



**Digital Literacy for Preschoolers**



Maximizing the Benefits of eBooks for Emergent Literacy

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**Adult Supports for Children’s Understanding of Interactive eBooks: A Cross-sectional Case Study**

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## Theoretical framework

- Sociocultural perspective
  - [Developmentally Appropriate Practice](#) (NAEYC, 2009)
    - Parents and other adults support children’s learning in many ways that are individually appropriate and culturally important
  - Emergent literacy (Teale & Sulzby, 1986)
    - Children develop in literacy from birth onward through text- and language-based experiences

*“Parents are like shuttles on a loom. They join the threads of the past with threads of the future and leave their own bright patterns as they go.”*

–Fred Rogers



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## NAEYC’s Developmentally Appropriate Practice [DAP] (2009)

- Child development in all domains: physical, social, emotional, cognitive
- Individually appropriate: different children require different interactions
- Cultural relevance

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## Why e-books?

- Cultural importance
  - Survey indicated schools interested in integrating more digital resources into classrooms ([SLU](#), 2015)
  - Media studies indicate high usage of e-devices in homes (e.g., Rideout, Lauricella, & Wartella, 2011; Common Sense Media, 2011)
  - Paternal & maternal social/emotional bonds from early parent-child reading (e.g., Bus, 1997) and co-viewing (e.g., Takeuchi, 2011)
- Outcomes from young children documented in extant research...
  - Comprehension (e.g., Labbo & Kuhn, 2000; Hoffman & Paciga, 2013)
  - Oral Language & Vocabulary (e.g., Korat, 2010; Smeets & Bus, 2012)
  - Concepts About (e)Print\* (e.g., Smith, 2001; Paciga & Hoffman, 2015)
  - Engagement levels (e.g., De Jong & Bus, 2004; [Chiong, Ree, Takeuchi & Erickson](#), 2012)

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## Purpose of study

- Large research focus on cognitive aspects of learning consequent from e-book reading, using e-book scaffolds as *replacement* for adult scaffolding
- This study focuses on shared reading experiences and will serve to illustrate two cases with goal of describing the kinds of interactions and learning outcomes that take place

*“Adults are needed to help children navigate the nuances of electronic text design and to help them explore the scaffolds that are built into the e-book as they construct their understandings and learn new content.”*

(Paciga & Hoffman, 2015, p. 4790)

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## Research questions

1. In what ways are e-book reading experiences similar and different for two children of different ages?
2. What learning outcomes are evident in the interactions?

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### Participants

**Annie (30 months)**




**Charlie (54 months)**



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### About the text





- The Three Little Pigs* by Nosy Crow (Illustrated and animated by Ed Bryan)
- Recommended for ages 6-8 in iTunes (but 3+ by publisher)
- Listed in 'Books' category [on iTunes](#)
- Winner of 2011 Editor's Choice Award from [Children's Technology Review](#)

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### Text features

From the publisher's [website](#):  
The *Three Little Pigs* app was created to take full advantage of the iPad's technical capabilities.

- Blow into the microphone to blow down the pig's houses
- Tilt the device to see more of the scene
- Zoom in to reveal hidden details
- Flick the characters to make them jump, spin and speak
- Tap the screen to trigger hundreds of funny interactive surprises

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### Procedure

- Each child experienced THREE e-book reading interactions with the parent/researcher individually, in our home (see McGee & Schickedanz, 2007 or Roskos, 2013 for explanation of multiple shared reading approaches)
  - 1<sup>st</sup> interaction – traditional read aloud by parent/researcher in "read by myself" mode
  - 2<sup>nd</sup> interaction – "read to me" mode with questions and support from parent/researcher
  - 3<sup>rd</sup> interaction – child choice with parent/researcher support and guided reconstruction (when appropriate)

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### High learning focus

- In the 3<sup>rd</sup> interaction, the parent/researcher employed a "high learning focus" approach to the e-book reading (Fender, Reichert, Robb, & Wartella, 2010)
  - Presented a great variety of words related to the story
  - Described what was on-screen
  - Maintained conversational focus on the text

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### High learning focus – Vocabulary 'straw'

**Annie & Katie**

K: Are those bricks or is that straw? [K points to straw. A continues to press pig 6 more times. Screen enlarges/zooms in and she looks up.]  
What is that stuff he has? (3:08)  
A: A taw.  
K: Yeah, straw. [Activates hotspot to move action forward in book.] Who likes to eat that?  
A: Dogs.  
K: Dogs eat straw? No, horses.  
A: Horses.  
K: Horses eat straw, right. Here, push his straw again. He's going to build a house out of straw. [A successfully activates the hotspot] (3:27)

**Charlie & Katie**

K: What's he doing with all that stuff? Do you remember what it's called?  
C: Hay. (2:12)  
K: Right.  
C: They could call it stroth too.  
K: Right. It's called hay or straw. [C is tapping pig to build house and move narrative along while conversing with K.] He's building a...  
C: House [looks up at K].  
K: A house, right. The bottom says, "The first little pig soon found a piece of land and he quickly built himself a house made of straw." [C advances page turn (2:32).]

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## High learning focus - Description

### Annie, Book (e-book's built in narration), & Katie

A: She make it. [Starts pressing on pig again and swings finger around in a circle, accidentally pressing the back icon, so the page starts over/reloads]. (4:48)  
 B: The second little pig found a piece of land and she built herself a house made of sticks. [A pressing 9 times and slowly dragging finger sideways across screen.]  
 K: [leaning in quietly and holding her arm] Press it one time like this. [A gets it after 3 hard presses.]  
 B: That's a good start.  
 K: One time. [K points to pig. A activates next action successfully after 2 taps.] Good girl.  
 B: La, la, la. I'll have this ready soon.  
 K: She's almost done, isn't she? [A taps 3 times quickly on pig.] One more. Press it one time. There you go! Good! Oh, look, she's got a ramp and some railings [pointing to illustration]. And a roof. A roof that's arched [traces arch with finger]. [A taps on the house 8 times rapidly.] Press on her. See what she has to say now. She's done. [A is unsuccessful in one try and gives up. K presses it for her.]

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## High learning focus - Description

### Charlie & Katie

K: Yep. "The little pig ran squealing to his sister's house with the wolf racing after him."  
 C: Why is that car there?  
 K: Well. I don't know. Do you think that wolf, um, thinks he's faster in a car?  
 C: Uh-huh.  
 K: Yeah, maybe. I think that's just how the author wanted to have the wolf chase the pig.  
 C: [touches his finger on the pig and the animation speeds up allowing the pig to appear to go faster] He's faster!  
 K: He does seem to run faster when you press on him.  
 C: Look [C continues to hold his finger down on the pig].  
 K: Mmm hmm.  
 C: See how he's running? [C continues to hold his finger down on the pig].  
 K: Yeah. He's super fast. What happens if you press on the wolf? Does he go faster?

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## High learning focus – Conversation Topic\*

### Annie

A: [turns to talk to K, imitating wolf] Grrr. Ahh. I angry. [looks at camera] Why you have this [referring to tripod and camera setup]?  
 K: [redirecting & pointing to screen on iPad] He's angry!  
 B: Wait till I get you.  
 K: Why is there smoke out of his ears [points to ears]? [K taps wolf 2 times.]  
 B: Grr. I'm furious.  
 (A starts to get up again)  
 K: No, no, no. [A swats at screen 2 times (frustrated?)] Ok. Let's see what the piggies say. Are they gonna let him in? [K is pointing to pig in window.] What about her? How does she feel?  
 A: [s]cared.

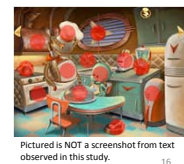
\*There were 0 instances of need to focus the topic of conversation with Charlie.

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## Data sources

- Video recordings from 3rd e-book reading interactions with each participant, individually
- Transcripts of the 3<sup>rd</sup> interaction with each child
- (Researcher's textual analysis/map of the application)
  - Needed to know what was possible in each kind of interaction with the e-book – taps, touches, interactivity
  - Knowledge of what each character would/could say and do as related to the movement of the narrative



Pictured is NOT a screenshot from text observed in this study.

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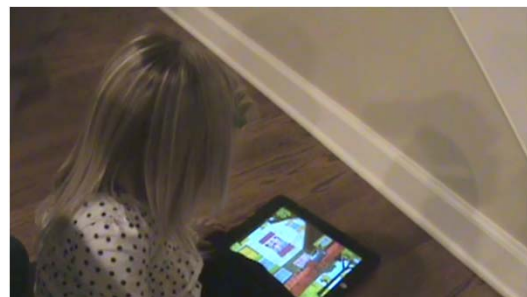
## Analysis

- Planned coding on transcripts with cross reference to videos, when necessary [application of Labbo's coding framework (2009)]
  - Development- and/or age- related differences in ways children interact with parent/researcher and the e-book
    - Teaching strategies utilized – focus, question, connect, navigate, pace
    - Evidence of care/relationship building – celebrate, validate, empathize
  - Evidence of learning/understanding\*
    - Recall of story details
    - Vocabulary understanding for select words
    - Commentary on story-related content (vs. non-related)
- Open coding to allow for emergent trends

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## Video clip #1: Annie & the wolf



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### Video clip 2: Charlie "He's faster!"



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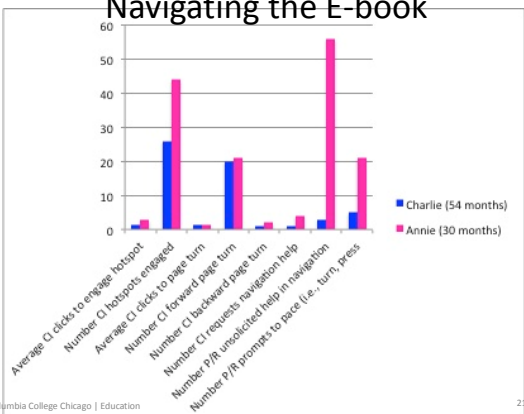
In what ways are e-book reading experiences similar and different for two children of different ages?

### RESEARCH QUESTION 1

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### Navigating the E-book



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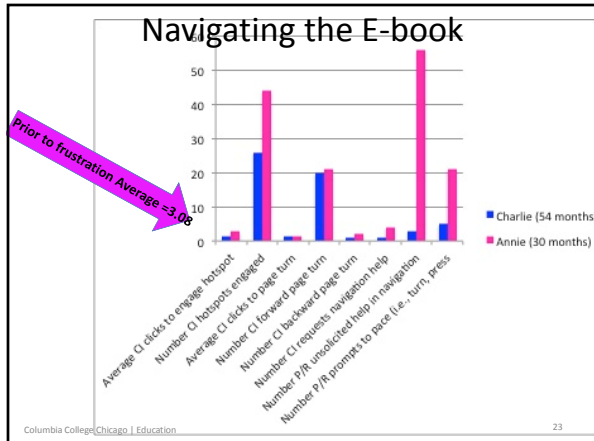
### Frustration with Navigation Annie

- K: Whoops. You started it over. You crashed it.
- B: The third little pig decided to build a house made of bricks. He worked hard and his house took a long time to build.
- A: Press it. [Starts to stand up and walk away 6:47]
- K: You want me to press it? Nope leave the camera alone.
- B: Oof! These bricks are really heavy!
- A: You do it. [K presses to advance action and comments.] Boom. [K presses to advance action and comments.] Boom.
- B: I'm going to need some more cement. [K presses.]
- K: Here comes the roof! Yeah!
- B: That was hard work. But it's a great house. [A presses pig 5 times quickly and then it goes.]

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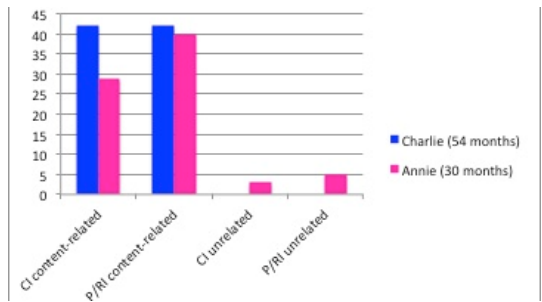
### Navigating the E-book



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### Questions and Comments about Narrative Content



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## Social/Emotional Observations

**Charlie**

- Sought out validation for understanding/comprehension
- ZERO instances of disengagement/distraction from activity
- Few expressions of empathy
- Resistance to clicking on the female pig character
- Enjoyed most when pigs caused harm to the wolf

**Annie**

- Needed much more celebration for navigation as her primary struggle was in this area
- Empathy for characters
- Emotional responses to overall mood of the story
- Engaged in dialogue with the characters in the story
- Enjoyed most when she got to blow the house down

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What learning outcomes are evident?

## RESEARCH QUESTION 2

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## Story Understanding

**Understandings**

- Refrain of story & predictable pattern facilitated story understanding – blowing the house down, “chiny, chin, chin...”
- Both children anticipate events forthcoming
- A demonstrates emotional empathy to characters
- C questions reasons for character’s motivations and begins to explore author/illustrator purpose

**Misunderstandings**

- A says they are going to a party (because pig says that in 1<sup>st</sup> scene of e-book)
- A started blowing down houses unaligned to actual narration in e-book (early in story)
- A says fire is making the pig scared
- A thinks the wolf’s tail in the chimney is a squirrel

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## Vocabulary understanding

	Annie	Charlie
straw	Recalls word, not function	Knows definition and synonym
sleepy*	Can tell why pig is tired, correctly taps the “sleepy pig” when prompted	Can tell why pig is tired, but no additional opportunities to assess
cement	No opportunity to assess	Cannot tell what it is, but correctly identifies its function (where it ‘goes’)
angry*	Associates appropriate sounds with anger (gggr, ahh), but doesn’t tell why smoke coming from wolf’s ears	No opportunity to assess
scared*	Tells that 2 of the pigs are scared of the wolf and empathizes with the characters, but incorrectly said that 3 <sup>rd</sup> pig was scared later	Knows that pig was scared as he ran away from the wolf
boil	Associates fire with boiling, but no additional documentation of word knowledge	Recalls word with prompt, “do you remember what it’s called when you make it hot?” and knows boiling water results in a burn

\* word selected because they are character traits of one of the main characters

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## Category of emergent reading

WHEN they took lead in retelling/reconstructing:

- Annie’s language aligned to Story Not Formed (similar to majority of 2s in Sulzby’s study)
- Charlie’s language waivered between Oral and Written Like (similar to majority of 4s in Sulzby’s study)

Image from Sulzby’s landmark RRC piece (1985)

Categories of Storybook Reading\*

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## Conclusions

- Older child was able to focus more on the story content and demonstrated deeper story understanding than the younger child
- Possibly more opportunity for CI questions and comments in “read by myself” mode
- Navigation served as a impediment more significantly for younger child (Paciga, 2014)
- Both children demonstrated age-appropriate story understandings (e.g., Sulzby, 1985) and vocabulary learning and social/emotional responses (e.g., Sipe, 2002)
- E-book reading provided opportunity for relationship building (similar to printed shared reading experiences, e.g., Bus, Belsky Van Ijzendoorn & Crnic, 1997; Bus, 2003)

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### Limitations

- Unstandardized interaction protocol
- No pre-assessment of vocabulary
- Interpretation bias?
- Generalizability



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### Future Directions

- Observe parents' interactions with children and e-books in variety of contexts
- Observe more classroom-based use of e-books and look at teacher-student interaction around texts
- Educate teachers and parents about developmentally appropriate ways to realize the potential of e-books for literacy development



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