Revisiting the Future of Reading: The Research and Design Behind XFR

Maribeth Back
FX Palo Alto Laboratory
3174 Porter Drive
Palo Alto CA USA 94304
01-650-842-4827
back@fxpal.com

ABSTRACT

Reading is part of how we understand the world, how we share knowledge, how we play, and even how we think. Although reading text is the dominant form of reading, most of the text we read— letters, numbers, words, and sentences—is surrounded by illustrations, photographs, and other kinds of symbols that we include as we read. As dynamic displays migrate into the real world at many scales, whether personal devices, handhelds, or large screens in both interior and exterior spaces, opportunities for reading migrate as well. As has happened continually throughout the history of reading, new technologies and shifting social patterns create new genres and styles of reading, which themselves may then combine to morph into something new.

At PARC, the RED (Research in Experimental Design) group examined emerging technologies for impact on media and the human relationship to information, especially reading. We explored new ways of experiencing text: new genres, new styles of interaction, and unusual media. Among the questions we considered: how might "the book" change? How does the experience of reading change with the introduction of new technologies, and how does authoring change?

In this talk, we'll discuss the ideas behind the design and research process that led to creating eleven different experiences of new forms of reading for a museum exhibit called "XFR: eXperiments in the Future of Reading." We'll also consider how our technological context for reading continues to change, and what influence the lessons from XFR may have on our ever-developing online reading experiences.

Categories and Subject Descriptors

H.5.2 [User Interfaces]

Keywords

Design research, dynamic text, speed reading, interaction design, RSVP, interaction metaphors, reading, multimodal reading, capacitive field sensors, free-field interaction.

1. INTRODUCTION

For a gallery exhibition at Silicon Valley's Tech Museum of Innovation, we created a set of hands-on "reading instruments" exploring the intersections of reading with digital technologies.

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"XFR: Experiments in the Future of Reading" [1] ran at The Tech for six months, and then toured to other technology and science museums around the US and Mexico. Our goal for the XFR exhibit, which originally drew over 250,000 visitors in six months, was to associate a sense of excitement, fun, and personal control with the act of reading. The experimental quality of these new devices invited visitors to engage with and reflect upon reading as experience. Each exhibit offered a view into a different aspect of a "new" reading possibility: enhancing the physicality of books, taking on the difficulties of controlling dynamic text, wandering through a labyrinthine, house-sized graphic novel, or being charmed by a robotic "Reading Eye Dog." Below are brief descriptions of some of the individual exhibits that will be discussed.

Figure 1. The XFR exhibition installed at San Jose's Tech Museum of Innovation featured eleven interactive reading experiences in a 4,000-square-foot gallery.

Listen Reader

Though predictions continue to abound that electronic books will supplant traditional paper-based books, the reality of the book as cultural artifact remains powerful. In designing the Listen Reader exhibits, we deliberately kept the physical affordances of paper books while adding electronic augmentation. The Listen Reader combines the look and feel of a real book — a beautiful binding, paper pages and printed images and text — with the rich, evocative quality of a movie soundtrack. The book's multi-layered interactive soundtrack consists of music and sound effects. Electric field sensors located in the book binding sense the proximity of the reader's hands and control audio parameters, while RFID tags embedded in each page allow fast, robust page

identification. The result is a "magic book" that responds to a reader's natural hand motions and page turns. Importantly, the interactive soundtrack provides only music and sound effects, not spoken text. The act of reading still belongs to the reader.

Figure 2. This version of Speeder Reader was built into a video game housing to emphasize genre crossover.

Speeder Reader

Speeder Reader [2] is an interactive reading station built around two primary ideas: dynamic text (especially RSVP, that is, rapid serial visual presentation), and the interface metaphor of driving. As words flash one at a time on a screen in front of the reader, he or she controls the rate of speed of the words with a gas pedal (up to 1850 words per minute in this instance). Text stream selection is performed with a steering wheel. Thus, one can "drive through a book." Speeder Reader uses people's knowledge of the familiar activity of driving an automobile (or, in the case of children, operating a speed-racing video game) to allow comfortable and intuitive access to a possibly less familiar world of interactive text. The power and ease of the car-driving interface also serves as a metaphor for the power of reading.

Tilty Tables

What if coffee-table books and coffee tables merged into one reading experience? Projected on the white surface of the 3'x3' Tilty Table is a high-resolution image that makes it appear as if the table is a glowing screen. When visitors tilt the table, accelerometers mounted beneath it cause the images on the surface to slide about in direct response. Each of the three Tilty Tables in the gallery provides a different reader experience. [1].

RED The Reading Eye Dog

This exhibit illustrates the impact of form on our perceptions of function. The machinery inside RED, the Reading Eye Dog, [1] is fairly standard for text-to-speech systems: stereo cameras, optical character recognition algorithms, and a voice synthesizer. Place printed (or even handwritten) text in front of RED and he'll read it out loud to you (after taking a moment to digest it). For a computer, this is not such a hard thing to accomplish. For a dog, even one that we can see is made of metal, it seems both difficult and charming: what a Good Dog! The Reading Eye Dog was one of the XFR show's most popular exhibits, generally surrounded by a crowd of children engaged in getting him to read aloud to them.

2. CONCLUSION

Several of the XFR exhibits attracted groups of people as often as they did single individuals. It was not uncommon to find several children piled into one of the Listen Reader armchairs, for example, or to find clusters of people around Speeder Reader, Fluid Fiction, or the Reading Eye Dog.

What lessons can we take forward from XFR into today's robust online reading environments? Can the design and research methods that produced these reading prototypes successfully inform online design and functionality?

All eleven of the XFR reading experiences were designed with the idea that form affects meaning, and in fact is inextricable from it. We found that by authoring the form as conscientiously as the content, we were able to achieve some unusual goals: getting people to read deeply in a museum setting, for example, and getting people to read socially, in groups, often aloud to each other. Interviews with visitors indicate that the exhibit succeeded in its primary mission: causing people to consider the origins of the text they read every day, and to ask themselves how they might read it differently in new forms.

Figure 3. The Tilty Tables encourage readers to use their bodies to engage with the moving text.

3. REFERENCES

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