Teacher Scaffolding of Preschoolers' Shared Reading With a Storybook App and a Printed Book

Teacher scaffolding of preschoolers' shared reading with a storybook app and a printed book

Michelle M. Neumann[a,b]

[a] School of Education and Profesional Studies, Griffith University, Queensland, Australia

[b]Griffith Institute for Educational Research, Griffith University, Queensland, Australia

Please direct correspondence to:

Michelle M. Neumann: School of Education and Professional Studies, Griffith University, QLD 4222, Australia. Telephone: +61 (0) 7 55529785. E-mail: m.neumann@griffith.edu.au

Abstract

Teachers are increasingly using new technologies such as tablets and apps during shared reading experiences at preschool. However, little is known about how teachers scaffold young children's shared reading with interactive e-books such as tablet-based storybook apps and how this compares to using printed books. In this observational study, a teacher read a storybook app to children aged 2 to 4 years ($N = 13$) individually or in a small group using an iPad. The same storybook was read to children in printed book form. The teacher's utterances were coded into three types of scaffolding behaviours (cognitive, affective, and technical). Scaffolding was observed for both the storybook app and printed storybook. The frequency of cognitive scaffolding was similar across both the storybook app and printed storybook. However, the frequency of affective and technical scaffolding was higher with the storybook app than with the printed storybook. The teacher made more utterances and spent a longer time reading the storybook app than the printed book. The findings suggest that affective and technical scaffolding may be important factors to consider during shared reading with storybook apps.

Keywords: teacher, scaffolding, shared reading, e-book, storybook app, touch screen tablet, iPads, young children

Introduction

New mobile technologies such as touch screen tablets and their interactive apps are becoming increasingly common in preschool classrooms (Geer, White, Zeegers, Au, & Barnes, 2017; Lee, 2015; Northop & Killeen, 2013). The interactive sounds, voices, and animations of apps capture children's attention and stimulates their senses (Geist, 2014; Marsh et al., 2015) and the use of touch-based gestures (e.g., tap, press, drag, swipe) allow children to gain immediate feedback. Based on a tablet's engaging multimodal elements and easy touch based operational features (Lauricella, Barr, & Calvert, 2014; Neumann & Neumann, 2015; Siegle, 2013), teachers have adopted them into their preschool classrooms (Lu, Ottenbriet-Leftwich, Ding, & Glazewski, 2017; Woloshyn, Bajovic, & Worden, 2017). Teachers also play a key role in supporting children's reading experiences with tablets and electronic books (e-books) (Christ, Wang, & Erdemir, 2018; Reich, Yau, & Warschauer, 2016). Different terms have been used to describe storybooks delivered through electronic devices (e.g., tablet-based e-book, book app, digital picture book; Reich et al., 2016). "E-book" has traditionally been used as a general term as e-books can be presented via computers with a keyboard and mouse or more recently via touch screen tablets. In the present study, the term *e-book* will be used in general and also when referring to computer-keyboard based studies and *storybook app* will be used for tablet-based studies where the storybook is an interactive app.

E-books provide young children with an engaging avenue to explore different worlds and gain new knowledge through these socio-cultural tools (O'Toole & Kannass, 2018). Teacher-child shared reading of e-books in the preschool classroom has the potential to enhance young children's learning experiences (Cahill & McGill-Franzen, 2013; Huang, Liang, Su & Chen, 2012). Shared reading with e-books possessing quality animations and interactivity (e.g., provision of dictionary meanings) has been found to foster vocabulary and learning of new words (Korat & Shamir, 2007; Korat & Shneor, 2019; Smeets & Bus, 2012). Also, Korat, Kozlov-Peretz, & Segal-Drori (2017) examined the effects of repeated e-book reading in kindergarteners aged 5 to 6 years old. It was found that children's ($N = 40$) receptive and expressive word skills were improved following two sessions of e-book reading compared to the control group ($N = 38$).

In the preschool classroom, Merchant (2015) conducted an observational study and explored a teacher and three toddlers' (aged 14-22 months) interactions with iPads and storybook apps in a preschool setting. A diverse range of haptic interactions with the tablet screen (e.g., tapping, pointing) was observed. Merchant (2015) highlighted that early childhood educators play a key role in guiding children's attention to elements of the story or words on the screen (e.g., "that says play") and supporting child experiences and engagement with the storybook app. Such teacher guidance is important to foster children's early literacy and language learning in the classroom (Korat et al., 2017). However, it is argued that more empirical work is needed to examine the teacher's role in scaffolding young children's shared reading experiences with e-books in the preschool classroom (Bus, Tackacs, & Kegel, 2015; Merchant, 2015) as e-book reading research has focussed mainly on independent child use of e-books (e.g., Korat et al., 2017; Zipke 2017). Prior to discussing shared book reading with e-books, the benefits of shared reading with printed books and a theoretical framework will be discussed.

Shared Reading

Shared reading has been defined as an active method of reading books that engages children with a story through book related conversations such as the teacher asking questions or making comments (Hindman, Wasik, & Erhart, 2012; Milburn, Girolametto, Weitzman, & Greenberg, 2014). Storybook reading is a regular activity in the preschool classroom and has many benefits for early learning (Bus, van Ijzendoorn & Pellegrini, 1995; Dickinson &

Tabors, 2001; Gonzales, Pollaord-Durodola, Simmons, Taylor, Davis, Forgarty, & Simmons, 2014). Shared reading experiences, through the use of printed storybooks have a positive influence on children's vocabulary (Gerde & Powell, 2009; Sénéchal & Cornell, 1993), and comprehension skills (Hoffman & Paciga, 2014; Rosenhouse, Feitelson, Kita, & Goldstein, 1997). The shared reading experience also fosters vocabulary and comprehension skills of children from low SES backgrounds and with language difficulties (Crain-Thoreson & Dale, 1999; Dickinson & Smith, 1994; Wasik & Bond, 2001).

Importantly, shared reading promotes conversation (Hoffman & Paciga, 2014; Massey, 2004) where language is used to support learning through co-construction of meaning (Milburn et al., 2014; O'Toole & Kannass, 2018) and this is underpinned by sociocultural theory (Vygotsky, 1978). A Vygotskian socio-cultural view informs the present research whereby learning is contextually based and occurs when children participate in social interactions around socio-cultural tools such as printed books or e-books (Christ et al., 2018; Kohm, Holmes, Romeo, & Koolidge, 2016; Kucirkova, Sheehy, & Messer, 2014). However, as reading multimodal text differs from reading static print (visual mode), the present study is also informed by multimodal literacy theories that considers the use of multiple modes (e.g., visual text, audio, pictures, graphics, animation) as avenues of communication (Kress, 2010; Wolfe & Flewitt, 2010).

Scaffolding

Scaffolding occurs when a teacher, parent, or carer uses supporting behaviours to guide a child through a challenging task and when the skill is mastered by the child then the scaffolding can be removed (Masters & Yelland, 2002; Pentimonti & Justice, 2010; Wood, Bruner, & Ross, 1976). For example, Walsh and Hodge (2018) highlighted the importance of creating quality book reading experiences by extending children's knowledge about words and comprehending meaning. Gonzalez et al. (2014) argued that child learning is optimised when teachers provide scaffolding to stretch children beyond their ability by engaging children in conversations prompted by teacher talk. For example, Milburn et al. (2014) describes teacher scaffolding at the level of the child's ability during shared storybook reading by asking questions (e.g., "What is this?" then extending "yes that's a butterfly") and taking children to a deeper cognitive level (e.g., "What do you think butterflies like to eat?), to foster oral language development and word learning.

Teachers play an important role in scaffolding children's learning during shared reading experiences with printed books (Gonzalez et al., 2014; Milburn et al., 2014; Pentimonti & Justice, 2010; Walsh & Hodge, 2018). Morrow, O'Connor, & Smith (1990) conducted a study with kindergartners at-risk of learning difficulties from four classrooms engaged in a program of shared storybook reading. The teachers provided children with questions and prompts to guide them through the reading session. Compared to the control group ($N = 30$), the shared storybook group ($N = 32$) made significant gains in comprehension skills and their ability to retell stories. Morrow et al. (1990) argued that "…reading to a child is not sufficient for maximum literacy growth. It is talk about the book that surrounds the reading that seems to be the key" (p. 268). More recent research has shown that teacher talk during shared reading creates an avenue for scaffolding children's learning about content, meaning construction, and forming deeper understandings about words and concepts (Gonzalez et al., 2014).

The benefits of scaffolding are further highlighted in a study where 20 preschool teachers were videoed using shared book reading strategies with two printed books and small groups of children (Milburn et al., 2014). The teachers' book-related talk was transcribed and coded and it was found that teachers who used a greater number of open ended questions and different words had longer and deeper book related conversations with the children. Although much work has examined teacher scaffolding with shared reading of printed books and its benefits, considerably less work has been done examining how teachers scaffold young children's early learning with technology (Plowman & Stephen, 2007; Masters & Yelland, 2002) and more recently with touch screen tablets (Burnett, Merchant, Simpson, & Walsh, 2017; Neumann & Neumann, 2015). Specifically, little research has examined how teachers support and scaffold children's interactions with storybook apps (Hoffman & Paciga, 2014; Zipke, 2017).

E-books

E-books are digitally constructed literature that is available in a variety of forms (e.g., CD ROM; iBooks) and genres (e.g., fairy tales, alphabet books) and possess various levels of functionality and interactivity. E-books can range from being a static digital replication of a printed book with very limited interactivity to possessing very high levels of interactivity and multimedia features such as animations, recorded audio, dictionary functions, videos, music, sound effects, and hyperlinked material (Hoffman & Paciga, 2014). Interactive e-books that can be downloaded to touch screen devices such as iPads and tablets are known as *storybook apps* (applications; Sargeant, 2015). These type of interactive e-books have been specifically designed for touch screen tablets and allow children to, for example, drag animated objects across the screen with a finger. A storybook app will be rejected for publication by the Apple store if it is only a static digitised version of a printed book or lacks a sufficient level of functionality (Sargeant, 2015). Furthermore, due to the plethora of e-books on the commercial market, the quality of e-books and effects on early learning have been questioned by researchers (Bates et al., 2016; Reich et al., 2016). Non-congruent hotspots such as flying animations can detract attention from the story and print (Christ et al., 2018). Through careful evaluation and design (for example ensuring that hotspots such as graphics or words link congruently to a game, text or animation) e-books have been found to be positive tools for supporting early reading experiences (Korat et al., 2017; Moody, Justice, & Cabelle, 2010).

Over the past two decades much work has been done to examine the effects of e-books on young children's language and literacy skills (deJong & Bus, 2003; Korat et al., 2017; Roskos, Burstein, Shang, & Gray, 2014). Several studies with preschool children found that vocabulary was fostered with e-books (Korat & Shamir, 2012; Korat, Levin, Atishkin, & Turgeman, 2014) and enhanced comprehension occurred with storybook apps that integrated audio narration, text highlighting, animated pictures, music, and sound with story text (O'Toole & Kannass, 2018; Reich et al, 2016). Korat et al. (2017) conducted an experimental study with 40 children in an independent e-book reading group and 38 children in a control group. The findings showed that independent e-book reading enhanced kindergartners' word learning. Korat et al. (2017) highlighted that the e-book's interactive hotspots with words and a pop-up dictionary meaning feature assisted children's word learning. It has been further suggested that the interactive visual and audio features of e-books promote enjoyment and reading comprehension (Moody et al., 2010).

Zipke (2017) examined the effect of child learning through interactive storybook apps on tablets with 25 preschoolers ages 4 to 5 years old. Two conditions were compared 1. Student independent reading on a tablet (read to me function with text highlighting) and 2. Teacher shared book reading with a comparable printed book. The teacher was instructed to conduct the read aloud as they normally would with any picture book. Word recognition and story comprehension reading was found to be higher in the e-book condition than the teacher read aloud condition using a printed book. Zipke (2017) suggested that this finding could have been attributed to the text tracking feature of the book app during independent e-book reading and that a digital word tracking feature may be an advantage for learning.

Some studies have shown that the use of e-books may lead to poorer vocabulary and story comprehension outcomes because of distractive hypermedia interactive features like "hot spots" and games (Bus et al., 2015; Reich et al., 2016; Zucker, Moody, & McKenna, 2009). For example, deJong and Bus (2003) conducted a randomised controlled study that compared the use of e-books and printed books in 48 preschool children aged 4-5 years old and found that children who had been read a printed book by an adult had better story recall than children who individually read an e-book. This is because without adult guidance children tended to ignore the oral text, play games and click between animations and a video embedded in the e-book. These distractions may lead children to listen to only fragments of the story. Reviews of studies comparing the effects of e-books and printed books are mixed and overall there is no conclusive evidence to date showing that either book format has an advantage over the other for skills such as vocabulary, comprehension, and decoding skills (Huang et al., 2012; Reich et al., 2016; Zucker et al., 2009).

A study by Roskos, Carroll and Burstein (2012) examined how teachers in eight preschool classrooms used e-book shared reading with iPads which were teacher-led and small group instruction based. The researchers focussed on observing the teachers' verbal strategies (e.g., directing, questioning, explaining, extending, conversing, and feedback) during touch screen use and how the teachers used the iPad to extend shared reading experiences and support vocabulary skills. Following eight e-book shared reading sessions over four weeks, it was found that teachers used strategies of questioning, providing explanations of word meanings and engaged children in conversations which was similar to how they shared printed books. Teachers were observed not to capitalise on media features of e-books such as hotspots or animations to support learning. It was concluded that teachers need more guidance to support shared reading with iPads such as how to use multimodal features to support learning and how to facilitate children's learning in small groups. As limited work exists on teacher e-book shared reading at preschool, the role of the teacher in the current age of digital storybooks requires attention (Bus et al., 2015). Although there has been a focus on the effects of independent e-book use on the development of young children's reading skills less is known about the teacher's role in scaffolding young children's learning with storybook apps in the classroom (O'Toole & Kannass, 2018).

For the present study, Yelland and Masters' (2007) categories of teacher scaffolding will be used to explore scaffolding during shared book reading with a storybook app and printed book. For these scaffolding categories, *cognitive scaffolding* is where teachers give directions and ask questions around concepts and processes. For *affective scaffolding* teachers encourage higher level thinking through positive feedback and positive encouragement. For *technical scaffolding* teachers provide assistance with operation of the tool's functions to support learning. These scaffolding categories have also been used by other researchers to explore teacher and parent scaffolding (Masters & Yelland, 2002; Neumann & Neumann, 2016; Neumann 2017a; Woloshyn et al., 2017). For example, Woloshyn et al. (2017) conducted a case study describing a year one teacher's experience using iPads in the classroom over a school year for activities such as mapping, writing stories, and creating movies. Woloshyn et al. (2017) highlighted how teacher use of cognitive, affective, and technical scaffolding strategies supported children's use of iPads and apps. This encouraged students to become independent learners, solve problems, take risks, and seek multiple solutions. Two tablet-based studies have explored the cognitive, affective, and technical scaffolding behaviours of parents when scaffolding children's play with apps (Neumann & Neumann, 2016; Neumann, 2017a). Neumann (2017a) observed 55 parent-child dyads as they played an interactive word matching app game on an iPad. Children dragged words into a sentence with support and guidance from their parent. Parents most frequently used cognitive scaffolding (e.g., confirmations, expansions, asking questions about the words e.g., "what does dog start with?) and least frequently used technical scaffolding (operational techniques e.g,. "press the button", "push the arrow"). Affective encouragement (e.g., Well done! Good job!) was used to encourage children to extend themselves to complete the word matching task. As limited research currently exists on teacher scaffolding and storybook apps it is important to examine how teachers scaffold young children's shared reading experiences with tablets and apps.

The present study

“Researchers have voiced the need to more deeply examine the teacher’s role in supporting shared reading with e-books (Bus et al., 2015; Hoffman & Paciga, 2014; O'Toole & Kannass, 2018) to support cognitive aspects of learning such as early literacy and language (Roskos et al., 2012). It is also important to examine how teachers meet the affective and technical needs of young children as this type of support also has the potential to benefit learning (Masters & Yelland, 2002). Therefore, a teacher’s use of cognitive, affective, and technical scaffolding during shared reading with a storybook app with sounds and animations and a comparable printed book was observed through video recordings and the frequency of teacher use of these scaffolding strategies were examined. The present study explored these questions:

1. How does the frequency of a teacher's cognitive, affective, and technical scaffolding differ during shared of a storybook app compared to a printed book?
2. What type of utterances are made by a teacher during shared reading with a storybook app compared to a printed book?

Method

Participants

A qualified and registered early childhood education teacher and 13 children (aged 2 to 4 years old; 6 boys and 7 girls) from an early years centre in the north of England participated in this study.

Materials

The storybook used was the paper printed "Mr Snake's Slippery Slide" (Neumann & Forster, 2007) and interactive storybook app "Mr Snake's Slippery Slide" (Neumann, 2017b). Based upon Hillman and Marshall's (2009) app selection criteria, this storybook app was judged to be suitable for young children in terms of its age appropriateness and interactivity. The pages have brightly coloured illustrations that correspond to simple sentences. It contained interactive features such as dragging characters on the screen with a finger (to trace around the snake's body and featured animated objects and characters that moved and made sounds (e.g., the mouse squeaked) when tapped. The text in the storybook app and printed book (See Appendix) were the same and illustrations were comparable as seen in Figure 1. The teacher and children had not read the story prior to participating in this study.

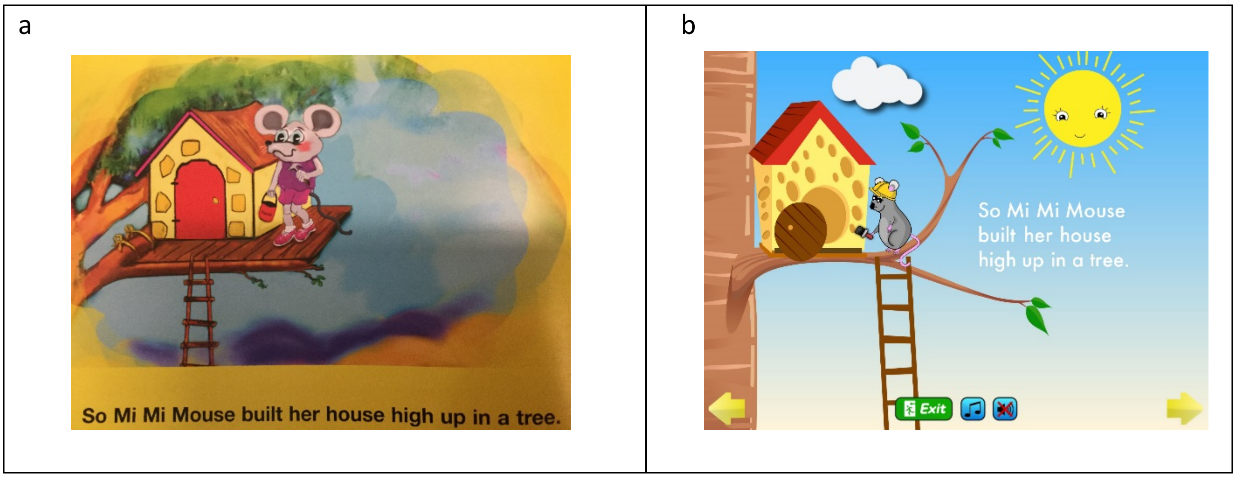

Figure 1. An example of a page from the (a) printed storybook and (b) storybook app on the iPad.

At the beginning of each shared reading session, the researcher instructed the teacher to "Please read this storybook app titled *Mr Snake's Slippery Slide* to your preschooler (s) in any way that you like. When you have finished, I will collect the iPad then I would like you to read your preschooler (s) the same story using the printed book in any way that you like". The order in which reading the storybook app and printed book were presented was counter balanced to control for potential order effects. The shared reading sessions occurred across a two-day period and the teacher was asked to select children in small groups or individually so that it that suited the class and teacher's schedule. The teacher read the storybook app and printed storybook aloud to four of the children individually and to three small groups of three children. There were thus 14 shared reading sessions in total. The children in the groups of three were not the same children as in the individual readings. The group size was set at three children based on recommendations by previous research that conducted shared reading in preschool settings with small groups of children (Milburn et al., 2014).

Measures

Cognitive, affective, and technical scaffolding

Each shared storybook reading session was transcribed to obtain the extra textual utterances made by the teacher. An utterance (Ninio & Bruner, 1978) was defined as a stretch of speech that has a pause, period of silence, or change of speaker prior to or before the stretch of speech (Crystal, 2008; Milburn et al., 2014). The time spent reading each story was measured from the start of the book reading to the end of the reading. Categories of cognitive, affective, and technical scaffolding (CATs) (Neumann and Neumann, 2016; Neumann, 2017a; Yelland & Masters, 2007) were used to code teacher scaffolding that occurred during each reading session. Each type of cognitive, affective and technical scaffolding provided by the teacher was scored 1 count for that type of scaffolding. Then the frequency of scaffolding utterances were calculated as counts per minute.

The following operational definitions for the categories of the CATs were used. *Cognitive scaffolding* was defined as when the teacher asked questions, elaborated on text content, expanded on word meanings and vocabulary, repeated and emphasised words in the text, helped children solve problems, or increased their knowledge and understanding about the world. Examples included “Can you tell me what happened to the mouse? and “That’s a baby kangaroo isn’t it?”. *Affective scaffolding* was defined as when the teacher provided children with praise, positive encouragement, and feedback for example, to complete a certain task (e.g., “Have a go!” “Excellent!”). *Technical scaffolding* was defined as an instance in which the teacher supported children in their operation of the book and helped them navigate successfully through the storybook app (e.g., “press the yellow arrow to turn the page”, “press Mr Snake’s head”, “Drag it”) and printed storybook (e.g., “Put your finger on there”, “Turn the page” “Make it come down with your finger”). Any extra textual utterances by the teacher that were not related to the shared storybook reading task were coded as *other* utterance (e.g., “Don’t pull off your band aid”, “Leave your shoes on”).

Inter-rater reliability

The author initially coded and scored the transcripts of each of the 14 shared book reading sessions (7 storybook app, 7 printed storybook). Following this, a trained research assistant with a postgraduate qualification coded a random selection of 28.5% (N = 4) of the sample. Cohen’s Kappa was .83 (CI_{95} = .76 to .89), which indicates a strong inter-rater agreement. The discrepancies identified between the two coders were examined and discussed. Due to high agreement between the coders, the author’s scores were used for all the transcripts.

Procedure

University ethics and permission to conduct research at the early years centre was gained. Parent approval and consent was obtained for the participating children. Each shared reading session was videoed in the same classroom at the early years centre which was a quiet room away from the main classroom. The teacher and child (ren) sat side by side on a low comfortable chair around a small table in a homely play setting. The iPad or printed book was placed on the table in front of the participants. The video camera was positioned on a tripod one metre in front of the table and the researcher remained behind the camera during each reading session.

Results

Frequency of teacher scaffolding and utterances

The descriptive statistics for teacher cognitive, affective, and technical scaffolding, other utterances and total teacher utterances are reported in Table 1. The mean time the teacher spent reading the storybook app (5.67 min; *SD* = 2.33, Range = 3.0 - 9.31) was longer in duration than the printed storybook (2.59 min; *SD* = 0.71, Range = 1.90 - 3.88). Across book type, cognitive scaffolding was the most frequent type of scaffolding provided by the teacher. The frequency of total teacher utterances was greater with the storybook app compared to the printed storybook. There were fewer instances of affective and technical scaffolding when reading the printed storybook app compared to reading the storybook app. There was a higher frequency of other utterances during reading of the storybook app compared with the printed book. Overall, differences in teacher scaffolding during storybook app or printed book reading were more apparent for affective and technical scaffolding than cognitive scaffolding.

Table 1.

Descriptive statistics for frequency of teacher scaffolding (counts/min), other utterances (counts/min), and total teacher utterances (counts/min): Mean (Standard Deviation, Range)

Behaviour	**Storybook app**	**Printed storybook**
Cognitive scaffolding	5.58 (1.05, 3.96 - 7.52)	6.41 (1.80, 2.93 – 8.30)
Affective scaffolding	4.55 (1.27, 2.56 - 6.69)	2.16 (1.18, 0.98 – 3.87)
Technical scaffolding	4.14 (1.57, 2.67 – 7.30)	0.92 (0.95, 0 – 2.93)
Other utterances	0.24 (0.33, 0 - 0.82)	0.04 (0.97, 0 – 0.26)
Teacher utterances	14.38 (2.83, 12.03 – 20.19)	9.45 (2.36, 6.83 – 12.63)

The scaffolding provided by the teacher, the time spent reading, and teacher utterances were further examined according to whether the teacher was reading to an individual child or a group of children. Table 2 provides the descriptive statistics for cognitive, affective, and technical scaffolding, other utterances, total teacher utterances, and time spent reading to one child or a small group with the storybook app or printed storybook. The teacher spent most time reading a storybook app to a group of children (7.58 min, *SD* = 1.62, Range = 6.09 - 9.31) compared to reading to an individual child (4.25 min, *SD* = 1.66, Range = 3.0 - 6.65); and the least time reading a printed storybook to an individual child (2.10 min, *SD* = 0.22, Range =1.90 - 2.41) compared to reading to a group of children (3.25 min, *SD* = 0.56, Range = 2.82 -3.88). Overall the frequency of cognitive scaffolding was similar in either the storybook app or printed book condition regardless of reading to one child or a small group of children. However, the teacher provided a greater amount of affective and technical scaffolding when using the storybook app with individual children or a small group of children than with printed storybook. The teacher overall made more total utterances with the storybook app when reading to either one or three children than when reading the printed storybook.

Table 2.

Descriptive statistics for frequency of teacher scaffolding (counts/min), other utterances (counts/min), and total teacher utterances (counts/min) to an individual child or small group of children: Mean (Standard Deviation, Range)

Behaviour	**Storybook app**		**Printed storybook**	
	Individual	**Group**	**Individual**	**Group**
Cognitive scaffolding	5.13 (0.82, 3.96 - 5.71)	6.18 (1.16, 5.42 – 7.52)	6.13 (2.49, 2.93- 8.30)	6.77 (0.10, 6.70 – 6.89)
Affective scaffolding	4.31 (1.73, 2.56 – 6.69)	4.88 (0.33, 4.5 – 5.09)	2.05 (1.18, 0.98 – 3.68)	2.30 (1.43, 1.06 – 3.87)
Technical scaffolding	3.59 (1.03, 2.67 – 4.51)	4.88 (2.11, 3.55 – 7.30)	1.32 (1.09, 0.49 – 2.93)	0.38 (0.39, 0.0- 0.77)
Other utterances	0 (0 – 0)	0.56 (0.25, 0.32- 0.82)	0 (0, 0 – 0)	0.09 (0.15, 0.00 – 0.26)
Teacher utterances	12.83 (1.18, 12.03 – 14.59)	16.44 (3.27, 14.19 – 20.19)	9.38 (2.99, 6.83 – 12.63)	9.54 (1.82, 8.16 – 11.60)

Qualitative description of teacher utterances

Teacher utterances in the transcripts were further examined to explore how the teacher used cognitive, affective, and technical scaffolding during shared reading with the storybook app compared to the printed storybook with one child or a group of children. The transcripts illustrate how the teacher scaffolded children through their shared reading experience with a storybook app or printed storybook. Smiling and laughing were observed during the shared reading sessions evidencing enjoyment. Within the transcript examples provided, the type of scaffolding coded for each teacher utterance is shown in square brackets e.g., [cognitive], [affective], [technical], [other]) and the story text read by the teacher is shown as [text]. (Note that pseudonyms are used for children's names).

Across both the storybook app and printed storybook conditions the teacher provided cognitive scaffolding in similar ways to help children understand the story content and words by asking children questions, repeating words said by children, responding accordingly, extending discussions, and reinforcing ideas. Cognitive scaffolding included the teacher asking questions and providing follow up comments about the story content, for example, the teacher said, "Look we've got lots of friends up in the tree…." and asked "What's happened to the ladder?" Similar instances of cognitive scaffolding also occurred when the teacher was reading to an individual children or a group of children. However, the content and types of questions asked were tailored for the individual child and specific interest in aspects of the story, as seen in these examples:

Storybook app:

Teacher: "Hello, ssssso nice to see you," he said and kept slithering. Suddenly Mi Mi Mouse yelled out, "STOP! I need your help! I can't get down!" [text].
Teacher: What's happened to her ladder? [cognitive].
Barry: Fall down.
Teacher: The wind blew it over didn't it? [cognitive]. It's fallen down [cognitive].

Printed storybook:

Teacher: "Hello, ssssso nice to see you," Mr Snake would say [text].
Lu Lu: She's not happy.
Teacher: Who's not happy? [cognitive].
Lu Lu: The mouse is not happy.
Teacher: No she's not very happy. [cognitive].

The teacher also used similar types of affective scaffolding language to praise, encourage and extend children's engagement with the story content when using either the storybook app or printed storybook. This was also the case when reading to an individual child or group of children. To encourage children to complete tasks such as helping the animals slide down Mr Snake's back, tracing Mr Snake with a finger, or turning the page, the teacher provided affective scaffolding such as "Very good" and "Super". Affective scaffolding commonly occurred alongside the child's completion of interactive tasks such as sliding their finger down Mr Snake's back when using either the printed storybook page or digital page as seen in this example.

Storybook app:

Teacher: Barry could you press the yellow arrow? [technical]. This one here darling. [technical]. Super. [affective].
Teacher: Do you think you can make her slide down again Annie? [technical]. Do you want to have another try again? [affective]. Press his face [technical].
Teacher: Shall I help you? [affective]. Give me your finger and I will help you to do it [technical].
Teacher: Very good [affective].

Printed storybook:

Teacher: Mr Snake slithered up the tree and said, "Slide down my back.'[text].
Teacher: Oscar, do you think MiMi Mouse can slide down Mr Snake's back? [cognitive].
Oscar: Yes
Teacher: Make it come down with your finger [technical].
Oscar: Yes
Teacher: Would you like to have a try? [affective]
Oscar: Yes
Teacher: Put your finger on there. [technical]. Look and make it go down Mr Snake [technical].
Teacher: Very good! [affective]. Well done! [affective].

However, compared to the paper printed book, the story app afforded more scope and opportunities for interacting with the screen through the app's multimodal and audio features. For example, the presence of sound produced by Mr Snake ("SSSS") and digital buttons to press to change objects or move objects and characters on the screen stimulated further engagement. The teacher also scaffolded children's tracing of the snake's body on the printed page and the screen providing similar types of technical scaffolding such as "Make it come down with your finger" and "Make your finger go all the way down". The storybook app further enhanced children's interactions with the pages because they could physically move and drag the animals to make each of them slide down Mr Snake's back. This feature extended children's engagement and conversations during shared reading as illustrated in this example:

Storybook app:

> *Teacher: Do you think you could help by pressing Mr Snake's face. [technical]. Would you like to have a go Fiona? [affective]. Can you see Mr Snake's face there if you press it what will happen? [technical].*
> *Teacher: What's that noise? [cognitive]. Is it SSSSSSS? [cognitive]. Snake [cognitive].*
> *Fiona: SSSSSSS. Snake.*
> *Teacher: If you use your finger Fiona. [technical]. Shall I help you? [technical]. Look you can make it go all around Mr Snake's body. [technical].*
> *Fiona: SSSSSS.*
> *Teacher: That's it. [affective]. Right. [affective]. Can you press the yellow arrow to turn the page? [technical].*

Discussion

The present study explored how an early childhood teacher scaffolded young children's interactions with a storybook app and printed book during shared reading. The teacher was observed to use cognitive, affective, and technical scaffolding to support children during shared reading with the storybook app and printed book. The frequency of utterances made by the teacher were examined to determine the extent to which the teacher engaged in different forms of scaffolding. The teacher used cognitive, affective, and technical scaffolding to engage children with the story content, encourage participation, and provide technical assistance. The teacher provided a similar amount of cognitive scaffolding regardless of whether the storybook app or printed book was used. However, more affective and technical scaffolding occurred during shared reading with the storybook app than with the printed book. The teacher spent a longer time reading with the storybook app than with the printed book. Although speculative, group size did not appear to influence the type and frequency of scaffolding that was provided and it is possible that the format of the book (e.g., storybook app or printed book) may not be as important as *how* they are used by teachers to support shared reading experiences.

Cognitive, affective, and technical scaffolding

Woloshyn et al. (2017)'s study was extended in the present research by examining the frequency of a teacher's cognitive, affective, and technical scaffolding during the shared reading of a storybook app. The present findings were similar to parent studies that have examined parent scaffolding of young children’s use of tablets and literacy game apps (Neumann & Neumann, 2016; Neumann, 2017a). For example, Neumann (2017a) found that parents provided mainly cognitive scaffolding and less affective and technical scaffolding during parent-child play with a word matching app. The teacher in the present study provided cognitive scaffolding such as asking questions about the story and making comments such as “Is that the noise that a snake makes?”, “She is hiding”. These examples of cognitive scaffolding and teacher talk around the story content during reading of the story app were also similar to when the teacher read the printed book (e.g., "Mr Kangaroo is on the floor isn't he?” and "He would have to come down from the treehouse").

Other studies have also highlighted similar benefits of parent scaffolding during e-book reading (See, Madhubala, & Koo, 2019; Korat & Or, 2010). Korat and Or (2010) investigated parent-child shared reading of e-books and printed books and found that mothers scaffolded children's learning in both print and electronic formats. E-book reading provided a context for enhancing young children's cognitive development and learning about general world knowledge, words and vocabulary. For example, mothers asked children questions about illustrations (e.g., pointing out a picture on the screen and saying "flower"), word meanings (e.g., asking the child what a particular word means then relating its meaning back to the context of the story), and personal experiences (e.g., relating a picture of a kite on the screen to when the child received a kite from their father).

Whilst acknowledging that the present case study cannot provide generalisations, the findings suggest that cognitive scaffolding around the story content and text may be potentially similar regardless of whether the book is in the form of a storybook app or printed book. Interestingly, Reich et al. (2016) found that young children can make similar cognitive gains and story detail recall during shared reading with storybook apps or printed books. However, these authors stressed that face-to-face interaction with adults and the quality of the storybook app are essential factors to consider when scaffolding young children's interactions with screens during storybook reading with tablets. The present study goes further to suggest that affective and technical scaffolding, in addition to cognitive scaffolding may also be important factors to consider during shared book reading with storybook apps in the preschool classroom.

It was found that a greater frequency of affective scaffolding where the teacher provided praise and encouragement (e.g., "That's it! Excellent!"), occurred during shared book reading with a storybook app compared to the printed book. Although speculative, this may have been due to digital and multimodal features (e.g., animations, sounds) of the story app that stimulated further exploration and play. For example, when children saw Mr Snake’s head glow bright yellow they curiously tapped on it then slid their finger down Mr Snake’s back which was followed by positive feedback from the teacher. A greater provision of child interactions with an interactive book app could potentially lead to more opportunities for children to explore, discover, and complete tasks (e.g., tapping the snake to hear a SSSSSS sound). These instances may have in turn prompted the teacher to provide more positive feedback and scaffolding. Indeed, teachers may need to be even more mindful of the need to scaffold during printed book reading as printed books lack digital prompts to stimulate and guide interactions.

Turning the page was an important task during shared reading of the storybook app or printed book with the teacher positively encouraging children to "have a go at turning the page". Interestingly, it was observed that the younger children found it difficult to turn the paper printed page because sometimes pages in a printed book “stick” together. For example, the teacher said, "Woops, you turned a couple of pages then. Let's just pop that page back". Following this, the teacher continued turning the page. In contrast, it appeared easier for all the children to turn the page when using the storybook app by pressing the yellow arrow which was followed by positive feedback by the teacher: "Can you press the yellow arrow? Super!" It is possible that the greater ease and success of turning the page on the iPad may have resulted in more instances of affective scaffolding by the teacher.

Technical scaffolding was the least frequent type of teacher scaffolding that occurred during all the shared book sessions, but it occurred more frequently when using the storybook app compared to the printed book. Tablet based storybook apps require more complex operational competencies such as tapping, pressing, dragging, and swiping (Marsh et al., 2015; Merchant, 2015) than printed picture books. These operational competencies are required to successfully navigate through the storybook app. When sharing storybook apps with young children, teachers can assist children to tap the arrows to turn the page or when interacting with the animations through other touch-based gestures such as press and drag.

Although the last page of both the storybook app and printed book provided an opportunity for the children to "Slide their finger down Mr Snake's back", greater technical scaffolding was needed to help children press and drag animals on the iPad screen. However, following a few attempts and technical scaffolding by the teacher, the children improved at the task and mastered it. For example, the teacher said, "We will have to press Mr Snake's head again to see if we can help him get down. Shall I see if I can help you? If you press it down look. You've got to follow Mr Snake's body all the way to the bottom". This highlights the important role that the teacher played in scaffolding children's interactions with the storybook app to complete a task. Further investigation is required to determine whether increased technical scaffolding by teachers may be more important for younger children or children who are less confident with operating tablets.

Teacher utterances

Overall, teacher utterances were more frequent and a longer time was spent engaged in the reading activity when using the storybook app compared to the printed book. One explanation for this could be the greater affordances provided by the storybook app in terms of its interactive features and activities. For example, physically dragging animals across the screen so children could visually see them slide down Mr Snake's back and the physical action of tapping the snake's head to hear a SSSSS sound facilitated engagement. Such multimodal activity may have stimulated further play, extended teacher utterances, and interest in the story. This in turn may have provided the teacher more opportunities for teacher talk thus lengthening the time spent engaged with the storybook app. Whether a storybook app affords more conversational time compared to a printed book requires further investigation with a larger group of participants.

The teacher used cognitive, affective, and technical scaffolding to promote discussion throughout the shared reading sessions and provided stimulating extra textual utterances and novel words that are important for supporting early language learning. The teacher was observed to use cognitive scaffolding and modelled and repeated words that were easily understood by the preschoolers plus integrated more complex words from the book. Shared reading with small groups of children also generated a richer channel for conversation as the teacher made comments and asked questions during shared reading with storybook app such as "Do you like cheese? What do you have cheese on?" and with the printed books "That's a mummy kangaroo isn't it? She's a lot bigger than the little kangaroo".

Researchers have highlighted the need for more work to investigate teacher scaffolding during shared storybook reading (Gonzalez et al., 2014; Pentimonti & Justice,

2010) and the depth of cognitive demand needed by the teacher to extend learning (van Kleeck, 2008). This is especially important for supporting young children's oral language development when using storybook apps or printed books. Shared reading has the benefit of engaging children in longer conversations which would be especially important for children at risk or from diverse language backgrounds (Milburn et al., 2014). More work is needed to analyse teacher questions as this approach would provide a deeper understanding of children's comprehension levels and how teachers can use cognitive scaffolding through questions and comments to support oral language (Walsh & Hodge, 2018). Further research is also needed to microanalyse teacher use of cognitive scaffolding during reading of storybook apps (e.g., completion prompts, recall prompts, open ended questions, closed questions).

Groups

There is currently no clear consensus on the most effective number of young children to have in a group for shared reading (Walsh & Hodge, 2018) and a ratio of one on one is advised for children who need additional support (Wasik, 2008). The amount of scaffolding a teacher needs to provide may be dependent upon whether shared reading involves one teacher and one child or a small group of children. In the present study the teacher provided on average similar frequencies of scaffolding regardless of reading to one child or to a small group of three children when using either the printed storybook or storybook app. Walsh and Hodge (2018) suggests that the optimal group size for shared reading might be dependent on the purpose of reading activity. For example, a smaller group may be advantageous if the teacher's goal is to encourage children to provide a verbal response.

In terms of group size and teacher scaffolding, it may depend upon the skills and abilities of the children. Providing cognitive scaffolding such as individualized questions can be difficult with a large group of young children. It has been suggested that reading in small groups with similar levels of cognitive development may be a beneficial approach (Milburn et al., 2014). However, more empirical research is needed to determine the right amount of scaffolding and the best group size needed to optimize children's shared book reading experiences with storybook apps and tablets.

Practical Implications

Although work has examined how teachers cognitively scaffold children's language learning with books using cognitive scaffolding, less is known about the role affective scaffolding plays in encouraging and praising children for their efforts and the role technical scaffolding plays in helping children physically handle books to maximise engagement and participation. Similar amounts of cognitive scaffolding (e.g., questions about the story content) were observed in both storybook app and printed book conditions. However, the present findings suggest that teacher use of affective and technical scaffolding to support learning during shared reading with tablets needs further consideration.

Examples of affective scaffolding highlighted in this study include providing positive feedback for completion of tasks (e.g., "Well done!") and encouraging engagement and participation in the digital shared reading experience (e.g., "Have a go!"). In addition, modelling how to use the storybook app and navigate through each interface (e.g., "Tap the arrow to turn the page") would be important for learning technical and operational skills. A child's age, abilities (e.g., fine motor capacity), and technical competence and confidence with tablets and printed books is also vital to consider when planning shared reading activities in the early years classroom. Furthermore, teachers need to be flexible in their approach to shared reading of printed books and storybook apps as they increasingly oscillate between digital and non-digital print based tools to scaffold and extend learning opportunities (Woloshyn et al., 2017). It is possible that, professional development workshops that apply shared book reading strategies for storybook apps may be beneficial for teachers. For example, how to deepen language skills by asking questions clarifying content and extending ideas whilst providing children with affective support and technical advice. However, some research has found that during e-book reading adult-talk that is not focussed on the story may distract children from learning (Bus et al., 2015). Therefore, the quality of teacher talk and scaffolding should also be considered for professional development programs for teachers.

Due to explosion of e-books and storybook apps on the commercial market the educational quality of these resources have been questioned by researchers. Teachers have been cautioned to carefully evaluate e-books prior to using them in the classroom (Bates et al., 2016) so that these books align with the instructional goals (Christ et al., 2018). For example, hotspots (pictures or words that perform some action or links to a game when selected) may detract students from learning voice to print matching or left-right directionality. Or hotspots may influence comprehension of text by not being connected to the meaning of the words (Bates et al., 2016). However, if hotspots, animations, sounds, visuals are congruent to the text and narration it may facilitate emotional development (e.g., suspenseful music alongside a wicked character; Bus et al., 2015) and comprehension (e.g., text highlighting; Christ et al., 2018). It is suggested that teachers should model and scaffold interactions with e-books to ensure deepest meaning making and learning (Christ et al., 2018). Hotspots and multimedia features of e-books have the potential to enhance or hinder learning (Reich et al., 2016) therefore critical selection of quality e-books is important. This also emphasizes the need to explore the use of multimodal literacy theory in the design of quality interactive e-books so that children's engagement with hotspots and multimodal texts can benefit learning.

Limitations and future research

The small sample size of this exploratory case study of one teacher limits generalisations of the findings to other classrooms, schools, and diverse communities. In addition, as only one storybook was used, generalisations cannot be made. Using cognitive, affective, and technical scaffolding to classify a teacher's utterances were key to mapping these behaviours. However, the development and design of a more refined coding system to microanalyse, for example, the types of cognitive scaffolding (e.g., literal, inferential, open/closed questions) would deepen the analysis and provide richer data on scaffolding early learning with tablets and apps. Also, a larger sample size would allow for a stronger examination of the effect of group size on shared reading and how the frequency and depth of children's utterances affect teacher scaffolding and extra textual talk. A closer examination of non-verbal teacher and child behaviours is needed to explore, for example, whether a teacher's smile of encouragement further supports children's engagement during shared reading with a tablet. In addition, as the researcher remained in the classroom behind the camera during the recording of the shared reading sessions, the potential effects of the presence of the researcher should also be considered when interpreting the findings.

Collection of demographic and children's prior home experiences with digital devices would be important factors to consider around the use of storybook apps and teacher scaffolding in the classroom. For example, data should be gathered on child and family SES, teacher education, curriculum, classroom reading activities, and home literacy environment. Future work is needed on how tablets impact upon early learning and how teacher support differs across storybook apps and printed storybooks (O'Toole & Kannass, 2018). Examining teacher scaffolding with a wider range of storybook apps of different genres with varying levels of interactivity would inform the planning and selection of books for shared reading activities in the classroom. Finally, as greater frequencies of affective and technical scaffolding were observed during shared reading with story apps compared to the printed storybook, there is a need to investigate this further. This is especially important as it is unclear whether higher frequency of scaffolding positively supports children's learning and participation in the shared reading activity or reduces children's opportunities to verbally participate.

Finally, although little is known about the emotional benefits of shared reading, it has been found to provide opportunities for supporting young children's emotional development (Aram & Shapira, 2012; Aligas & Margallo, 2016; Kohm et al., 2016). Other studies have shown that adult-child shared book reading enhanced children's socio-emotional adjustment, empathy and language skills (Aram & Aviram, 2009). This is because shared reading experiences promote conversations between the adult and child about emotions of the book characters (Zeece, 2004) and assists preschoolers in expressing and understanding their own emotions (Colwell, 2001). Therefore, future research should examine how teachers can best scaffold young children's emotional development through shared storybook reading of both printed books and storybook apps. It would also be important to explore if teacher motivation differs between shared reading of storybook apps and printed storybooks as this would influence children's experiences and exposure to multimodal texts.

Conclusion

Teachers play a key role in supporting preschool children's shared book reading experiences with storybook apps and printed storybooks. Categorising teacher's utterances can provide a useful platform to analyse teacher talk around storybook apps. The present study showed that a teacher's use of cognitive, affective, and technical scaffolding supported and engaged young children during shared reading and also engaged them in conversations. The teacher's use of cognitive scaffolding was similar across both the storybook app and printed book although higher affective and technical scaffolding occurred during the use of the storybook app. The factors that determine differences in scaffolding across book formats requires further investigation however, it is possible the that benefits of shared reading may lie not in the form of the book, but how they are used by a teacher.

References

Aliagas, C., & Margallo, A. M. (2016). Children's responses to the interactivity of storybook apps in family shared reading events involving the iPad. *Literacy, 51*, 44 52.

Aram, D., & Aviram, S. (2009). Mothers' storybook reading and kindergartners' socioemotional and literacy development. *Reading Psychology, 30*, 175-194. doi: 10.1080/02702710802275348,

Aram, D. & Shapira, R. (2012). Parent-child shared book reading and children's language, literacy, and empathy development. *Rivista Italiana di Educazione Familiare*, *2*, 55 65. doi:10.1002/trtr.1543

Bates, C. C., Klein, A., Schubert, B., McGee, L., & Anderson, N., Dorn, L., McClure, E., &, Ross, R. H. (2016). E-books and E-book apps: Considerations for beginning readers. *The Reading Teacher*, 70, 401-411.

Burnett, C., Merchant, G., Simpson, A., & Walsh, M, (Eds). (2017). *The case of the iPad: Mobile literacies in education*. Singapore: Springer.

Bus, A. G., van Ijzendoorn, M. H., & Pellegrini, A. D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmission of literacy. *Review of Educational Research, 65*, 1–21. doi:10.2307/1170476

Bus, A. G., Takacs, Z. K., & Kegel, C. A. T. (2015). Affordances and limitations of electronic storybooks for young children's emergent literacy. *Developmental Review, 35*, 79-97. doi:10.1016/j.dr.2014.12.004.

Cahill, M., & McGill-Franzen. (2013). Selecting "app"ealling and "app"propriate book apps for beginning readers. *The Reading Teacher, 67*, 30–39. doi:10.1002/trtr.1190

Christ, T., Wang, X. C., & Erdemir, E. (2018) Young children's buddy reading with multimodal app books: reading patterns and characteristics of readers, texts, and contexts, *Early Child Development and Care, 188*, 1012-1030, doi: 10.1080/03004430.2016.1241776.

Colwell, M. J. (2001). *Mother-child emotion talk, mothers' expressiveness, and mother-child relationship quality: Links with children's emotional competence*. Dissertation Abstracts International: Section B: The Sciences and Engineering, n. 61(7-B), p. 3877.

Crain-Thoreson, C., & Dale, P. S. (1999). Enhancing linguistic performance: Parents and teachers as book reading partners for children with language delays. *Topics in Early Childhood Special Education, 19*, 28–39. doi:10.1177/027112149901900103

Crystal, D. (2008). *A dictionary of linguistics and phonetics*. 6th Edition. Malden, MA: Blackwell Publishing.

de Jong, M. T., & Bus, A. G. (2003). How well suited are electronic books to supporting literacy? *Journal of Early Childhood Literacy, 3*, 147–164. doi:10.1177/14687984030032002

Dickinson, D. K., & Smith, M. W. (1994). Long-term effects of preschool teachers' book readings on low-income children's vocabulary and story comprehension. *Reading Research Quarterly, 29*, 104–122. doi:10.2307/747807

Dickinson, D. K., & Tabors, P. O. (Eds.). (2001). *Beginning literacy with language: Young children learning at home and school*. Baltimore, MD, US: Paul H Brookes Publishing.

Geer, R., White, B., Zeegers, Y., Au, W., & Barnes, A. (2017). Emerging pedagogies for the use of iPads in schools. *British Journal of Educational Technology, 48*, 490–498. doi:10.1111/bjet.12381

Geist, E. (2014). Using tablet computers with toddlers and young preschoolers. *Young Children, 69*, 58–63.

Gerde, H. K., & Powell, D. R. (2009). Teacher education, book reading practices, and children's language growth across one year of Head Start. *Early Education and Development, 20*, 211–237. doi:10.1080/10409280802595417

Gonzalez, J. E., Pollard-Durodola, S., Simmons, D. C., Taylor, A. B., Davis, M. J., Fogarty, M., & Simmons, L. (2014). Enhancing preschool children's vocabulary: Effects of teacher talk before, during and after shared reading. *Early Childhood Research Quarterly, 29*, 214–226. doi:10.1016/j.ecresq.2013.11.001

Hillman & Marshall (2009). Evaluation of digital media for emergent literacy. *Computers in the Schools, 26*, 256–270. doi:10.1080/07380560903360186

Hindman, A. H., Wasik, B. A., & Erhart, A.C. (2012). Shared book reading and head start preschoolers' vocabulary learning: The role of book-related discussion and curricular connections. *Early Education and Development, 23*, 451–474. doi:10.1080/10409289.2010.537250

Hoffman, J. L., & Paciga, K. A. (2014). Click, swipe, and read: Sharing e-books with toddlers and preschoolers. *Early Childhood Education Journal, 42*, 379–388. doi:10.1007/s10643-013-0622-5

Huang, Y., Liang, T., Su, Y., & Chen, N. S. (2012). Empowering personalized learning with an interactive e-book learning system for elementary school students. *Educational Technology Research and Development, 60*, 703–722. doi:10.1007/s11423-012-9237-6

Kohm, K. E., Holmes, R. M., Romeo, L., & Koolidge, L. (2016). The connection between shared storybook readings, children's imagination, social interactions, affect, prosocial behavior, and social play. *International Journal of Play, 5*, 128-140, doi:

10.1080/21594937.2016.1203895

Korat, O., & Shamir, A. (2012). Direct and indirect teaching: Using e-books for supporting vocabulary, word reading, and story comprehension for young children. *Journal of Educational Computing Research, 46*, 135–152. doi:10.2190/ec.46.2.b

Korat, O., Levin, I., Atishkin, S., & Turgeman, M. (2014). E-books as facilitator of vocabulary acquisition: Support of adults, dynamic dictionary, and static dictionary. *Reading and Writing, 27*, 613–629. doi:10.1007/s11145-013-9474-z

Korat, O., Kozlov-Peretz, O., & Segal-Drori, O. (2017). Repeated e-book reading and its contribution to learning new words among kindergarteners. *Journal of Education and Training Studies, 5*, 60–72. doi:10.11114/jets.v5i7.2498

Korat, O., & Or, T. (2010). How new technology influences parent-child interaction: The case of e-book reading. *First Language, 30*, 139-154.

Korat, O., & Shamir, A. (2007). Electronic books versus adult readers: Effects on children emergent literacy as a function of social class. *Journal of Computer Assistance Learning, 23*, 248–259.

Korat, O., & Shneor, D. (2019). Can e-books support low SES parental mediation to enrich children's vocabulary? *First Language*, 1-22, doi: 10.1177/0142723718822443.

Kress, G. (2010). *Multimodality: A social semiotic approach to contemporary communication.* London, UK: Routledge.

Kucirkova, N., Sheehy, K., & Messer, D. (2014). A Vygotskian perspective on parent–child talk during iPad story sharing. *Journal of Research in Reading, 38*, 428–441. doi:1111/1467-9817.12030

Lauricella, A. R., Barr, R., & Calvert, S. L. (2014). Parent-child interactions during traditional and computer storybook reading for children's comprehension: Implication for electronic storybook design. *International Journal of Child-Computer Interaction, 2,* 17–25. doi:10.1016/j.ijcci.2014.07.001

Lee, L. (2015). Digital media and young children's learning: A case study of using iPads in American preschools. *International Journal of Information and Education Technology, 5*, 947–950. doi:10.7763/ijiet.2015.v5.643

Lu, Y., Ottenbreit-Leftwich, A. T., Ding, A., & Glazewski, K. (2017). Experienced iPad-using early childhood teachers: Practices in the one-to-one iPad classroom. *Computers in the Schools, 34*, 9–23, doi:10.1080/07380569.2017.1287543

Marsh. J., Yamada-Rice, D., Bishop, J., Lahmar, J., Scott, F., Plowman, L., Piras, M., French, K., Robinson, P., Davis, S., Davenport, A., Winter, P. (2015). *Exploring Play and Creativity in Preschoolers' Use of Apps: Technology and Play*. Economic and Social Research Council. Retrieved from http://www.techandplay.org/tap-media-pack.pdf

Massey, S. (2004). Teacher-child conversation in the preschool classroom. *Early Childhood Education Journal, 31*, 227–231. doi:10.1023/b:ecej.0000024113.69141.23

Masters, J., & Yelland, N. (2002). *Teacher scaffolding: An exploration of exemplary practice*. In D. Watson (Ed.). Networking the Learner. (Ch 28 pp. 289-300). Springer: New York.

Merchant, G. (2015). Keep taking the tablets: iPads, story apps and early literacy. *Australian Journal of Language and Literacy, 38*, 3–11.

Milburn, T. F., Girolametto, L., Weitzman, E., & Greenberg, J. (2014). Enhancing preschool educators' ability to facilitate conversations during shared book reading. *Journal of Early Childhood Literacy, 14*, 105–140. doi:10.1177/1468798413478261

Moody, A. K., Justice, L. M., & Cabell, S. Q. (2010). Electronic versus traditional storybooks: Relative influence on preschool children's engagement and communication. *Journal of Early Childhood Literacy, 10*, 294–313. doi:10.1177/1468798410372162

Morrow, L. M., O'Connor, E. M., & Smith, J. K. (1990). Effects of a story reading program on the literacy development of at-risk kindergarten children. *Journal of Reading Behaviour, 22*, 255–275. doi:10.1080/10862969009547710

Neumann, M. M. & Forster, K. (2007). *Up Downs: A fun and practical way to introduce reading and writing to children aged 2–5*. Sydney: Finch.

Neumann, M. M. (2017a). Parent scaffolding of young children's use of touch screen tablets. *Early Child Development and Care, 188*, 1652–1662. doi:10.1080/03004430.2016.1278215

Neumann, M. M. (2017b). *Mr Snake's Slippery Slide*. https://itunes.apple.com/au/app/mr-snakes-slippery-slide/id1297123418?mt=8

Neumann, M. M., & Neumann, D. L. (2015). The use of touch screen tablets at home and preschool to foster emergent literacy. *Journal of Early Childhood Literacy*, *17*, 203–220. doi:10.1177/1468798415619773

Neumann, M. M., & Neumann D. L. (2016). An analysis of mother-child interactions during an iPad activity. In K. Alvarez (Ed.), *Parent-child interactions and relationships: Perceptions, practices, and developmental outcomes (pp. 133–148).* Hauppauge, NY: Nova Science Publishers Inc.

Ninio, A. & Bruner, J. (1978). The achievement and antecedents of labelling. *Journal of Child Language, 5*, 1–15. doi:10.1017/s0305000900001896

Northrop, L., & Killeen, E. (2013). A framework for using iPads to build early literacy skills. *The Reading Teacher, 66*, 531–537. doi:10.1002/trtr.1155

O'Toole, K. J., & Kannass, K. N. (2018). Emergent literacy in print and electronic contexts: The influence of book type, narration source, and attention. *Journal of Experimental Child Psychology, 173*, 100–115. doi:10.1016/j.jecp.2018.03.013

Pentimonti, J. M., & Justice, L. M. (2010). Teachers' use of scaffolding strategies during read alouds. *Early Childhood Educational Journal, 37*, 241-248.

Plowman, L. & Stephen, C. (2007). Guided interaction in preschool settings. *Journal of Computer Assisted Learning, 23*, 14–26. doi:10.1111/j.1365-2729.2007.00194.x

Reich, S. M., Yau, J. C., & Warschauer, M. (2016). Tablet-based eBooks for young children: What does the research say? *Journal of Developmental and Behavioral Pediatrics, 37*, 585–591. doi:10.1097/DBP.0000000000000335

Rosenhouse, J., Feitelson, D., Kita, B., & Goldstein, Z. (1997). Interactive reading aloud to Israeli first graders: Its contribution to literacy development. *Reading Research Quarterly, 32*, 168–183. doi:10.1598/rrq.32.2.3

Roskos, K., Carroll, J., & Burstein, K. (2012). Descriptive observations of Ebook shared reading at preschool. *Journal of Literacy and Technology, 13*, 27-57.

Roskos, K., Burstein, K., Shang, Y., & Gray, E. (2014). Young children’s engagement with e-books at school does device matter? *Sage Open, 4*, 1–9. doi:10.1177/2158244013517244

Sargeant, B. (2015). What is an e-book? What is a book app? And why should we care? An analysis of contemporary digital picture books. *Children's Literature in Education, 46*, 454–466. doi:10.1007/s10583-015-9243-5

See, K. T; Madhubala, B. H; & Koo, A. C. (2019). Motivation of parents towards reading multilingual eBooks to preschool children. *Interactive Journal of Interactive Mobile Technologies, 13*, 20-36.

Sénéchal, M., & Cornell, E. H. (1993). Vocabulary acquisition through shared reading experiences. *Reading Research Quarterly, 28*, 360–374. doi:10.2307/747933

Siegle, D. (2013). iPads: Intuitive technology for 21st-century student. *Gifted Child Today, 36*, 146–150. doi:10.1177/1076217512474983.

Smeets, D. J. H., Bus, A. G. (2012). Interactive electronic storybooks for kindergartners to promote vocabulary growth. *Journal of Experimental Child Psychology, 112*, 36–55. doi:10.1016/j.jecp.2011.12.003

van Kleeck, A. (2008). Providing preschool foundations for later reading comprehension: The importance of and ideas for targeting inferencing in storybook-sharing interventions. *Psychology in the Schools, 45*, 627–643. doi:10.1002/pits.20314

Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.

Walsh, R. L., & Hodge, K. A. (2018). Are we asking the right questions? An analysis of research on the effect of teachers' questioning on children's language during shared book reading with young children. *Journal of Early Childhood Literacy, 18*, 264–294. doi:10.1177/1468798416659124

Wasik, B. A., & Bond, M. A. (2001). Beyond the pages of a book: Interactive book reading and language development in preschool classrooms. *Journal of Educational Psychology, 93*, 243–250. doi:10.1037/0022-0663.93.2.243

Wasik, B. (2008). When fewer is more: Small groups in early childhood. *Early Childhood Education Journal, 35*, 515–521. doi:10.1007/s10643-008-0245-4

Wolfe, S., & Flewitt, R. S. (2010). New technologies, new multimodal literacy practices and young children's metacognitive development. *Cambridge Journal of Educatio,n 40*, 387-399.

Woloshyn, V. E., Bajovic, M., & Worden, M. (2017). Promoting student-centered learning using iPads in a Grade 1 Classroom: Using the digital didactic framework to deconstruct instruction. *Computers in the Schools, 34*, 152–167, doi:10.1080/07380569.2017.1346456

Wood, D., Bruner, J. C., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of Child Psychology and Psychiatry, 17*, 89–100. doi:10.1111/j.1469-7610.1976.tb00381.x

Yelland, N., & Masters, J. (2007). Rethinking scaffolding in the information age. *Computers and Education, 48*, 362–382. doi:10.1016/j.compedu.2005.01.010

Zeece, P. D. (2004). Promoting empathy and developing caring readers. *Early Childhood Education Journal, 31*, 193-199.

Zipke, M. (2017). Preschoolers explore interactive storybook apps: The effect on word recognition and story comprehension. *Education and Information Technologies, 22,* 1695–1712. doi:10.1007/s10639-016-9513-x

Zucker, T. A., Moody, A. K., & McKenna, M. C. (2009). The effects of electronic books on pre-kindergarten-to-grade 5 students' literacy and language outcomes: A research synthesis. *Journal of Educational Computing Research, 40*, 47–87. doi:10.2190/ec.40.1.c

Appendix

Mr Snake's Slippery Slide

Page 1: Mi Mi Mouse was scared of Mr Snake. He looked very sneaky and slippery.

Page 2: So Mi Mi Mouse built her house high up in a tree.

Page 3: Each day Mi Mi Mouse watched Mr Snake slither past to the water hole. "Hello, ssssso nice to see you," Mr Snake would say. Mi Mi Mouse just hid in her house.

Page 4: One day a big wind blew her ladder over. Mi Mi Mouse could not climb down.

Page 5: The next day Mr Snake slithered past towards the water hole. "Hello, ssssso nice to see you," he said and kept slithering. Suddenly Mi Mi Mouse yelled out, "STOP! I need your help! I can't get down!"

Page 6: Mr Snake slithered up the tree and said, "Slide down my back.' (*Can you slide your finger down Mr Snake's back?*)

Page 7: Mi Mi Mouse slid down Mr Snake's back. "WEEEEEEEEEEEE!"

Page 8: Together, they fixed up the ladder. Then Mi Mi Mouse and her friends slid down Mr Snake's slippery slide all day long. Mi Mi Mouse was not scared of Mr Snake anymore.