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Getting Smarter About E-Books for Children

Lisa Guernsey and Michael H. Levine

This article is adapted from *Tap, Click, Read: Growing Readers in a World of Screens* (Jossey-Bass, 2015) by Lisa Guernsey and Michael H. Levine.

Children's books captivate young children, and teachers love to see kids engrossed in their pages. But what if that book is an e-book? Does that change the equation?

That question has gnawed at Adriana Bus, a professor of education and child studies at Leiden University in the Netherlands, who has been studying electronic storybooks for more than 15 years. In a recent article in the journal *Developmental Review*, she recalled some of the worrisome issues she encountered in her first experiments with 4- and 5-year-old children. One experiment, in the year 2000, centered on 15-minute reading sessions with *P.B. Bear's Birthday Party*, a children's book by Lee Davis (1998). Back then, children were using a CD-ROM version of the book on a desktop computer. The CD-ROM provided children two options: they could have

the book read to them, or they could press the Playtime button to play matching games, puzzles, and mazes associated with the book. When children chose Playtime, they were certainly engaged. But it was *what* they were engaged in that troubled Bus. “Most children completely ignored the oral text and just played games and activated the animations,” she wrote. “Insofar as they listened to the story text, they did not listen to the pages in order.” Often they were simply hearing text fragments in a seemingly random order that was disconnected from the visualizations (Bus, Takaacs, & Kegel 2015).

Bus was witnessing story time hijacked. Instead of learning new vocabulary or comprehending the story, children struggled to understand it. Assessments showed that the children with unrestricted access to Playtime struggled to recall the story line and didn’t know the words in the book.

Studies find pros and cons

Findings like this may lead many early educators to avoid children’s e-books altogether. But, as I discovered in writing *Tap, Click, Read: Growing Readers in a World of Screens* (2015) with my coauthor Michael H. Levine, these findings don’t tell the whole story. Not all of Bus’s findings have been negative, and over the past decade, research from many quarters of the globe—the Netherlands, Israel, Australia, the United States—has shown that there are features and affordances within digital storybooks that can do more to advance children’s learning than print books.

One study showed a net positive for parents and the way they interact with their children when reading e-books together.

A few years ago, a *Future of Children* review of research on e-books and literacy summarized more than a dozen experimental studies with evidence that e-reading technology has “real promise” in assisting young children in learning to read (Biancarosa & Griffiths 2012). In one study, for example, e-books led to improved phonemic awareness and print-concept awareness among preschoolers—especially those with learning disabilities (Shamir & Schlafer 2011).

Another study (Korat & Or 2010), discussed in the next section, even showed a net positive for parents and the way they interact with their children when reading e-books together.

The trick is in sorting the good from the bad while also paying attention to how *adults* use these books. As digital media become ever present in 21st century family life, being able to make smart decisions about children’s books, no matter what format, is becoming an important skill for teachers and other early childhood professionals. Although research on children’s e-books is still nascent, studies are pointing to general principles that can help educators make smarter decisions about what to introduce to young children, what to avoid, and how to encourage parents to spend time engaged in stories with their kids, whether the platform involves paper or pixels.

Adult-child interactions around e-books

One overarching message from the science of early learning is that children thrive when adults in their lives have conversations with them. Children’s books are wonderful conversation starters, and study after study has shown how much kids gain from the back-and-forth interactions elicited by turning the pages of a book. Now that e-books are part of the picture, the importance of these conversations has not receded. In fact, if Sherry Turkle’s book *Reclaiming Conversation: The Power of Talk in a Digital Age* (2015) shows us anything, it is how much we need to pay attention to the way we use media to cue, not cut off, conversation. Some preliminary evidence of e-book-reading interactions between adults and children showed that the devices themselves can get in the way of rich conversation and children’s story comprehension (Chiong, Ree, & Takeuchi 2012; Parish-Morris et al. 2013).

A series of studies by scholars in Israel can help us think more deeply about how e-books can and should involve parents and teachers in joint learning moments with young children.

Interactions around educational e-books

Led by Ofra Korat and Tal Or at Bar-Ilan University, the studies in Israel compared how different types of e-books might cause parents to interact differently



when reading them with their children. In one experiment, Korat and Or used *Just Grandma and Me*, by the internationally popular author Mercer Mayer (1994). They labeled that as the commercial e-book. The other e-book, which they called educational, was titled *Hatractor Beargaz Hachol* (The tractor in the sandbox). It was specifically designed to promote early literacy. Features include embedded definitions of difficult words, dynamic visuals that dramatize the story line, highlighting over words as they are spoken, and words that, when clicked, are spoken aloud in an intentional way so that one can hear the syllables and sounds within. The researchers called these features *scaffolding mechanisms*, and they wanted to know, How will the presence of these mechanisms change the conversations that parents are having with their kids while reading these books?

They randomly assigned groups of mothers and their kindergartners to either the commercial e-book or the educational e-book and then videotaped the interactions. Later, when the researchers systematically reviewed those tapes, they noticed some significant

differences. The educational e-book led to more expansive talk on the part of parents. The words in the tractor story were more difficult than in *Just Grandma and Me*, and the embedded dictionary included elaborations that “may have directed the mothers to expand the discussion about the story, including word meanings” (Korat & Or 2010).

In an interview, Korat suggested that the educational e-book might have influenced the mothers to talk with their kids at a higher level. One might even say it was teaching parents as much—maybe even more—as it was teaching kids. “The e-book itself,” Korat explained, “was an instructor to the parent” (Korat 2014). But she stresses that it had to be designed to foster that kind of learning; the quality of the interactions was dependent on the quality of the book’s design.

Interactions around e-books and print books

At around the same time, Korat and other Israeli scholars were also trying to answer another nagging

question: How do adult–child interactions around educational e-books compare to these interactions around the same book in print? In a study conducted with some of the same content (the tractor book, for example), they found evidence that the educational-e-book-plus-adult approach may be the winning combination. In that study, researchers compared four conditions: children reading educational e-books by themselves, children reading educational e-books with an adult, children reading print versions of the same books with an adult, and a control condition that equated to regular kindergarten classroom time. Later, the children were tested on their reading progress. Across the four conditions, the children who learned the most were the ones who read the educational e-books with an adult assisting them (Segal-Drori et al. 2010).

E-book features that promote learning

If e-books designed to be educational can have this kind of impact, that begs the question, What exactly does good educational design look like? Researchers and child-development-savvy developers are starting to find out. The tractor book, for example, included features such as text highlighting and definitions for difficult words. What was it about these features that made a difference?

Bi-modal text

Deborah Linebarger, an education professor now at Purdue University, has conducted myriad experiments on how children learn from print on screen. Much of her research has zoomed in on the importance of text highlighting, or what is sometimes called *bi-modal text*—the highlighting of words in sync with audio narration. Several years ago, Linebarger tested the effectiveness of this feature as she conducted studies around the television show *Between the Lions*, which employs many instances of words being highlighted on screen. In a range of settings from Pennsylvania to Mississippi to Native American reservations in New Mexico, Linebarger discovered that preschool and kindergarten viewers performed better on early literacy and reading tests than children who did not watch the show (Linebarger 2001). She has also been involved in eye-tracking studies of the television show that showed how the text highlighted during the read-alouds works

to focus children’s attention on the words as they are being read (Linebarger, Piotrowski, & Greenwood 2010). (*Between the Lions* is now off the air, but clips are available on PBS and YouTube at <http://pbskids.org/lions/videos/>.)

Today text highlighting is becoming commonplace in reading software used in elementary schools. While text highlighting is not easy or inexpensive to produce, it is starting to be found in e-books that are designed to be educational. Each letter, word, or sentence can be highlighted as the digital narrator speaks, and children can press on words or sentences to hear them repeated. Sometimes readers can open audio recordings to hear pronunciations or, as with the tractor book, click on definitions.

Researchers found evidence that the educational-e-book-plus-adult approach may be the winning combination.

Of course, these new features come with new cautions. Literacy expert Barbara Culatta and her colleagues at Brigham Young University and Georgia State University have discovered some problems: some apps attempt to use bi-modal text to teach phonemic awareness but actually mislead young readers about the sounds of letters and words. They have witnessed an app, for example, that shows children the word *cake* and proceeds to sound out four letters, including the *e*, which is silent. Teachers will need to watch out for these kinds of mistakes, which will simply breed confusion for children—not to mention adults (Culatta, Hall-Kenyon, & Bingham 2016).

Audio narration

Another common feature of educational e-books is a choice button that enables children to either read a book themselves or have the book read to them. Teachers see the value of the audio narration in e-books, just as books on tape have been useful in classroom settings for decades to help model fluency. For example, Julie Hume, an elementary school teacher in University City, Missouri, has used e-books with her students who are struggling readers. “When students repeatedly have a strong model of the fluency, the more

they hear that, the better they get it,” Hume states. When children listen to narration that helps them connect to the words on the page, she says, “the hardest part of the fluency is being taken away, so they are able to focus on understanding the text, which is what you want” (Hume 2010). But with this advantage comes another factor to consider: elementary school teachers are starting to watch for students in their classrooms who are always choosing *Read to Me* and never choosing *I’ll Read It Myself*. At some point, teachers say, they want children to be able to make that switch.

Interactive elements and literacy: Closing thoughts

These kinds of features—text highlighting and audio narration—were not the digital features that led to the worries of Adriana Bus as she observed children using e-books 15 years ago. In that case, it appears to

have been the presence of games, puzzles, and other interactive elements tangential to the story line that led children astray. Studies are showing that the placement of these kinds of interactive elements, often called *hot spots*, can be a significant factor in determining an e-book’s educational value. For example, Alice Wilder, an educational media expert who works at the e-book company Speakaboos, sees a big distinction between anywhere—everywhere interactivity versus what she and others call *interactivity on the plot line*. Wilder warns that there are creators in the industry who are not focused on literacy goals and do not know much about what children need at young ages. As is clear in the example of *P.B. Bear’s Birthday Party*, many creators may assume that the only way to capture children’s interest is to embed games, toys, and animations. “That will make them laugh and keep them coming back,” Wilder said in an interview, “but it may not do a thing to help children become stronger readers” (Wilder 2015).



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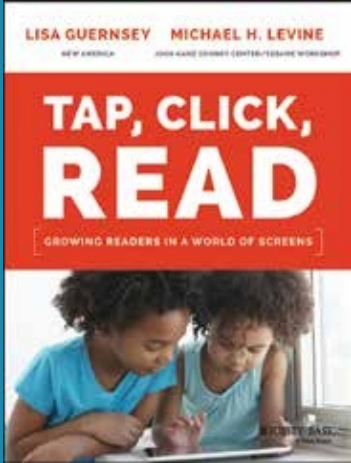
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