

The Dream of Interactivity in Children's Literary Media

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Abstract:

This contribution approaches the concept of interactivity in relation to children's literary media, highlighting the historical relation between children's literature and innovation, the promise of interactivity as an ever-moving horizon of expectations in digital media, and the need for balance between technological and cognitive interactivity.

Firstly, this chapter discusses the concept of interactivity within the context of reading, examining the types of interactivity at work in digital media and proposing transliteracy as an appropriate perspective to encompass them. Following a transliterary approach, the chapter then presents examples of children's literary media that can function as bridges between different modalities of reading, especially between print and digital literacy. From this double perspective, it will address the initiatives of libraries to preserve children's literature of the past in 'enriched' digital formats. And, subsequently, it will describe children's and young adults' electronic literature that explores the interactive potential of electronic textuality without losing sight of print's affordances.

Given the hybridity of old and new media of postdigital literary artefacts, it becomes necessary to develop a model of reading that takes into account not only children's cognitive developmental states, but also the different types of interactivity at work simultaneously and the multiplicity of literacies necessary to approach them.

Keywords: interactivity, transliteracy, children's literature, electronic literature.

INTRODUCTION

In recent years, with the rapid growth of interactive media use among children, parents and teachers alike have expressed concerns regarding the addictive quality of many of these digital products and the apparent lack of benefits their use provides. The general impression is that children are reading less print and with poorer results, whereas their screen times are increasing.¹ After reviewing several reports on reading from the National Endowment for the Arts, Hayles (2012: 56) identified an important need: 'The crucial questions are these: how to convert the increased digital reading into increased reading ability, and how to make effective bridges between digital reading and the literacy traditionally associated with print.' In this context, the appearance of children's literary media capable of constructing such bridges and improving children's reading skills by facilitating enriching forms of interactivity becomes a promising field of exploration.

But what do we mean by 'interactivity' in the context of reading? What kinds of dreams, desires or myths has this term agglutinated? How is it connected with the ability to engage actively and imaginatively with the realm of fiction? Moreover, what are the new forms of reader engagement that technology makes possible and how are these affecting previous notions of reading?

One of the most difficult challenges teachers and parents face when trying to make children read printed texts – especially when they have already been mesmerised by screens for an extended period of time – is to fully transmit to them the experience of what reading should be like. To introduce children to the literary experience, we begin by telling them stories during bedtime, we show them picture books so that they learn to read images, we slowly introduce them to books with more and more text, until we can eventually disappear from the picture so that they can fully immerse themselves in the fantasy world on their own. This had been the technique until now. However, print's competition against a plethora of multimedia products for electronic devices has altered the traditional method of virtual world building with sensory information extracted exclusively from linguistic code, a cognitively more challenging activity than watching animated movies and playing *Angry Birds*.

When we as parents were the storytellers, we fulfilled a number of roles to help them mentally construct the fantasy world: by making sound-effects; using intonation to highlight important passages; acting out characters with different voices; asking questions to ensure comprehension; personalising the story, and any other trick that worked to help them visualise the alternative world to which they were magically travelling. This process is time consuming, but it establishes a necessary foundation that is difficult to recuperate if it is missing, and that will affect the child's capacity to use their imagination in other subjects, such as mathematical abstractions, biological diagrams, or geographical charts (Gallas 1999). As Borgstrom has observed: 'Until such a time that children can learn to create their own worlds within the confines of a given piece of literature – forming a sort of imaginative fusion – it is the responsibility of caregivers and educators to facilitate that genesis' (2011: 3). In the absence of quality storytelling time on the part of adults, interactive literary media is perceived as a surrogate in this direction.

Nevertheless, when we ask children what they wish books were like, those magical books that have not been invented yet, their replies also define the cultural set of expectations that we have constructed around 'interactivity', but in a different direction. They dream of the possibility of physically inhabiting the fantasy world described by the story, of being protagonists in it, of enjoying from the inside well-known stories or creating new ones through their actions and imaginingsⁱⁱ. Thus, on the part of children, experts on possibilities, the dream of interactivity triggers the fantasies of readers regarding immersion in the fictional world and interaction within it, surpassing the actual habits of suspension of disbelief, character identification, and escapism, for a more potent and literal fusion with the fantasy world. This dream, which involves the fusion of physical reality and fictional virtuality, can become real in ever more engaging ways thanks to the creative strategies made possible by technology in the realm of mixed reality, that ever expanding field, as we can see in the proliferation of augmented reality books for children, augmented reality games such as *Pokemon Go*, virtual reality for children such as Google's 3D painting game *Tilt Brush* or Playstation's *Moss*, and interactive storytelling robots such as Codi by Pillar.

So, whereas children dream of taking action and control of the story (and this has been to some extent gratified by technological advances, especially in videogame creations), adults, on the other hand, inadvertently dream of cloning themselves through technology, substituting integrated aural narration and interactive reading comprehension activities for their role as storytellers and mediators. In short, and just like its analogue predecessors, children's literary media needs to balance many opposing forces: it needs to appeal to children's and adults' desires, it is often simultaneously written to be read independently or read aloud by an adult, and it aims at transmitting important cultural values while avoiding being overtly didactical (Domke 2020).

This chapter will address these issues by reflecting on the concept of interactivity in relation to children's literary media: highlighting the historical relation between children's literature and innovation, the promise of interactivity as an ever-moving horizon of expectations in digital media, and the need for balance between technological and cognitive interactivity. I will discuss children's literary media from a double perspective: referring to literary texts of the past that have regained a new reading life in the digital sphere, as well as to new creations that explore the possibilities opened by electronic textuality. The variety of approaches and the hybridity of old and new literary material make it necessary to evaluate the affordances of each formula and its capacity to generate a pleasurable and insightful reading experience in order to reflect on the uses and potential of interactivity in children's literature

DEFINING INTERACTIVITY IN THE READING PROCESS

The word *interactivity* evokes very different ideas depending on the context in which it is used. In 1977, American psychologist Rumelhart (1942-2011), one of the most important contributors to a formal analysis of human cognition, developed a model of reading that he called *interactive*. Rumelhart's model described the reading process as interactive as opposed to the serial models of reading that preceded it. He maintained that reading was an information-processing system consisting of several knowledge sources (orthographical, lexical, syntactical and semantic), each operating independently but interacting with each other to arrive at the most plausible hypothesis, instead of a series of linear, stage-oriented and non-interacting levels of processing. The interactive model of reading combines surface structure systems, such as the perceptual level of reading, with deep structure systems, at a cognitive level, to construct meaning. Rumelhart argued that bottom-up models do not fully describe the influence of higher-level processing on lower-level perceptions, since, for example, knowledge of context plays a very important role both in letter and word recognition.

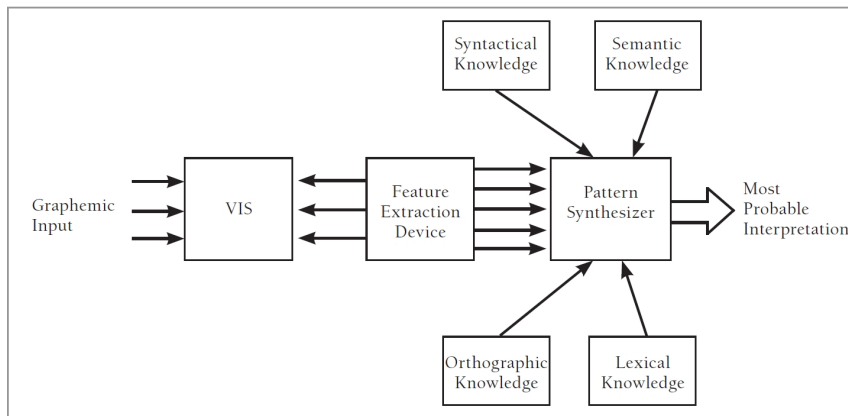


Fig. 1 A stage representation of Rumelhart's interactive model of reading (VIS refers to "Visual information store") (1977: 732).

With the advent of digital technology, the word *interactive* became almost invariably associated with technological products. As Aarseth reminded us in *Cybertext* (1997), interactive computers were those that accepted user input while a program was running, as opposed to 'batch' computers, which processed only preloaded data without interruption. As we can see, Rumelhart's model of reading assigned an interactive ability to the mind's sensory and cognitive processes, anticipating the development of a computer model that would eventually also be capable of simultaneous processing, getting closer to a human brain's innate abilities.

The widespread association of interactivity with technological apparatuses has often downplayed our own innate interactive capabilities. In the context of reading, a similar distinction seems to be commonly assumed to exist between print and electronic texts as between 'batch' and interactive computers, by which only electronic texts are capable of interactivity. In critical discussions of hypertext, this assumption has polarised critics towards opposed understandings of the term. For technophile critics, the term 'interactivity' refers to a human/non-human type of interaction in which the technological artefact used can provide feedback and respond to human input. Therefore, they defend technological interactivity as the unique form of interactivity and view cognitive interactivity between reader and text as purely metaphorical. On the other hand, humanist critics undermine technological interactivity as pure simulacrum of the true communication that can only take place when two humans interact (Goicoechea 2010). For the general public, however, the word *interactive* evokes a set of rather cloudy ideas. As Aarseth (1997: 48) points out:

The word *interactive* operates textually rather than analytically, as it connotes various vague ideas of computer screens, user freedom, and personalized media, while denoting nothing. Its ideological implication, however, is clear enough: that humans and machines are equal partners of communication, caused by nothing more than the machine's simple ability to accept and respond to human input. Once a machine is interactive, the need for human-to-human interaction, sometimes even human action, is viewed as radically diminished, or gone

altogether, as in interactive pedagogy. To declare a system interactive is to endorse it with a magic power.

This ‘magic power’ has materialised in the contemporary myth of interactivity, which has become ubiquitous in the commercial rhetoric of the digital age, signifying ‘a modern, radically improved technology, usually in relation to an older one’ (Aarseth 1997: 48). This myth has also penetrated the realm of digital reading, inspiring the design of reading apps and ebooks with the promise that they can be useful in promoting vocabulary development and reading comprehension, via digital scaffolds such as oral narration, sound effects, animation or games. Thus, even though reading is an interactive process *per se*, the phrase ‘interactive reading’ has acquired different connotations depending on the context. Whereas in a traditional pedagogical setting, ‘interactive reading’ is often used to describe a classroom activity (in which a teacher reads aloud the text or asks students to read it, then formulates questions to ensure the text has been understood, helping students to detect implicatures and engage actively with interpretation), it is nowadays common to encounter the phrase to refer to the use of digitally enriched texts which can function as substitutes for adult reading companions.

Given these different understandings of the term, a working definition of ‘interactivity’ in the reading process will need to encompass the different levels at which interactivity is at play (understanding ‘interactivity’ as a feedback loop of information, be it virtual and/or physical) and the different forms interactivity takes in a postdigital context characterized by the developing field of extended reality (which encompasses all physical-and-virtual combined environments and human/machine interactions made possible by computer technology and wearables). Thus, interactivity is at work in forms of communication that can be synchronous/asynchronous, human-to-human/human-to-non-human, and even non-human-to-non-human, in environments where virtual and physical elements coexist in different degrees. We also need to develop models of reading that can account for the interaction between all these different variables. The interaction between reader and reading device could be considered a form of human-to-non-human interaction, and human-to-human interactivity, which remains crucial in all the stages of learning to read and in the development of a reading culture, can also take place in a multiplicity of settings, both physical and virtual.

Thus, we could understand ‘interactivity’ in the reading process as the result of both human and non-human interactions at different levels, in which several factors will determine the degree of interactivity obtained from such interactions. In the reading experience, the interactivity provided by the physical reading device and the chosen media format will be activated with varying degrees of success depending on the different types of literacies and cognitive skills of readers and the capacity of their reading communities to accompany them in the process. Applying Rumelhart’s interactive model of reading to this complex setting, we must expect that different feedback loops will take place at multiple levels between the reader and the literary media object/environment and that different knowledge sources will be activated and passing information back and forth:

- 1) The technical level includes computer, digital and screen literacy, as well as knowledge of the technical requirements for reading (types of connection,

reading devices, additional equipment such as VR glasses, smartphones, tablets, etc.).

- 2) The media level relates to information and multimedia literacy (recognition of media formats and forms of engagement, ability to read and communicate using a variety of media: text, audio, video, image, etc.).
- 3) The cognitive level involves the capacity to actively engage with the text through critical and creative thinking (recognizing genre patterns, making plot predictions, filling in the narrative gaps, solving puzzles, extracting knowledge, interpreting symbolic messages, etc.).

To account for the interrelation among these multiple levels, Thomas et al. (2007) have coined the term ‘transliteracy’: ‘the ability to read, write and interact across a range of platforms, tools, and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks’. As Thomas et al. claim,

transliteracy calls for a change in perspective away from battles over print versus digital, and instead towards a unifying ecology not just of media, but of all literacies relevant to reading, writing, interaction and culture, both past and present.

This perspective allows us to incorporate different types of literacy and to acknowledge that reading is happening through a multiplicity of media. In this changing environment, we will need to adjust our understanding of what it means to read, as well as to reevaluate certain behaviours, such as multi-tasking or synesthesia, since what in some contexts can be perceived as dysfunctional, can be a useful strategy in others.

What becomes obvious is that we need a new model of reading that takes into account the new types of texts (multimedia, transmedia) that have emerged, as well as the new reading devices and contexts of reading. Such a model would necessarily need to integrate a great variety of informal sources of knowledge (e.g. computer games and social networks) and integrate computational systems as new actors in the equation (see Bell and Ensslin forthcoming).

STRATEGIES TO ENHANCE INTERACTIVITY IN CHILDREN’S LITERARY MEDIA

This chapter uses an approach based on transliteracy – which attempts to build bridges and connect modalities of reading from the past, the present, and hopefully, the future – to explore different strategies used to ignite the dream of interactivity in children’s literary media across multiple eras. This will allow us to put into perspective the strategies used in the postdigital era, when print’s affordances are nostalgically recuperated in both digitised children’s literature of the past and in freshly made electronic literature.

Enriching Digitised Children's Literature

Since Newbery's *A Little Pretty Pocket-Book* (1744), which is considered the first book in English specifically for children, the interplay of media formats and technological innovation has been a crucial element in the evolution of children's literature. Authors have experimented with the engaging power of image, sound, touch and smell, thus activating as many of our senses as possible. The combinatory potential of print has been explored through volvelles (wheel charts with rotating parts) and turn-up books (also called harlequinades or metamorphoses) made up of vertical slats or flaps that allow different combinations and page transformations, such as the famous ones designed by Benjamin Sands. Three-dimensional experiments have emerged in pop-up books and tunnel books (with the shape of an accordion), with movable parts and pieces with which to play. Interactivity has also been triggered in books with magnets to situate characters and objects in different settings, or with integrated puppets. Other senses apart from sight have been activated in books with sounds (triggered by touch or page-turning) or with different textures or smells. Books have also mimicked animation through different techniques: apparitions have been simulated with colour filters that illuminate different features on the same page; pictures have disappeared and transformed into different ones using fan type rotations, and images have acquired movement through ombro cinema techniques (sliding a striped acetate sheet across interlaced images) or page flipping.



Fig. 1. Comparison of two of Benjamin Sands' transformation books: *Metamorphosis, oder eine Verwandlung von Bilder mit poetischen Erklärungen zur Unterhaltung der Jugend* (1833); and *Metamorphosis, or, A transformation of pictures* (1802). Photograph by Library Company of Philadelphia.

Most of these insertions are aimed at triggering some action on the part of the reader that breaks with the conventional page-turning, linear reading of the text. By introducing another material reading axis, they expand the content of the text in different

directions: providing extra illustrations of the scenes narrated, hidden messages to be discovered, toys with which to continue developing the story, and so forth. Often interpellating the reader in modes that allow for the fusion of the physical and the virtual planes, these new elements also propel an exploratory attitude in the reader that ignites curiosity and provides the pleasure of discovery. They also highlight the overlooked affordances that the codex has to offer: unlike the scroll, the book has always provided both sequential and random access; it is volumetric (it stores information in a space that it is already three-dimensional); it is finite (it has well-defined boundaries); it offers a comparative visual space through its recto and verso pages; and it is a writable as well as readable device (Kirschenbaum 2008). Through marginalia and grangerizationⁱⁱⁱ, readers of the past have also customised their books with their own additions, often very artistic and entertaining (Visconti 2013). Paying close attention to the codex affordances will be of crucial importance when designing new reading artefacts for the electronic landscape. As Kirschenbaum (2008: 1-2) states:

Books on the screen are not books, they are models of books. (...) By reflecting the affordances of the material codex artifact to greater or lesser extents, electronic books allow us to prescriptively model a range of different user interactions with bookish information spaces, or what I call bookspaces.

The new electronic bookspaces for print in the digital environment offer their own particular strategies of reader engagement through interactive features, which can be used to ‘enrich’ children’s digitised texts in ways that can help bridge the gap between reading modalities of different times and cultures and expand the readers’ horizon of expectations. The insertion of multimedia elements to remodel children’s literature of the past can be considered a contemporary form of grangerization on the part of digital editors: digitised texts are ‘enriched’ and annotated by inserting photographs, drawings, etc., taken from other works, but also newly made annotations and interactive features, such as annotations that explain vocabulary and cultural context, self-correcting exercises, puzzles, and audio narrations. Moreover, these texts can be actualized in new reading devices: electronic whiteboard, computer, e-reader, tablet, mobile phone; and in new reading contexts: the Internet, digital libraries, and application stores like Amazon, Google Play, and App Store.

Following the innovative spirit of writers who expanded the codex properties, I would like to pay attention to some strategies implemented by research groups in collaboration with libraries to recuperate print children’s literature of the past for contemporary readers and make visible to a wider audience their collections of digitised children’s literature. Digitised collections of print children’s literature reveal the tastes of librarians well-versed in the digital humanities, who share the contemporary concern with the materiality of literary artefacts and are fascinated by special books that, through their use of interactive features, were pioneers in their own time. Note, for example, the Rare Book and Special Collection Reading Room at the Library of Congress, which provides access to a growing Children’s Literature Collection that currently offers 137 digitised texts, including a Bible for children with pictograms from 1788. The main drawback, however, is that most often these digital collections, housed by research and university

libraries, are not addressed to children, parents or teachers, but mainly to researchers. The digital reading spaces or bookscapes for accessing these works vary in the set of options offered: single or double page-turner readers, access to usage statistics, thumbnails, image and text page files available for download, zoom, and Boolean search options inside the text, and in some cases, automated audio narration. A noteworthy digitisation project is the British Library collection 'Turning the Pages', which also integrates text and audio files per page, which are used differently in each work. For example, in the case of Lewis Carroll's *Alice's Adventures Under Ground* (1864), the audio offers an oral narration of the original handwritten text, and the text notes provide its transcription in print, whereas in William Blake's notebook, the audio files enrich the text with an exegetical dimension, explaining the significant elements in the poet's doodling. However, this stylized model has only been implemented in literary jewels housed in places not specifically designed for children.

Conversely, other digitisation projects have attempted to appeal to children as their ideal target audience. For example, the University of Maryland houses the International Children's Digital Library (ICDL), with digitised children's books in 76 different languages, including bilingual and multilingual editions, that offer children from minority communities the opportunity to connect with stories in their native languages. Though their reading space is simple enough (in plain digitised format with single-page turning), the collection provides access to the books in multiple and original ways, organising entries not only by language, but also by the colour of the cover (including 'rainbow'), by book shape and size, type of character, genre, and 'true vs. make believe'.

Other attractive initiatives are the beautiful and informative digital exhibition *Pop-Up and Movable Books. A Tour through Their History*, housed in the University of North Texas Library, which uses animations and videos to illustrate the movable elements in each item of the collection, and the Spanish National Library Digitised Children's Book collection, which includes automatic audio narration and has also made available for download artefacts such as antique cut-out dolls, children's birthday invitations, and colouring picture books. This library has also initiated a collection of interactive books, which so far includes the Interactive Quixote and the Interactive Leonardo, and which will soon harbour the Interactive Calleja project (Bárcena & Goicoechea 2021). This innovative digital edition presents *Plague of Dragons*, a collection of sixteenth stories adapted from Edith Nesbit's tales and published in 1923 by the pioneering Spanish publisher Saturnino Calleja. This collection includes the bilingual edition of the stories with dramatised audio narration, eight different types of annotations addressed to children aged 7-11, and three reading modes: the Spanish version (with interactive annotations oriented to promote a literary and creative reading), the English version (for the study of English as a second language), and a bilingual version (for a contrastive study of English).



Fig. 2. Detail of pages and annotations from the Interactive Calleja Project.

Using maps as an interactive way to access old texts is another approach used by libraries to recuperate classic children’s literature. This is the case of *Celia in the Revolution: Digital Cartography of Madrid*. The Spanish philologist María Jesús Fraga gives life to this project based on the work of Elena Fortún, a popular early twentieth-century children’s literature writer among Spanish-speaking audiences. The work consists of the contextualization on a map of Madrid from the 1930s of different passages from the novel, in which an adolescent Celia experiences key events of the civil war. On the map, different itineraries travelled by the protagonist are offered, as well as information about the historical context with complementary texts that include period photos and multimedia links.

These projects attempt to recuperate young reader’s engagement with print by using the modalities of reading to which they are readily attracted. They enable a fragmented, non-linear consumption of an electronic textuality rich with audiovisual material, animations, and games, while offering insights into the past.

Fusing Technological and Cognitive Interactivity in Children’s Electronic Literary Media

This section explores children’s literary media newly created for the electronic medium. In this field, readers’ engagement also depends on different types of interactivity and authors attempt to find a balance between introducing the interactive features made possible by the ever-expanding field of technological innovation and taking into account the child’s own interactive capabilities. The works I will discuss belong to the field of electronic literature, a type of experimental literary media which is still a *rara avis* in the commercial circuits, but which is the spearhead of innovation and can hold the key to the future developments of literary media (see for example Patti; O’Sullivan; Bell; Skains; and Erslev, in this volume, and Manresa and Real 2015, one of the first collections of essays in the field of electronic literature for children). The field of electronic literature has contributed new literary genres that can offer exhilarating reading experiences for children: we can find kinetic poetry with impromptu words, collaborative and generative poetry assisted by bots, hypertext narratives that offer a labyrinth of multiple readings at

the click of the mouse, interactive fictions in which the reader controls the course of the story and its characters, and more. Electronic literature thus places at its centre not only literary experimentation with technology, but also a reflection on our increasingly strong fusion with the electronic devices that surround us.

The dream of interactivity has always been a potent driving force in the development of electronic literature for children. Nevertheless, I can perceive an evolution in the field from an early stage in which creators focused on the development of technological interactivity (creating systems that provided feedback loops and the possibility of a bilateral performance through the use of code, natural language recognition, movement sensors, virtual reality, and so forth). A second generation of children's electronic literature shows a more balanced formula in which cognitive interactivity is also promoted by several strategies: such as introducing a less-saturated media environment (often dispensing with text or images), requiring readers' attention not only towards the electronic device, but to the world around them, or leaving blanks to be filled by readers' creativity and ingenuity.

This evolution is also the result of a post-digital entourage in which technological achievements are confronted with the drawbacks of living in environments saturated with digital technology. The post-digital aesthetics of contemporary electronic literature for children recuperate and remediate some of the affordances of older media forms and techniques, such as silent film, comic strips, visual novels, hand-drawn illustrations, pop-up books, stop-motion animation, etc. to create beautiful works that construct a warm, familiar reading environment, where reading pleasures of the past coalesce with top-notch technology.^{iv} In this vein, I present a selection of electronic literature works that have found an equilibrium between past and present reading modalities, between technological and cognitive forms of interactivity.

a) Text-based Interaction: Interactive Fiction

As mentioned above, children's dreams of interactivity in literary media entail potent immersion in the story through feedback loops that allow personalization, decision-making and problem-solving: in short, they want to be capable of interacting with the fictional work at different levels. One of the electronic literature genres that has successfully materialised the dream of interactivity is Interactive Fiction (IF), a type of adventure narrative or game that has relied on text to construct its fictional space, and whose interface and form of user interaction can be text-only. A work of IF for children that introduces a successful formula to connect the traditional role of the storyteller with the choice-driven narration made possible by electronic textuality is the story collection of *Mrs. Wobbles & the Tangerine House*, written by the Marino family (2012-2020). These stories invert the tendency observed in other examples of IF by placing emphasis on the narration, allowing readers to fully immerse themselves in the fictional world and enjoy the choices and the gamification of the story, which is smoothly integrated in the narrative. From the perspective of the interactivity of its medium, the Marino s' tales provide readers with the option of listening to a magic book narrate its own stories, a

book that voices opinions and behaves as another character, or reading them by themselves. This magic book adopts the role of the storyteller, fusing the voice of the co-author (Mark Marino) with that of his creation to form the ideal partner to accompany the child through a series of wondrous adventures in the magic foster care home of Mrs. Wobbles.

b) Image-based (Tactile) Interaction: Wordless Works for Tablets

While the interactive fiction of the Marino family encourages children to concentrate on the written text, there is a genre that adopts the opposite strategy by dispensing with text in favour of an exploratory use of illustrations, which enforces the reader to contribute with a fitting storyline. An outstanding creation in this category is *Spot* (2015), by David Wiesner, one of the world's foremost illustrators, who has embarked for the first time on a visual adventure for iPad. We can explore *Spot* zooming in and out of its five intersecting universes: Lower Rügg, a miniature world under an armchair, where fluff bunnies share space with tourists from the farthest corners of the galaxy; Mekanikos, a world of robots; Oceana Prime, an underwater world; Kataluna, a world of cats; and an intergalactic space station. The starting point is the desk of busy ladybugs trying to build a gigantic mechanical ladybug. The reader can explore each world looking for the portal to access another. The characters of one world make cameos in the others and little by little the reader learns to recognize its protagonists and the portals. Along the way, they must imagine the adventures that keep the beings she encounters so busy. The story explores through its images the relationship between the different species and the global habit of tourism, which gives rise to images that invert the patterns of the world in which we live, offering a magical experience that ignites the imagination and creativity of those who visit it.

The absence of text encourages the readers to develop a mental story that weaves the illustrations together into a coherent narrative, promoting the reader's cognitive interactivity. The piece introduces choice by allowing the reader to traverse the spaces at will through its hypertextual structure.

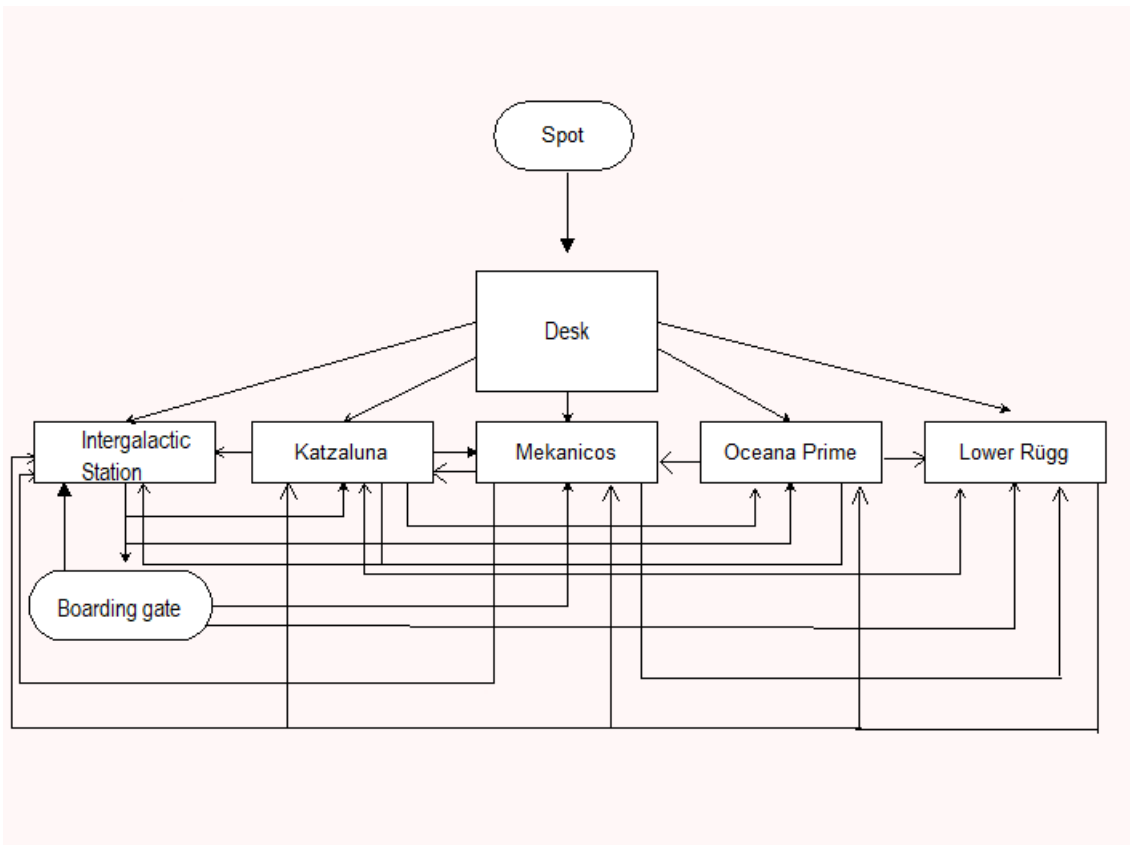


Fig. 3. *Spot*'s hypertextual structure.

c) *Image-based Augmented Reality*

Augmented reality has introduced a kind of magic similar to the dreamt fusion of the physical and the virtual planes imagined by children. Balanced products that do not impinge too much on the child's or young adult's own creativity offer a space for cognitive interaction by focusing either on an image-based or an audio-based interactivity, avoiding in this manner to overload the product with excessive sensory data. A good example of this is publisher Kókinos' *Animated Stories* collection, a print collection of illustrated stories with a free augmented reality application, that progressively introduces text over an image-based augmented reality, where sound is subtly used but the work of the illustrator takes centre-stage. The books can be read separately or brought to life by placing a tablet or smartphone on their pages. The animation in each story is integrated coherently in the narrative: for example, in *Amigos* (2017), illustrated by Charlotte Gastaut, an adorable and innocent Yeti searches for a companion in a snowy landscape, showing how nature can be truly alive if one knows how to look; or in *¡Valentina!* (2017), a shy little owl finds a pair of glasses and puts them on, starting an initiation journey through the night forest. Children's use of the application places them in the shoes of the stories' protagonists, discovering together the secret animations awaiting behind each page. Moreover, the animations are triggered with some variability each time, encouraging rereading of the stories.

CONCLUSIONS

This paper has examined children's literary media that offer bridges between past and present modalities of reading, using an approach based on transliteracy. For that purpose, I have avoided placing digital and print texts in opposition, exposing instead the hybrid gradation of different media strategies which can be found in children's literary media for the digital domain, which in later years has advocated for the remediation and recuperation of old media affordances. This tendency has manifested, for example, in enriched editions of digitised children's literature of the past, which recuperate literary jewels in formats that include interactive features with which the child is already familiar, such as non-linear exploration and links to multimedia content.

As we have seen, children's literary media across time explores the possible environments in which the reader can be situated within the media and technological options available, transforming children's dreams of interactivity into real-life experiences. Nevertheless, electronic literature for children seems to be evolving towards a simplification of technological interactivity in favour of greater cognitive participation in the construction of the narrative. To achieve this balance, authors concentrate on text, illustrations, or sound, leaving ample margin for the reader's imagination to fill the gaps.

Notes

- i. If we take into consideration the PIRLS (Progress in International Reading Literacy Study) results for student achievement by country, we can see that, even though a majority of countries improved their results with respect to 2001, an important decline was detected in 2016 with respect to results in 2011. Out of the 18 countries that have participated in all the editions of this study so far (2001, 2006, 2011 and 2016), 12 countries have improved their results in 2016 with respect to those of 2001, whereas only 6 have lower results in 2016 than in 2001. Nevertheless, if we compare the results obtained in 2016 with respect to those of 2011, the picture varies significantly, with 9 countries obtaining lower results than in the previous study, 1 remaining equal and 8 improving their results.
- ii. Results were obtained from 24 interviews with children during an interactive reading experience with fourth graders in a Spanish public school in 2019, in which they were introduced to the first pilot of *Plague of Dragons*, a project discussed in detail in 'eLITE-CM Project: Developing Enriching Interactivity in Children's Digitized Literature and Elit' (Goicoechea 2020).
- iii. Grangerization was an eighteenth-century hobby initiated by the publication of the *Biographical History of England, from Egbert the Great to the Revolution* by amateur historian James Granger (1769). This book, aimed at collectors of printed images, was interactive, since it featured portraits of historical figures and blank leaves to let readers take notes referring to their own collections. Soon, collectors went beyond the book's intended use, instead adding their own portrait collections

directly inside. With time, grangerization became a popular hobby in which readers used printed books as the basis for their own multimedia projects. They pasted in prints and pages of text from other books, and made connections between related topics by adding letters, drawings, catalogues, etc. into the original volume.

- iv. For an exploration of children's electronic literature, the reader can visit the following digital collections: the kid eLit ELO 2021 exhibition (<https://eliterature.org/elo2021/kidelit/>), Children's E-Literature (<http://ilovepoetry.org/?p=11228>), Children and Young adults electronic literature recommendations by Gretel research group (<https://www.gretel.cat/recomendaciones-lij-digital/?lang=es>), Ciberia project's Collections of Children and Youth Electronic Literature (<http://www.ciberiaproject.com/coleccion-lij-digital/>).

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