Print Books vs. E-books

The Joan Ganz Cooney Center

Spring 2012

Comparing parent-child co-reading on print, basic, and enhanced e-book platforms

A Cooney Center QuickReport by Cynthia Chiong, Jinny Ree, Lori Takeuchi, and Ingrid Erickson

Today's e-books, including those designed for the iPad, Kindle Fire, and NOOK Color, have evolved from platforms displaying simple digitized versions of print books (*basic*) to tools that can support highly interactive, multimedia experiences (*enhanced*). Researchers at the Joan Ganz Cooney Center wondered how these advances might relate to parent-child storytelling, otherwise known as *co-reading*. This study details our comparison of co-reading across three book formats: print books, basic e-books, and enhanced e-books.

We asked 32 pairs of parents and their 3–6-year-old children to read a print book and an e-book together. Half of the pairs read a basic e-book and the other half read an enhanced e-book. We found that enhanced e-books offer observably different co-reading experiences than print and basic e-books, a finding consistent with studies of earlier storytelling media.[1]

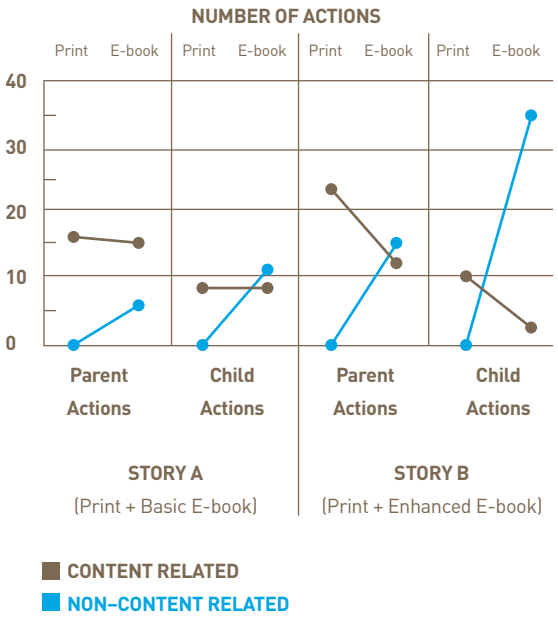
Key findings from this QuickStudy—detailed on the following pages—suggest two recommendations:

For designers: Exercise caution when adding features to enhanced e-books, especially when those features do not directly relate to the story. E-book enhancements should also be designed in a way that allows parents to access and control settings to customize the co-reading experience with their children.

For parents and educators: Parents and preschool teachers should choose print or basic e-books to read with children if they want to prioritize literacy-building experiences over ones intended "just for fun." Some of the extra features of

Finding 1: Parent–Child Conversation

Data: The basic e-book elicited similar levels of *content related actions* (e.g., labeling, pointing, and verbal elaboration of story features) from the children and parents as its print counterpart, whereas the enhanced e-book drew out fewer content related actions than its print counterpart. Both types of e-books, but especially the enhanced e-book, prompted more *non-content related actions* (e.g., behavior or device focused talk, pushing hands away) from children and parents than the print books.



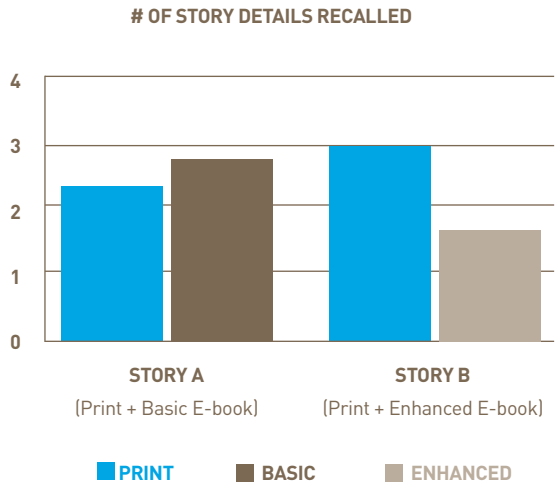
Finding: The enhanced e-book was less effective than the print and basic e-book in supporting the benefits of co-reading because it prompted more non-content related interactions. When adults prompt children with questions pertaining to the text, label objects, and encourage them to discuss the book contents in terms of their own experiences and curiosities, this elicits increased verbalization by the child and can lead to improved vocabulary and overall language development.[2]

enhanced e-books may distract adults and children alike from the story, affecting the nature of conversation and the amount of detail children recall. However, given that appeal is an essential building block for early literacy development, enhanced e-books may be valued for their ability to prompt less motivated young readers toward engagement when they might otherwise avoid text altogether.

Finding 2: Story Comprehension

Data: Children who read enhanced e-books recalled significantly fewer narrative details than children who read the print version of the same story.

Across all book formats, children performed nearly equally when asked to explain a critical element in the story.

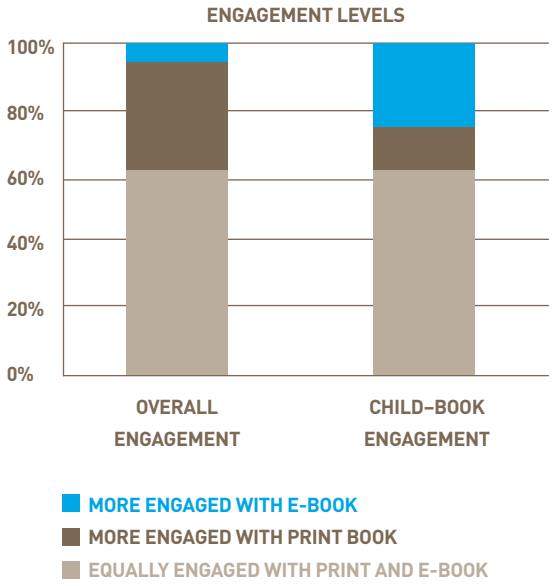


Finding: Features of the enhanced e-book may have affected children's story recall because both parents and children focused their attention on non-content, more than story-related, issues.

Finding 3: Engagement

Data: When measuring overall engagement—a composite of parent-child interaction, child-book interaction, parent-book interaction, and signs of enjoyment—63% of the pairs were as engaged reading the print book as they were when reading the e-book (both types). Only 6% of the pairs were more engaged with the e-book than the print book, compared to the 31% of pairs that were more engaged with the print book than the e-book (see left bar of graph).

When measuring *child-book engagement* (e.g., direct attention, touch), more children showed higher levels of engagement for the e-books than the print books, though a majority were equally engaged by both book types (see right bar of graph). Children also physically interacted with the enhanced e-book more than when reading either the print or basic e-book.



Finding: The print books were more advantageous for literacy building co-reading, whereas the e-books, particularly the enhanced e-book, were more advantageous for engaging children and prompting physical interaction.

About the QuickStudy

STUDY PURPOSE

The QuickStudy is a format that allows us to rapidly probe new platforms to determine whether they warrant further investigation on a more controlled basis with larger populations. In this study, we sought to explore differences in the way parents and their preschool-age children (3-6) interact when reading print books, basic e-books, and enhanced e-books together. We chose to investigate tablet based co-reading on the Apple iPad in particular because this device has demonstrated a quick and notable rise in the marketplace: it is predicted that the iPad will claim more than half of the market share of all tablets sold around the globe in 2012—over 50 million.[2] In parallel, Nielsen reports that 7 out of every 10 children in tablet-owning families used a tablet computer.[3]

RESEARCH QUESTIONS

- What is the nature of parent-child and child-book interactions when reading each of the three formats?
- How does child engagement with the story vary across the three formats?
- How does child comprehension of the story vary across the three formats?

STUDY DESIGN

This study employed a within- and between-subjects design (see Figure 1). We asked parent-child pairs to read an e-book and a print book together so that we could see how book format mediated parent-child interaction. We used two types of e-books in the study—one basic and the other enhanced—so that findings would be applicable to a wider selection of iPad-based e-books. To offset possible order effects, half of the families read the e-book first and the other half read the print book first. This made for four groups (two conditions with counterbalanced sub-groups) to which pairs were randomly assigned.

MATERIALS

We selected the enhanced and basic e-books according to the following criteria: they had to be (a) appropriate for 3–6-year-olds; (b) science themed; (c) short enough to be read in 10 minutes; (d) produced by a recognized publisher of children's e-books; and (e) possess a print counterpart. The print books used in the study were the analog and, in fact, original versions of the selected e-books.

SETTING & PARTICIPANTS

Data was collected over several days at the New York Hall of Science. We recruited 32 pairs of parents and their 3–6-year-old children from the pool of museum visitors, including 11 boys (mean age=4.64, SD=0.90), and 21 girls (mean age=4.05, SD=0.80). Two-thirds of the children read the books with their mother, and the remainder of the children read with their father or other family member. A majority of participants were white and of middle or high socio-economic status. This research was conducted under human subjects approval, which required that parents sign consent forms for their child's and their own participation.

PROCEDURE & ANALYSIS

An interviewer asked each family to read the e-book and print book in the order based on their assigned grouping. After each reading, the interviewer asked the child questions to assess his/her comprehension of the story. As parents filled out a short survey on family reading practices and

Figure 1: Between- and within-subjects design

	Condition 1	Condition 2
Story A	Print	Basic e-book
Story B	Enhanced e-book	Print

demographics, children picked out a sticker book for completing the study. All procedures were videotaped and interviewers took notes. Two researchers coded the tapes and notes for engagement and the types and frequency of parent-child and book interactions (93% inter-rater reliability). Analyses of the comprehension scores, engagement ratings, and types and frequency of interactions are reported here.

LIMITATIONS

This research was conducted with only 32 families and two specific e-book titles, which limits the generalizability of its findings to the wider population of families or e-books.

NEXT STEPS

In addition to running this study with a larger and more representative sample of participants and books, future research should systematically examine what types, combinations, and placement of e-book features (e.g., hotspots, games) help or hinder learning and conversation, and explore how different populations (e.g., lower income families, non-native English speaking families) use them.

SUMMARY OF PARENT-CHILD CONVERSATION ANALYSES

On the following page, mean counts of participant behaviors are displayed along with their standard deviations (SD). An analysis of variance (ANOVA) was used to analyze differences between print and e-book platforms in both the basic and enhanced conditions. F and p-values are reported for significant differences.

ENDNOTES

1. Namely, that compared to print books, e-books are less supportive of story-focused conversation and story comprehension (De Jong & Bus, 2002; Masur, Flynn, & Eichorst; Parish-Morris, Hirsch-Pasek, Golinkoff, & Collins, in review).
2. Zevenbergen & Whitehurst (2003)
3. Canaccord Genuity (2012), http://tinyurl.com/7ehe7p4
4. See Nielsen (2012), http://preview.tinyurl.com/7yragxl

advancing children's learning in a digital age

the Joan Ganz Cooney Center at Sesame Workshop

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This research was conducted in partnership with the Sara Lee Schupf Family Center for Play, Science, & Technology Learning (SciPlay) at the New York Hall of Science. SciPlay is an applied research center dedicated to designing and testing playful approaches that support deep engagement and science learning.

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SUMMARY OF PARENT-CHILD CONVERSATION ANALYSES

What do they do/talk about?

	Print vs. Basic E-book						Print vs. Enhanced E-book					
	Average number of times				Stat. Significance		Average number of times				Stat. Significance	
	Print A	SD	Basic	SD	F	p–value	Print B	SD	Basic	SD	F	p–value
Parent labels or points to pics/text*	7.8	4.9	6.9	9.2	-	-	11.1	22.9	6.4	4.5	0.7	0.4
Child labels or points to pic/text*	5.7	4.3	4.6	4.5	-	-	4.8	5.9	1.9	1.7	3.7	0.065
Parent counts	0.6	1.5	0.2	0.6	-	-	1.1	3.3	1.1	2.3	-	-
Child counts	0.4	1.3	0.3	0.7	-	-	2.7	5.6	0.3	1.0	-	-
Parent asks questions	5.4	4.3	5.7	9.5	-	-	6.1	9.1	6.7	8.1	-	-
Child asks questions	0.5	0.9	0.7	1.3	-	-	0.8	1.2	0.9	1.6	-	-
Parent elaboration*	9.4	8.0	9.4	11.6	-	-	11.1	13.0	6.5	5.3	-	-
Child elaboration*	1.6	1.9	2.6	4.1	-	-	3.9	4.5	0.8	1.1	7.5	0.010
Parent talks about book features**	0.6	1.3	2.1	2.4	4.5	0.042	0.4	1.0	8.9	10.9	9.73	0.004
Child talks about book features**	0.1	0.3	0.1	0.4	-	-	0.0	0.0	0.6	0.9	7.3	0.011
Parent turns the page	6.7	6.4	6.1	6.3	-	-	6.3	8.0	3.2	3.0	-	-
Child turns the page	1.2	1.7	0.9	1.5	-	-	1.8	1.7	6.2	6.7	9.5	0.004
Parent hotspots**	--	--	2.9	3.4	--	--	--	--	6.4	7.5	--	--
Child hotspots**	--	--	9.7	11.5	--	--	--	--	34.6	40.6	--	--

Behaviors

	Print vs. Basic E-book						Print vs. Enhanced E-book					
	Average number of times				Stat. Significance		Average number of times				Stat. Significance	
	Print A	SD	Basic	SD	F	p–value	Print B	SD	Basic	SD	F	p–value
Parent positive behavior	1.8	1.8	2.3	3.1	-	-	2.0	1.8	3.1	3.9	-	-
Child positive behavior	1.8	2.5	1.7	1.3	-	-	1.4	1.3	1.9	2.3	-	-
Parent negative behavior	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-
Child negative behavior	0.1	0.5	0.2	0.8	-	-	0.1	0.5	0.1	0.5	-	-
Parent distracted	0.8	1.1	1.5	1.8	-	-	1.3	2.0	0.9	1.5	-	-
Child distracted	4.1	2.4	2.3	1.9	5.3	0.029	3.3	2.9	3.7	2.3	-	-

* = Content related ** = Non–content related