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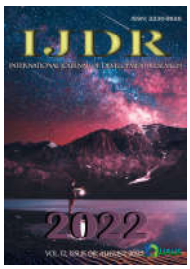

RESEARCH ARTICLE OPEN ACCESS

TOM TOM: A DIGITAL EDUCATIONAL GAME PROTOTYPE FOR THEORY OF MIND ASSESSMENT AND INTERVENTION FOR CHILDREN WITH AUTISM SPECTRUM DISORDER

***[1]Milena de França Monteiro and [2]Izabel Augusta Hazin Pires**

[1]Teacher of the Early years of Elementary School in the Municipal Education Network of Paranamirim, RN and Pedagogical Support, in the State Education Network of RN. Rio Grande do Norte, Brazil; [2]Associate Teacher at the Federal University of Rio Grande do Norte, working in the Department of Psychology and in the Graduate Program in Innovation in Educational Technologies, at Instituto Metrópole Digital. Natal, Rio Grande do Norte, Brazil

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****Corresponding author:***
Milena de França Monteiro

ABSTRACT

Autism is a neurodevelopmental disorder that compromises interaction and social communication, as well as causes behaviors that deviate from the patterns. Therefore, it causes deficits in social skills and cognitive processes inherent to the Theory of Mind, such as understanding and predicting one's own actions and the actions of others. This problem affects the school performance and social relationships of the autistic child. Thus, this article is the result of a research whose main objective was to develop the prototype of an educational digital game, called Tom Tom, for evaluation and intervention in the domain of Theory of Mind in children from 6 (six) to 8 (eight) years old. with Autism Spectrum Disorder. The elaboration and development of the game prototype consisted of pre-production (planning, elaboration of the Game Design Document), production (development of the code in accordance with what was planned) and post-production (technical, content and pedagogical validation). At the time of validation, the game was considered adequate for its purpose, being recommended as a tool that contributes to the expansion of new learning, skills and competences.

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INTRODUCTION

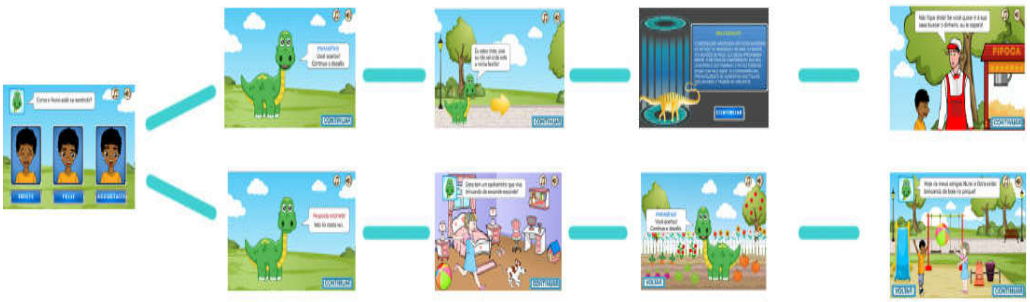
Spectrum Disorder (ASD) is characterized by qualitative differentiations related to interaction, social communication and behavioral patterns. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), ASD is classified as a neurodevelopmental disorder (APA, 2014). It usually manifests before school age, causing weaknesses in personal, social, academic or professional performance, that is, deficits in cognitive and/or social skills. Social skills are essential in interaction processes, such as understanding and using rules, communicating, learning, sharing spaces with others, adapting to different situations, interpreting thoughts and desires (not only of oneself, but of others) (KHOURY ET AL., 2014). Cognitive processes related to the development of social skills are associated with the Theory of Mind (ToM), which consists of the ability to understand and attribute mental and emotional states of oneself or others, allowing to anticipate and interpret behaviors (MARTINS; BARRETO; CASTIAJO, 2014). People with ASD show flaws in the ToM, materialized in the difficulties of establishing and maintaining social relationships, harming their learning process. Thus, the obstacle of adapting a mental response prevents the child from adopting an intentional posture and, consequently, from engaging in school activities, especially traditional and mechanical ones. In this sense, the Digital Information and Communication Technologies (TDIC) are presented as a way to dynamize the regular training environments, being able to be allied to the introduction of new modes of communication for the expression of thoughts, giving new meaning to verbal and visual language skills, allowing the learner to be the protagonist of the construction of their knowledge and externalize their mental processes (ALMEIDA; VALENTE, 2011). Barroso and Souza (2018) elucidate that digital tools enable essential visual experiences for the public with ASD, preventing disorders with "social and cognitive barriers", caused by face-to-face contact, facial expressions or vocal intonations. Thus, a way is found to simulate everyday situations, so that, when faced with similar experiences in real life, they assimilate with such previous experiences in digital format. From this perspective, digital games demonstrate effective results in the field of education, including for children with qualitatively atypical developmental trajectories. Thus, digital games transcend mere entertainment to act as subsidizing tools for the formation of creative and transformative thinking, in different teaching-learning contexts, accompanying intra and interpersonal development, in line with consolidated theories in the areas of education, psychology and from other areas of study of cognitive and social human development (MONTEIRO, 2021). Considering, therefore, the relevance of digital

games being allied to the educational processes of children with ASD, this article discusses a research whose main objective was to develop a digital game (called Tom Tom) for evaluation and intervention in the domain of ToM in children aged 6 (six) to 8 (eight) years with ASD. The design and development of the ToM ToM game, based on Lima et al. (2017), consisted of the stages of pre-production (planning, elaboration of the Game Design Document, based on classic ToM paradigms), production (game prototyping) and post-production (technical, content and pedagogical validation), detailed in the next sessions.

METHODS

Pre-production: In this phase, data about the user, the game's usage environment, the educational objectives, the core content and the expected results were listed. Therefore, there was the participation of individuals with ASD in this process, given the premise that characterizes the neurodiversity movement: "Nothing from us without us". Interviews were carried out at the school, field of work and observation, with children aged 6 to 8 years old, diagnosed with ASD, which helped to reflect on the suitability of interest of a sequence of seven digital games. This interaction was described and analyzed in the article "EdiLim as a tool for the development of games that enhance stimuli for students with ASD" (MONTEIRO; PETRY; TAVARES, 2019). Subsequently, the Game Design Document (GDD) was elaborated, included in this study, based on the ideas of Sousa, Monteiro and Mendonça-Junior (2017), as a landmark document, containing the theoretical basis, the operation and the advantages of the product. . The document presented elements such as theme, mechanics, platforms, phases and other features, being a guide to the proposal, mapping the needs to be met by the game.

Production: The Tom Tom game contemplates as underlying elements the classic paradigms of assessment and intervention in ToM, whose levels are progressively incorporated as the narrative evolves. His narrative is, above all, based on the John and Mary Test (JMT), cited by Tonelli (2009), as an activity of false beliefs of one person in relation to the belief of another. In general terms, the JMT describes the moment when John and Mary see the ice cream man in a square. Then the ice cream man moves to another space, and John doesn't realize that Mary has observed the situation. Soon, John holds a false belief about Mary's belief: that she thinks the ice cream man is in the old place. At this point, the following question is directed to the examinee: Where does John believe that Mary will look for the ice cream man? School children with neurotypical development will probably say that John thinks Mary will look for the ice cream man in the square. In cases of autism, there are difficulties in understanding mental states and in predicting actions based on the weaving of this logic. Classified as a Serious Game, the game aims to enable users to perform real-world tasks (DJAOUTI ET AL., 2011), using stylized representations of people (virtual avatars), as interveners, in order to provide empathy and self-recognition within the game. , through profiles that suit their age group, with characteristics familiar to the user. The stories are made up of everyday situations, incorporating actions of cooperation, sabotage, metaphors and failures of social rules, being associated with verbal and non-verbal tasks. The main character interacts with the others, doing routine activities, such as looking for food, an object or a person, talking, walking, playing, etc. How each phase is resolved will determine the subsequent activity. During the course of the game, questions are present, involving inhibitory control, in the direction of emotional self-regulation, context reality and working memory (important for learning, logical reasoning and problem solving), so that meta-representations referring to the main character are stimulated. , in relation to a second character (MONTEIRO, 2021). According to Monteiro (2021), the main game will have some challenges with two characters, Dora and Nuno. At the end of each phase, the child is referred to another challenge. This referral will depend on the results obtained in the previous phase. If the student reaches the level objective, the game level will change. Otherwise, you will be sent to a level with an equivalent level of complexity (with the same characters, but in other narratives), where you will remain until you hit the challenge and can return to the main game level you were in (Figure a). Altogether, the story has four levels and, for each of them, there is a compatible intervention. As a mediator of the entire context, a character belonging to the children's imagination, the dinosaur Tom Tom, was chosen, promoting a particular experience between the player and the game's history, and revealing new information and facts as each stage is concluded.



Source: Clickideia (2021 apud MONTEIRO 2021)

Figure a. Game logic after hit and miss actions

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure b. TomTom splash screen

Tom Tom has lost his family and wants to find his way back to the Dinosaur Valley, which will be possible if the player manages to complete the challenges until the last phase (MONTEIRO, 2021).The choice of the dinosaur as a character in the initial story came from the perception that, alongside superheroes, cars, trains and astronomy, dinosaurs are mentioned by Ferreira and

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure c. Feedback

Compiani (2015); Arizaga et al. (2016); Lins (2020) as the concentration of interest (hyperfocus) of children with ASD. Thus, scenes with Tom Tom can allow greater engagement in the search for a solution to the main problem, as well as providing feedback for the progress of the game's stages. Tom Tom is presented to the user on the third screen of the game (Figure b). As the game's narrator, Tom Tom participates during all stages, helping to choose the avatar and explaining the challenges of each level. It is responsible for presenting performance feedback, indicating the correct path towards new challenges, in addition to earning rewards, in the form of a "Dinosaur Coin", on which the child clicks and receives information about a certain species of dinosaur (Figure c).). The alternatives for the answers, in most of the challenges, are illustrated through images, contemplating the facial expressions of the characters or the indicated places to look for someone (Figure d). According to Monteiro (2021), the activities listed for this tool are based on the PMBOK (2004), and its steps: understand customer needs, plan the solution, implement the solution, validate the solution and deliver the product.

Post production: The tool was validated in three stages: technical validation, content validation and pedagogical validation. Each segment of professionals participated in the presentation of the proposal, had access to the game and filled out the evaluation instruments. The response options of the instruments were elaborated using a Likert scale: totally disagree, partially disagree, neither agree nor disagree, partially agree and totally agree. Pedagogues with experience in inclusive education, specialized educational assistance and in the work of children with ASD participated in the pedagogical validation, in order to observe whether Tom Tom as a learning object is able to adapt to different learning styles, as guided by Reategui and Finco (2010). The pedagogical aspects that guided this validation stage took into account whether the product presents problem situations that allow the formulation of hypotheses, investigation and/or comparison; the use of resources that enable the capacity for elaboration based on action and reflection; different alternatives to solve a problem; the registration and consultation of actions developed, with a view to resuming learning, by the student himself; encouraging the investigation of new information in other research media; different alternatives for presenting information that adapt to students with different learning styles; content presented in an appropriate manner for different learning styles; contribution to the development of skills and abilities in an active way (MONTEIRO, 2021). Computer Science and Computer Engineering professionals have analyzed the specific guidelines that share technical validation. The functionality of the game was also evaluated according to the ideas of Reategui and Finco (2010), according to the following aspects: robustness (absence of errors, control of unexpected problems, stability); portability (transmission of software from one environment to another, without financial loss or the need to change the operating system) and; the interface (insertion of images, presentation of texts, orientation and navigation, interactivity, aesthetics and affectivity). Psychologists from the Research and Extension Laboratory in Neuropsychology at UFRN evaluated the game in the content aspect. Therefore, they evaluated the game's script in terms of effectiveness and efficiency (development of the instrument, clarity of language, theoretical and practical relevance, etc.). This step was elaborated according to the criteria adapted from Pasquali et al. (2010) and Guimarães, Carvalho and Pagliuca (2015). In addition to the specific aspects for each committee, the validation forms presented sections common to the three groups, containing criteria for the quality of the game content to be evaluated, on a scale from 1 to 10, where 1 was the lowest quality and 10 the highest quality. Then, the instrument presented a space for the issuance of an opinion, so that the judges could present their suggestions for improvement and comments in. A final opinion was filled out about the quality of the game, according to the ten validation variables by Pasquali and collaborators (2010): general assessment of the contents, presentation, organization, clarity, objectivity, usefulness/relevance, updating, reliability, vocabulary and instructional sequence. These items could be assessed as adequate, adequate with changes or inadequate. Finally, they answered about the possibility of indicating the game, being able to tick the options "yes", "yes, but with changes" and "no", the following question: "Would you recommend the Tom Tom game as a tool for expanding learning? " (MONTEIRO, 2021).

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure d. Facial expressions in challenge 04

The results were computed based on the Content Validity Coefficient (CVC), indicated by Pasquali et al. (2010), and Hernandez-Nieto (2002). This method has the purpose of evaluating the agreement between the three judges of each area.

> "Baseado na literatura, o cálculo do CVC foi realizado em cinco etapas: 1. Calcula-se a média das notas dos juízes (M_x); 2. Divide-se a média (M_x) pelo valor máximo que a questão pode receber, chegando ao Coeficiente de Validade Convergente inicial (CVC_i); 3.É calculado o erro (Pe_i), dividindo 1 (um) pelo total de juízes, elevado pelo mesmo número de avaliadores;4. Subtrai-se o CVC_i pelo Pe_i para obtenção do Coeficiente de Validade Convergente final (CVC_c); 5. A média CVC_i ($MCVC_i$) é subtraída pela média do Pe_i (MPe_i), obtendo o Coeficiente de Validade Convergente total do questionário (CVC□), o qual para ser aceitável, deve se obter o valor ≥ 0,70. Além do CVC, foram calculadas as médias de notas atribuídas à qualidade e o percentual recomendação do jogo [...]" (MONTEIRO, 2021, p. 104)

The Likert scale was graded from 1 (one) to 5 (five), in which the highest weight is attributed to the option "totally agree". In the cases of general assessment of the contents, the grades ranged from 1 (one) to 3 (three), whose maximum grade corresponds to the item "adequate".

RESULTS

In this section, the judges' validations about the Tom Tom game will be discussed, in accordance with Monteiro (2021). Analyzing the pedagogical validation, it is emphasized that the pedagogical experts evaluated the product as pertinent and relevant, as a pedagogical resource (Figure e). The average on the overall quality of the game was equivalent to 9.66667. The suggestions for improvement sent by

the group referred to the waiting time for changing the scene after a given command (problem is solved by the technical production team), as well as a test stage with the target audience, which so far has not been possible, due to the pandemic scenario, arising from Covid-19.

ATRIBUTOS	M_x	CVC_i	Pe_i	CVC_c
Apresenta situações-problema que propõem a formulação de hipóteses, a investigação e/ou a comparação.	5	1	0,03704	0,96296
Possui recursos (como exercícios, alternativas de navegação) que oportunizam a capacidade de elaboração a partir da ação e reflexão.	5	1	0,03704	0,96296
É composta por alternativas distintas para resolver um problema.	5	1	0,03704	0,96296
Permite registrar e consultar ações desenvolvidas, para que o aluno resgate o seu processo de aprendizado.	5	1	0,03704	0,96296
Estimula a investigação de novas informações em outros meios de pesquisa.	4,66667	0,93333	0,03704	0,8963
Dispõe de alternativas para apresentação das informações que se adaptam a alunos com diferentes estilos de aprendizagem.	4,66667	0,93333	0,03704	0,8963
Apresenta os conteúdos de maneira apropriada, capaz de se adequar aos diferentes estilos de aprendizagem.	4,66667	0,93333	0,03704	0,8963
Contribui para o desenvolvimento de competências e habilidades de maneira ativa.	5	1	0,03704	0,96296
Total (CVC_t)				**0,93796**

Source: Monteiro (2021)

Figure e. Agreement between pedagogical judges

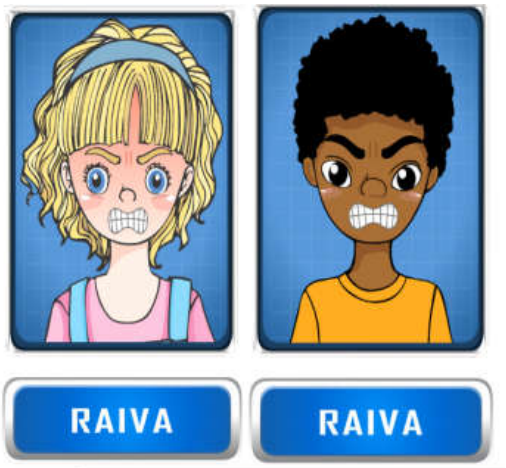
ATRIBUTOS	M_x	CVC_i	Pe_i	CVC_c
Não apresenta erros.	4,33333	0,86667	0,03704	0,82963
Ao apresentar problemas, permite a continuidade da tarefa pelo usuário.	4,33333	0,86667	0,03704	0,82963
Pode ser utilizado em computadores com diferentes configurações.	4	0,8	0,03704	0,76296
Pode ser usado com variados sistemas operacionais (ex. Linux, Windows, MacOS).	4,33333	0,86667	0,03704	0,82963
As imagens são utilizadas de forma a ilustrar conteúdos e explicações.	5	1	0,03704	0,96296
A quantidade de imagens apresentadas em cada cena é adequada.	4,66667	0,93333	0,03704	0,8963
O contraste entre fontes e fundo de tela está adequado para a leitura dos textos.	5	1	0,03704	0,96296
As fontes apresentam tamanho adequado, ou existe a possibilidade de ajuste, conforme necessidade do usuário.	4,66667	0,93333	0,03704	0,8963
Os textos longos estão alinhados à esquerda.	4,33333	0,86667	0,03704	0,82963
Apresenta consistência visual na apresentação de informações.	4,66667	0,93333	0,03704	0,8963
É possível ao usuário saber em que ponto do jogo se localiza, por meio de títulos e rótulos.	3,33333	0,66667	0,03704	0,62963
Os ícones de acesso a outras funções são identificáveis de modo fácil.	4,66667	0,93333	0,03704	0,8963
Os recursos interativos permitem que o usuário altere configurações do sistema, para obtenção de respostas distintas, em conformidade com suas ações.	4,66667	0,93333	0,03704	0,8963
Apresenta recursos gráficos que melhoram o aspecto estético da interface, tornando-o prazeroso.	3,66667	0,73333	0,03704	0,6963
Sua interface apresenta elementos (como personagens) que exploram a expressão de afetividade.	5	1	0,03704	0,96296
Total (CVC_t)				**0,851852**

Source: Monteiro (2021)

Figure f. Agreement between technical judges

The general average attributed by the technical experts was 8.33333. The lower result than the first segment is justifiable through the detailing of suggestions from this group, in addition to evaluating distinct attributes of the pedagogues (Figure f). Technical judges 01 and 03 reported aspects such as the need to review the non-clickable arrow, present in Tom Tom's path, as well as the movement of the characters' mouths and the neutrality of the facial expression that represented "anger", aspects changed after this step. validation (Figure g). Judge 03 pointed out that in case of an error at a given moment of the game, the system continued the stage, which may be caused by the fact that the user did not wait for the time to finish the narration and consequent loading of the page. This indicated a failure similar to the one mentioned above by one of the pedagogical judges.

Thus, a new factorization was made, both to solve the waiting time, and the problem of passing from one screen to another after making a mistake. Furthermore, variations were suggested to the player and decision making in the intervention challenges. However, there were time limitations for this aspect to be modified for this first version of the prototype. The texts inserted in the buttons were also pointed out as something to be revised. However, they are guidelines present in the accessibility proposal followed for the production of this learning object. This guarantees access to information in different ways, because using image, text and sound it is possible to achieve different learning styles. The absence of more than one operating system and the possibility of verifying how the system reacts to concurrent accesses prevented a more consistent evaluation. A positive factor is that the game has been programmed to be accessed on any model of computer, mobile phone and browser: Windows, Linux, iOS, Android. The average equivalent of Tom Tom's overall quality assigned to the game's quality was 9.33333. Content agreement analysis is specified below (Figure h).



Source: Clickideia (2021 apud MONTEIRO 2021)

Figure g. Updated angry expressions

ATRIBUTOS	M_x	CVC_i	Pe_i	CVC_c
O conteúdo está adequado às necessidades que se propunha.	5	1	0,03704	0,96296
Contém informações necessárias à compreensão do conteúdo.	5	1	0,03704	0,96296
Apresenta conteúdo e informações devidamente organizados.	4,66667	0,93333	0,03704	0,8963
Suscita interesse ao seu uso.	4,66667	0,93333	0,03704	0,8963
Possibilita reflexão sobre o conteúdo.	5	1	0,03704	0,96296
Permite colocar o conteúdo em prática, em situações da vida real.	4,66667	0,93333	0,03704	0,8963
Estimula a aprendizagem sobre o conteúdo.	4,66667	0,93333	0,03704	0,8963
Possibilita a busca de informações sem dificuldade.	5	1	0,03704	0,96296
Sua apresentação é atrativa.	4,66667	0,93333	0,03704	0,8963
Permite envolvimento ativo e interativo na apreensão do conhecimento.	5	1	0,03704	0,96296
Oferece navegação virtual sem dificuldades.	5	1	0,03704	0,96296
Total (CVC_t)				**0,93266**

Source: Monteiro (2021)

Figure h. Concordance between content judges

His suggestions were the need for an introduction to the understanding that the dinosaur had been lost in the neighborhood of children Dora and Nina (Figure i); clarification about the purpose of dinosaur coins; and an animation scene for the presentation of dinosaur species. It was felt that these ideas would make the story more understandable, coherent and dynamic. So the changes were made. To solve the second orientation, the coins were better identified, through narratives, which suggest that by clicking on the image, they can be redeemed (Figures J and K).

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure i. Explanation of the relationship between Tom Tom and the children

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure j. Explanation of the coin's purpose

Source: Clickideia (2021 apud MONTEIRO 2021)

Figure k. Narrative that suggests clicking on the coin image

Regarding the third point, the dinosaur species presentation screens were animated: the animals began to appear as holographic representations. Considering the experts' validations, it is important to reiterate that the calculated CVC values met the acceptance parameters clarified by Pasquali et al. (2010), and Hernandez-Nieto (2002), given the adequacy of the items analyzed through a situation of numerical equality (3x3). Answering the question: "Would you recommend the ToM ToM game as a tool for expanding learning?" 8 (eight) of the 9 (nine) evaluators recommended the game, and 1 (one) would recommend it, as long as the suggested changes are made.

DISCUSSIONS

Based on the initial proposal, the Tom Tom game was designed to be used in the school environment, whether in the regular classroom or, for example, in a Specialized Educational Service room, with educational objectives as guides, and fostering emotional intelligence, through empathy, cooperation, self-knowledge, self-care, improvement in social relationships. Situations that simulate real-life contexts also support intellectual development, through logical reasoning. Thus, such a tool combines reasoning, social interaction and emotion. The school is a space where game experiences can be experienced in face-to-face contact, allowing professionals to assess their relevance, as well as the possibility of handling situations of anxiety or frustration, whether in the "virtual world" or real. In turn, a work whose centrality is in ToM suggests the acquisition of knowledge about the subject and, therefore, an approach to professionals who have the necessary training to evaluate each case: the psychologist. Thus, it is expected that the use of Tom Tom will be extended to the area of psychology and health, being able to be a resource used in clinical trials. After all, its core objective is to intervene and progressively assess the stages of ToM (MONTEIRO, 2021). Although most of the changes suggested by the validation of the judges have been considered, new versions of the prototype will insert a score table as a feedback system; a progress bar to locate the game's stages; the mobility of the characters' mouths, aiming at greater animation of the scenes; and a robust metric system, in order to obtain the results of each user in a database, and generate a report with the indexes for analysis by professionals (MONTEIRO, 2021). It is expected that these changes, added to what has already been incorporated into the product, will help children to re-signify experiences, involving emotions, senses and reasoning. That the target audience get involved with the narrative, feel that they participate in the challenges, engage in problem solving, and develop skills and competences, arising from social cognition. May it be another instrument that facilitates the school, educational and social inclusion of autistic people.

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REFERENCES

Almeida, M. E. B.; Valente, J. A. 2011. Tecnologias e currículo: trajetórias convergentes ou divergentes? São Paulo: Paulus (Coleção Questões Fundamentais da Educação – 10). p. 5-37.

Arizaga, M. P. G. et al. Doble excepcionalidad: análisis exploratorio de experiencias y autoimagen en estudiantes chilenos. In: Revista de Psicología, Vol. 34 (1), 2016 (ISSN 0254-9247). Disponível em: http://dx.doi.org/10.18800/psico.201601.001. Acesso em: 10 set. 2020.

Associação Americana de Psiquiatria – APA (2014). Manual diagnóstico e estatístico de transtornos mentais [recurso eletrônico]: DSM-5 / [American Psychiatric Association ; tradução: Maria Inês Corrêa Nascimento ... et al.]; revisão técnica: Aristides Volpato Cordioli ... [et al.]. – 5. ed. – Dados eletrônicos. – Porto Alegre: Artmed.

Barroso, D. A.; Souza, A. C. R. (2018) O uso das tecnologias digitais no ensino de pessoas com autismo no Brasil. In: Anais Congresso Internacional de Educação e Tecnologias. Encontro de Pesquisadores em Educação a Distância. 2018. Disponível em: http: //www.cietenped. ufscar.br. Acesso em: 20 ago. 2019.

Djaouti, D. ET AL. Origins of serious games. In: MA, M.; Oikonomou, A.; Jain, L. C. (orgs.) (2011). Serious games and edutainment applications. Editora: Springer London, 1 ed. DOI: 10.1007 / 978-1-4471-2161-9_3.

Ferreira, S. M. S.; Campiani, M. (2015) A complexidade do ensino de ciências a partir da linguagem analógica para alunos com transtorno do espectro autista. In: X Encontro Nacional de Pesquisa em Educação em Ciências – X ENPEC. Águas de Lindóia, SP – 24 a 27 de Novembro de 2015. Disponível em: http://www.abrapecnet.org.br/enpec/xenpec/anais2015/resumos/R0140-1.PDF. Acesso em: 15 set. 2020.

Guimarães, F. J.; Carvalho, A. L. R. F.; Pagliuca, L. M. F. (2015) Elaboração e validação de instrumento de avaliação de tecnologia assistiva. In: Rev. Eletr. Enf.; 17(2):302-11.

Disponível em: http://dx.doi.org/10.5216/ree.v17i2.28815. Acesso em: 06 jul. de 2020.

Hernandez-Nieto, R. (2002) Contributions to statistical analysis. Mérida: Los Andes University Press.

Khoury, L. P. et al. (2014) Manejo comportamental de crianças com Transtornos do Espectro do Autismo em condição de inclusão escolar: guia de orientação a professores. São Paulo: Memnon. Livro eletrônico.

Lima, M. B. et al. (2017). Construção e validação de vídeo educativo para orientação de pais de crianças em cateterismo intermitente limpo. In: Revista Escola de Enfermagem da USP. 51:e03273. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0080- 126 62342017000100462&lng=en&nrm=iso&tlng=pt. Acesso em: 25 fev. 20020. DOI: http://dx.doi.org/10.1590/S1980-220X2016005603273

Lins, M. C. (2020). A mediação psicopedagógica no processo de aprendizagem de crianças com transtorno do espectro autista na educação infantil. In: Revista Educação em Foco. Edição nº 12. Disponível em: https://portal.unisepe.com.br/unifia/wpcontent/uploads/sites/10001/2020/06/A-MEDIA%C3%87%C3%83OPSICOPEDAG%C3%93GICA-NO-PROCESSO-DE-APRENDIZAGEM-DECRIAN%C3%87AS-COM-TRANSTORNO-DO-ESPECTRO-AUTISTA-NAEDUCA%C3%87%C3%83O-INFANTIL.pdf. Acesso em: 15 set. 2020.

Martins, C.; Barreto, A. L.; Castiajo, P.(2014) Teoria da mente ao longo do desenvolvimento normativo: Da idade escolar até à idade adulta. Análise Psicológica, 1 (XXXII): 377-392. Disponível em: http://www.scielo.mec.pt/scielo.php?script=sci_arttext&pid=S0870-82312013000400005. Acesso em: 11 fev. 2020.

Monteiro, M. F.; Petry, A. S.; Tavares, R. J. C. (2019). O EdiLim como ferramenta de elaboração de jogos potencializadores de estímulos de alunos com TEA. In: Prometeu, Ano V, n. 5. ISSN 2175-0920. Disponível em: http://lte.ce.ufrn.br/prometeu/revistas/revista_2019/2.O-EDILIM-COMOFERRAMENTA.docx.pdf. Acesso em: 11 jul. 2020.

Monteiro, M. (2021). Tom Tom: Jogo Educacional Digital de suporte à Teoria da Mente para crianças no Transtorno do Espectro do Autismo. Dissertação de Mestrado em Inovação em Tecnologias Educacionais. Instituto Metrópole Digital. Universidade Federal do Rio Grande do Norte. Natal, RN, Brasil. Disponível em: https://repositorio.ufrn.br/bitstream/123456789/32437/1/TomTomjogo_Monteiro_2021.pdf

Pasquali, L.; Cols. (2010) Instrumentação psicológica: Fundamentos e práticas. Porto Alegre, Brasil: Artmed.

Reategui, E.; Finco, M. D. (2010). Proposta de Diretrizes para Avaliação de Objetos de Aprendizagem Considerando Aspectos Pedagógicos e Técnicos. In: Revista Novas Tecnologias na Educação. CINTED-UFRGS. V. 8 Nº 3. Disponível em: https://seer.ufrgs.br/renote/article/view/18066/10653. Acesso em: 16 mar. 2020. DOI: https://doi.org/10.22456/1679-1916.18066

Sousa, R. A. O. Monteiro, J. V. Mendonça-Junior, G. M. (2017). Desenvolvimento Visual e Avaliação do Jogo Mobile Pet Shelter. In: Anais SBC – Proceedings of SBGames. Curitiba – PR. p. 252-260. ISSN: 2179-2259. Disponível em: https://www.sbgames.org/sbgames2017/28939arw2923/ARTES_E_DESIGN/FULL_PAPERS/175504_2_versao_preliminar.pdf. Acesso em: 17 mar. 2020.

Tonelli, H. (2009). Autismo, Teoria da Mente e o Papel da Cegueira Mental na Compreensão de Transtornos Psiquiátricos. In: Psicologia: Reflexão e Crítica, 24 (1), 126-134.

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