

# Reading in the Wild: Sociable Literacy in Practice

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## ABSTRACT

Online reading, especially among children, is an understudied phenomenon. Thus designers of digital libraries and pedagogic tools for children generally lack deep knowledge about how to shape reading experiences so that they will be attractive for young audiences. Without a nuanced picture of children as readers, we are unlikely to develop systems responsive to their needs and desires. Participatory design coupled with studies of prototypes in natural conditions may help us create experiences that contribute to proficient literacy practices among children 10 to 14 years old. Our participatory design processes revealed that children this age highly value sharing their experiences and that reading sociably can introduce new pleasures. The current study uses the *Alph* prototype to study how one small group of children responds to its sociable literacy features.

## Keywords

Participatory design, sociable literacy, digital annotations

## ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces – *user-centered design*; Group and Organization Interfaces – *Collaborative computing, Asynchronous interaction*.

## INTRODUCTION

Online reading, especially among middle-school children between the ages of 10 and 14, has not received much research attention. Yet the past five years have seen measurable changes in how both adults and older children use the Web to find information, to keep up with news, and to accomplish a wide range of tasks both for school or work and for play. In July 2005, Lenhart and Madden [9] reported that internet use among teenagers in the United States had grown 24% in the past four years and that 87% of children between the ages of 12 and 17 are online. In fact, 82% of American youngsters are online by the time they are 12. We can expect the trend to continue

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downwards so that in the near future a large majority of children over 10 years old will be using the internet regularly.

At the same time that internet use is becoming ubiquitous among teenaged Americans, reading proficiency seems to be in decline [12]. These twin trends make it more urgent that researchers, educators, and developers create information technologies to stimulate engagement with a range of vital literacy practices, including imaginative literature [11, 13, 14]. Although we know very little about how much or how often children read for pleasure, concerns about whether children's reading proficiency is declining frequently surface in the popular press. News reports on the reading abilities of recent college graduates amplify worries about whether the next generation of college students will exhibit even weaker abilities [3].

Children between 10 and 14 years old seem an especially important cohort because most of them have already mastered primary literacy skills—the ability to decode visible signs into words and sentences, but they need to be motivated to move beyond basic competence to proficiency. One traditional mechanism for honing literacy has been young adult fiction, whether as part of schooling, as an organized extra-curricular activity through book clubs and reading circles sponsored by public libraries, or as a self-directed leisure activity. To engage young adults with imaginative literature and with complex nuanced language, we will need to develop technologies that respond to their needs and to their preferences.

## DEVELOPING AN ONLINE READING INTERFACE

Over the past three years, we have undertaken participatory design work with an intergenerational team consisting of six to eight children between the ages of 10 and 14 working alongside two graduate students and two faculty. This approach has enabled us to explore many dimensions of children's literate lives. Working with the International Children's Digital Library (ICDL) [5], our intergenerational design team has explored the three main reading interfaces it supplies [4; 8]. With children acting as our research partners, we also conducted extensive contextual inquiry about the reading habits, preferences, and future visions of children in this age cohort [15].

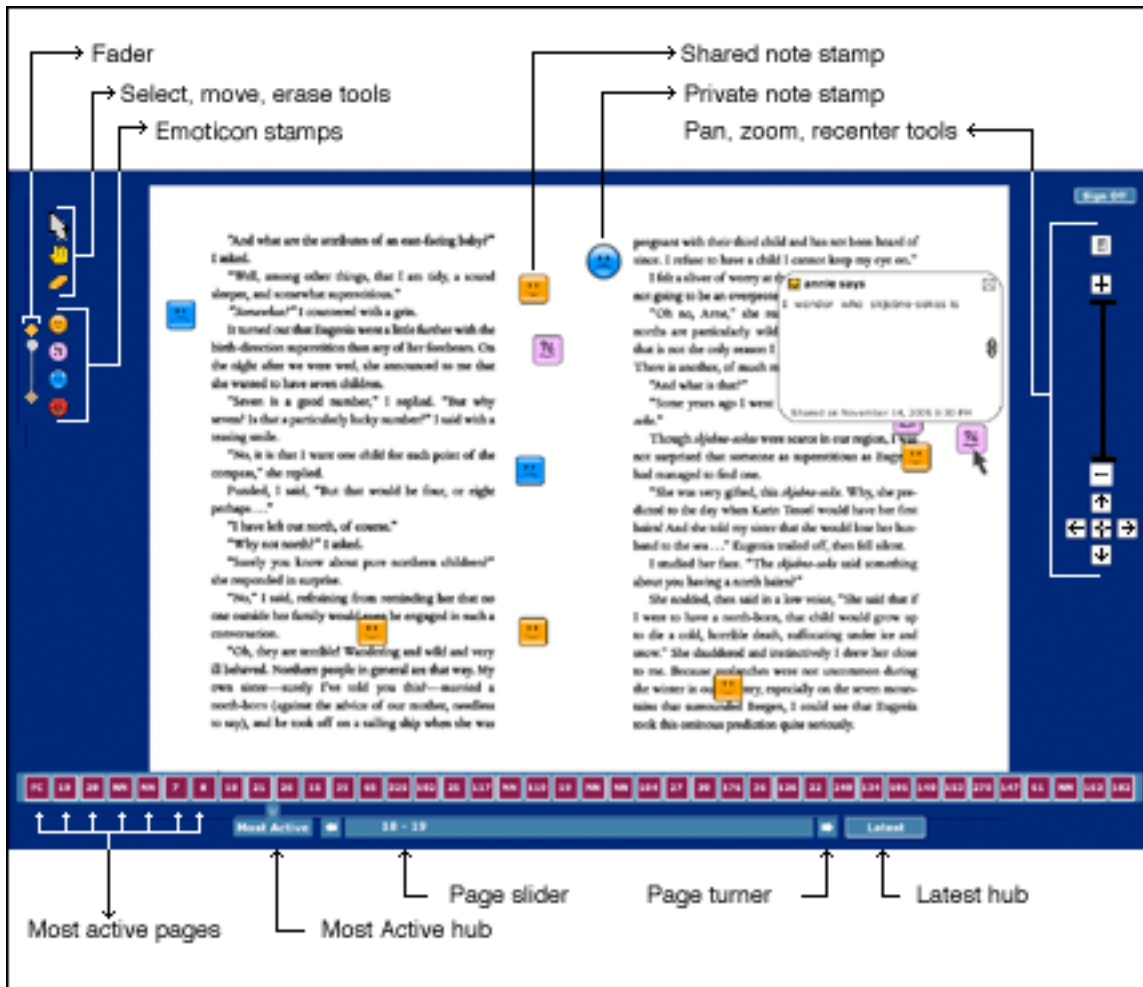


Figure 1: Two annotated pages in *Alph*.

One outcome of our contextual inquiry and our exploration of the ICDL has been the recognition that children want ways to engage in more active, and more social, reading. The ICDL's three book reader interfaces, the only reading interfaces developed specifically for children, all work from scanned images of pages and all provide ways to turn pages and to manipulate the virtual book to make progress through it possible [4, 5]. The "standard reader" basically supports paging forward and backward, while the "comic book reader" and the "spiral book reader" both present novel overviews of all the pages of a book so that a reader can select any page from the arrangement of thumbnails. However, these interfaces for reading do not support more interactive and more sociable practices.

*Alph*, in contrast, supports sociable reading of traditional children's literature in order to meet the expectations of young readers [6, 7]. Like the ICDL, *Alph* uses images of book pages and provides readers with interface elements to turn the virtual pages and to resize pages for easier reading. It allows readers to choose between viewing a single page at a time or viewing a two-page layout. Unlike the ICDL

book readers, however, *Alph* incorporates software for constructing social relationships with other readers of the book. Using scanned pages and a decidedly book-like navigation system minimizes the chance that an unfamiliar representation of the book would distract or disorient readers. By maintaining as many features of the physical artifact as we could, we hoped to be able to examine the novel functionalities, the sociable features, more clearly.

*Alph* creates a sociable reading environment by supporting communications among readers who belong to the same Internet Reading Group (IRG). Readers can leave annotations on the book's virtual pages by choosing one of four icons, "stamping" the icon anywhere on the page, writing a note attached to the stamp. The author of the note can choose to keep the note private or to share it by clicking on a button on the note object. If she keeps the note private but decides to share it later, she can return to it and change its designation. If a note is shared, other readers who are members of the same IRG will be able to see the icon and read the note. When stamps are placed in such a way that they obscure the book's text, *Alph* provides a tool

to “fade” the stamp so that the text underneath is readable (see figure 1).

Readers see shared notes others have left when they arrive on an annotated page. Notes they have not yet read are marked with a green border while notes they have read show the emoticon. To see who wrote the note or to glance at the contents, the reader mouses over the emoticon stamp. Clicking on the stamp opens the note fully, making reading easier. To enable readers to find the notes others have left in other areas of the book, the interface provides two activity hubs, one showing the locations of the most recent notes (Latest hub) and the other showing which pages have the largest accumulation of notes (Most Active hub). The hubs are located near the navigation tool that allows readers to page forward or back or to move in leaps or jumps (a group of pages of any desired size) [10] by manipulating a slider with page number indicators (see figure 1).

### RESEARCH DESIGN

Given the worldwide efforts to create useful and sustainable digital libraries of every type and description, the largest frame for this study asks whether digitally-delivered traditional literature for young adults might have a role to play in preserving and augmenting the development of advanced literacy practices. While that question is too large to answer meaningfully through a small study of short duration, it is important that we explore whether some ways to deploy literature online might be helpful in creating positive literacy experiences for children from 10 to 14 years old. We cannot begin, however, without developing specific systems for online reading with which to explore some plausible designs for interaction with texts and with other readers.

More than two decades of research on reading from screens has demonstrated that in order to test systems appropriately, prototypes must cross some key thresholds of usability and acceptability, including physical, perceptual, cognitive, and perhaps even social factors [2]. Our first field test of *Alph* [7] suggested that we needed to ensure that scanned pages were crisp and that resizing pages always resulted in highly legible text.

We also learned that the interface would need to facilitate locating the notes written by others and probably would need multiple mechanisms for the sociable features. In addition, our work with the children on our design team suggests that offering something children really enjoy reading may be a key element.

In our preliminary study in fall 2004, the children on our intergenerational design team together with some of their parents and friends, used *Alph* for four weeks to read an acclaimed work of young adult fiction [6; 7]. Analysis of this first field test was suggestive. We learned that the children who had participated in designing the system felt they had had positive experiences using it, that tools like

*Alph* may help shed light on the potential for social software features to augment and sustain the pleasure of leisure reading, and that sociable reading tools may alter some traditional reading habits. Because the first test users were also co-designers, however, we were unable to reach larger conclusions about how tools like *Alph* might be experienced by children who had not provided design guidance.

In fall 2005, we recruited a group of five children from 10 to 12 years old to participate in a reading group sponsored by the Corvallis Benton County Public Library. The children volunteered to use *Alph* for four weeks to read *East*, an award-winning novel by Edith Pattou. The book was chosen by the children’s librarian who also organized the reading group. The public library sponsors many such reading groups to encourage young adult readers. Typically, the Corvallis-Benton County Public Library organizes such groups for young adult readers several times a year as part of an effort to encourage reading for pleasure.

For this study, the recruiting posters announcing the group also informed potential participants that they would be using computers to help shape the book of the future. Participants were asked to make the same commitment to reading the online book as they would have made to reading a physical book in the context of a library-sponsored reading group. Although typically the reading groups the library sponsors attracts both boys and girls, in this case only five girls from 10 to 12 years old volunteered. They agreed to read with *Alph* and to allow us to observe their use of it.

The study ran from November 7, 2005, through December 5, 2005. To introduce the participants to the system, we demonstrated the system and asked each participant to create an account using a screen name (see Table 1). At the end of the study period, the participants met again to discuss their experiences with each other and with the researchers. In the intervening four weeks, the participants accessed *Alph* from their homes or schools and did not meet face to face.

Guided by exploratory questions suitable for naturalistic and ethnographic studies, our current study examines

- whether children reading a traditional book online will use *Alph*’s sociable features;
- whether annotations show strong connections to the book or simply record unrelated chatter;
- whether children use both shared and private notes and whether private notes differ from shared ones;
- how the participants divide their time and attention between the book’s text and the notes;
- whether reading pathways with sociable online books differ from those with physical books;
- whether social or environmental factors help shape the experience of online reading with *Alph*.

The software logs and timestamps every mouse click and some mouse over events, providing us with a detailed picture of readers' interactions with the book and with each other. In addition, we gathered the participants together at the end of the study period to talk with them about their experiences. The participants provided post-it notes with accounts of three things they liked about using *Alph*, three things they did not like, and three suggestions for improving the system. Researchers used the conversation to ask for clarifications and explanations, to discuss more general questions about their home and school environments, and to discover any problems they might have had with getting time on the family's computer or accessing *Alph* from school. In appreciation for their help with this research, we then gave each child a copy of the book so that they could finish reading it on paper if they liked.

## RESULTS

Our first analysis of the log files focuses on general reading behaviors and uses of the sociable features in *Alph*. In particular, we have looked at reading episodes, the nature of the marks and annotations, and the reading pathways or trajectories participants took through the novel.

### Reading Episodes

Participants varied widely in their use of the book and *Alph*'s sociable functions. One participant, HollyL, was quite methodical, reading at a fairly steady pace nearly every day. Typically, she would read in the late afternoons or early evenings for about 15-20 minutes at a time and generally covered 13-15 pages in that time. Some sessions were shorter, occasionally as brief as eight or nine minutes. She read, or at least viewed, about 60% of the book and her reading pathway suggests that she read in a fairly traditional way, looking at notes left in the book when she came across them, but not often seeking them out.

At the other extreme, Aura essentially gave up after only two reading episodes. In the discussion at the end of the study period, she indicated that she had had to compete for

time on the computer with others in her family, but we cannot rule out a lack of interest or other discomforts and dislikes she might have been reluctant to share with us. A third participant (Balderick) read sporadically for a while and then seemed to drop out, but she has returned to *Alph* at least twice since the end of the study period, apparently looking at the notes she had not previously seen. Two other girls appear to have read all or nearly all of the book using *Alph*.

Annie read in uneven bursts in approximately 20 individual sessions, ranging from several hours to as little as two minutes in duration. Her longest reading episode took 2:45:00 minutes. On one day toward the end of the study period, she logged three separate sessions for a total connection time of 3:20:00. The log suggests relatively constant activity during most of these three periods, but of course we cannot know for certain what kinds of things she might have been doing in addition to moving the mouse and clicking on navigation features in the interface. During the longest of the three sessions that day, she seems to have viewed only about 45 pages and there are some gaps several minutes long during which no events were recorded even though she had not logged off the system or quit the application.

The most active participant (Amethyst) began her participation a week later than the others and did the majority of her reading and writing in the last 10 days or so of the study period. Nevertheless, she seems to have read the entire book using *Alph* and often read steadily for long periods of time. On the two days before the end of the study period, she spent nearly 4:45:00 traversing 365 pages. Although she started later than the others, she passed the early parts of the book where the most notes ultimately accumulated before many of them were written. As she was reading the last 25% of the novel, she encountered no notes other than her own. Still, when she reached the end, she spent some time using the social navigation tools to seek out and read notes she had not encountered on her pathway through the text.

**Table 1: Annotation Activity**

Screen Name	Public	Private	Deleted	Total	Percentage
Amethyst	67	3	3	<b>73</b>	27%
Annie	36	0	4	<b>40</b>	15%
Aura	7	0	0	<b>7</b>	3%
Balderick	37	5	1	<b>43</b>	16%
HollyL	75	0	34	<b>109</b>	40%
<b>Total</b>	<b>222</b>	<b>8</b>	<b>42</b>	<b>272</b>	<b>100%</b>
Percentage	82%	3%	15%	<b>100%</b>	

### Marks and Annotations

Participants produced a total of 272 notes and marks of which 222 (82%) were shared. Only eight private notes (3%) were created and retained (i.e. were not deleted) (see Table 1). All shared notes were directly related to some aspect of the novel with two exceptions (and those were requests for help with a computer problem). Many notes revealed emotional responses to events and characters in the novel or compared the participant’s life and circumstances to the lives and circumstances of the book’s characters.

Because they were not intended for others to read, researchers simply noted the existence of the eight private notes and determined that most have no text attached to the iconic marker. The creators of these marks may have decided not to write a note for sharing and then simply neglected to erase the mark. Alternatively they might have intended the icons to note their private reactions to parts of the novel, responses they did not feel they wanted to share with others.

Readers used all four annotation types, though it is evident that some were used considerably more often than others. The “confused” icon was used to signal a perplexing moment in the story or to ask a question about an unfamiliar word or name (see Table 2).

### Reading Pathways

Although our participants showed idiosyncratic patterns of reading and writing, all four who worked with *Alph* in a serious way used social navigation features to some extent. Balderick was very interested in moving back and forth in the book to look at the notes others had left. But she also read the fewest pages of *East*. In contrast, Amethyst, the only participant to complete reading the novel by the end of the study period, largely stuck to a traditional forward pathway for most of her reading time. She seems mostly to have waited until she had finished the novel to explore the social navigation features, although she did look at notes she encountered as she read. Her behavior might be at least partly a product of what annotations were available for her to view since her traversal of the novel is largely out of

synch with the participation of the others. She quickly read her way out of the locations where there were numerous annotations.

Annie moved around in the book during her initial two reading episodes but then seems to have settled into a fairly traditional mode of turning the virtual pages. She completed about 75% of the novel during the study period.

In the graph showing the four participants’ reading pathways (see Figure 2), the x axis represents the sequence of user events, the y axis the pages of the book. Thus when a line dips as it moves to the right, the reader is navigating to an earlier page. When it spikes upward, the reader is moving to a later page. The vertical dividers represent boundaries between reading episode dates so that it is possible to see when two or more participants were reading on the same day and where they were located relative to each other and to the whole book.

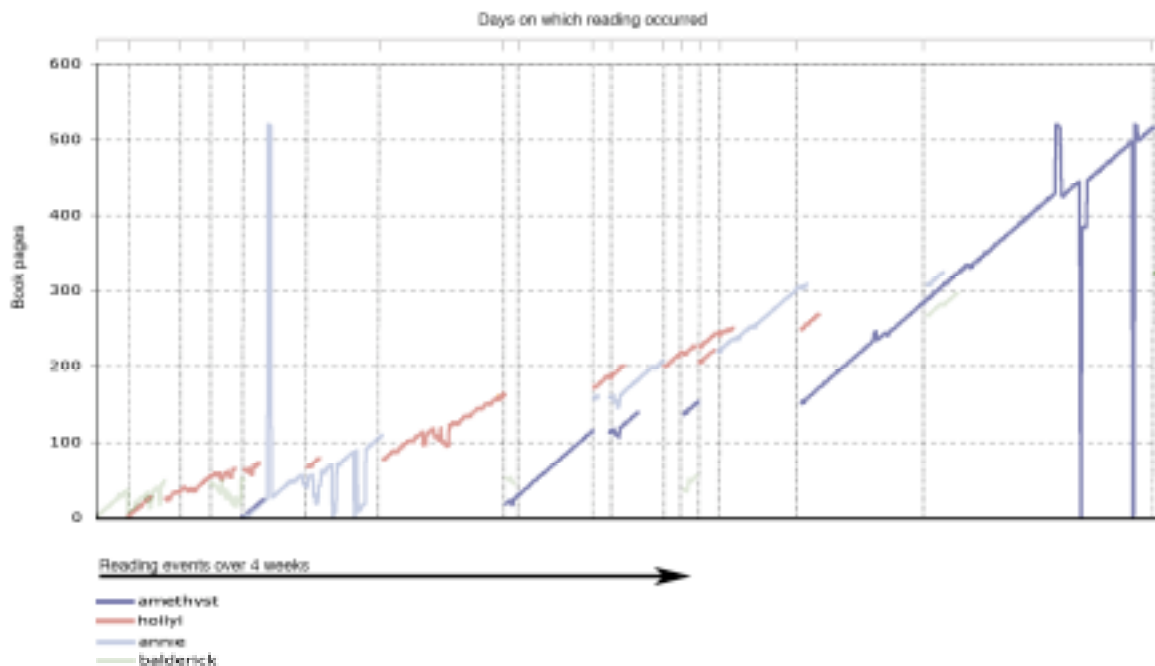
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### Participant Perceptions

When asked to write about what they liked, disliked, and would recommend for future development, all participants expressed pleasure in writing notes in the book and several noted that pages took a long time to load. Two mentioned difficulty or displeasure about reading from screens and one found the navigation mechanism for turning pages annoying. Two would like to see a feature for highlighting text, not just placing notes on or near an interesting passage. In these responses, the participants in this study confirmed and reiterated concerns our own young design team members had also mentioned.

**Table 2: Annotations by Participant and Emoticon Type**

Screen Name	angry	confused	happy	sad	Total	Percentage
Amethyst	4	37	22	10	73	27%
Annie	3	7	26	4	40	15%
Aura	1	3	1	2	7	3%
Balderick	1	19	19	4	43	16%
Hollyl	13	35	36	25	109	40%
<b>Total</b>	<b>22</b>	<b>101</b>	<b>104</b>	<b>45</b>	<b>272</b>	<b>100%</b>
<b>Percentage</b>	<b>8%</b>	<b>37%</b>	<b>38%</b>	<b>17%</b>	<b>100%</b>	



**Figure 2: Reading pathways for four participants.**

From the general conversation at the end of the study, two surprises emerged, both related to the social conditions for technology use rather than the technologies themselves. One participant told us she'd had trouble using *Alph* not because *Alph* was difficult or off-putting but because her older brother generally occupied both of the family's computers whenever he was home. Another revealed that in her household, she was allowed to use the computer only one hour a day and had to choose what activities she would pursue with her allotted time. Two girls tried to access *Alph* from their schools but could not do so because *Alph* requires participants to log in and the schools' rules did not allow children to use internet sites that require log in.

## DISCUSSION

Observing reading in the wild presents many challenges and this small study illustrates some of its complexities. The data show considerable evidence of engagement with the story the participants were reading: collectively, they created a substantial body of annotations almost all of which were tightly linked to specific moments, themes, events and places in the narrative. They occasionally responded to the notes others' left often in order to respond to questions. Most participants read persistently.

Moreover, the reading pathways they used suggest that at least with this particular narrative, the primary pleasure came from reading Pattou's novel. Participation in the social features did not, it seems, distract or detract from the pleasure of reading in a fairly traditional way.

It is impossible to know how these particular participants read for fun using traditional books. As a result we cannot compare their behavior with *Alph* to anything like a base line. The variety of patterns and habits for reading even among this small sample—the times of day, lengths of episodes, days of the week and so on—suggests that reading practices may be highly personal and even idiosyncratic. The role of family routines and rules as well as school activities and regulations are also difficult to factor into this tantalizing glimpse of reading online.

Likewise it is difficult to gauge the effect of novelty for these participants. Their activities do not suggest that they grew less interested in annotating as they progressed through the book, but because they did not engage each other as avidly as we had expected, finding an opening for self-expression might be a more attractive use of *Alph*'s affordances than using the system to form social ties.

The feedback about the system yielded few surprises. This study confirmed that response time from the system needs to be fast enough so that there is no noticeable lag in turning pages or jumping across many pages. In other words, the navigation mechanisms that mimic physical books must work as quietly and as efficiently as their paper counterparts.

At the same time, the children in this study could imagine additions to the toolset *Alph* currently supplies. Participants expressed a desire for additional ways to mark texts, specifically a "highlight" feature. This element has also

cropped up frequently in our work with the children on our intergenerational design team. Their interest in augmenting *Alph* suggests that reading appliances like *Alph* could have a future with children in this age cohort.

### CONCLUSIONS AND FUTURE WORK

Despite a few remarks about legibility and responsiveness of the system, *Alph* seems to have crossed the key thresholds Dillon articulates [2.]. At least four of five original participants read persistently and in some cases for relatively long stretches, suggesting that neither reading from a screen nor reading in what is probably an unusual location in the home presents a high barrier to testing the sociable features of the application.

Although this study includes only a small number of participants who worked with *Alph* over a relatively brief time period, participants' behavior with the technology suggests that they used and appreciated its sociable features. They wrote a lot of notes and used the tool to record feelings about the book or to ask questions about unfamiliar words, names, and locations. They felt comfortable sharing their feelings and thoughts with other girls whom they had not met before. They used the full range of expressive icons the interface provides so they apparently did not feel it impolite or inappropriate to ask questions, to signal sadness, or even occasionally to express anger about events and characters in the novel. Although they created and did not delete a few private annotations, generally those marks differed from shared ones only by virtue of the fact that they often included no note.

Some of the visible patterns in participants' use of the annotation and sharing features are no doubt colored by the fact that the children in the study did not know each other before the study began as well as by the fact that we had so few participants. Under those conditions it was difficult to achieve the kind of intensity and density of virtual presence it probably takes to keep children eagerly returning to look for new annotations in the book. Although they did occasionally answer each other's questions or respond to another's expression of delight or sadness about something happening in the book, these instances were more sporadic than we had predicted. In this respect, the results of this study differ from those in last year's work with our own young design partners. Our team members know each other well because they work together for three hours a week 26 Saturdays a year. So they actively looked for new notes from their buddies. In the current study, we saw much less of that behavior. Although this study's participants stressed the fun of writing notes and of self-expression, they were silent about the experience of reading notes others had left. Their feedback indirectly supports our tentative conclusion that tools like *Alph* will be most interesting and fun when members of Internet Reading Groups already share social connections and interests.

At the same time, the reading pathways show these participants dividing their time and attention between the novel and the sociable environment *Alph* supports. We don't of course have any information about how these same participants, or any children in this age range, read physical books. For all we know they flip to future pages and look back at pages already read with some frequency. Yet our general understanding of the kind of reading that is intended to be engrossing and immersive—the kind of reading to which adults would have young adults aspire—depicts readers' progress through a book as a largely linear business of turning pages one at a time in a forward direction [1]. Our two studies of sociable literacy in practice with *Alph* suggest that such tools might well alter the practice of reading in a number of ways. Adults may feel deeply ambivalent about these changes even if sociable and dynamic reading environments help a wired generation move toward the advanced literacy practices post-industrial societies require.

Both the sociable features of *Alph* and the reading pathways children employ deserve further study with larger groups of participants. A more detailed analysis of reading pathways will yield a more nuanced picture of reading practices and also of the ways readers might manage the oscillation between the narrative space of the book and the personal and social spaces of the annotations. Finding strategies for studying more facets of reading in the wild, including more detailed observations of the physical and social conditions in which reading online takes place, is sure to reward the effort such studies will require.

In particular, we need to have a clearer picture of the role adults play in structuring the reading practices of our young adults. In this study, we see some hints of a clash of cultures in the rules governing children's use of computers at home and at school. Books after all are simple, one-purpose objects offering highly constrained and stylized interactivity. It is unlikely that either school personnel or parents would have restricted our participants if they had wanted to read *East* in paper form. But computers open a whole world, and possibly a more dangerous world, of social practice, of multi-tasking, of attention divided between interactions with a work of fiction and interactions with friends, family, or even strangers.

That some adults will feel uncomfortable with an openly sociable practice of literacy may signal the kind of change that disruptive technologies tend to bring. Re-envisioning reading and re-inventing the book may bring a generational divide into sharper focus. At the same time, this tension underscores the imperative to bring children into the design process, so that the technologies we adults build will be culturally suited to the world our children inhabit.

In building *Alph* with guidance from our contextual inquiry and our intergenerational design team, we intended to explore ways to bring books into the wired environments

that our young adults call home. Both our own research and studies like Lenhart and Madden's [9] demonstrate that digital natives gravitate toward and live within an always on, always connected world. If we want them to read novels like Pattou's *East* because we believe that kind of reading experience is vital to developing sophisticated literacy skills, we will need to situate *East* and its ilk in the milieu young adults inhabit.

*Alph* represents one probe into what sociable literacy, interactive literacy, might mean. As a community of researchers and developers and as a society, we will need many more such probes and more extensive studies of reading in the wild in order to design a world with sophisticated literacy practices for our children, at least if it's to be a world they will want to call their own.

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