Mediated reading of children's digital literature

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Abstract

In recent years, we have seen an increase in the production of digital works for children and, due to their uniqueness and complexity, they open new discussions on the practice of mediated reading. This article aims to reflect on the mediation demands necessary to ensure the involvement of young children in digital literary reading situations. We present analyses of two studies conducted in Brazil, the first involving literary reading on mobile devices, in the family context, by children between three and ten years of age, and the second, in the reading of digital works on the computer by five-year-old children in the school context. The findings of the two studies point to distinct categories and modes of mediation that relate to the types of devices that were performed the readings, as well as the semiotic and interaction specificities of each work. We found that children's readers need guidance and motivation of the adult mediator to execute reading strategies and thus understand the operation of the work and be able to engage effectively and autonomously.

Keywords: Children's digital literature. mediation. reading strategies.

Resumo

Mediação de leitura literária digital com crianças

Nos últimos anos, temos visto um aumento na produção de obras digitais para crianças, que, devido à sua singularidade e complexidade, abrem novas discussões sobre a prática da leitura mediada. Este artigo tem como objetivo refletir acerca das demandas de mediação necessárias para garantir o envolvimento das crianças em situações de leitura literária digital. Apresentamos análises de duas pesquisas realizadas no Brasil, a primeira envolvendo a leitura literária em dispositivos móveis, no contexto familiar, por crianças entre 3 e 10 anos de idade, e a segunda, a leitura de obras digitais no computador, por crianças de 5 anos de idade, no contexto escolar. As descobertas dos dois estudos apontam categorias e modos de mediação distintos, que se relacionam aos tipos de dispositivos em que foram realizadas as leituras, assim como às especificidades semióticas e de interação de cada obra. Verificamos que as crianças leitoras necessitam de orientação e motivação do adulto mediador para a execução de estratégias de leitura, para compreender o funcionamento da obra digital e conseguir se engajar de forma efetiva e autônoma.

Palavras-chave: Literatura digital infantil. Mediação. Estratégias de leitura.

Resumen

Mediación de la lectura literaria digital con niños

En los últimos años, hemos visto un aumento en la producción de obras digitales para niños, que por su singularidad y complejidad abre nuevos debates sobre la práctica de la lectura mediada. Este artículo tiene como objetivo reflexionar sobre las demandas de mediación necesarias para garantizar el envolvimiento de los niños en situaciones de lectura literaria digital. Presentamos análisis de dos investigaciones realizadas en Brasil, la primera de lectura literaria en dispositivos móviles, en el contexto familiar, con niños de 3 a 10 años, y la segunda, la lectura de obras digitales en ordenadores, con niños de 5 años, en el contexto escolar. Los resultados de los dos estudios señalan distintas categorías y modos de mediación, que se relacionan con los tipos de dispositivos que se realizaron las lecturas, así como las especificidades semióticas y de interacción de cada obra. Descubrimos que los niños lectores necesitan orientación y motivación del mediador adulto para ejecutar estrategias de lectura, para comprender el funcionamiento de la obra digital y conseguir involucrar de manera efectiva y autónoma.

Palabras clave: Literatura digital infantil. Mediación. Estrategias de lectura.

Introduction

Given the expanded use of digital devices, such as computers and touchscreens, and with the rapid advancement of digital technology, mobile devices (e.g. tablets, iPads, and smartphones) have been increasingly used by young children (MILLER, WARSCHAUER, 2014; PANORAMA MOBILE, 2017, CHAUDRON et al, 2018). Their activities with digital devices revolve around recreation, seeking information, reading, creating and communicating (CHAUDRON et al, 2018) through a variety of environments and digital text genres. Undeniably, nowadays there is an increasing digital convergence (JENKINS, 2009), establishing multimedia integration, which allows readers to browse through different platforms on the same device. In other words, society is experiencing now the anthropological turn (CANCLINI, 2015) in reading, especially in literary reading, which is increasingly expanding as technology evolves and as digital devices advance, and which, as explained below, have greatly influenced children's literature.

Digital literature (HAYLES, 1999; MURRAY, 2003; TORRES, 2004; UNSWORTH, 2006; TURRIÓN, 2014a) encompasses materials created with digital technology and to be read on digital devices. In recent years, the production of digital literature for children has been considerably increasing. Such literature comprises writings and creations that involve programming language, moving images, sounds, links and other resources that demand intense user engagement in reading. The emergence of children's digital literary materials to be read on computers and later on mobile devices (e.g. tablets and iPads) has quickly attracted the attention of several researchers (SCHWEBS, 2014; AL-YAQOUT; NIKOLAJEVA, 2015; TURRIÓN, 2014b; YOKOTA, 2015; SARGEANT, 2018) interested in understanding the phenomenon of children's digital literature reading.

However, children's digital literature, mainly due to its uniqueness and complexity, incites new discussions around the practice of mediated reading, whether performed by teachers or parents. Kucircova (2018) conceptualizes mediated reading as "personalized reading", be it on screen or another medium. When the child reads a particular text, the adult can create situations or ask questions, relating the narrative to the readers' previous experiences, which can include the child's memories. According to the above author, when adults personalize children's stories, they increase children's story comprehension, add coherence to their memories and help them recognize patterns in the world around them.

In a study on digital reading practices in family and school settings with 2-6-year-old children, Real and Correro (2015) verified that, without the presence of a mediator, children's comprehension of the story's multimedia elements remains solely as a game practice (ALVES, 2015). In situations where children need to solve some type of challenge to continue reading, they tend to employ interaction movements and behaviors similar to those they do when playing a digital game, intermittently zapping or touching the

screen (ALIAGAS & MARGALLO, 2017). Compared to print books, digital texts have the potential to combine a wider range of senses because their multimodal features can stimulate visual, auditory, kinesthetic, and tactile senses (NEUMANN et al., 2017).

In this context, this article aims to reflect on the demands of mediated reading in terms of children's engagement in digital literature reading. It analyzes two surveys carried out in Brazil within the scope of mediated reading of children's literature on digital devices. The first survey, in a family setting, comprised 3-10-year-old children reading digital texts, mediated by an adult, and (2) the second survey, in a school setting, comprised 5-year-old children reading digital texts, mediated by a teacher. The findings of the two surveys point to different criteria and categories of mediation according to the types of devices used for reading, and the interactive and semiotic specificities of each text.

Literature review

Children's use of digital technologies and development of digital literacy

Reading and writing on digital devices, that is, digital literacy (SOARES, 1999; NEUMANN et al., 2016; BARON, 2019) has become more and more common owing to the expanded use of digital technologies. Chatting and texting via mobile devices is already a reality among children aged 3 years onwards (MARSH et al., 2017). In Brazil, the data from the 2017 survey by Panorama MobileTime Opinion Box showed that 9% of 0-to-3 year-old children have their own smartphone and 41% of those who do not, use their parents' device. Besides, smartphone ownership by children reaches 46% among 7-to-9-year olds. These data indicate that the practice of digital literature reading among children is quite common from a very young age and begins in the family environment.

The survey "Retratos da Leitura no Brasil" [Portraits of Reading in Brazil] by Instituto Pró-Livro investigates the profile of readers in the country and, in its latest edition, published in 2016, collected data about digital reading. The results showed that the most cited activities carried out on the Internet by 5-to-10-year-old children are as follows, in decreasing order: playing games; watching videos, movies and TV; listening to music; exchanging messages on WhatsApp; receiving e-mails; and participating in social networks, forums and blogs. The reading activities most cited by children, regarding Internet use, are those assigned by teachers as school projects, accounting for 44% thereof, followed by reading news, updates, newspapers, books and magazines, which together reach 44% as well. Online reading activities for looking up information, learning and sharing knowledge accounted for 32% and, in this particular edition, reading fanfics represented 1% of the surveyed children. The survey uses the terms activity and reading activity as distinct actions; however, both cases regard digital reading.

The International survey coordinated by Chaudron et al. (2018), carried out with 234 families in 21 European countries, revealed that of the different digital devices used by children, tablets and smartphones

are the most used ones for their multiple functions and their ease of mobility. According to the survey, the children's main activities comprise relaxing, entertainment, seeking information, learning, creating and communicating. All these activities are carried out using Google, Youtube, Tv, games, a variety of applications, including those for instant communication, video recording, image capture, social networking, among others. Finally, Marsh (2019, p. 24) stresses that one of the COST-Action working groups, "The Digital Literacy and Multimodal Practices of Young Children" (DigiLitEY), funded by the European Union Commission between 2015 and 2019, found strong evidence that young children are, from birth, immersed in a media and technology-rich environment.

These two surveys allowed observing that contemporary children's culture has been permeated by the digital writing culture, that is, reading and writing on digital devices has been part of children's routine from an early age. In this context, the concept of digital literacy has been discussed from a cultural, social, anthropological, technological, and pedagogical perspective (SOARES, 2002; DUDENEY et al, 2016; BARON, 2019; MARSH, 2019). Baron (2019) refers to digital literacy from a perspective focused mainly on the use of digital technology. For the author, digital literacy is related to the set of skills necessary for an individual to access information and services from different digital devices, such as tablets, computers and smartphones, digital televisions, digital cameras, wearable devices (e.g. HMDs), that is, it is related to learning multiple technological skills, thus becoming digitally literate (BARON, 2019). However, Baron (2019) resorts to a socio-cultural perspective when stressing the need of an individual to know how to use such devices according to the everyday life demands of reading and writing, and proposes, as did Soares (2002), a definition of the term in a broader perspective of social practices underlying reading and writing in digital environments. Marsh (2019, p. 21) expands the concept of digital literacy to reading and writing practices that also include non-digital materials. After all, reading and writing practices may resort to different media, but all of them are connected by the same communication objective.

Dudeney et al. (2014) created two new concepts based on the demands of digital literature reading – multimedia literacy and mobile literacy. In multimedia literacy, the authors consider the fact that users are confronted with proliferating pictorial displays of information online, ranging from tag clouds and visual search results to digital stories, among others, which demand comprehension not only of verbal texts, but also visual, static or moving texts. When reading digital materials, the simple representation of an icon (to click/start the story or interact with the texts) may be decisive. Mobile literacy, in turn, arises from the development and intense use of mobile devices (tablets and smartphones), hyper-connectivity and a new sense of space, once data, books, photos, videos, applications and other resources can be shared and connected with other users – a fact made possible by the ease brought about by technological mobility. It can be stated that these skills are covered in the definition suggested by Soares (2002) and Marsh (2019), who proposed a broad conceptualization of digital literacy, comprising the need of a diversified skill set for

reading and writing in digital apparatuses. The aforementioned definitions help understand the phenomenon of digital literature reading based on the skills necessary for the development of children's digital literacy.

In addition to being readers, children have had the opportunity of being writers thanks to the creation of specific software for their age group. For example, when playing with digital manipulatives such as programmable Lego bricks, children can create their own characters, robotic creatures that move and interact with each other (LIEBERMAN et al., 2009). By the same token, activities of writing texts and rewriting alphabet letters and words have proved engaging and effective in children's emergent literacy with digital and non-digital tools (NEUMANN, 2016). As could be observed, digital culture mobilizes literacy practices (STREET, 2014), behaviors, habits, values, which modify the ways of thinking, communicating, learning, playing with the children of today, of this century, and in this space, in each society, in each family, within different but connected contexts.

Digital literature reading among children

The reading of literary fiction among children has become a common practice in digital culture given the facilitated access to a variety of reading materials disseminated on television programs, digital games and animated videos on Youtube (UNSWORTH, 2006). The current scenario provides countless digital texts aimed at children; however not widespread in Brazil. Because it is relatively recent, the production and dissemination of digital literature (MURRAY, 2003; TORRES, 2004; UNSWORTH, 2006; HAYLES, 2009; TURRIÓN, 2014a; SERAFINI, KACHORSKY & AGUILERA, 2016) takes place by means of authors' websites and the applications that they sell, or when they make their materials available free of charge on the Internet. Defining to which type or genre a certain text belongs, whether it is digital literature or not, has always been a controversial topic, since the diversity of texts, their multidimensions, their levels of complexity and their rapid transformations due to the advances in the technologies used to produce them, can generate dubious categorizations of digital literary texts. In addition, the categories created and taken as a reference for the analysis of such texts may become obsolete in a short period of time.

However, to help understand the types of texts read by the children participating in the two surveys described above, the present article will categorize the texts into two subgenres of children's digital literature (GABELICA, 2018), namely: 1) web-based interactive narratives (for computers); and 2) literary apps or app books (for mobile devices). A strong similarity between these two subgenres regards the reader's engagement in reading, that is, there is the possibility, in both cases, of the reader participating physically and actively in the stories. It is just the text format and the e-reading device that differentiate these two subgenres: the first requires a computer and a web platform, and the second, on the other hand, allows reading on a mobile device (tablets or smartphones, iOS or Android). While the former does not

require, for the most part, download or installation on the device, as the material is often available on the author's website, free of charge and openly, the latter requires download from an app store (Google Play or App Store) and installation on the device.

According to Correro (2014), digital books for children can be defined as hybrid, multimodal and multisensory materials, in which the reader can find a varied set of texts, images, sounds, as well as interactive resources that will foster the child's motivation and promote creative thinking about the story.

In terms of literature reading with the use of digital technologies, some studies (CINGEL & PIPER, 2017; KUCIRKOVA & LITTLETON, 2016; BUS, NEUMAN & ROSKOS, 2020; CHRIST, WANG & ERDEMIR, 2016) have presented results about the effects of animated and interactive resources in mediated reading. Christ et al. (2019) investigated reading patterns among 5-6-year-old children while reading app books in the school setting. Reading patterns varied, as some children tended to browse pages without using the hotspots, while others stayed on a single page for a while, rereading the text and making use of hotspots persistently. This suggests that an adult mediator with previous experience in digital literature reading can help the child reader to follow the storyline and feel motivated to click/tap on links, drag objects or take other actions aligned with the story, pointing or indicating ways to construct meaning out of the text, with the multiple semiotic resources presented (PEREIRA, SILVA, ARAÚJO & BORGES, 2020).

Although in a small number, Brazilian researchers have focused their efforts on investigating children's digital literature reading and the reception thereof among young children (MORO & KIRCHOF, 2018; MORO, 2018), for instance, by analyzing sound resources of literary apps on how exactly the child readers listen to such type of digital text (MORAES, 2019). Other studies have focused on the interaction of children with app books by means of parents' mediation and construction of meaning based on the children's reading responses to the multimodal potentiality of this type of material (FREDERICO, 2018). Other studies have sought to create educational actions using digital literature (ARAÚJO et al, 2019; ARAÚJO, 2019).

Mediated reading of children's digital literature

Reading digital texts demands cognitive development in order to construct meaning from the various semiotic resources presented, whether verbal, visual or audio. Added to these cognitive skills is the development of reading conditions, that is, sociocultural knowledge related to text genre, cultural diversity, language, previous knowledge and the device on which the text is read. In terms of the socio-cultural aspects related to digital literature, the child needs to have previous knowledge about the electronic literature genre (HAYLES, 2009), for instance, telling whether it is digital poetry, hyper-fiction, or generative poetry. Still on these aspects, one must also consider on which digital device (tablet, smartphone or computer) the text

will be read, whether the device has a touch screen or whether it is keyboard-based, and even its material shape (whether the keyboard is virtual or physical).

These aspects related to socio-cultural knowledge and digital literacy will influence the choice of most appropriate reading strategies to read the text. The devising of strategies and the use of varied procedures should be considered for later adaptation to the diverse and multiple situations of reading and support. Solé (2008) suggests three strategies to be used before, while and after reading. Active strategies before reading comprise having previous knowledge about the story, following some procedures such as: motivation for reading; reading objectives; predictions about the text; and questions (SOLÉ, 2008, p. 89).

After the child's predictions about the text, it is time to proceed to the while-reading strategies. To read digital books, readers need first to know how to use them, how they work, where links are located, whether it is necessary to click, tap, drag, zoom in and out, move the page, type, or even move the body, that is, when gestures are necessary to successfully complete the reading. In print books, similarly, the child needs to know how it is structured, where it starts and where it ends, identify cover elements and page corners. All those elements can be sought by exploring the book summary, the linguistic resources present in the text, or just by browsing around to understand how the material was created and find out if it is a book with popups, a book with only images, or a book with blank spaces for the reader to fill in. Some authors (CASSANY, 2006; COSCARELLI, 2016) point out that it is all about 'navigating', that is, to read is also to navigate, whether in print or digital books.

The strategies applied while reading digital literature are not fixed, and different situations may occur, whether with the presence of a mediator or not. The child can opt for reading "independently", using personal strategies based on the semiotic resources that unfold and provide clues for the following of the storyline. Story comprehension, when one acts as a mediator in a reading activity, is grounded on the principle that visual resources like animations and interactions, as well as verbal and audio resources, indicate clues or means by which children can gesture according to a certain narrative context. However, children do not always understand the meaning of the semiotic resources that appear in the electronic book, which leads them to question the methods and modes of interaction. The purpose of reading, in such cases, is for the sheer pleasure of reading a certain text, in a way that the child feels free to read individually, without the presence of a mediator.

Given the heterogeneous nature of digital texts, in each type of digital literature practice the reader needs to be introduced to reading once again, becoming familiar with new instructions, rules and settings, new types of texts, new combinations between text, image, movement and/or music (GOICOECHEA, 2010).

Mediated reading results from the action of a mediator, whether teachers, classmates or, if in the family setting, parents, grandparents, siblings. When it comes to reading strategies, adequate planning is

necessary to deal with the implications and challenges imposed by reading per se (SOLÉ, 2008). While-reading activities are therefore devised for a specific purpose: to encourage readers to make predictions about what they are reading so that they can engage in and construct meaning out of the text.

This article will focus on the while-reading stage in which the reader devises strategies in the course of reading. As for digital literature reading, mediation varies according to the type of text and its form of presentation (verbal, visual, audio, interactive, animated), as well as children's age and individual experiences. In digital literature reading in family settings, parents tend to adjust mediation according to the knowledge and cognitive development of their child, promoting different forms of verbal guidance to encourage the child reader to understand the story (KIM & ANDERSON, 2008). However, Pereira et al. (2019) point out the importance of mediation by a "more proficient" adult to stimulate children through constant dialogue, encouraging them to interact with the digital book.

Methodology

The data presented in this article derived from two surveys carried out in Brazil with 3-to-10-year-old children engaged in digital literature reading, in family and school settings, mediated by adults. The data from the two surveys were analyzed following these three criteria: (1) mediation for emergent literacy (in contact with digital media) and digital literacy (in a broader sense); (2) mediation for gestures and behaviors in digital reading; and (3) mediation for reading strategies towards children's engagement.

Survey 1

Survey 1 was carried out in 2016 in family settings with 3-to-10-year-old children in their homes, in the city of Osório, state of Rio Grande do Sul, Brazil, comprising 5 meetings with each group of readers. The survey aimed to analyze how children in that age group read digital literature in the family environment. Interviews were conducted with three families about the children's reading preferences and the use of digital technologies. In a second step, the children read app books and were organized into three groups of readers, namely: Group 1 (Gabriel, 3 years old); Group 2 (Elena, 4 years old; and Isabella, 7 years old); Group 3 (Ana Paula, 8 years old; and Rafael, 10 years old). Although the reading was done individually on mobile devices (tablets and iPads), there were times when the children requested the surveyor's mediation or family participation. Thus, the app books selected for the study were appropriate for the level of digital literacy and reading/writing skills of each group of readers, also taking into account their previous experience with digital technology.

Reading the app books: *Mini Zoo*; *Chomp*; *Quem soltou o Pum?*; and *Spot*

The reading activities for the study included eight app books, however, for the purposes of the proposed analysis, only four of them will be considered, namely: *Mini Zoo[1]*, *Chomp[2]*, *Quem soltou o Pum?* *[Literally: Who let out Toot?] [3]* and *Spot[4]*, which were read by the children either individually, with their parents and/or with the surveyor's intervention. The app books have, as common characteristics, interactive resources of touching, pinching-to-zoom and swiping over the characters and scenarios in the story, which makes reading possible even for children not yet literate or who are still acquiring initial literacy.

For each group of readers, a specific plan was structured based on the three stages (before, while and after reading), as suggested by Solé (2008), which served as semi-structured guiding plan for the activities conducted with the children. In the first stage (before reading), playful and informal conversations were held with the children in order to motivate them to read. The second stage (while reading) provided moments with and without mediation by an adult, thus prioritizing freedom for readers to interact as spontaneously as possible. In the third stage (after reading), the children were given a moment for interpretation or a simple dialogue about the stories, either through conversations about the readings or through a transfer activity (SARAIVA; MELLO & VARELLA, 2001). The transfer activity relied on the use of ArtRage, a painting application, on which the children could express themselves visually according to their interpretations of the stories.

Survey 2

Survey 2 was carried out in 2017 and 2018, in a school setting, with 5-year-old children in a public Early Childhood school located on the outskirts of the city of Belo Horizonte, state of Minas Gerais, Brazil. The survey aimed to carry out continuing education for teachers and create digital reading and writing activities for children in a school's computer lab. On a weekly basis, surveyors and teachers from classes of 4-and-5-year-old children studied topics on digital writing culture, and two selected teachers prepared computer-lab activities for those classes, in a way connected with the activities performed in the classroom. The proposed activities addressed different digital environments and genres in order to promote greater insertion of children in writing culture, as well as in the reflection on the alphabetical writing system of the Portuguese language. Such lesson planning considered the development and demand of the children in a way to provide them with meaningful experiences thus contributing to the construction of knowledge about social uses of digital writing culture, in addition to stimulating ethical behavior, and teaching about security on the Internet. The literacy events (STREET, 2012) that took place in the computer lab were filmed and subsequently analyzed with all the school teachers involved.

Reading the app book: *Blá Blá*

This article presents a literacy event that took place in November 2017, with a class of 5-year-old children reading the digital storybook entitled *Blá Blá* [Literally: Blah Blah] by Vicent Morisset. Divided into five parts, *Blá Blá* has moving images, audio and few verbal resources, written in Spanish with text displayed only in the subtitles. These features allow children who have not yet appropriated the alphabetical writing system, and even those who do not know the Spanish language, to be able to read. For the purpose of the survey, in the reading event, the teacher called one child at a time to interact with the app book on a laptop computer while the other children watched. At the end, the teacher proposed a conversation round where the children could share their impressions about the story, a moment of which the teacher took advantage to assess the class' global understanding of the storyline. Subsequently, two of the children were interviewed and asked to describe their reading experience with the digital book, and it is worth noting that they had no previous practice with digital literature.

Results and discussion

Mediated reading of digital literature can be performed 1) by adults/peers or 2) by the app itself through interaction with characters, contextualization, and semiotic resources that situate the reader in the story, presenting possible ways of reading-browsing. The data on these two forms of mediation that will be presented below came from the surveys previously described and will help understand the demands of mediation in the two reading contexts addressed in this article.

Adult-mediated reading

Adults can promote children's engagement in reading digital literature through various guiding tips given during reading. The data from the two surveys showed that, regardless of the setting, whether family or school, children who do not have reading experience with digital texts needed constant guidance to read the material. In addition, engagement in digital literature reading may be associated with children's previous experiences with digital devices. Regarding the family setting, children who had previous contact with mobile devices found it easier to deal with the interaction elements and technological resources available in the digital book, however they requested the presence of an adult to share impressions and engage in the storyline.

In the survey, adult-mediated reading encompassed three criteria: (1) mediation for emergent literacy (in contact with digital media) and digital literacy (in a broader sense); (2) mediation for gestures and reading behaviors – subdivided into three types: a) directions for the gestures, b) exemplification of the gestures, c) reflection on the gestures; and (3) mediation for reading strategies – subdivided into two types: a) from the gestures to the story, b) from the story to the gestures. Below are presented the three types of adult-mediated reading according to the survey data.

Mediation for emergent literacy and digital literacy

It was found that having skills at the type of digital device used for reading, whether a tablet or a laptop, has repercussions on the adult mediation that the child will need in order to be able to read a digital storybook. Tablets, for their touchscreen feature, make the use of gestures easier for the child reader to interact with the story. In addition, some of them are familiar with using their parents' smartphones at home, or they even have their own tablet. Thus, the tactile feature of such devices is one of the reasons why children become more easily engaged in reading than they do when using a regular laptop computer. The survey data indicate that mediation for digital literacy with the use of laptops and tablets was different due to the type of device, but, in particular, adult-mediation was more frequently requested in the event that the child used a laptop to read.

> Surveyor: [...]Look over there, you see [points at the projector screen]. The student who comes here will have to tap on that tiny hand over there, when it pops up. When that tiny hand appears, you have to tap on it and see what's going to happen. If you focus your attention right there, it'll be easy to learn, huh. Let's do it? (Reading *Blá Blá*)
> Teacher: Look over there, class! Do you see it here? [assists student to swipe on the touchpad - speaks softly] When it […] you have to tap… (Reading *Blá Blá*)
> Surveyor: Take a look, you can touch on [...] You can use the tablet [...] Tap on the animals ... [...]Try to drag them sideways to see what happens... (Reading *Mini Zoo*)
>
> Source: Authors' own database.

As can be seen in the excerpt above, it was not simple for the children to understand how the laptop touchpad worked, as they touched the pad and the effect thereof appeared somewhere else, which seemed a little abstract for them, and also because then again they are used to touchscreens on smartphones and tablets. With tablets, for emergent literacy it was necessary to provide mediation to show the children some finger movements, such as the swipe and pinch-to-zoom features; however, the children did not request constant mediation, only at the beginning of the reading and in some moments while reading, especially regarding interaction/storyline issues. However, still with tablets, mediation for digital literacy was perceived in the reading activity, as the children compared digital books with print books and digital games. This was probably due to their reading practices being only with print books and their use of tablets being only for playing games. Using tablets to read digital literature seemed somewhat unusual to them.

> [Reading *Spot*]
> Surveyor: And what do you think this application is? For you, what would this app be?
> Rafael [10 years old]: I don't know... maybe an interesting game for minors...
> Surveyor: Have you considered that it may be a book, for example?
> Rafael: It would be cool too if it were a book… guess I don't know how to zoom in and out... [...] Yeah ... it's like an RPG but with a camera.
>
> [Reading *Quem soltou o Pum?*]
> Surveyor: Do you remember Pum? Pum the dog?
> Gabriel [3 years old]: Uh-huh…
> Surveyor: This one is about Pum...

Father: Oh no! I can't believe it's the Pum book!
Mother: What? The Pum book again?
Gabriel: No, it's not the book, it's the game!

Source: Authors' own database.

It was observed that children associated the use of a tablet with entertainment, such as playing games and watching series. Readers will read digital literature based on their previous knowledge and reading experiences. Their references lead them to seek definitions of what a book, a game, an application, a story, a film... would be like. However, hybrid and multimodal digital literature tends not to match the references one has built throughout the history of writing culture. Mediation both for emergent literacy and digital literacy is important for children to build new references and be able to engage, with more autonomy, in future readings of further digital literature. Discussions that encourage digital fiction reading among children, be it a game or a digital story – as well as the use of different devices and ways of reducing distraction and eye-wandering with other applications while reading, as verified by Aliagas and Margallo (2015), among first-time readers, who easily exchanged the story being read for a game that randomly popped up – can contribute to the development of skills for digital literature reading.

Mediation for gestures and reading behavior

Digital literature with a high level of interactivity and multimodality demands from the reader making gestures in order to proceed with the story, that is, according to what the story requires and the semiotic resources used. The type of digital device that the child is using to read is also important. It was observed that the children handled mobile devices more intuitively, compared to reading on the laptop computer. This may have occurred because the tablet promotes more embodied modes of interactive reading, which tend to more easily elicit movements from the reader's body (MANGEN et. Al., 2019). Therefore, interaction with tangible mobile interfaces intuitively produces gestures that lead to reading behaviors different from those while reading on the computer. Three types of mediation for reading gestures were observed in the study:

Directions for the gestures

Throughout the reading activity with the participating children, the mediating adults recurrently used the verbs: tap, swipe, move and touch. The directions for the children to make the corresponding gestures were emphatic and spoken repeatedly during mediation, as the example below, with excerpts of the while-reading stage.

[Reading *Blá Blá*]

Teacher: "The student who comes here will have to tap on that tiny hand over there, when it pops up" "Keep tapping, again and again!" [Reading *Blá Blá*]
Teacher: "Tap over there!" [Reading *Blá Blá*]
Student: "[...] press on it" [Reading *Blá Blá*]
Surveyor: "Keep on tapping, don't stop. As long as you see the tiny hand, you can tap on it."

[Reading *Chomp*]
Elena [4 years old]: I'm a centipede!!! (laughs)
Surveyor: You gotta tap over here, look! See what happens....
Surveyor: You gotta touch it slightly, keep touching it to see what happens […]
Oh, this one is cool... go back there... touch the bunny... for you to see...

Source: Authors' own database.

There are varied ways in which children handle and physically interact with digital devices, which ascribe functionality to the story. In cases where the children used tablets for reading, three types of gestures were identified: stabilizing movements, control movements, and deictic movements (MERCHANT, 2017). When the story demanded comprehension and interpretation of visual and verbal resources, children just watched the scenes, in an attempt to decipher some unexpected event (stabilizing movements). After becoming more familiar with the story, they started interacting with recurring gestures, such as tapping, swiping, and at times using more than one finger to perform the action (control movements). Deictic movements referred more precisely to the way in which the children reacted to a certain event or animation seen while reading, pointing with a finger, showing possibilities of interaction, or simply directing their eyes to parents, seeking to share their reading enjoyment.

Exemplification of the gestures

In this type of mediation, the adult exemplifies by performing the gestures before the child starts reading the digital storybook, so that he/she can learn the necessary gestures to operate the book as a whole or a specific part of it. This type of mediation served for the children to realize, throughout the reading, that different gestures may be necessary according to each story.

[Reading *Mini Zoo*]
Father: How about the other one, in the other cup, is there more?
Gabriel [3 years old]: Uhmm, I don't think so…
Surveyor: Wait, I think it's this way, look! ... I think it should be downwards
(exemplification of the gesture)

[Reading *Spot*]
Rafael [10 years old]: What is this arrow?
[surveyor shows on the screen the function of the app's arrows]

[Reading Blah Blah]
Surveyor: Keep tapping, again and again! Move it, move it! Keep moving it.
You can stop him, look ... [surveyor approaches the child to show]

Source: Authors' own database

The excerpts above demonstrate that the need for constant mediation for gestures while reading leads to intense participatory behavior. Additionally, the situations where the children tried to perform gestures as if they were interacting with a real object (e.g. to turn on a toaster, the child did not tap the screen, but tried to swipe his finger downwards over the toaster button) confirm their immersion and engagement with the characters and, consequently, with the story as a whole. However, given that the surveyed children had no previous experience as readers of that type of book, some of them initially stood still and felt insecure about performing the gestures to interact with the story, thus requiring exemplification by the mediating adult. This was also observed by other researchers in different contexts. Frederico (2018), for instance, pointed out that some children showed little confidence, refusing at times to interact with the multimedia resources of the story. This fact might have occurred due to the children's emotional response to certain situations in the text, which often depend on the ability to separate reality from fiction.

Reflection on the gestures

In this third type of mediation for gestures, in the school setting the teacher, after reading, proposed a moment for reflection on the gestures necessary to read the story. In turn, in the family setting, the reading activity provided the children with a moment for reflection on their comprehension of the story and the semiotic functions of the images and animations produced for the narrative. This type of after-reading mediation makes it possible to recap the reading strategies used by the child while reading.

> [Reading *Blá Blá*]
> Surveyor: Did you notice that this time there were fewer?
> Why is that, class? Did he eat fewer tiny balls?
> Student 1: Because he didn't grab many...
> Student 2: Because he tapped less on the tiny balls.
> Surveyor: Well done!
>
> [Reading *Chomp*]
> Elena [4 years old]: Is that an egg?
> Surveyor: Yeah, it's an egg...
> [comprehension of what was happening in the images and animations]
>
> Source: Authors' own database.

Raising children's awareness of the importance of participatory behavior in reading digital literature instigates them to identify the level of interactivity of every story. It is necessary to learn how each digital book works; given that some will be more interactive than others will. It is up to the reader, when starting reading, to become familiar with the browsing mode in order to construct meaning out of the text. In this sense, it is primary for the mediating adult to consider how a given digital book works and its potential (SERAFINI et al., 2016) for a literature reading experience for the target readers. After recognizing these elements, the mediation process unfolds in a way that children can develop relevant skills by identifying

the interactive and browsing resources available, necessary for a successful reading of the story, and for the very practice of digital literature reading.

Mediation for reading strategies

The survey data indicate that mediation for reading strategies regarding digital books, that is, the decisions that children make to proceed with reading revolve around using the necessary gestures to follow the storyline by selecting, evaluating, persisting or abandoning the movement used while reading. In this sense, while-reading strategies relate more often to browsing than to understanding the story, as it normally is with print books, because understanding the story is also related to understanding the way the digital book works, that is, how it should be browsed. Two types of mediation for reading strategies were observed, as follows.

<u>*From the gestures to the story*</u>

As can be seen in the excerpts below, this type of mediation took place when the adult drew the attention to the gesture made by the child (such as tap, drag, swipe) and the effect thereof in the story. In each digital book, they read and in each different section, gestures may have been repeated indeed, but with different repercussions in the story.

> [Reading *Blá Blá*]
> Teacher: The more you touch it, the tiny hand, the more it does things, how cool is that!
> Surveyor: The tiny balls get colorful.
> Student 3: They're m&m's.
> Surveyor: m&m's, look! It's shaking !! It's going to explode!
> (screen changes - students exclaim "wow!!")
>
> [Reading *Mini Zoo*]
> Gabriel [3 years old]: A soccer ball! It bounces on its own… Dad, it bounces on its own!!
> Father: Really?
> Gabriel: Look! (makes a gesture on the screen)
> Father: And the kids just watch it?
> Gabriel: Take a look, they hit one another!
>
> Source: Authors' own database.

It was observed that the discovery of the gesture effect leads to children's engagement in the story; after all, they feel they have the power to interfere in the storyline. In some moments, for instance, when mediated by parents, just a glance or intention to share with their parents the interactive effect generated by the touch reiterates the children's engagement and their will to participate more actively in the story. Such situations reveal the importance of reading socialization (ALIAGAS & MARGALLO, 2015) and demonstrate that when integrated into the reading context, whether a family or school setting, the children can ascribe new meanings to the literature reading experience.

From the story to the gestures

In this type of mediation, the adult shows the child what is happening in the story to subsequently indicate the gesture that led to the next step in the storyline. In the digital books used in this analysis, this type of mediation highlighted the semiotic visual and audio resources available, as well as their meaning within the context of the story.

[Reading *Blá Blá*]
Teacher: Ms. Sandra will call each child to do [...]. So everybody please pay attention! Meanwhile what should you do […]? Pay attention to what's going on! Hey,
Pedro, listen up...
Teacher: Ask him to tap… Take a look over here, class! It only falls when you tap on it, you see? [pointing to the balls moving in the story]
Students in unison: uh-huh.
Surveyor: Is he getting mad!? You see, class? Wherever you move the arrow, he looks at! Move the arrow somewhere else and you'll see. Downwards [character blinks and makes an intense sound]
Students: Noooo!!

[Reading *Mini Zoo*]
Father: Open your mouth as if you were crying! Pretend you're crying! Make-believe!
Gabriel [3 years old]: Waaaaaa!!! Waaaaaa!!!
Father: But you can't leave the screen!
Gabriel: Waaaaaa!!! Waaaaaa!!!
Father: Tap again to remove the pacifier!
Gabriel: [makes noise as if using a pacifier]
[The boy touches the character and removes pacifier]
Gabriel: Waaaaaa!!! Waaaaaa!!!
Gabriel: Chomp, chomp, chomp… [as if chomping a pacifier nipple]

Source: Authors' own database.

The mediating adult instigates inference of the multimodal aspects in the story, so that the child can globally understand the text, at the same time that prompts the child to distinguish the gestures necessary for browsing the digital book. In the above case, the mediating parent motivated the child while reading, making him create new narratives, speeches and imaginary situations as if he were actually inside the story. Thus, the book's interactivity can also foster the creation of a hybrid version of the story (speeches and dialogues) devised by the child, therefore evincing the literary imagination (ALIAGAS & MARGALLO, 2017) made possible by the very fact that the reader feels part of history.

Mediation through the storybook

Digital storybooks by themselves can indicate which gestures are necessary (as in *Mini Zoo*) or paths/directions that can be taken (as in *Spot*). In other narratives, such as the Brazilian app book *Quem soltou o Pum?*, the indication of gestures is intuitive (like touching the lamp bulb to turn on the lights and continue the story) and demands more complex knowledge about the semiotic visual resources of the book

and the contextualization of the narrative. This would be an adequate moment for the mediating adult to intervene and help the child develop their own reading strategies, as can be seen in the excerpts below. As the child is still getting to know the digital device and the book itself and is still grasping the meaning that each semiotic resource carries along, in general, 'mediation through the book' takes place by trial and error. Child unwittingly taps or drags on an element in the story and realizes, without the adult mediation, the result.

[Reading *Chomp*]
Gabriel [3 years old]: Father: Didn't catch it? (laughs)
Gabriel: He's trying to catch it!
Gabriel: Why is he running away?
Father: The butterfly is fast too, you see...
Surveyor: Tap on the butterfly to see what it does ...
Father: Touch it for you to see... just tap on the butterfly and see ...
Father: The butterfly caught him??
Gabriel: Why it won't catch it???
[tried in different ways, from top, bottom, left and right, but didn't managed to make the tiger catch the butterfly]
Father: Butterflies are hard to catch...
Gabriel: Dang, you deserved it, you silly thing! [boy taps on the animal, curses and then moves on to the next screen]

Source: Authors' own database.

As can be seen, the child used different gestures to make the character perform an action but as he failed, he changed his reading strategy to reach his goal. More specifically, it was about a tiger hunting a butterfly, but the book purpose is precisely to create a conflict and not allow the reader to "catch" the butterfly. Quite the opposite: the tiger gets a slap from the butterfly, launching him away through the scenery. Through trial and error, the child understood that the tiger was unable to hunt the butterfly, cursed his own character (Dang, you deserved it, you silly thing!) and solved the conflict.

In general, since children quickly become familiar with the technological and semiotic resources in a digital book, they also develop their own autonomy, finding enjoyment in experimenting and dialoguing with the characters, at the same time that they learn to control the reading, situations that lead them to use the device on their own (REAL & CORRERO, 2015).

Conclusions

Mediated reading of children's digital literature, whether on computer and/or mobile devices, expands their literary and aesthetic experience. Adult mediation promotes a deeper and more reflective understanding of multimodal texts that demand reading strategies aligned with the storyline and the appropriate gestures to read them. As could be seen, the digital book on its own can offer mediated reading when the child attempts some gestures to browse the story; however, it proved insufficient for a more

detailed reading. Mediated reading, in either school or family settings, is important and necessary, and even classmates/peers or siblings at home can serve as mediators.

Reading engagement expands when a playful mediation is performed by adult individuals, allowing the child reader to participate more actively in the story, where he/she can create new characters or make up a whole new story. In addition, the survey data demonstrated that, for children, literature reading is usually related to print books rather than to digital devices, which in general are associated with games and entertainment products. This fact shows a path to follow: to consider the need for prior mediation about the functions of digital devices in digital culture today, devices that can also be related to literature reading, as well as to the aesthetic appreciation of new storybooks produced for children.

Notas

[1] Groups 1 and 2.

[2] Groups 1, 2 and 3.

[3] Groups 1 and 2.

[4] Group 3.

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