed At The Learning Of Children With Autism Spectrum Disorder. Design & Technology Magazine, V. 9, N. 19, 2019.

9. Autism. Google Play, 2022. Available At: Https://Play.Google.Com/Store/Apps/Details?Id=Com.Phonegap.Matraquinha&Hl=Pt_Br&Gl=Us. Accessed On: 12 Dec. 2022.

10. Pan American Health Organization. Icd-10. [S.L.]: Ops, [N.D.]. Available At: Https://Www.Paho.Org/Pt/Search/R?Keys=Cid+10#Gsc.Tab=0&Gsc.Q=Cid%2010. Accessed On: 3 Out. 2022.

11. Pine. Language And Cognition Therapy. Apps For Education, 2020. Available At: Https://Appseducacao.Rbe.Mec.Pt/2020/03/05/Terapia-Da-Linguagem-E-Cognicao-Com-Mita/. Accessed On: 12 Dec. 2022.

12. Fun Routine. Google Play, 2022. Available At: Https://Play.Google.Com/Store/Apps/Details?Id=Br.Com.Phaneronsoft.Rotinadivertida&Hl=Pt_Br&Gl=Us. Accessed On: 12 Dec. 2022.

13. Special Secretariat For Human Rights. Assistive Technology. Brasília: National Undersecretary For The Promotion Of The Rights Of Persons With Disabilities, Technical Adjustments Committee, 2009.

Images

Eduedu. Android List, 2022. Available At: Https://Www.Androidlista.Com.Br/Item/Android-Apps/1105693/Eduedu-Avaliacao-E-Atividades-Para-Alfabetizacao/. Accessed On: May 13, 2022.

Rattle. Matraquinha, 2022. Available At: Https://Apps.Apple.Com/Br/App/Matraquinha/Id1423586611. Accessed On: May 13, 2022.

Mita. Google Play, 2022. Available At: Https://Play.Google.Com/Store/Apps/Details?Id=Com.Imagiration.Mita&Hl=Pt&Gl=Us. Accessed On: May 13, 2022.

Fun Routine. Google Play, 2022. Available At: Https://Play.Google.Com/Store/Apps/Details?Id=Br.Com.Phaneronsoft.Rotinadivertida&Hl=Pt_Br&Gl=Us. Accessed On: May 13, 2022.