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# Children's Books: Paper VS Digital, What Do They Prefer?

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Copyright is held by the owner/author(s).  
IDC '16, June 21-24, 2016, Manchester, United Kingdom  
ACM 978-1-4503-4313-8/16/06.  
<http://dx.doi.org/10.1145/2930674.2936004>

**Abstract**

In this paper we present a study through which we intended to understand children's preference towards book formats, in particular digital or paper ones. To accomplish this, we created an original story (*Ritinha*) illustrated by two children. The traditional book format was composed by static images and text. The digital format had animated images, hyperlinks to navigate to different parts of the story and static text complemented by an audio narrative. We conducted a field study with 105 children in order to observe in which format children would prefer to read a book: if in paper or in digital format. The method used to accomplish this task was direct observation.

**Author Keywords**

Digital Books; Paper books; Hypertext; Drawing; Children; Interaction design

**ACM Classification Keywords**

Design.

**Introduction**

The fast progress of Information and Communication Technologies (in particular the transition to an information society in which the Internet and World Wide Web assume fundamental importance) has significantly affected the mode how we think about the

nature and functions of paper book. The emergence of electronic books for example, has considerably changed the traditional book printing approach (Furtado, 2006). In recent years we have been witnessing the development of new writing and reading forms, new distribution channels and, in particular, the multiplication of digital documents, virtual bookshops, digital versions of referenced paper books and new devices for reading eBooks (Furtado, 2006). The classic paper book facilitates a linear communication's mode, although the properties of printed books are such that the text doesn't require to be read only by a linear method. Every printed book can be opened at random and a reader can begin reading at any point. Because of this possibility of opening a book and starting anywhere, a printed book easily adapts to either linear or non-linear speech, such as when a printed encyclopedia is read. "Choose Your Own Adventure" books, back in the seventies, used these properties of printed books in order to build interactive printed texts for children well before the advent of hypertext and digital books (Packard, 1982). In a printed book we can jump between any page, or skip ahead to a document or article that was cited as a footnote. On the other hand, digital technologies such as hypertext promote a faster system, though this phenomenon provides the same result of reaching a desired document as we would find in an analogue system. A hypertext link, typical in digital texts, allows us to create and explore a vast network of hyperdimensional content, which could, if the user wishes, connect various points of the text through a click creating this way new realities well beyond the control of the author himself (Aarseth, 2005). On one hand, a hypertext document can be so dynamic that users feel that there are more navigation options than in the linear text

version. On the other hand, a hypertext document can be as open and interconnected so that users could be overwhelmed by the multiplicity of choices.

## **Methodology**

In order to better understand children relationships with printed and digital texts we created and studied *Ritinha*, a digital and analogue story aiming to engage children of the age of 8/10 in reading and understanding tasks. *Ritinha's* content was inspired by values of friendship, family, equality and sharing. It is a story about a group of friends who want what all children want, to feel no different from anyone else. In order to accomplish this task, we focused on 105 children from 5 schools who were currently in the 4th grade of Basic Education at Madeira Island, Portugal. We created an original story and showed it to these children in two different formats: paper and digital. Firstly, we showed the paper one and then the digital one. The digital one had animated images, hyperlinks to navigate to different parts of the story and static text narrated through audio.

## ***Ritinha's* narrative**

Whether in its linear printed format or digital multi linear, a story is a structured artifact. In a digital story artifact, the structure can be composed and decomposed according to different paths, but the characters' construction remains the same.

*Ritinha's* narrative was conceived and designed to convey feelings of friendship, sharing and communication between children and it's focused on multicultural values. Subjects like having friends of different colors/races and how it contributes to child's social development are addressed in this narrative.



Figure 1: *Ritinha's* print book.



Figure 2: *Ritinha's* digital book screen shot.



Figure 3: *Ritinha's* digital book screen shot.

*Ritinha's* narrative is about children's physical and cultural differences. The main characters are from different countries, such as South Africa, India, China, and also Portugal. Four characters were physically described and some of their cultural particularities were revealed. Their function is to show that anyone with several physical and cultural characteristics can be real friend of another. *Ritinha* shows that friends should be friends no matter what differences they have: their clothes, their toys, their preferences, their families. After designing the characters, we build the plot and the sequence of characters' action necessary for them to achieve their goals.

Firstly, *Ritinha*, the main character, and her friends are physical and emotionally described. Secondly, two playing activities that *Ritinha* loves are described ("playing hide and seek", "playing with cars"), each one reveals something that has happened. Thirdly, *Ritinha* has seen that her friend Lúcia goes home with different people on different days: with her dad and brother; with her aunts; with her parents. And lastly, *Ritinha* goes home with her mother to tell what she learned about her friends and their countries to her father who is in a wheelchair. Finally, a branching structure of the plot points was organized so that multiple paths through the plots were possible to explore in the digital format (Figure 4).

The digital interactive book and the paper version had in common the images and text. For the development of these two versions it was requested the collaboration of two children who would not participate in the experiment. These two children were invited to draw the characters and scenarios. Subsequently the images

were colored out, digitized, cut and vectoryzed (Figure 7).

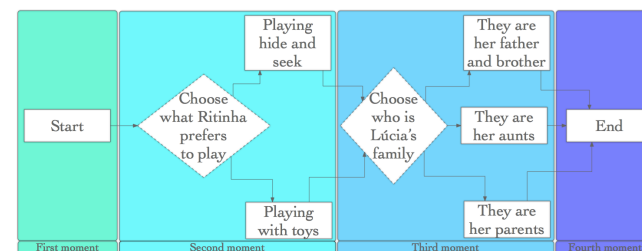


Figure 4: *Ritinha's* plot diagram.

For the book's paper version, it was necessary to make a front and a back cover for it and number the pages. For the digital book, it was necessary to record audio's narrative and to coordinate the contents themselves: images, text, audio. To produce the audio files, it was requested the usage of a professional audio equipment and the collaboration of children and adults in order to record their voices for the narratives and characters dialogues. Images and texts were putted together in different pages to obtain the appearance of an illustrated paper book. In the paper format, children were only able to explore one path of the story. After adding the covers (Figure 1), it was printed out and assembled at a design studio while the digital version was assembled through the PowerPoint application to run on both OSX (Mac) and Windows computers (Figures 2, 3, 5, 6).

### Children Reaction *Ritinha's* Paper Book

7% of children read the story out loud, giving more importance to the text. Others (93%) were observing its images and were commenting together that they were colorful and by their shape it looked like they



Figure 5: *Ritinha's* digital book screen shot.



Figure 6: *Ritinha's* digital book screen shot.

could move. In the end, when we told them that if the story had options to choose the character's path so they would be able to see different stories outcomes while reading the same story text, they were surprised and amazed by the fact that with those options they were able to imagine the continuation of the story. When we said that there was an interactive version of the story available, they showed interest about the possibility of the story to continue besides the paper version. It was verified that they liked to know there was a story with options where they could imagine each story behind each option before clicking it.

### Children Reaction *Ritinha's* Digital Book

40% of children were silent while listening to story's audio although at the same time 50% were paying attention to digital book's animated images and they were talking about story's speech and images details. Only 10% were paying more attention to the text than to the images. When these children were listening to the story's audio, they were also reading out loud the text that was appearing on the screen at the same time. While seeing *Ritinha's* digital book, they were smiling a lot. Some children smiled because some of them had never seen a digital story. Others because the book format was different from any other digital book they had ever seen. After seeing *Ritinha's* digital book 98% of children said that they liked the possibility to choose the characters' paths, which reveals curiosity and desire to advance in the story. They really liked to imagine different paths that the main story could take. They liked to anticipate what would happen after clicking on each option. Only 2% of the children would rather read a linear story than a non-linear one.

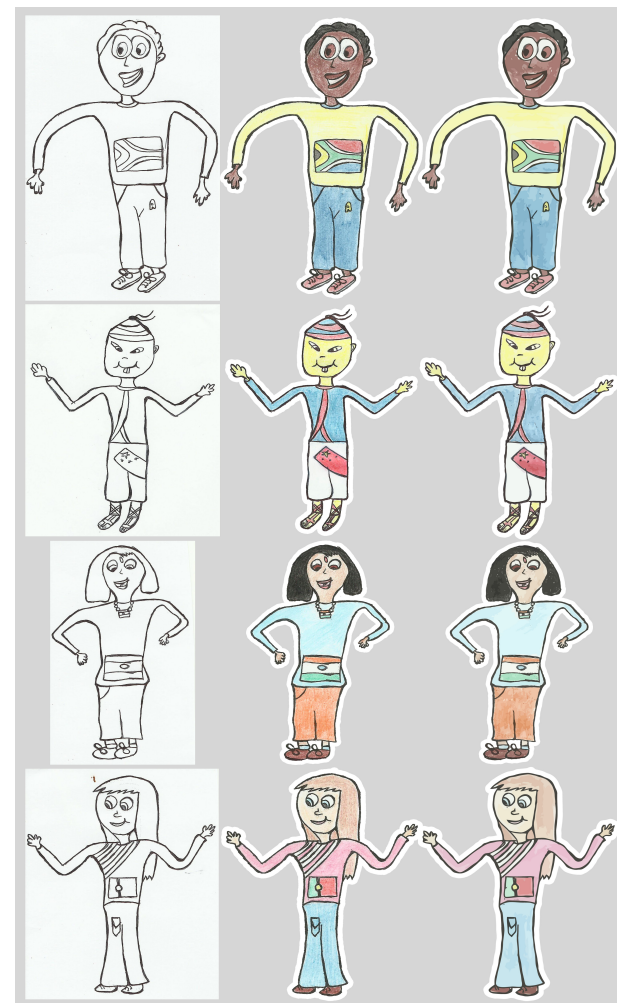


Figure 7: *Ritinha's* main characters' process. First you can see the drawings sketches, secondly the illustrations (hand colored) and thirdly the vector images.



Figure 8: Screen shot of *Ritinha's* app in Apple Store.



Figure 9: Screen shot of painting on *Ritinha's* app in Apple Store.



Figure 10: Screen shot of painting on *Ritinha's* app in Apple.

### Results

After the direct observations, children were asked if they would rather read *Ritinha* in paper book format or in digital book format or in both formats (Table 1).

Question	Both formats	Digital format	Paper format
Children's answers	53%	29%	18%

**Table 1:** Children's results to the question "Which format do you prefer *Ritinha's* story?".

Those who would prefer read *Ritinha* in paper format (18%) said to appreciate the following aspects:

- *To handle, to turn over the pages of.* This topic about physical touch is very intrinsic. This feature makes the book becomes more personal, enabling the user to feel and open it.
- *Reading time.* On this format, children can spend much time as long as they want.
- *Imagination, emotion.* They can imagine the scene's action, giving more liveliness to the story in their mind. They argue they can live more the story's adventure.
- *Autonomy of reading.* Children are able to go and get it in a more convenient way (they only need to pick up a book from a table or bookcase). They can read it alone without help, they don't need to switch on a computer or table, these two may switch off themselves by some reason.
- *Pleasant reading.* On paper books children can have a more pleasant reading and argue that they don't need to strain their vision.

Children who would prefer read *Ritinha* in a digital book (29%) argued for the following positive aspects:

- *Possibility to choose the character's path.* Children liked the hypertext component.
- *Graphics.* They can see more exciting graphics in a digital book than in a paper one, they liked the animated images.
- *Storytelling.* The story is told through a playable audio narrator, so they don't need to read it. They compare it to a digital environment as the television. They argued this format has an innovative style whilst it is more engaging.
- *Good for sweating problems.* Some children pointed out that for them is difficult to handle a paper book because they sweat on their hands, so they argued digital book is better to handle because they don't need to turn over the pages of like in a paper book.

And finally, those who preferred to read *Ritinha* in both formats (53%) pointed out:

- *Curiosity and power to vary.* They enjoy all features of both format. They liked handling a book but also liked the interaction with a digital device and they could vary between the paper and digital book version of the same story. In both formats they could practice their reading. On a paper book they said they might have a more careful reading, and on a digital book they might get lost with the animated graphics and storytelling's audio. However, they argued this doesn't mean digital books are, somehow, less good for them.
- *Consideration for others.* Children who would rather have books on paper and digital than only in one format are aware that there are still many children who don't have a computer at home neither even a tablet. They would prefer all stories in these two formats, so every child could have access to them too.

## Conclusion

In this paper we have reported on a comparative study between analogue and digital interactive books with the 4th grade of the 1st cycle of Basic Education at Madeira Island. We discovered that most students (53%) gave preference for both formats: paper and digital. Children like to feel the book with their hands, but they don't dispense the opportunity to interact with a digital device. Digital books allow the inclusion of multimedia content that enables a more complete and interactive user interaction. It was evidenced by the fact that most children liked the possibility to choose the character's paths to unlock the story. Digital books are only an interaction complement between students and literary text. Please note this study doesn't aim to distinguish digital books as the best tool versus paper books in education. It is common sense that school's educational books have an important role in the teaching-learning process and have a great appreciation by all, although digital books are a useful tool for teachers in order to make their classes more appealing. With this kind of book format children at school feel more engaged to interact and learn new concepts.

Results from this study motivated us to continue the project and build an interactive application with *Ritinha's* story (Figures 8, 9, 10, 11). This application was developed in Objective-C for iPad. For this app we only introduced a new tool that enables children to paint the main characters and save their paintings. *Ritinha's* app is currently available for iPads at Apple Store.



Figure 11: Screen shot of *Ritinha's* app in Apple Store.

## Acknowledgements

The research leading to this work has received funding from ARDITI (Agência Regional para o Desenvolvimento da Investigação, Tecnologia e Inovação), under grant No. 002458/2015/132. We thank to all children and adults that took part on the narratives' construction, to the children that participated in the experiment and to Eng. Paulo Freitas for developing the *Ritinha* App.

## References

1. Aarseth, Espen. 2005. *Cibertexto – Perspectivas sobre a Literatura Ergódica*. Pedra de Roseta, Lisboa.
2. Furtado, José Afonso. 2006. *O Papel e o Pixel – do Impresso ao Digital: Continuidades e Transformações*. Escritório do Livro, Florianópolis.
3. Packard, Edward. 1982. *The Cave of Time – Choose Your Own Adventures Series*. Random House Children's Books, USA.