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The Digital Children's Book – Types of Media and Interactivity

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ABSTRACT

This paper uses the literature review methodology to compile knowledge about the children's digital book theme. It begins with a brief historical contextualization of the evolution of the children's book and a reflection on the use of technology by children. Next, the different types of digital media are listed, referring to the critical points of its history, and focusing on mobile devices as reading media for children. Finally, we reflect on digital interactivity in children's books, which are now visual, sonorous, and tactile.

Keywords: Editorial design, Children's digital book, Media, Interactivity

INTRODUCTION

Editorial Design has long been the great pillar of written and visual communication. The book has enabled multiple changes and altered the configuration of the world as we know it today. Within the book's framework, children's books are of crucial importance due to their role in training future adults and responding to the external world's series of cognitive and analytical demands. In recent decades, discoveries have unveiled infinite possibilities within this area, with advances in technologies that have changed how we read and document everything around us. This article addresses the children's digital book and its main types of media and interactivity, describing various devices and characterizing their diverse potentialities.

CHILDREN'S BOOK: BRIEF HISTORICAL DESCRIPTION

Children's literature is consolidated as a valuable and indispensable instrument for developing the individual in childhood. The picture book, as tangible material, can be seen as a social, cultural, and historical document composed of text, illustrations, and graphic design, which culminate in an experience for the child (Bader, 1976).

By analyzing the history of general literature, we can see that it has always reflected the dominant society's knowledge, attitudes, and values (L. R. Sipe & Pantaleo, 2008). With children's literature, it was no different. The first children's books date from when children's entertainment was not considered, so they focused on religious and grammatical teaching

and the good manners common in that time society. In these books, illustration was almost non-existent, and it had a minor role, only in details or vignettes made by unknown artists (Burlingham, 1997). As there were changes in the understanding of childhood, from the 18th century onwards, the market for children's audiences expanded, and the concept of play also gained space in the figure of the book. The *movable books* or *movable toy books* emerged as an innovation on the vision of the tangible material, breaking the usual concept of the codex and its closed structure between cover, core, and seam. These books were characterized by sheets folded in diverse parts, forming several flaps that, when lifted, revealed other images or texts; and by having systems of levers that moved the various parts of the illustrations; or even loose parts that allowed children to recreate the stories. After the First World War, mobile books suffered a decline, but their concept would endure in *pop-up* books, which provide the reader with the feeling of participating in the story's interpretation (Silva, 2017).

With these kinds of books, we realize that the concepts of play and interaction, which we find today in digital media, have existed for a long time to achieve a greater engagement of the child with the object, making the experience more active and, therefore, more memorable.

The twentieth century brought significant changes to children's books, led by the most developed countries, which raised their literacy levels (Burlingham, 1997). Great names in the areas of art and design will influence the construction of children's books and, from the decades 60-70, it was noticed an actual explosion in the production of children's literature, with the massive action of designers and artists on graphic projects of books (Girão & Cardoso, 2018). From the 1980s onwards, children's books went through the same changes as the rest of the publishing market due to the new production processes made possible by the introduction of computers and software.

At the end of the century, the digital medium for reading became slowly part of the routine in schools and homes, with new concerns regarding alphabetization and literacy. In the 21st century, there is a need to develop in society the digital skills necessary for progress that will be increasingly electronic. In this contemporary scenario, the pedagogical look over the child's development emerges again. The child can now count on children's digital books to build, from an early age, skills in the use of technologies (Schugar et al., 2013).

THE USE OF TECHNOLOGY BY CHILDREN

Alpha Generation is a term coined by demographer Mark McCrindle that designates those born from 2010 onwards who "have access to more technology, information, and external influences than any generation before them" (MacCrindle & Fell, 2020, p. 6). 2010 was coincidentally the year of the first iPad launch, which revolutionized the computer market by introducing the touchscreen. The Alpha generation lives immersed in this technology and is unaware of the period of its non-existence (Furtado, 2019).

This cultural context of the last decade (2010–2020) helps us to better understand the generation of children we currently have as readers. Accustomed to the process of informal learning while having fun, playing games, or surfing the Internet, this generation prefigures a new teaching process that should develop in the future. It may be misleading to think that mobile devices will replace printed books. However, the idea of an integral separation between one and the other is already mistaken. Children's literature can take advantage of current technology to gain strength and take advantage of this state of immersion of children in various supports with multiple technological tools (Furtado, 2019).

For a long time, the idea of children having mobile devices for entertainment was seen negatively. Today, we already know that the big difference between the benefits and harms lies in the way parents and tutors manage the time of exposure to digital content. If balanced with outdoor leisure activities and traditional play and interaction with other children, technology alone is unlikely to negatively affect a child's behavior, learning, or health (Plowman & McPake, 2013). Parents and teachers have already realized that, although formally more educated, the Alpha generation is deficient in practical matters. Therefore, materials that foster skills such as social competencies, entrepreneurship, strength, coordination, innovation, etc., are more likely to gain the educators' attention (MacCrindle & Fell, 2020).

For children's use of digital media to be fruitful, adults must accompany them, analyzing and selecting what passes through their hands. Furthermore, autonomy in decision-making must be encouraged to direct the individual, from early childhood, for the best use of technology (Plowman & McPake, 2013).

TYPES OF DIGITAL MEDIA USED: BRIEF HISTORICAL PERSPECTIVE

The first digital media accessible to the everyday user was the personal computer, which emerged in the 1980s. At that time, with the expansion of the graphic interface, a few books started to be available on CD-ROM. It is the case of the interactive book "Arthur's Teacher Trouble" (Living Books, Brøderbund, 1992), which had great success with the public, representing an excellent example of the use of the resources available at the time (Pinto et al., 2013).

Subsequently, several other interactive book projects with the same format gained relative popularity, but the configurations remained unchanged until the end of the 20th century. With the arrival of the Internet, computers got more storage capacity, and CD-ROM materials made part of their contents available in online portals (Pinto et al., 2013). In the first decade of the millennium, computers (desktop and laptop) dominated school and family environments, with their appearance and technical specifications progressively changing.

In 2001, Microsoft launched a first attempt in the direction of what we know today as a *tablet*. However, the ***Microsoft Tablet PC*** model was a failure, as it was neither practical nor versatile and ended up falling into oblivion (Marín, 2014).

It is worth looking back forty years to point out the first project aiming to be a mobile device for personal use, specifically for children. Alan Curtis Kay (1940) – important name in the computer science area, responsible for contributing to the conception of the graphical interface of computers as we know it today – published in 1972 the article "A personal computer for children of all ages" presenting the ***Dynabook*** project**.** Despite its revolutionary character, the *Dynabook* did not advance beyond the prototype phase. However, Kay's ideas can be pointed to as guidelines for today's tablets since the author states that a mobile device "(…) must allow texts to be edited and stored; it must allow its owners to express themselves through drawings, animations or musical compositions; it must offer users the possibility of reading innumerable books and letters; it must even be able to reproduce several hours of music or audio files and serve as a means of communication." (Marín, 2014).

In describing the *Dynabook* project, Alan Kay reports that he intended to make an object that was accessible to adults also accessible to children so that the potential of computational thinking could help them develop better than the adults of that time (Kay, 2013). Inspired by educational thinkers, Kay cites some guidelines from Maria Montessori, who advocated immersing children in complete environments to lead them to understand the world around them. The computer would then represent this multiple access to knowledge and science, available in the palm of children's hands on a global scale (Kay, 2013). Kay's aspirations materialized in 2010 with the iPad launch by Apple Inc.

MOBILE DEVICES AS A READING MEDIA FOR CHILDREN

From their launch and the offer of *touchscreen* technology, tablets quickly became a popular object among children, who were initially interested in the device only for entertainment purposes. The publishing market saw an opportunity to expand its operations in the virtual environment with the emergence of the *eBook* as an "interactive electronic book that can allow the integration of text with images, audio, video and animations" (Bidarra et al., 2012, p. 2). The year 2012 represented a significant milestone for the recognition of the children's *eBook* in the market, with the inclusion of the award for the digital category at the Bologna children's book fair.

A closer look allows us to see that the eBook concept has been transformed over time, changing its reading and perception characteristics according to the available devices. Yokota & Teale (2014) divide the trajectory of the digital children's book into four moments: i) the digitization of printed books; ii) the transformation of stories into digital animations; iii) the transformation of the virtual book from digital resources; and iv) the addition of interactive resources, such as games, that extend beyond the story.

In the first case, in the digitization of printed books, all the physical media characteristics were maintained, offering only the possibility of reading the story on a digital device. The researchers evaluate the proposal as positive as we can access digital books from anywhere. However, the media transfer causes a loss of sensorial value in many cases since most printed books use

their own formats, paper types, and finishing to integrate the story (Yokota & Teale, 2014).

In the second case, the digital books started to have animation of parts of the story, which was similar to what happened in the applications available on CD-ROM. The main difference between reading a printed book and a book in this format is the direction of the process, which is no longer done by the child/reader but by the creative director.

In the third case, situated in the first decade of the 21st century, the digital book creators started to incorporate multimedia elements that could complement static images. There was the addition of ambient sounds and the possibility of narration of the texts, besides small *hotspot* areas programmed to respond to the mouse click with small animations.

In the fourth and last scenario, which comprises part of the *app* books we currently own, the interactive features extend beyond the story and offer the possibility of games such as "puzzles, matching games, and coloring or drawing opportunities" (Yokota & Teale, 2014, p. 580).

With this study, we perceive a clear evolution in digital books caused by the technological transformations that occurred and the migration from computers (desktop or laptop) to mobile devices. Studies point out that the use of these devices in childhood is positive and that, according to McKenney & Voogt (2010) *apu*d Brito & Dias (2016), as they grow up, children improve their use. Girls are responsible for a broader and more diversified manipulation, differently from boys, who mainly use them for *online* games. The current digital literary culture, from digital devices, should also count on the mediation of parents and tutors who understand the potential of each medium and bring a contemporary aesthetic appreciation to the child's view (Araujo & Moro, 2021).

DIGITAL INTERACTIVITY: THE VISUAL, SOUND AND TACTILE CHILDREN'S BOOK

Printed books for children rely on two fundamental types of interaction, as explained by D. Menegazzi et al. (2018, p. 47): (1) physical interaction – which takes place through handling the object itself, plus additional features such as tabs/pop-ups and (2) intellectual interaction – through reading comprehension, sense decoding, etc. Digital books added (3) digital interaction with "resources that demand and result in interactive actions differently from what occurs with the printed book". (D. Menegazzi et al., 2018, p. 47).

It is important to mention a curious aspect concerning digital interaction using screens: children's development of fine motor skills. According to Kamysz & Wichrowski (2014), mobile devices in childhood collaborates in improving body mechanisms, offering the hand, specifically, more ability to perform activities such as holding a pencil, dressing clothes, etc.

Whether in a book or a game, the interactive factor is always a seductive element for children. Even facing difficulties in some process of decoding the written text, the children will be motivated by the possibility of actively acting on the object they have in their hands (Frederico, 2016). Interactivity in printed books is always a bridge between the fiction configured on paper and

reality, making digital interactivity even more dynamic. Thus, "the boundaries between the real and the represented world are not as defined and clear as in most printed texts". (Frederico, 2016, p. 106). Some digital book applications offer the possibility for the reader to relate to the story directly, customizing the project by adding music, visual elements, narration, sound effects, etc. Such a possibility promotes the opportunity for teachers and researchers to discuss "how certain modes can alter or enhance the visual and verbal narrative" (Serafini et al., 2016, p. 511).

To better understand the concept of interactivity, we must dedicate some space to the hotspots, which are fundamental in defining an interactive interface. Hotspots are "specific areas on the screen where readers can tap, swipe, or pinch across a device's surface to generate sounds, animations, or even additional content during the reading experience" (Serafini et al., 2016, p. 511, T.L.). These features enable interaction with the elements displayed on the screen, resulting in visual and sound stimuli and enabling connection with sources outside the app, such as websites and social networks.

In a paper published in DIGICOM (International Conference on Digital Design & Communication), D. Menegazzi et al. (2018) state that, despite the concern about the indiscriminate use of hotspots in digital children's books, few studies are mapping all the possibilities and their impacts. However, the researchers schematized, from a scientific literature review, the main functions that hotspots can perform:

"(1) Access to dictionaries and extra interactive content; (2) access to and interaction with games; (3) control of videos and animations; (4) access to system settings; (5) customization; (6) menu access; (7) navigation between pages and sections; (8) access to hyperlinks; (9) monitor and support learning through tools such as quiz and feedback; (10) integration with physical media" (D. Menegazzi et al., 2018, p. 49).

This structuring character of hotspots (responsible for navigation between content, offering additional materials and support) enables a direct connection with the story. It can be grouped in infinite ways from details in the interface. In the view of experts, the interactive factor "is about a playful approach to reading, which manifests itself in action and strong reader involvement, mainly (though not exclusively) in gamification contexts" (Pereira et al., 2016, p. 27). Several researchers, however, warn about the need for these resources to be in concordance with the narrated passage to provide complete assimilation between verbal and non-verbal language, "selecting the relevant information from the illustrations that match the story text and form integrated mental representations" (Zsofia Katalin Takacs, 2015, p. 12).

CONCLUSION

Children's books are a highly relevant resource in children's development. The pedagogical nature always connected to them requires professionals involved in their production to be attentive to the behavioral concepts of childhood, to enhance the action of reading and learning. The digital children's book has brought a wealth of new potential, both in terms of access – which is now universal – and multimedia resources, which have made it possible to

transform books into a visual, sound, tactile, and interactive reality. However, we cannot fail to mention that we are at a time of technology in continuous movement, which means that digital books quickly become obsolete. In a scenario of low consumption, this has consequences. The digital book is costly compared to the printed book, making it still have a timid performance compared to the offer of games and digital applications for children. However, several investigations alert the need to produce quality materials, making the correct use of multimedia tools. We should also note that the current trend is for the print and digital media to become complementary, in a hybrid relationship, which should be further explored in other studies, such as in the author's master's degree dissertation (Mascarenhas, 2021).

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