FINAL REPORT

PTDC/CCI-COM/119030/2010

EngageBook: touch, read and play

01-04-2012 - 10-02-2015

Delivery: 12.03.2015 (30 days after the end of project)

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This report intends to give a detailed notion about the entire project development from its publications to communications; from the workshops to the software and BridgingBook patent. To make it clear we followed the Tasks timeline as presented in our proposal, adjusting dates, when they were changed. Because we followed a double take in prototyping/software development, we will also repeat some of the tasks in order to give information about each different phase and its dimensions, in an autonomous way.

1 | State-of-the-art
01-01-2012 - 29-02-2012

Throughout the project duration, we followed the activities as we've defined in our proposal. The first months we added a new analysis layer from the more recent state-of-the-art, and we manage to present and publish some of it in conferences to gather more feedback, as follows.

Paper: Pinto, A. L., Zagalo, N., & Coquet, E. (2012). From a click to a gesture: a contribution to defining the concept of children's e-picturebooks. Paper presented at the 2nd International Conference - Art, Illustration and Visual Culture in Infant and Primary Education, Aveiro, July 23rd-25th 2012. (pp.215-220) ISBN: 978-989-98185-0-7
Link: https://drive.google.com/file/d/0B227gFPzT1hvTmoxaHVENm54WEk/view?usp=sharing

Paper: Pinto, A. L., Coquet, E., & Zagalo, N. (2012). Pedra, papel ou digital: onde lê, como lê e o que lê a criança na era digital. Paper presented at the 7º internacional de Investigação em Leitura, Literatura Infantil e Ilustração, Universidade do Minho, Braga, 23 de Junho 2012
Link: https://drive.google.com/file/d/0B227gFPzT1hvb1M5XzhJeWhTQ3c

Communication: Zagalo, N. (2012). "Videogame Emotions Suffer from an Interactivity Paradox."
ECREA, Experiencing Digital Games: use, effects & culture of gaming, 23-25/10/2012, Istambul, Turkey
Link: http://www.slideshare.net/nzagalo/videogame-emotions-suffer-from-an-interactivity-paradox

Communication Poster: Pinto, A.L., Do clique ao gesto: o livro interactivo digital para a infância no tempo das interfaces gestuais, in Udesign12, 1º encontro nacional de doutoramentos em design, U.d. Aveiro, 2012, ISBN: 978-989-20-3421-8
Link: https://drive.google.com/uc?id=0B227gFPzT1hvOFk5dFZ3a19WSjA (p.360)

2 - Paper prototype development
**01-02-2012 - 31-11-2012**

Hereafter we've started the experimentation. From the experimentation process and tests made we come to decide to pursue with two different concepts: a) add a complete physical book object to a tablet; b) superimpose physical objects on the tablet surface.

**Experimentation and tests**

The early experimentations were made through the use of paper drafts and storyboards; and it was implemented on paper and cardboard, while the tablets were used only in simulation mode.

A) First approach: Tablet + Physical Book (01-04-2012 - 31-07-2012)
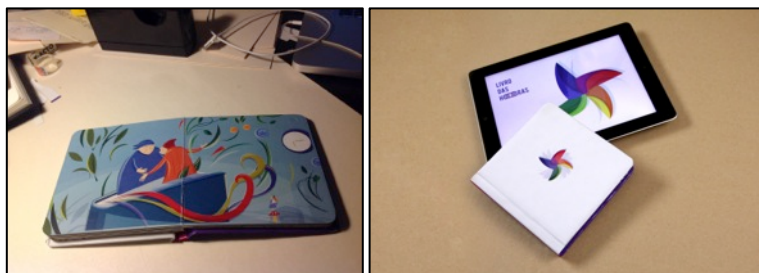
In the first approach we've experimented to add a physical book to a tablet, and exploit the narrative complementarity from their combination. With this approach we intended to use the properties of the paper book artefact, and add to it the digital properties from the tablet.

B) Second approach: Object superimposition (01-07-2012 - 31-11-2012)
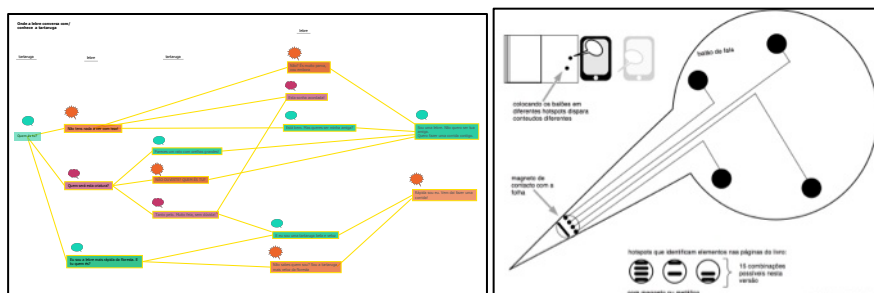
In the second approach we tried a different route, going for a book almost completely digital, to which we would add physical objects, as dialog balloons, that would be necessary in order to construct the narrative. The core idea was to enhance the digital with tangible properties and somatic sensorial relations with the virtual book object.

3. Paper prototype evaluation (Approach A)
01-07-2012 to 31-12-2012

The evaluation with paper prototypes revealed to be poor in extracting data from the kids usage. The main problem here was, in fact, the experimentation of novel concepts, which were not yet glimpsed. At that time in the project we're still not totally sure about the paths to follow or avenues to explore. We were testing, experimenting and exploring different possibilities. The interaction with kids helped but more in a informal and collaborative approach. That's why we never put in place an evaluation process before having the digital prototype available. Even if we still concur with our proposed approach to have a formal evaluation with the paper prototype, we become aware that doing this while exploring novel and completely different concepts would not be helpful. So we preferred to bring kids in our lab, let them experiment, while we informally explain them what we wanted.

We developed the first concept sketch: a medium fidelity prototype working as a technical draft to test the basic functions and affordances of the book allowing us to know if the technical concept was achievable.

After the first sketch prototype two high-fidelity prototypes have been developed

Prototypes developed

1. **Bridging Book Concept** - https://vimeo.com/64249658
2. **Human Body**: https://vimeo.com/117906168

4. Final Prototype (Approach A)
01-09-2012 to 31-03-2013

From both the paper prototyping and the feedback gathered in the informal evaluations, we developed the first high-fidelity prototype.

Communication: Figueiredo, A.C., Pinto, A.L., Branco, P., Zagalo, N., Coquet, M.E., (2013), Bridging book: a not-so-electronic children's picturebook, Proceedings of IDC 2013, 12th International Conference on Interaction Design and Children, New York, USA, (p.569-572), ISBN: 978-1-4503-1918-8
Link: https://drive.google.com/file/d/0ByjRDdpnL8ltbGVpUXRxVFpjVkU/view?usp=sharing

Communication: Figueiredo, A.C., Pinto, A.L., Branco, P., Zagalo, N.,, (2013), Bridging book: a not-so-electronic children picturebook, 2013 ACM SIGCHI Conference on Human Factors in Computing Systems, CHI '13, Paris, France, April 27 - May 2, 2013, Extended Abstracts, (p.2801-2802) ISBN 978-1-4503-1952-2
Link: https://drive.google.com/file/d/0ByjRDdpnL8ltUFlQT0RFakxncFk/view?usp=sharing

5 . Software development (Approach A)
01-09-2012 to 31-06-2013

With the first round of feedback and prototypes done, we started the implementation of the final software version, the BridgingBook (BB). Finally, with the software implemented, we requested first the national patent, which raised the attention of international companies.
After signing an exclusive contract with Hung Hing Printing Group Limited, we submitted the patent for international publication.
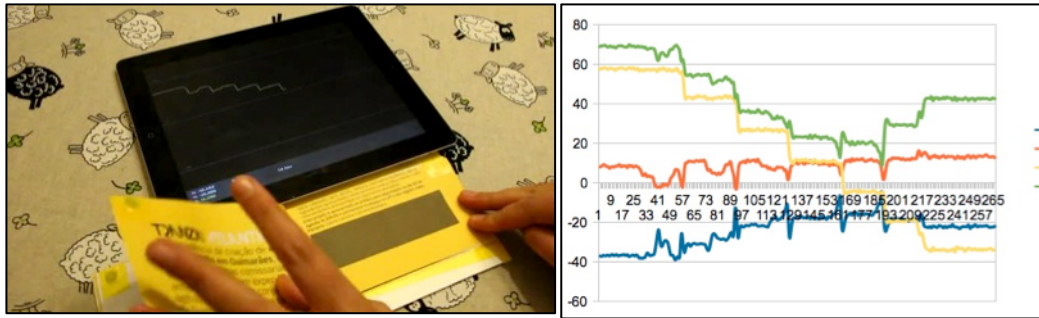
5.1 Patent

Figueiredo, A.C, Pinto, A.L., Branco, P., Zagalo, N., (2014), Interactive Book Electronic System And Operation Method, Patent Pub. No.: WO/2014/170840, International Application No.: PCT/IB2014/060761, Publication Date:23.10.2014, International Filing Date:16.04.2014

Link: https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2014170840

Sold for exclusive international use to Hung Hing Printing Group Limited

Link: http://www.hunghingprinting.com/whatsnew/1861

5.2 Software (1)

BridgingBook App

https://drive.google.com/folderview?id=0ByjRDdpnL8ltfm04aU50Qkh6cW5JdHUzUWdNazFKSVk3SWlTU1BvNC1qay1JQVVqQ0RMWk0&usp=sharing

5.3 Software videos

1. Bridging Book Technology - https://vimeo.com/85462506

2. Bridging Book Flexible: https://vimeo.com/106638343

3. Bridging Book for the iPhone: https://vimeo.com/117906169

Master Thesis (1): Ana Carina Figueiredo (2013) Bridging Book: novo modelo de livro híbrido, entre o papel e o digital, Master Thesis in Technology and Digital Art, University of Minho

Abstract: "This work presents the development of an hybrid book integrating simultaneously the digital and printed supports. Theoretically is framed in the field of human-computer interaction, focusing on the emergence of new interaction paradigms that recover the potential of materiality in the context of computer systems."

6 . Prototype testing (Approach A)

01-03-2013 to 31-06-2013
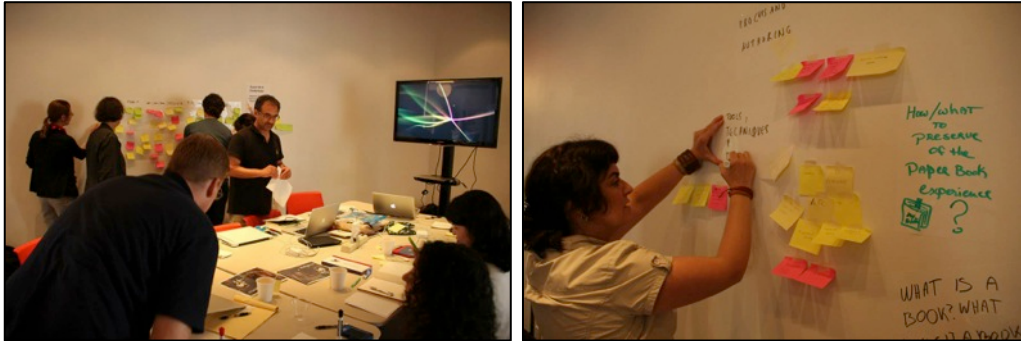
Workshop (1): Pinto, A.L.,, Zagalo, N., Sylla, C., Freed, N., Figueiredo, AC., Qi, J., Branco, P., Coquet, M.E., (2013), Bridging books: the printed book as a support for digital experiences. Proceedings of IDC 2013, 12th International Conference on Interaction Design and Children, New York, USA, (p.606-609), ISBN: 978-1-4503-1918-8

Communication: Ana Lúcia Pinto, Ana Carina Figueiredo, Pedro Branco, Nelson Zagalo, Eduarda Coquet, (2013), Bridging book: desenvolvimento de livros híbridos para crianças. Atas da conferência Interação 2013 - 5ª Conferência Nacional sobre Interação, Vila Real - Portugal. 7 e 8 Novembro 2013

Demo presentation: Ana Carina Figueiredo, Ana Lúcia Pinto, Pedro Branco, Nelson Zagalo, Eduarda Coquet, (2013), Bridging book: protótipo de livro híbrido para crianças. Atas da conferência Interação 2013 - 5ª Conferência Nacional sobre Interação, Vila Real - Portugal. 7 e 8 Novembro 2013

7.Prototype evaluation with children (Approach A)

01-04-2013 to 31-10-2013

After the first sketch prototype two high-fidelity prototypes have been developed.

Through the design development stages of high-fidelity prototypes the user's feedback was emphasized and allowed us to evaluate and redesign it iteratively.

On the two sessions with children we evaluated the prototype affordances, the children's relationship with the narrative and their full experience

For both evaluation sessions we selected children aged between 7 to 9 years, to whom the prototype is addressed and we used similar protocols.

The feedback from both sessions tells us that the narrative relationship between the printed and the digital contents of the book must be enhanced. They also expect more ways to interact with the medium. They also seem to expect elements and activities they are used to experience in other domains as video games. The paper book was also redesigned due to their feedback.

Session (1): "BridgingBook". School "EB1/JI Cruz D'Argola". 19 April 2013

Session (2): "Come play with the Magic Book". Library Lúcio Craveiro da Silva, Braga. 19 October 2013

Paper presentation: Pinto, A.L. (2014), Touch, read and play: enhancing the reading experience of hybrid-enhanced children's picture books. In Proceedings of IDC '14, 13th International Conference on Interaction Design and Children, Aarhus, Denmark, June 2014

Link: https://drive.google.com/file/d/0ByjRDdpnL8ltQVh6emtsQnRrMVU/view?usp=sharing

8. Paper prototype evaluation (Approach B)
01-11-2013 – 31-03-2014

Session 3: "How many forms have a book?". Library Lúcio Craveiro da Silva, Braga. 5 March 2014

To the approach B we developed a full evaluation process with children to design, test and refine the Balloons interface.

On the first phase we implemented a paper prototype evaluation. We intended to verify the narrative creation using the paper elements and a previous story – the hare and the rabbit – and we employed on it both the characters and the comic balloons. The input from this first session allowed us to develop the interface as well as the narrative storyboard with its narrative paths.

9. Final Prototype (Approach B)
**01-04-2014 to 31-07-2014**
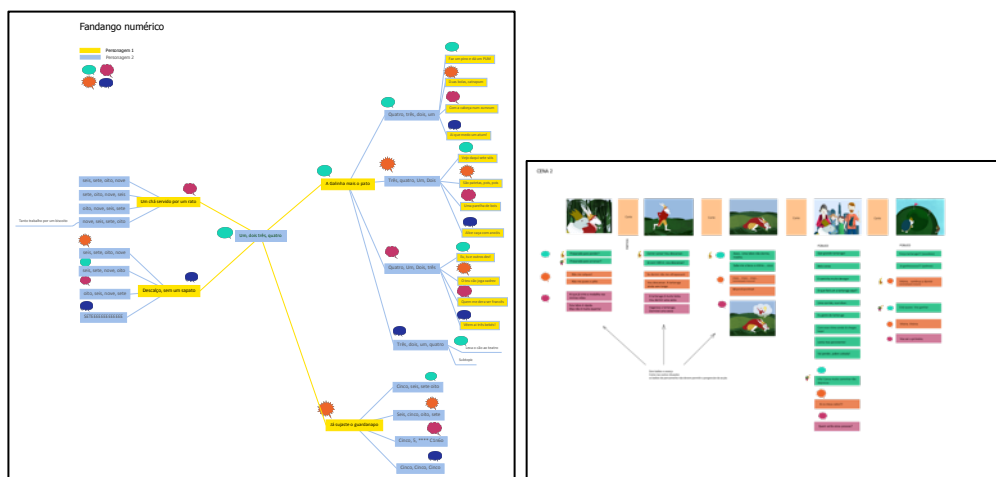
Prototypes developed
3. Balloons – https://www.youtube.com/watch?v=bW1FRyD2jzE
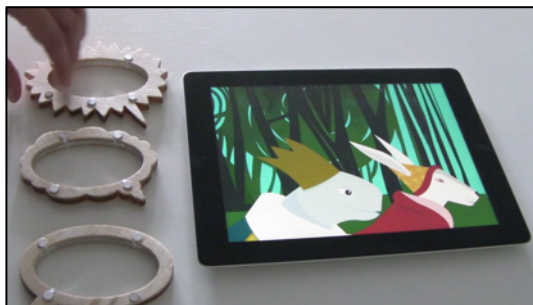4. My Farm: https://vimeo.com/117906167

10. Software development (Approach B)
01-08-2014 to 31-10-2014

In this phase we had to develop the technology that would support the simulated prototypes developed in the previous point. For that we had to program a fully new application that would be able to read different objects on the top of the tablet. This demanded routines to detect touch, drag and stamp features.
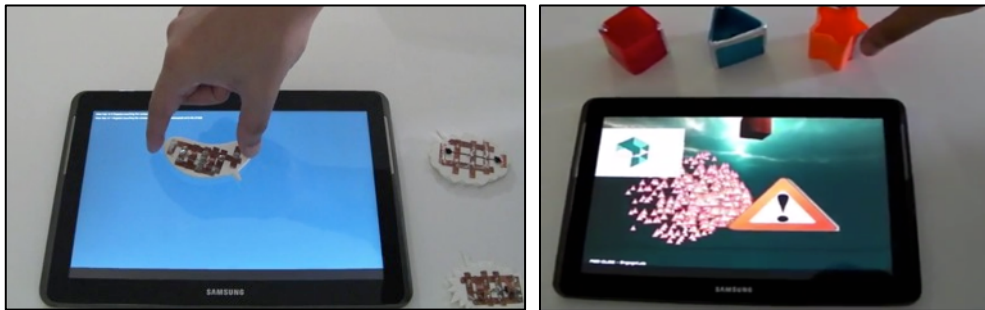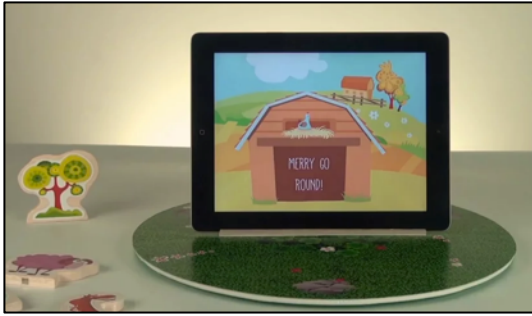

With the technology in place we could advance for the implementation of two applications, Balloons App and Merry Go Round App. The first application, was designed to implement the "Second approach: Object superimposition", that we talked about in point 2. As for the application "Merry Go Round", it was created more as a mixing between the two approaches. Our idea was to find out if there were any gaps we weren't aware between the two approaches.

Software (2): Balloons App

https://drive.google.com/folderview?id=0ByjRDdpnL8ltfm04aU50Qkh6cW5JdHUzUWdNazFKSVk3SWl
TU1BvNC1qay1JQVVqQ0RMWk0&usp=sharing

Video Final: https://vimeo.com/121676464

Software (3): Merry Go Round App

https://drive.google.com/folderview?id=0ByjRDdpnL8ltfm04aU50Qkh6cW5JdHUzUWdNazFKSVk3SWl
TU1BvNC1qay1JQVVqQ0RMWk0&usp=sharing

Video Final: https://vimeo.com/106272723

11. Prototype testing (Approach B)
01-11-2014 to 31-01-2015

On the last evaluation with children we tested the fully functioning balloons interface, concerning the narrative and the interface usability. We also observed the tangible balloons being used by children on the tablet screen. We detected some interaction dubious situations and we have recorded some narrative construction issues to correct.

Session (4): "Tangible Dialogs", Library Lúcio Craveiro da Silva, Braga. 11 November 2014

Communication: Figueiredo, A.C., Sylla, C., Branco, P., Zagalo, N., (2014), Merry Go Round: a physical, virtual, physical… toy. In Proceedings of ACE '14, 11th International Conference on Advances in Computer Entertainment, Funchal, Portugal, 11-14 November 2014

Link: https://drive.google.com/file/d/0ByjRDdpnL8ltMl9xdzRoOE1mLWM/view?usp=sharing

Master Thesis (2): Rafael Carvalho Ferraz, "*Storytelling Interativo - A Banda Desenhada nos Novos Meios Digitais de Informação*", 2014. Dissertação (Mestrado em Ciências da Comunicação (Audiovisual e Multimédia) - Universidade do Minho.

Abstract: Exploratory Research aimed to investigate the possibilities of linking comics to digital media, through the use of interactive narrative combining new technologies interaction, as Unity and BridgingBook platforms.

Thesis Prototype: Hiper BD

Link: http://repositorium.sdum.uminho.pt/handle/1822/34302

12. Data analysis and interpretation (Approach A & B)
01-09-2013 - 31-01-2014

This was the last phase of our project the one dedicated to the analyses of all developed elements, to interpret work done and data collected, in terms of the objectives of our project proposal. To help us in this process we made a workshop, previously to this phase, in June 2015 having as the main goal, the discussion about the use of narrative in media. From the perspective of the project, we were interested in understanding the pervasiveness of narrative models, and how they could be fuelled by our project propositions, mainly the two software models developed throughout the two approaches A and B. The results of the workshop were then published, as the following ebook.

Workshop (2): "Narrativa, Media e Cognição", Centro de Estudos de Comunicação e Sociedade. Universidade do Minho, 27 de Junho 2014
Link: https://sites.google.com/site/narrativamedia/

Book - Zagalo, N., Oliveira, S., (Eds) (2014), Abordagens da Narrativa nos Media, CECS/UM, Braga, pp.134, ISBN: 978-989-8600-31-8
http://www.lasics.uminho.pt/ojs/index.php/cecs_ebooks/issue/view/163

During this period we developed a final workshop (3) to analyze the creative potential behind the Approach A. For this specific workshop, we've created blank BridgingBooks, that kids would fill themselves with drawings, texts, video and audio.

Workshop (3): Sylla, C., Figueiredo, A.C., Pinto, A.L., Zagalo, N., Branco, P. (2014) Merging Physical and Digital White Canvas to Unleash Children's Creativity. In Proceedings of ACE '14, 11th International Conference on Advances in Computer Entertainment, Funchal, Portugal, 11-14 November 2014
Link: https://drive.google.com/file/d/0ByjRDdpnL8ltdzAtRjBqdWtxb2s/view?usp=sharing

The workshop above served the developing of a final journal paper (1) on the BridgingBook model software, with an entire section dedicated to the interpretation of data collected during sessions with kids. The idea was to present the new creative avenues this tool presents to creators of books, giving them and overview of possibly new techniques to tell stories.

Journal Paper (1): Pinto, A.L., Zagalo, N., Coquet, E., Figueiredo, Branco, (submitted), Don't toss out the printed book: bridging printed and electronic books, in journal **Learning, Media and Technology**, Taylor & Francis

Last, and even if only related with the state-of-the-art, after 2 years our communication presented during the first year of the project, at ECREA, was accepted with revisions, to be published by the journal Games & Culture. This journal paper (2) relates with the state-of-art prior to the developing of this project, however the discussion presented there, about the design of interactive storytelling, is relevant for the creation of new stories using our new proposition for interactive books, which need models of interactive storytelling.

Journal Paper (2): Zagalo, N., (accepted with revisions), Storytelling Design of Sadness in "Heavy Rain", in journal Games and Culture, Sage Journals

13. Expected results soon

The project ended by the 10 February 2015, however we keep working with the company Hung Hing, helping them fine tuning projects using our patent. Also we've some theses being finished:

Ana Lúcia Pinto, is finishing the writing of her PhD thesis, titled: ***Do click ao gesto, o livro interactivo digital para a infância, no tempo das interfaces gestuais.***

Tiago Tsou, is finishing the writing of his Master thesis, ***The Digital Platform and Illustration.*** Master Thesis Prototype: https://www.youtube.com/watch?v=cn5lLztwI28

Finally we're preparing a last paper, ***Technology, back from the Virtual*** for the national journal, Communication and Society, that will discuss the approach 2, mainly the questions related with the tangibility regarding virtual reading.

14. Conclusions

We were able to create two new models for the design of books, which makes use of both paper and digital elements.

The first model was implemented, tested and evaluated, to finally become the software BridgingBook, which ended as an International Patent, being exclusively sold internationally by the company Hung Hing.

The second one, that was also implemented and tested, offers us new conceptual approaches for the use of semantic codes by taking advantage of a combination between digital contents on tablets and tangible physical objects.