Parent and Child Reading, Designing for an Interactive, Dimensional Reading Experience

Hervé Gomez

Everyday Learning group , MediaLab Europe
Sugar House Lane Bellevue Dublin 8, Ireland
`herve@mle.ie`
`http://www.mle.ie`

Abstract. The emergence of new immersive, interactive storytelling interface offers new ways of engaging a user in narrative. Traditionnal storytelling media such as books can benefit this technology in various ways. Examining the cognitive approach of the user-narrative interaction, we envisage the design of an interactive book as a support for exploring and interpreting a story. The project Dimensional Reading offers an interactive, immersive interface to support the parent-child reading experience.

1 Introduction

New interactive, immersive technology offers new possibilities for stortelling. Using immersive virtual environments, the Aladdin project [1, Paush R et al] physically involves the user in the narrative[1]. Traditional media also benefits from this technology like movies, books and other traditional media. From a Childrens book like Leapfrog [2], enabling the reader to interact with the text using a pen attached to the book, to the project Listen-reader [2, Back M et al], there are a variety of possible designs for interactive books. This heterogeny is the result of the varied contexts in which we use books. Our project, Dimensional Reading explores ways of designing interactive books to enhence the parent-child reading situation.

2 Related work

Currently, interactive book design tends toward two goals. One is to support the learning experience, as the Leap frog so illustrates in a commercial product. The Magic Book project [3, Billinghurst M et al] offers more complex configurations to support learning through books. Using special handheld glasses, the users can explore each page as a 3-D virtual environement. Another tendency in interactive

---

[1] The interface consist in a 3 dimensional virtual environment embedded in a Head Mounted Display (HDM), the user is a led to fly a virtual carpet using a motorcycle-like control seat. Describing the design process, the authors defined their approach as using VR [virtual Reality] as storytelling medium [1, Paush R et al]

[2] http://www.leapfrogschoolhouse.com/Products/index.asp

book design is to support the narrative. The Listen-Reader project [2, Back M et al] consists of a book which provides a sound background for each page. Sensors embedded in the pages enables the detection of the proximity of the readers hand to the pages. When the readers hand approaches the page, some sounds become louder. In this project sound is used to illustrate the narrative, to suggest an atmosphere that would enhance the reading experience. Our project is particularly inspired by the Listen-Reader experience. We believe that using sound as a surrounding environment can help define the reading context. As the Listen-Reader was developed for exhibitions, Dimensional Reading differently aims to explore the many dimensions engaged when parent and child are reading together: from interacting with the text to using the text to interact with each other. Imagining the situation when a parent and a child engage together in reading and sharing comments and questions, we wonder how to use sound to enhance this interaction without interrupting the flow of the experience. One primary question is then to identify the process involved between the user and the text while reading in order to understand in a way parent and child can use the text to interact. Such an approach would provide guidelines for a new kind of interactive immersive book.

3   Between User and Narrative - The Notion of Blank

At first sight, the immersivity realised while reading a book seems more fragile than that of the movie experience. The activity of reading can easily be interrupted by an external event, as opposed to the movie, where the audience is in a room dedicated to this form of immersion. Wolfgang Iser offers an analysis of the interaction between reader and book, based on the notion of Blanks. According to Iser, that which is omitted in the text is what enables the interaction between reader and text. The success of the interaction relies on the ability of the reader to surmount this asymmetry, between the text and the readers subjectivity. This interaction could, therefore, be described in these terms:

> Blanks indicate that the different segments and patterns of a text are to be connected even though the text does not say so. They are the unseen joints of the text, and as they mark off schematas and textual perspectives from one another, they simultaneously prompt acts of ideation on the readers part[4, Iser.W.]

The authors suggest the existence of a dynamic process in the readers/viewers mind, that leads him to continuously reorient himself with respect to the narrative. His representation of both his role, as a viewer, and of what is happening in the narrative, are what engage him in the act of reading. The feeling of immersion is thus a result of the reader involvement in such process. This understanding of the situation of immersion therefore provides a principal guideline for the design of innovative storytelling interfaces. The involvement of the user depends on his ability to find plausible the content he is exploring, as well as his commitment to engage with that content. Hence, the social and cultural contexts

that the interface addresses (that is, the realms of possible interpretation for the user) are essential in the design of immersivity. From this perspective, the ideal approach to the design of an immersive story-telling interface, using new technology, should focus on assessing the capacity of the content to evoke the users representations, and on generating an environment to support this new range of content.

4   Dimensional Reading: supporting the Interaction

If, as we saw previously, the users representations are at stake during the experience of a narrative, the process described is implicit and focuses on the users mind. W. Iser (1989:34) describes it as a process of ideation. The experience of a narrative engages the set of representations internalised by the user previously during his/her everyday experience of the physical, social and cultural realm. We believe that implementing interactive technology in traditional narrative interfaces could, therefore, render explicit the cognitive processes involved in experiencing a narrative. The emergence of multimedia and interactive technology has brought about new possibilities for the designers of storytelling interfaces. The manner in which the narrative is experienced can now depend on the users choice between a set of possibilities. In this context, the users individuality during the experience is actively involved in the progression of the narrative. Where such technology explicitly involves the user in the evolution of the narrative, it seems possible to use these resources to help the user reflect on his understanding of the narrative, without disrupting the flow of the experience. This was the approach we deployed in the design of an immersive, interactive book that enables users to share and express their understanding of a text. The design process was oriented in two main directions. One referred to the type of media used, and the other concerned the general context of the interaction.

4.1   Defining the Media

4.2   Choosing a book: Continuity of the Narrative vs. Interactivity

Implementing new technology within a traditional storytelling interface implies adapting to the constraints of the media itself. One of the principal design issues in creating a new interactive storytelling interface is negotiating the balance between the narrative or scenario and the interactivity. This negotiation consists in deciding how much exploration should be up to the user, and how the system is going to suggest the development of the narrative. In most cases, the narrative has to be interrupted in order to let the user explore a sequence and implement choices, and then the user has to trigger something in order to resume the course of the narrative. This configuration can be illustrated by certain visual interfaces, such as movies or 3d graphics environments [1, Paush R et al], but also in certain commercial interactive books where the reader has to hear a bell to turn the page. The choice of a book depends on how appropriate it is in its particular

relationship to the user. The reader has a certain control in the progress of the narrative. By choosing to turn the page of a book, the reader decides to move on to another part of the text. This existing feature of the book offered us a context in which to design the nature of the interaction. In each page, the interactivity offers ways of reflecting on the content of that page. In the final version of the augmented book, the progress of the narrative would rely not on the nature of the interaction, but on the engagement of the user. The design of the interactivity would then be concentrated more on the consistency between the content of each page, offering ways of illustrating the meaning of the text, rather than led by the necessity to drive the reader in a specific direction. The design of the interactivity focused on maintaining the natural interaction people usually have with an ordinary book. The interactivity would then work as an accentuation of the text, which would encourage a reaction or a questioning from the reader.

4.3 Description of the system

Fig. 1. Functional diagram of proposed system

In order to keep the interaction with the physical object natural, we sought to retain the traditional physical aspect of the augmented book. The electronics are hidden in the back cover and only the sensors can be seen. The pages of the book do not have any electronic devices embedded in them. The sensor readings of the book are sent to the computer through an RF (Radio Frequency) transmitter, which enables the user to manipulate the book at ease. The computer centralises the sensor readings (light and sound), and organises the interactivity

of the page according to the information it receives. (see Fig. 1)

The design of thi s interactivity, then, is motivated by the desire both to keep the interaction intuitive, but a lso to suggest a reaction or a questioning, rather than an imposition of our understanding of the text. Because any representation or illustration of the text invites the reader to adopt a certain point of view in relation to the text, the balance between suggesting and imposing was difficult to reach. The choice of sound as a feedback cue for interaction originates in this reflection. Sound appeared to us the best way of suggesting an environment, which is intrumental in generating the atmosphere described in the text without disturbing the readers focus on the text. The sound interactivity includes a default background for each page, consistent with the general context of that page, where sound events are triggered according to the properties of the room that the reader is in. By relating some physical aspects of the environment to how the sound background is responding, we are expecting the reader to question this orientation towards the text, and potentially generate a reaction or a comment. In order to facilitate the design of the interactivity we decided to write the narrative ourselves. The story was meant to go through very different scenes, highlighting dramatic differences in the default background. The story describes the journey of a little bear who cant find his muppet, and goes through a 7-scene journey to find it. Each double page opens on a different scene, where the hero is discovering a new environment. Hence, Scene 1 takes place in the cave when the bears are sleeping, scene 2 in the cave when the bears are awake, and scene 3 near a swamp where Little Bear (the main character) meets a frog (see figures 1 and 2). No cues were given to the reader about the interactivity of the book, the text does not indicate what would trigger such and such sound, so that the reader has to find by himself (or seek) what will happen if the environment changes. From the writers perspective, the readers role in the story could be described as being that of the guardian angel of the main character. However, no mention of such a perspective is revealed to the reader.

The description of the interaction in the first scene of the book illustrates the design of the interactivity. The first scene opens on a bear family (dad, mum and Little Bear) sleeping in a cave at the end of the hibernating period. The augmented environment continually plays a mix of snoring sounds and water drops falling. Any sounds in the readers room can be heard in the loudspeaker with a reverb effect. When the reader speaks, he can hear his voice as if he was in a cave with the characters of the narrative. The microphone is sensing any sounds in the readers room; these sounds are modified through the computer in real-time. When the light that reaches the book increases in intensity, a howling sound is triggered, as if this amount of light would have disturbed an animal. Moreover, when a sound in the readers room is loud enough, a yawn sound is triggered, as if the bears had been woken up.

The design of the physical interface enables the readers to explore each scene without having to disrupt the progress of the narrative. In this way, the natural aspect of the activity of reading is preserved. Both the sound environment design and the interactivity serve the general context of the interaction. The book was

designed for a particular reading situation: parent-child shared reading.
subsectionDesigning and Enhencing the context The context in which our book would be used was inspired by two kinds of situations. The first one was the parent and child reading together and sharing comments on the text. The second was based on the project KidsRoom [5, Bobick et al], where the human-computer interaction was strongly referring to a specific cultural context. The KidsRoom embeds a virtual interactive narrative environment into a physical space in order to stimulate childrens' immersion in the narrative [5, Bobick et al]. The room-size characteristics of the interaction playground encourage dynamic social interaction. Not only can a group of children take part in the experience, but the interface also invites them to play with the objects in the physical environment, as well as socialising with their peers. The interface design here envisages two different levels of immersion. One would be physical, surrounding the children in a story using virtual and physical cues: Computer-generated images projected on the wall and MIDI sound for the virtual side, and lighting effects and bedroom-like decor for the physical space. The other would be cultural and social: encouraging social interactions between participants, and choosing the child bedroom as an interaction playground, the interface invites one to enter a childs world.

In the KidsRoom, the connection between socio-cultural interaction in the nonnarrative world and the experience of the narrative is organised through the configuration of the physical space. Using these two situations as steppping stones for the design of our book, we wanted to create an environment where the relationship between parent and child is an integral part of the interaction design. As a result, the usage of room properties (such as light or sound) was used as a modality to reflect how the parent and child interact through the text. The sound background and effects were then used as an invisible curtain, which defines the parent-child as a dyad and protects it from the external world. Modifying the way the parent and child hear their own voices during the interaction is an element of this process, of including possible change in the external world into the narrative experience. The sound-events, triggered when the light level on the book or the sound volume in the room changes, are extra material provided to the dyad to encourage and stimulate comment on how these sounds relate - or dont - to the text. The interactivity is meant to stimulate the sharing of what the text doesnt necessary describe. In this way, the augmented book aims to enhance the richness of the internal interpretative process of the users, as well as their capacity to share, exchange and learn from each other.

5 Future work

As a work in progress, the existing prototype needs some improvement in various domains, from the quality of the wireless transmission to the quality of the code. The improvement of how the whole system works proceeds in tandem with the need to have the book meet the people. In other words, we plan to explore how parent and child interaction with a regular book can inform the

design of the interactivity. Pilot studies, involving parent and child reading and describing their reading experience, can aid the decision process in the design of the next prototype. A parallel work direction lies in adapting this technology to an existing story. An existing narrative would offer a more appropriate support for the design of the interactivity. We would have to approach the interactivity of the book towards our understanding of the text, of what could be a support for commenting. Such an approach would contribute to situating the status of the representations and the interpretations produced during the interaction with the book, with further interpretation made by professional critics and writers. We would then be able to document the production process, from the text to the design of the immersive environment, and contrast this with the current usage of the book.

The dimensional reading is an attempt to enhence an experience: parent and child reading together. As a book designed originally for home entertainment, it became, along the design process a tool to requestion and explore the relationship between people narrative and technology.

References

1. Paush, R., Snoddy, Jon,, Taylor, R., Watson, S., Haseline, E.: Disneys Aladdin : First Step toward Storytelling in Virtual Reality. ACM 1996 p 193 205
2. Back, M., Cohen, J., Gold, R., Harrison, S., Minneman, S.: Listen Reader: an electronically augmented paper-based book proceedings of CHI 2001, ACM Press, April 2001.
3. Billinghurst, M., Kato, H.,Poupyrev, I.: The MagicBook: Moving Seamlessly between Reality and Virtuality In IEEE Computer Graphics and Applications, May/June, 2001, pp. 2-4
4. Iser, W.: Prospecting : From reader response to Literary Anthroplogy the John hopkins University Press (1989)
5. Bobick, A., Intille, S., Davis, J., Baird, F., Pinhanez, C., Campbell, L., Ivanov, Y., Schutte, A., Wilson, A.: The KidsRoom: A perceptually-based Interactive and Immersive Story environment Presence, 1999, vol 8, no 4, pp369-393