Reading Highly Interactive Electronic Storybooks Vs. Minimally Interactive Electronic Books: Relative Influence On Time On Task, Narrative Retell, And Parental Perceptions

Jose Humberto Carrasco
University of Texas at El Paso, jhcarrasco@miners.utep.edu

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READING HIGHLY INTERACTIVE ELECTRONIC STORYBOOKS VS. MINIMALLY INTERACTIVE ELECTRONIC BOOKS: RELATIVE INFLUENCE ON TIME ON TASK, NARRATIVE RETELL, AND PARENTAL PERCEPTIONS

JOSE HUMBERTO CARRASCO
Department of Rehabilitative Sciences

APPROVED:

Vanessa T. Mueller Ph.D., Chair

Connie Summers Ph.D.

Nigel G. Ward, Ph.D.

Bess Sirmon-Taylor, Ph.D.
Interim Dean of the Graduate School
READING HIGHLY INTERACTIVE ELECTRONIC STORYBOOKS VS. MINIMALLY INTERACTIVE ELECTRONIC BOOKS: RELATIVE INFLUENCE ON TIME ON TASK, NARRATIVE RETELL, AND PARENTAL PERCEPTIONS

by

JOSE HUMBERTO CARRASCO

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Abstract

The purpose of this study was to investigate whether there was a difference in percentage of book read and the complexity of the narrative retell when children read highly interactive electronic books (e-books) versus minimally interactive e-books. An area to study further was parent’s perceptions of their children’s preference of highly versus minimally interactive e-book. A single subject rapid-alternating treatment design was used on three children (4-6 years of age). The participants read and then provided a narrative retell of both e-books over a 12-week period. Children’s percentage of book read, grammar elements, cohesion elements, and proposition use were analyzed. Additionally, a parental questionnaire to examine parental perceptions regarding their child’s preference of both types of e-books was provided. Through visual inspection of the data and effect size it was concluded that percentage of book read did not vary from baseline for both highly interactive and minimally interactive e-books due to a probable ceiling effect. Research failed to provide a clear advantage for either e-book category (i.e. highly vs. minimally interactive). It was difficult to make a clear distinction due to participant variability, although, the data revealed some clues as to what e-book category resulted in more elaborated narrative retells. All parents reported a positive attitude toward e-books and two out of the three parents showed a preference towards the minimally interactive e-books as they concluded that the highly interactive could be somewhat distracting at times.
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Chapter 1

Introduction

Computers comprise an important function in our societal and individual needs. Their presence in households has increased over the past decades, escalating from 8.4% in 1984 to 81.4% in 2010 (U.S. Department of Commerce, Bureau of the Census, 1984; U.S. Department of Commerce, Bureau of the Census, 2010). With the increase in available computerized devices comes an increase in the accessible software; some of which are aimed toward educational purposes. One example of an educational tool is an Electronic book (e-book). E-books encompass attractive features, which can have a role in reinforcing language development and literacy in young children. Nevertheless, the existing body of research on e-books as support for literacy development is not consistent nor meets the needs of modern society. This software’s potential may be greatly underestimated.

There is evidence suggesting that early reading experiences are predecessors of successful literacy development (Bus, Van Ijzendoorn, & Pellegrini, 1995; Van Kleeck, 2003), which consequently supports the need to observe which types of reading devices provide the most support in developing reading and comprehension skills. As a result of increased availability of computerized devices in the home environment, children are being introduced to technology, such as hand-held devices, at an early age. Subsequently, due to the vast variety in e-book features, it is important to understand which of these features provided are most beneficial to a child’s development because it has been suggested that there are relationships between factors such as early reading experiences supporting letter name or recitation, finger localization, and vocabulary development which are positive predictors of academic achievement (Tramontana, Hooper & Selzer, 1988). Therefore, if technology (i.e. e-books) can be beneficial
for children’s development, we must ensure the planning of the necessary tools that will foster children’s development (National reading panel, 2000). The purpose of this study is to contribute to the existing body of knowledge, by observing whether there was a difference in percentage of book read, and the complexity of the narrative retell when children read highly interactive electronic books (e-books) versus minimally interactive e-books. In addition, this study was also aimed towards understanding parent perception of highly versus minimally interactive e-books.
Chapter 2
Literature Review.

2.1 E-books in literacy development

Early reading experiences have been widely acknowledged as being a valuable support of literacy development (Bus, Van Ijzendoorn, & Pellegrini, 1995; Van Kleeck, 2003). These early experiences expose the child to words, sounds used in our language, rhyming, and other activities that support the development of phonemic awareness and vocabulary development. Through constant exposure to reading experiences, children are building the foundation for reading as they learn letter recognition (i.e. letter-sound knowledge) and phonemic awareness which supports the development of reading (Lyon 1997).

E-books have presented with interesting and often conflicting results in the area of children’s literacy development. A review of the existing literature yielded a picture of a complicated and unclear relationship between e-books and learner outcomes (Schugar, Smith and Schugar 2013). A study by Korat (2010) found positive effects of reading an e-book on children’s language and literacy in kindergarten and first graders as they found that children from both school grades demonstrated significant progress in word meaning, word reading, and word comprehension. Korat concluded that kindergarteners improved more than first graders in word meaning and word reading compared to all treatment groups. However, some of the limitations of her study included a small book selection, lack of scenarios for practice, unchallenging reading tasks for first graders, no production skills prior to intervention, and no socio–economic diversification of participant selection.

A study by Baid and Henniger (2011) performed a qualitative analysis of e-books read on an iPad within the context of “serious play” facilitation. This is a concept that represents the
literacy skill development and fundamental principles of perceivability, operability, understandability, and robustness. They found that the multi-modal technologies incorporated in the e-books offered significant opportunities for helping individuals develop their literacy skills. The authors also argued the need to evaluate weaknesses in current applications “to support the development of literacies rather than add to the confusion of young learners” (Baid and Henniger, 2011, pg13).

Shamir and Korat (2007), in a 3-session study with 72 children from three kindergartens, found that pre- and post-intervention emergent literacy measures (i.e. word recognition, emergent writing, and phonological awareness) improved, demonstrating an overall increase in emergent literacy levels. Their study supported e-book effectiveness in literacy development and that working in peer-assisted reading groups does not hinder nor aid in literacy development. One of the limitations was that their study consisted of using a specialized book and did not test the widely available or most commonly used e-books. The authors also mentioned that the most commonly used e-books are not satisfactorily developed. Many of the e-books are crowded with a variety of features which may not be beneficial since most lack a dictionary, include distracting games, include hotspots that are incongruent with the story content, and therefore lack age appropriate function. The authors also suggested future research was needed to compare the use of commercial e-books more available to the general population in promoting literacy.

In contrast to the previous studies, Pearman (2008) failed to find a clear relationship between e-book features and their support or impediments to comprehension. However, his study concluded that interactive storybooks may facilitate reading comprehension for second-grade students who are struggling with developing reading skills and strategies.
Other studies have also found the lack of a clear advantage on comprehension from e-book controlled reading (Leong, 1995; Grant, Jamilla & Grant, 2004). Leong (1995) conducted a study on 192 children and after analyzing their reading comprehension, mean scores, and standard deviation using the Canadian Test of Basic Skills (CTBS), found no clear advantage to students’ comprehension when using computer-controlled reading.

In sum, early reading experiences can play a crucial role in fostering children’s verbal knowledge (Lewin, 2000). However, research on e-books has shown both supporting and contradicting evidence to its overall effectiveness in stimulating literacy development.

2.2 E-book versus Print books

Although not much research has been conducted on e-books, some have compared them to their predecessor: the print book. Pearman (2008) examined the effectiveness of independent reading through electronic text compact disc read-only memory (CD-ROM) storybooks. He measured comprehension with oral retellings and found that storybooks (e-books) helped improve reader comprehension by providing multisensory features such as audio support, animations, and video clips that added meaning which was not found in the traditional texts. The traditional print texts rely mostly on the reader's internal strategies to activate prior knowledge. In contrast, e-books provide an interaction between the reader and the text. Moreover, the author concludes that electronic texts have the possibility of enhancing comprehension for students who are struggling to acquire the necessary skills for reading.

A study by Chera and Wood (2003) found e-books can support phonological awareness. In their study 15 kindergartners (3 to 6 years old) were exposed to e-book reading activities during 4 week periods versus an equally matched control group that only completed normal activities (i.e. phonics tuition and techniques to develop a sight vocabulary). The intervention
group demonstrated significantly higher increases in phonological awareness than the control group but resulted in no significant benefits for word reading.

Other studies like Almaguer and Pena (2010) and Chau (2008) concluded that e-books increased children’s enjoyment which increased interactivity of the e-books vs. traditional paper books. For example, Almaguer and Pena (2010) concluded in their study with 43 pre-service teachers and their corresponding classrooms that using e-books offers two-fold benefits by increasing children’s engagement and participation in technologically integrated instructional strategies while assisting in developing the children’s literacy skills.

A study by Grimshaw, Dungworth, McKnight, and Morris (2007) on 132 children who read either an e-book or a print book culminated in the conclusion that narration and dictionary features in e-books can increase children’s comprehension. The authors also concluded that children who read the e-books significantly enhanced their comprehension thanks to their added dictionary and narration, however, they found no statistically significant difference between the control and treatment groups.

On the contrary, research by Chiong, Ree, Takeuchi, and Erickson (2012) compared e-books to print books and found that children who read enhanced e-books recalled significantly fewer narrative details than those who read the print version. They also found that on almost all formats, children performed nearly even when asked to explain the main elements of the story. The enhanced e-book was less effective than the print and basic e-book in supporting the benefits of co-reading. The print books were more advantageous for literacy-building co-reading, whereas the e-books, particularly the enhanced e-book, more effectively engaged children and prompted physical interaction.
Although the evidence is obviously conflicting, others have supported e-books as the future of education since change is inevitable, and technology will continue to improve (Grant, 2002). Due to the lack of data and the variability of research results, there is a need to further evaluate the difference between print and e-books. Thus, the above studies highlight some important comparisons that have been made between e-books and print books. Even though technology may play a supportive role in children’s literacy development, the research still requires further investigation to solidify its claims.

2.3 What We Know About e-books and their Design

Some educators, as well as researchers, believe that enhanced e-books with their newly added features might be useful in supporting children’s literacy and language development (de Jong & Bus, 2003). However, research on e-books is still in its formative stages with vast opportunities for research. Research on electronic books has typically focused on e-book construction, and its multimedia effects, as well as comparing traditional vs. paper books. Multimedia effects can range from written text (highlighted or not), sound effects, special effects like animations (both touch activated and automatic), and even automatic read aloud (already recorded or recordable). The text can range in characteristics; some include highlighted word, phrase, or even paragraph as it is automatically read. Innovations like this can be beneficial to the child’s learning process. It can allow the child to relate written text with the corresponding pronunciation; therefore allowing the child to correlate the production of the word to the written text. It means that the child can actually follow the text as it is being read and hear how each word is being pronounced. It can help the child maintain attention to task as the text provides a visual for him or her to follow.
In some instances these types of books contain additional information, which can be accessed by clicking certain areas like the word or additional arrows on the margins of the book. Aids like these can provide additional information about the word, story, provide questions, and answers to assess how well the material is understood. They also provide additional support/clarification by repeating the word, phrase, or a previously read paragraph. These features, when well designed, can promote child’s literacy and language development (de Jong & Bus, 2003; Korat & Shamir 2008). Attractive features within the e-books can provide a more realistic reading experience than the drill method of fostering literacy (Labbo & Reinking, 1999). Shamir and Korat (2009) elaborated on basic categories by identifying design features appropriate for young learners. Features like (a) oral reading with sequential text highlight, (b) hotspot activation aligned with text, (c) dictionary option, and (d) games separate from text mode can help by reducing distractibility during the e-book reading. Currently, there is no clear-cut frame or best practice related to e-book design; however, the primary foundations (i.e. supporting features) are in place which may be advantageous in early reading.

2.4 Primary focus of the present study

Even with on-going research, there is much to be done in respect to the impact of e-book features. In the present study, the impact of e-book features in top rated e-books available online were observed by comparing highly interactive to the minimally interactive e-books. The researcher assessed e-book types relative to the child’s attention to task and how well a child retold the story. The story grammar elements, story structure level, completeness of story retelling by coding all the propositions, and story cohesiveness were all part of this assessment. The objective was to see if children produced better, more detailed retells after reading the minimally interactive e-books compared to the highly interactive e-books. Additionally, the
researcher observed the children’s progression through the book to determine the percentage of book read when reading minimally interactive vs. highly interactive e-books. Lastly, the parent’s perceptions of their children’s interactions with minimally vs. highly interactive e-books were recorded.

The research questions asked were 1) Is there a difference between children’s percentage of book read when reading minimally interactive vs. highly interactive e-books? 2) Will children produce richer story retells after reading the minimally interactive e-books compared to the highly interactive e-books? 3) Is there a difference of parent’s perception of their children’s interactions with minimally vs. highly interactive e-books?

The three research hypotheses were as follows: 1) Children reading the highly interactive e-books would remain on task for longer periods of time and read more of the book compared to the minimally interactive e-books. This hypothesis was supported by the argument that e-books are more enjoyable and entertaining than print books. The rational for selecting the highly interactive e-book over the minimally interactive e-book was also based on the assumption that highly interactive e-books can be more entertaining due to their vast features. 2) Children reading minimally interactive e-books would produce richer story retells after reading minimally interactive e-books vs. reading the highly interactive e-books. This hypothesis was based on arguments by Shamir and Korat (2007) that most commercial e-books are crowded with many features, most which have not been proven to be beneficial. The hypothesis was also based on the assumption that too many features can be distracting to the child which will limit the overall gain. 3) Parents would prefer the minimally interactive e-books vs. highly interactive e-books. This hypothesis was based on the assumption that parents will observe how their children deviate or get lost when the e-books contain too many features.
Chapter 3
Research Design and Methodology

3.1 Participant Selection and Description/recruitment

An IRB protocol was submitted and approved before participant recruitment began. Three typically developing children, ages 4-7 were recruited for the study. Exclusionary criteria included any known developmental disorders such as autism, intellectual disability, attention deficit disorder (ADD) or attention deficit hyperactivity disorder (ADHA). Child A was a 4 year-old girl, child B was a 5 year-old girl, and child C was a 6 year-old girl.

Recruitment flyers were distributed and posted around the University of Texas at El Paso campus. The flyers included the researchers’ contact information. Interested parents contacted the researchers to obtain additional information. If the child met the inclusion criteria, parents were asked to sign the consent form giving permission for their child to participate in the study. Once the inclusion criterion had been verified and all questions from the parents had been answered, parents signed the informed consent forms allowing their children to participate in the study. Consent forms were available in English and Spanish for bilingual parents. Consent forms were provided in English with Spanish on the other side of the page.

Consent forms informed participants that they were free to withdraw from the study at any time without consequence. Parents were told that they were not required to share any information regarding their perceptions on their child’s experience with the electronic books unless they wished to do so.
3.2 Setting

The study was conducted in the Speech, Hearing and Language clinic at the University of Texas at El Paso. A room in the speech clinic was utilized during the sessions. The room contained the following: 1) a table, 2) three chairs, 3) and an IPAD. The table was located in the center of the room with two tables and a third chair located across the room. The child sat in the center of the therapy room and the parent was seated across the room. The clinician sat in the third chair which was located across the table. The electronic books were read by: 1) the clinician or 2) the child with aid of the read aloud option found within the electronic books (IPAD).

The parents were given the option to have the session at times when it was convenient with their schedule, such as after work. Each session lasted approximately 60-90 minutes. During the study period, clients were asked to meet 2 times per week for 1 hour each session for no more than 3 months.

3.3 Study Design

Due to the nature of this study and its comparison goals, a Single Subject Rapid Alternating Treatment design was used to analyze the child’s response to either the minimally or highly interactive e-books. In this design, after the baseline phase, two treatments were administered (alternating rapidly) during the treatment phase. These two treatments consisted of the highly interactive e-books and the minimally interactive e-books. The treatments were counter balanced to control for any ordering effects (Kazdin, 1982). The rationale behind using this design was based on the fact that it allowed for a comparison of the two treatments within an
individual. The children served as their own control with the use of a baseline, allowing observation of individual differences.

3.4 Materials

The electronic books were displayed onto a 16-gigabyte, 2nd generation IPad which the children received during the reading sessions, and, which was returned at the completion of each session. Features of highly interactive e-books (≥ 4 features) and minimally interactive e-books (< 4 features) included: read aloud, highlighted text, sound effects, interactive (i.e. touch animation, touch quests, and touch music activation), animations, games, dictionary, and automatic page turn. Baseline was conducted by using three age appropriate conventional paper books. Treatment consisted of utilizing 2 e-books per session (1 highly and 1 minimally interactive), a total of 16 e-books (see Appendix A for a list of the books used).

3.5 Dependent Measures

All collected story retells were audio taped and transcribed. First, the components of the narrative were assessed.

1. Percentage of book read - The researcher recorded the amount of the book the child read either with help from the clinician or as it was being automatically read. Percentage of book read was defined as: the last page read by the child read divided by the total book pages.

   a. The reading was considered to be finished once the child:

      • Finished the book
      • Got up, walked around, without interest of finishing the story
      • Lost interest when the child told the researcher he/she was done reading the book.
2. Children’s narrative retell completeness and complexity was determined after transcribing the child’s narrative retell of the story. First, story grammar analysis and story structure level analysis were conducted. Second, the story cohesion was observed and propositional analyses were conducted to observe completeness of story.

a. Story grammar elements: this analysis is designed to examine the overall thematic organization in terms of causal and temporal relationship for fictional stories (Hughes, McGillivray & Schmidek, 1977). Organization was assessed by completing a story grammar analysis. In other words, the story grammar analysis was used to determine the overall components used in this study. Hughes, McGillivray & Schmidek (1977) provided a list with the eight common parts of a story grammar (see Appendix B).

b. Story structure level: an analysis that can provide information on how children develop their narratives, and can allow for observation of how they move from simple descriptive sequences, or additive chains, toward more elaborated and complete episode structures. Kazdin (1982) provides a list of the story structure levels (see Appendix C).

c. Cohesion: Is the linguistic feature that helps a listener understand a unit of discourse and judge its effectiveness as a narrative (Hughes, McGillivray & Schmidek, 1977). Cohesion analysis was used to determine the organization at a more global level. In 1976, Halliday and Hasa identified five categories of cohesive markers in English (see Appendix D).

d. Propositional analysis: For the analysis, the clinician counted the total number of propositions in each of the e-books and then divided the number provided in the story retells by the number the number of propositions originally counted in each e-book. The
propositions were determined by identifying the main points and ideas in each individual story as explained by Boudreau (2007).

3. A questionnaire was administered to the parents or caregivers at the beginning, during, and at the end of the study to assess their perceptions regarding their child’s attitudes toward the electronic books (see Appendix E for the survey).

3.6 E-book selection

E-books were downloaded onto the iPAD 2gen from the e-book selection of the Apple server. Eight highly interactive and eight minimally interactive e-books were selected for this study. E-books were downloaded from the first 1500 top hit list from Apple’s online server on May 23, 2012. Additionally, other books were bought for use in the study with price not exceeding 5 U.S. dollars. All books were age appropriate and ranged from 8-30 pages in length. E-books were considered to be highly interactive if they contained more than four of the following features: read aloud, highlighted text, sound effects, interactive (i.e. touch animation, touch quests, touch music activation), animations, games, dictionary, and automatic page turn. Minimally interactive e-books contained 4 or less of the previously mentioned features. Appendix A provides a list of the e-books utilized in this study.

3.7 Procedures:

Upon entering the therapy room, the caregiver and child were asked to sit. The child sat in the center of the therapy room and the parent was seated across the room. Parents were previously instructed that their interaction should be kept to a minimum; parents should only provide positive comments on reading behavior when necessary (e.g. that looks like a fun book to read, you read it all!). Before beginning to read the e-books, the researcher provided a tutorial
on how to use the device for each specific book. Then, the clinician provided the overall instructions.

“I want you to read these books then you are going to tell me and your Mommy/Daddy the story.”

The child was allowed to start reading the book. When the child appeared to have finished interacting/reading the book he/she was asked: “Are you done reading the book?” If the child responded “Yes” the child was then asked to retell the story. Parents were asked to approach the table/reading area, for the child to begin the retell. If the child responded “No”, the child was given more time to continue interacting with the e-book. After a few more minutes, he/she was asked to retell the story to the researcher and parent.

Each participant read two e-book stories per session from the iPAD and retold each story after reading each book. During the retell, the researcher encouraged the child to begin the story retell. The researcher used open-ended questions to urge the child to continue the retell when necessary. During baseline, the clinician read a story to the child straight from the conventional paper book. The clinician read each book with no deviations from the text.

3.8 Proposed Statistical Analysis:

As is customary with Single-Subject Designs, the evaluations of results were not based on any statistical analysis but rather on visual examination of data. Visual inspection examined the percentage of book read, percentage of story grammar elements produced, percentage of propositions produced, and the number of cohesion elements used.

Additionally, effect size was determined by calculating the percentage of non-overlapping data (PND) (Scruggs, 1987). Percentage of non-overlapping data (PND) was
calculated by adding data points higher than baseline and then dividing them by the total number of treatment sessions. According to Scruggs and his colleagues (1987) a score of 90% or higher is considered to be highly effective, a score of 70-90%, moderately effective, a score of 50-70%, minimally effective, and a score less than 50%, ineffective. Computing effect size will allow an observation of the treatment efficacy at the end for both treatments.

3.9 Inter-rater reliability:

Inter-rater reliability was conducted by having a fellow graduate student complete transcription and scoring of 20 percent of the overall data. For appropriate inter-rater reliability, the second rater completed three hours of training. The training consisted of practice transcription of audio and video files until 95% inter-rater transcription accuracy was achieved. The scoring of all five analysis areas (i.e. percentage of book read, story grammar elements, story structure level, cohesive markers, and propositions) consisted of practice scoring after reading the specific success/failure criteria for each analysis completed.

The second rater completed practice scoring of stories for all analysis areas until 90% or higher inter-rater reliability was achieved and felt comfortable with the transcription, guidelines, and scoring methodology. Inter-rater reliability was calculated by using the percentage of agreement. The percentage of agreement was used since it gives a rough estimate of reliability and it is the most popular method of computing a consensus estimate of inter-rater reliability (Multon, 2012). The data collected resulted in inter-rater reliability of 92% for the utterance segmentation and 96% for the transcribing. The interrater reliability resulted in 100% percentage of agreement for Percentage of book read, 93% for cohesive markers, 81% for the story grammar elements, 100% for the story structure level, and 100% for number of propositions.
Chapter 4

Results:

4.1 Percentage of book read

The percentage of book read (PBR) began when the child started reading the page and stopped when the child got up to walk around, lost interest by telling the researcher he/she was done reading the book, or when the child completed the book and told the researcher he/she was done reading the book. The PBR was calculated by dividing the last page the child said he/she was on by the total number of pages the e-book contained. The research found that the children remained on task just as well as they had done during baseline performance. For all children (A, B, and C) performances remained constant and demonstrated neither gain nor loss in PBR. Figure 1.1 shows the percentage of book read for each child during baseline and treatment session (highly interactive and minimally interactive). Even though there was no performance gain due to max score during baseline performance, there is no performance loss during treatment sessions. Baseline performance for children A, B, and C remained constant at 100% PBR throughout the three sessions and maintained performance during all eight treatment sessions. Effect size for the three children was not calculated due to mastery at baseline performance.
Figure 1.1 *Percentage of book read by child A, B, and C.*

Children A, B, and C baseline performance (i.e. 100% time on task) and treatment performance as they read the highly and minimally interactive e-books. Effect size was not calculated due to mastery (100% of book read) of performance at baseline and maintenance of performance throughout the treatment period.
4.2 Story grammar elements

There was no clear pattern of improvement or advantage for the story grammar elements when reading highly or minimally interactive e-books. The overall number of story grammar elements varied by child and book read. Child A demonstrated an effect size of 12.5% (ineffective), for both the minimally interactive and highly interactive e-books. Child B demonstrated minimally effective scores (50%) for the minimally interactive e-book and ineffective scores (25%) for the highly interactive e-book. Child C demonstrated an equally ineffective effect size of 37.5% for both highly and minimally interactive e-books. Figure 1.2 shows the overall story grammar elements produced by each child during each of their baseline and treatment sessions. Thematic organization in terms of causal and temporal relationship of the fictional stories demonstrated effect sizes that only reached a max score of minimally effective for child B when reading minimally interactive e-books. Although the overall effect sizes range from ineffective to minimally effective, visual inspection reveals a performance incline for children C after treatment session 5 (minimally interactive e-book) and treatment session 6 (highly interactive e-book). When we look at Table 1.1 we are able to observe how the children failed to achieve highly and moderately effective scores for both e-book types. The figure shows how only child B had a minimal effect size after reading the minimally interactive e-book. All other books for all three children were ineffective (>50%).
Figure 1.2 *Number of story grammar elements child A, B, and C produced.*

The overall number of story grammar elements varied by child and book. Effect size of minimally interactive e-books was 12.5% for child A, 50% for child B, and 37.5% for child C. The effect size of highly interactive e-books was for 12.5% child A, 25% for child B, and 37.5% for child C. According to Scruggs’s (1987) interpretation of effect sizes, minimally interactive e-books ranged from ineffective (scores less than 50%) to minimally effective (scores from 50%-70%) and the highly interactive e-books achieved ineffective scores (less than 50%).
4.3 Story structure level

Story structure level was assessed by looking for major story parts to determine if the children developed their narrative skills. This was supported by moving from simple descriptive sequences, or additive chains, to more elaborated and complex episodes. The results showed that the structure of child A maintained a variable but positive performance incline. Child A had an effect size of 62.5% (minimally effective) for the minimally interactive e-book and 37.5% (ineffective) for the highly interactive e-book. Children B and C demonstrated ineffective scores (0%) for both the highly and minimally interactive e-book. Figure 1.3 fails to show a vibrant performance incline. In addition, Table 1.1 shows how only the story structure level for child A demonstrated minimal effect size after reading the minimally interactive e-books. All other books, both highly and minimally interactive, for all three children demonstrated ineffective scores (<50).
Story structure level of minimally interactive e-books. The effect size of minimally interactive e-books was 62.5% for child A, 0 for child B, and 0 for child C. The effect size of highly interactive e-books was 37.5 for child A, 0 for child B, and 0 for child C. According to Scruggs’s (1987) interpretation of effect sizes, minimally interactive e-book’s ranged from ineffective (scores < 50%) to minimally effective (scores from 50% to 70%) and the effect size of the highly interactive e-books was ineffective (< 50%).
4.4 Cohesive markers

The cohesive marker analysis determined how well a listener can understand a unit of discourse and judge the effectiveness of the narrative (i.e. story organization at a global level). The effect size of child A ranged from 25% (ineffective) for the minimally interactive and 50% (minimally effective) for the highly interactive. The effect size for child B maintained ineffective scores for both minimally interactive (25%) and highly interactive e-books (12.5%). However, child C demonstrated moderately effective size (87.5%) scores for the highly interactive e-books as compared to only 12.5% (ineffective) for the minimally interactive e-books. Figure 1.4 shows a performance incline for child A and C when providing story retells for the highly interactive e-books, however, no visible incline was seen for child B. Table 1.1 also shows how the effect sizes failed to achieve highly and moderately effective scores. It is clearly observable from the figure that only child A and C had noteworthy effect sizes. The figure shows how Child A had a minimal effect size after reading the highly interactive e-books and that child C had a moderate effect size after reading the highly interactive e-books. It was also observed that the child A and C said they had previously read the highly interactive story of 8/13/2014.
Cohesion markers produced by child A, B, and C. The effect size of minimally interactive e-books was 25% for child A, 25 for child B, and 12.5 for child C. The effect size of highly interactive e-books was 50 for child A, 12.5 for child B, and 87.5 for child C. According to Scruggs’s (1987) interpretation of the effect sizes, minimally interactive e-book’s achieved ineffective scores (< 50%) and the highly interactive e-books ranged from ineffective (< 50%) to moderately effective (scores of 70% to 90%).
4.5 Propositions

The propositional analysis consisted of identifying all the main points and ideas in each story. All the propositions were then calculated by percent of propositions in each story. The propositional analysis revealed the greatest change when compared to all other analysis. Figure 1.5 shows clearly that children A and B had ineffective effect sizes for both highly and minimally interactive e-books. Child A had an effect size of 25% for the highly interactive e-books and 12.5% for the minimally interactive e-books. Child B had an effect size of 25% for the minimally interactive e-books and 0% for the highly interactive e-books, however, child C demonstrated an effect size of minimally effective (50%) for the highly interactive e-books to moderately effective for the (75%) minimally interactive e-books. Table 1.1 shows how Child C demonstrated moderate and minimal gains from the e-books. Child C had gains from both e-book types compared to the other two children who failed to achieve noteworthy effect sizes. Children A and B had ineffective scores after reading both the minimally and highly interactive e-books. Child C demonstrated a minimal effect size for the highly interactive e-books and a moderate effect size for the minimally interactive e-books.
Figure 1.5  *Percentage of story propositions produced by child A, B, and C during story retells.*

Percentage of story propositions produced by e-book and child. The effect size of minimally interactive e-books was 25% for child A, 25 for child B, and 75 for child C. The effect size of highly interactive e-books was 12.5 for child A, 0 for child B, and 50 for child C. According to Scruggs’s (1987) interpretation of the effect sizes, minimally interactive e-books ranged from ineffective (scores < 50%) to moderately effective (scores of 70% to 90%) and the effect size of the highly interactive e-books was ineffective (< 50%).
Table 1.1 *Effect sizes of all behaviors for child A, B, and C*

Effect size of highly and minimally interactive e-books of each treatment for each behavior measured. Highly effective is represented by the color green, a moderately effective is represented by the color blue, minimally effective is represented by the color yellow, and ineffective is represented by the color white.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Child A</th>
<th>Child B</th>
<th>Child C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimally Interactive</td>
<td>Highly Interactive</td>
<td>Minimally Interactive</td>
</tr>
<tr>
<td><em>Story grammar elements</em></td>
<td>12.5%</td>
<td>12.5%</td>
<td>50%</td>
</tr>
<tr>
<td><em>Story structure level</em></td>
<td>62.5%</td>
<td>37.5%</td>
<td>0%</td>
</tr>
<tr>
<td><em>Cohesive markers</em></td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td><em>Propositions</em></td>
<td>12.5%</td>
<td>25%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Effect Size (Color coded) | Highly effective (<90%) | Moderately effective (70-90%) | Minimally effective (50-70%) | Ineffective (>50%)
4.6 Parental reports:

Parent opinions varied according to each book. The parent of Child A answered that her child preferred the highly interactive e-books more throughout the whole length of the study. Her most common explanation appeared to be that the child enjoyed the lively features available in the e-books. Her opinion was based on the fact that her child “requested to re-read books” that had active games and lively features. The parent stated on the questionnaire that she considered an e-book entertaining because of the incorporated animations, games, and sound effects. According to the parent, her child liked the read aloud, sound effects, animations, and games. Her conclusion was that her daughter enjoyed interactive e-books (both minimally interactive and highly interactive) better than print books.

The parent of Child B had similar thoughts to the parent of Child A. She thought her child enjoyed e-books better than print books due to the games, animations, highlighted text, automatic page turn, interactivity, read aloud, and sound effects. Her questionnaire stated that the features within the book helped her child stay on task and provide additional entertainment to the already beneficial habit of reading. Parental responses of books the child liked started with preference for highly interactive e-books for the first two sessions but switched preference to minimally interactive e-books for the remaining six treatment sessions. Her explanation mentioned that she noticed better understandability with the minimally interactive when producing the narrative retells.

The parent of child C supported the other two parents’ ideas regarding their views on e-books. Although this parent produced mixed results during her daily treatment questionnaires
(i.e. three sessions she rated higher the highly interactive and five sessions she rated higher the minimally interactive e-books), she wrote on her final questionnaire that her daughter appeared to like minimally interactive e-books more. Additionally, she stated that it was apparent that her child was interested in both e-books. The parent's final comments included that her daughter loved the e-books and continuously requested to read them again when at home. Another outstanding comment included that parent C noticed she considers that reading experiences are beneficial for the child regardless of presentation or format. Parent of child B stated she had previously read e-books with their daughter; while parents of children A and C had not.
Chapter 5

Discussion:

In this study I investigated the difference between using highly interactive versus minimally interactive e-books on percentage of book read, story grammar elements, story structure level, cohesive markers, and propositions produced. The following discussion is an attempt to answer the following research questions: 1) Is there a difference between children’s percentage of book read when reading minimally interactive vs. highly interactive e-books? 2) Will children produce better richer story retells after reading the minimally interactive e-books compared to the highly interactive e-books? 3) Is there a difference of parent’s perception of their children’s interactions with minimally vs. highly interactive e-books?

1. Is there a difference between children’s percentage of book read when reading minimally interactive vs. highly interactive e-books?

There was no difference in terms of the percentage of book read, child performance remained constant and demonstrated neither decline nor gain as a result of reading either e-book. All three children maintained baseline performance when reading highly and minimally interactive e-books. There was no difference due to possible ceiling effect in which the behavior has reached a maximum effect (100%), so that the introduction of another treatment (i.e. highly or minimally interactive e-books) does not increase its effectiveness. Percentage of book read remained at 100% throughout the eight baseline and treatment sessions for all three children. When
comparing treatment to baseline performance, reading minimally and highly interactive e-books can be equally effective as reading print books (baseline performance).

Results of 100% book read for both the highly and minimally interactive e-books can possibly be associated to variables like previous shared reading experience. Initial parental reports supported that all three children had previous experience with shared reading which could have supported the baseline results of 100% book read. However, variables like interactive animations within the e-books may not be disregarded as possible contributors to the child maintaining performance. Research based on longer and more complex e-books can supplement and answer whether the quantity of e-book features are attributable to the percentage of book read. Based on the research results, there is no difference when reading highly vs. minimally interactive e-books; this did not provide support for my first hypothesis.

2. Will children produce better richer story retells after reading the minimally interactive e-books compared to the highly interactive e-books?

Through visual inspection of the data there is not a clear relationship between treatments and the dependent measures. Visual inspection of the results show what appears to be a plateau effect for the story grammar elements and story structure level. However, the cohesive makers appear to show better results for the highly interactive (i.e. child A and C) and better Proposition results (Child B and C) for the minimally interactive e-books. Figure 1.6 also shows a balanced result since when looking at the three participants overall, both the highly interactive e-books and minimally interactive e-books produced 1 moderately effective and 2 minimally effective scores.

When looking more closely at the minimally interactive e-books, child A demonstrated better effect sizes for story structure level (62.5% minimally interactive e-book vs. 37.5% for
highly interactive e-book) and for propositions produced (25% for minimally interactive e-book vs. 12.5% for highly interactive e-book). Additionally, child A attained equal effect sizes for story grammar elements (minimally and highly interactive, 12.5%) and also an advantage for highly interactive in terms of cohesive elements produced (25% effect size for minimally interactive e-books vs. 50% for highly interactive e-books). The effect sizes for child A were not as drastic and reaching only moderate effect sizes for the story structure level while reading minimally interactive e-books. Story grammar elements, cohesive markers, and propositional analyses for both highly and minimally interactive e-books revealed an ineffective response when compared to the baseline performance.

Therefore, child A demonstrated slight (minimally effective) benefit from both the highly and the minimally interactive e-books. Child A demonstrated better story structure when reading the minimally interactive e-books but produced more cohesive markers when reading the highly interactive e-books. Due to the mixed gains it cannot be argued that either e-book was more effective for child A.

While reading minimally interactive e-books child B demonstrated larger effect sizes for the story grammar elements (50% minimally interactive vs. 25% highly interactive), cohesive markers (25% minimally interactive vs. 12.5% highly interactive), and propositions produced (25% minimally interactive vs. 0% highly interactive) indicating that minimally interactive e-books enabled the child to produce more intricate story retells. Figure 1.6 revealed that the effect is slightly larger for the minimally interactive e-books. The only analysis in which the child performed equally for both was the story structure level analysis (0%) indicating that both remained at the same structure and caused no effect in that area. Although the effect size ranged from ineffective to minimally effective and visual inspection fails to provide a clear advantage
for either treatment, child’s B effect sizes tend to slightly favor the minimally interactive e-books.

During narrative retells of minimally interactive e-books, child C only showed a larger effect size for the propositions produced (75% minimally interactive vs. 50% highly interactive). Child C demonstrated equal effect sizes for story grammar elements (37% for both highly and minimally interactive e-books) and story structure level (0% for both highly and minimally interactive e-books). On the contrary, cohesive markers indicated that highly interactive e-books were more effective than minimally interactive with 12.5% vs. 87.5% respectively. Additionally, when conducting visual inspection of the data, we observed a continuous positive trend for the story grammar and propositions, however, further treatment sessions are required to determine if the positive trends would have continued, stabilized, or declined. In summary, the visual analysis and effect size of child C indicate slight benefits for both minimally and highly interactive e-books but fail to provide a clear distinction or advantage for either book type.

Children A, B, and C provide support to previous studies suggesting the effectiveness of features in stimulating children’s literary skill development (Korat, 2009; Korat & Shamir, 2007; de Jong & Bus, 2003) as the children’s performance improved when reading minimally and highly interactive e-books. My results fail to support previous research by Chiong, Ree, Takeuchi, and Erickson (2012) in that children produce weaker retells, recalling fewer narrative details (i.e. propositions), since their performance remained stable and in some instances demonstrated slight gains from both types of books.

Due to the variability in results (from ineffective to moderately effective), the data failed so provide strong support for e-books effectiveness over print books and opens the possibility to support research by Akamatsu and Andrews (1993) who argue that other factors like adult
scaffolding are major contributors in the development of literacy. In sum, the results did not provide a clear advantage for either e-book type and only provided slight and minimal support for e-book effectiveness.

Visual inspection of the data indicated that it is difficult to make a clear distinction, however, effect size provides a clue to what features types provide better narrative retells. Results in this study showed that all three children had variable gains which suggest wide variation among children and their ages. The mixed results with slight gains fail to provide supporting evidence for the second hypothesis. The results provide variable effect sizes for both e-book types that ranged from minimally effective (<50%) to moderately effective (scores of 70% to 90%), therefore, the data does not support the second hypothesis: that reading minimally interactive e-books provide better narrative retells than those provided when reading highly interactive e-books.

3. Is there a difference of parent’s perception of their children’s interactions with minimally vs. highly interactive e-books?

Parent perception towards e-books did vary in some cases but showed commonalities in the end. I observed the parental perception through a daily parental questionnaire when they described their feelings regarding their child’s attitude toward the electronic books. A difference in perceptions toward minimally and highly interactive e-books was observed as 2 out of the 3 parents agreed on their preference for minimally interactive e-books. The parents of children B and C concluded that they thought their children enjoyed minimally interactive e-books more due to reasons like their child’s attitude towards the minimally interactive e-books, parent’s perception of their child’s narrative retells when reading minimally interactive e-books, and even parent’s perception of child’s interactivity with the books. The parents of children B and C also
shared that their children preferred electronic books over print books due to their lively features (e.g. games, animations, highlighted text, automatic page turn, interactivity, read aloud, and sound effects). Although the parents of children B and C preferred minimally interactive e-books, the parent of child A answered that the child preferred the highly interactive e-books more throughout the whole length of the study due to the lively features (i.e. games, touch activation, sound effects, and even animation) available in the books. This parent noticed her child played more with the books that contained more interactive features (e.g. games, animations, sound effects, touch activation). Both parents showed a preference for minimally interactive e-books because on some books highly interactive e-books appeared to “distract” and “sidetrack” their children. Additionally, the parent concluded that their child preferred e-books over print books. The results of this study concurs with Almaguer and Pena (2010) that e-books offer benefits by increasing the child’s engagement and participation in technologically integrated programs, therefore, the study demonstrated that parents believed that their children had a preference of e-books over print books and of minimally interactive e-books over highly interactive e-books.

I found that two of the three parents rate minimally interactive e-books more beneficial and more interesting to their children, thus providing support to my third hypothesis. Parents supported this because minimally interactive e-books have features, which in some cases, can be turned on and off. According to the parents, the some of the features (e.g. dictionary, highlighted text, and sound effects) helped the child stay on task while providing additional support to the story theme. The results also demonstrate that minimally interactive e-books were seen as positive by the parents. Parents rated or considered minimally interactive e-books as entertaining and good because some contained variations of games, audio, highlighted text, read aloud,
animation, among others. It is likely parents would be inclined to purchase e-books and e-readers like the ones they were shown because of their child’s positive engagement with them. These results confirm Karat’s study (2007) in which he found several features benefited children as well as increased good parental perceptions regarding highly interactive e-books.

5.1 Limitations

This study was limited, as are all single-subject designs, and can have the weaknesses of rapid alternating treatment designs. Single subject designs are limited since, due to the small number of participants, the results cannot be generalized to the entire population; however, the results can serve as a platform for future research. The treatment limitations also include a possible treatment interference/carry over effect, and may present difficulty in analyzing data when overlap is present. Due to the great number of features and their variability (e.g. read aloud, highlighted text, sound effects, interactive, animations, games, dictionary, and automatic page turn, etc.), it is difficult to say with certainty which of these or which combinations are the most effective.

5.2 Suggestions for future research

The study allowed comparison of children’s narrative retells and percentage of book read when reading e-books (highly interactive vs. minimally interactive). The data also allowed comparison of baseline (print books) performance compared to e-books, however, further analysis and investigations are needed to confirm these trends. For example, baseline data can be incorporated with parental scaffolding to compare effectiveness of e-books versus print books with parental scaffolding. Additional analysis could incorporate quantitative analysis to reveal if
there is a statistically significant difference between baseline and treatment sessions ultimately shedding some light on the efficacy of e-book features.

Micro analysis or a more detailed analysis of the interaction with the book, like a micro analysis of touch patterns or even eye gaze, could have determined which features specifically entertained or distracted the child. Once those specific variables are identified, further research can undertake an analysis of what quantities or what combinations provide the best effects. In order to provide a more extensive explanation of the patterns observed more microanalyses are needed to truly make cause and effect relationships. Finally, due to the number of participants included the research cannot generalize the results to the general population. In order to provide data that can generalize to the population the research requires systematic replication that look at different variables (e.g. different populations, treatment length, etc.) and replication with designs that incorporate larger number of participants.

5.3 Clinical implications

E-books can be valuable tools utilized during early reading experiences to aid in literacy development. Minimally interactive e-books, combined with other early intervention techniques and programs, can possibly provide greater benefits for children. The use of technology with children can possibly help with literacy development. It is the responsibility of those clinicians to use the materials that have proven to be effective and that will provide the greatest change in order to provide the best services available. The need for e-book efficacy studies is important due to its diversity and growing availability.
Summary:

E-books research has demonstrated mixed results regarding its use and effectiveness. This research has supported independent e-book reading by children can be a positive learning experience. Other researchers (Laboo & Reinking, 1999) have found e-book readings can provide an approach to learning, comparable to the traditional drill activities. The effectiveness of each device may vary based on the qualities or features presented to the reader, therefore, how well an e-book supports a child’s understanding and what percentage of the book he reads can depend on the quality features that relate directly to the storyline (Shamir & Korat 2007).

Providing children with the appropriate e-books (e.g. written text together with synchronized highlighted text and read aloud) seems to support the child’s focus and understanding of the story. This study concluded that it is difficult to make a clear distinction for either type of e-book but a detailed observation of the effect size provides some clues toward minimally interactive e-books having a slightly better retells. Both e-books provided weak results that ranged from ineffective to moderately effective. Further research is still needed to be certain which specific features or combinations are the most beneficial to the reader.

This study also showed that children can benefit from e-books as much as traditional print. Children were able to provide narrative retells with the same quality, if not slightly higher, when reading interactive e-books as those provided when they read print books. No difference in percentage of book read was observed, probably due to a ceiling effect. Reading highly interactive and minimally interactive e-books showed variable results, however results tended to favor minimally interactive e-books. Although results were variable, ranging from ineffective to moderately effective, they failed to support the second hypothesis as both retells demonstrated slight gains by children A and B after reading the minimally interactive e-books compared to
those produced when reading the highly interactive e-books. For example, Child C produced mixed results, as two analyses were equally as effective, one favoring towards the minimally interactive e-books and the other, the highly interactive e-books.

All three parents had positive attitudes toward e-books at the end of the study. Two out of the three parents concluded that their children preferred electronic books over print books due to their lively features (e.g. games, animations, highlighted text, automatic page turn, interactivity, read aloud, and sound effects) and to apparent distraction in the highly interactive e-books. Similarly to other studies (Snow et al., 1998; Korat 2010) it may be suggested that e-books which incorporate specific features such as questions, animations, highlighted text, and audio tracks, have the capacity to keep the child entertained and help with child’s early literacy during vulnerable stages. Further research can focus on longer stories, more complex stories, and specific analysis of longer e-books. It is important to understand the limitations of this study, and caution should be used when interpreting the results. Replication with a wider range of books should be carried out to solidify the findings as well as with a more finite classes of e-books. Further studies should also take into consideration that this study is based on single subject design and is not representative of the whole population; therefore, a randomly assigned group study should be conducted to generalize results to the population level.

It should be also noted that the young children we studied were able to use the devices without much assistance. I do not suggest that technology alone can prompt children’s literacy, and adult support and mediation is an important factor to us. Nonetheless, it is a possibility that well-designed e-books when carefully chosen by parents can provide support as well as provide a non-traditional enjoyable learning experience.
References


## Appendix A: Book description

<table>
<thead>
<tr>
<th>Book Title</th>
<th>Program</th>
<th>Features:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Read aloud</td>
<td>Highlighted text</td>
</tr>
<tr>
<td>Clifford's good deeds</td>
<td>Storia</td>
<td>✓</td>
</tr>
<tr>
<td>I love school</td>
<td>Storia</td>
<td>✓</td>
</tr>
<tr>
<td>The elephant's child</td>
<td>Absolutist</td>
<td>✓</td>
</tr>
<tr>
<td>The Bremen town musicians</td>
<td>Absolutist</td>
<td>✓</td>
</tr>
<tr>
<td>The selfish giant</td>
<td>Tab tale</td>
<td>✓</td>
</tr>
<tr>
<td>Three little pigs</td>
<td>Absolutist</td>
<td>✓</td>
</tr>
<tr>
<td>Astrid &amp; Siri</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Fox and Crow</td>
<td>Tab tale</td>
<td>✓</td>
</tr>
<tr>
<td>The crow and the pitcher</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>The fox and the grapes</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>The ant and the chrysalis</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>The tortoise and the hare</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>The country and city mice</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>The lion and the mouse</td>
<td>Wild fables</td>
<td>✓</td>
</tr>
<tr>
<td>Curious Victor</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Too many bananas</td>
<td>Meme tales</td>
<td>✓</td>
</tr>
</tbody>
</table>

**E-book type (Color represented in table)**

<table>
<thead>
<tr>
<th>Highly interactive</th>
<th>Minimally interactive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B: Story grammar elements

Hughes, McGillivray & Schmidek (1977) eight common parts of a story grammar:

<table>
<thead>
<tr>
<th>Story grammar element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Reference to time and place</td>
</tr>
<tr>
<td>Initiating event or problem</td>
<td>includes a problem that requires a solution, even that set the story in motion.</td>
</tr>
<tr>
<td>Internal response</td>
<td>Statement of how a character feels in response to the initiating event.</td>
</tr>
<tr>
<td>Internal plan</td>
<td>A statement of an idea that might fix the problem</td>
</tr>
<tr>
<td>Attempt</td>
<td>Some action taken by the main character to solve the problem</td>
</tr>
<tr>
<td>Consequence</td>
<td>The event(s) following the attempt</td>
</tr>
<tr>
<td>Resolution or reaction,</td>
<td>The final state or situation triggered by the initiating event</td>
</tr>
<tr>
<td>Ending</td>
<td>A sentence or phrase that clearly states that the story is over.</td>
</tr>
</tbody>
</table>
Appendix C: Story structure level

Kazdin A.E. (1982): story structure levels with approximate developmental age and description

<table>
<thead>
<tr>
<th>STORY STRUCTURE LEVEL</th>
<th>Developmental Age</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Descriptive sequence</td>
<td>Preschool</td>
<td>Describes character(s), surroundings, and habitual actions with no causal relations.</td>
</tr>
<tr>
<td>2. Action sequence</td>
<td>Preschool</td>
<td>Actions are chronologically but not causally ordered.</td>
</tr>
<tr>
<td>3. Reactive sequence</td>
<td>Preschool</td>
<td>Includes actions, each of which automatically causes other actions, but no planning involved; no clear goal-directed behavior.</td>
</tr>
<tr>
<td>4. Abbreviated Episode</td>
<td>About 6 years</td>
<td>Provides aims but does not explicitly state the plan; planning must be inferred.</td>
</tr>
<tr>
<td>5a. Incomplete Episode</td>
<td>Around 7-8 years</td>
<td>States planning, but one of three elements (IE, A, or C) is missing.</td>
</tr>
<tr>
<td>5b. Complete Episode</td>
<td>Around 7-8 years</td>
<td>Aims and plans; reflects evidence of planning in attempt to reach goal; has at least IE, A, and consequence uses words like decided to</td>
</tr>
<tr>
<td>5c. Multiple Episodes</td>
<td>Around 7-8 years</td>
<td>Chain of reactive sequences or abbreviated episodes, or a combination of complete and incomplete episodes</td>
</tr>
<tr>
<td>6. Complex Episode</td>
<td>Around 11 years</td>
<td>…</td>
</tr>
<tr>
<td>7a. Embedded Episode</td>
<td>Around 11 years</td>
<td>…</td>
</tr>
<tr>
<td>7b. Interactive Episode</td>
<td>Beyond 11-12</td>
<td>…</td>
</tr>
</tbody>
</table>
**Appendix D: Cohesive elements**

<table>
<thead>
<tr>
<th>Category: Reference</th>
<th>Types:</th>
<th>Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal reference:</td>
<td>I, you, us, he, him, she, her, they, them, their, our, mine, its</td>
<td></td>
</tr>
<tr>
<td>Demonstrative reference:</td>
<td>The, this, that, these, those, here, now, then</td>
<td></td>
</tr>
<tr>
<td>Comparative reference:</td>
<td>another, same, different, else, more, so much, second, otherwise</td>
<td></td>
</tr>
</tbody>
</table>

**Conjunctive**

Additive: and, also, nor, or, furthermore, besides, incidentally, that is, likewise, for instance

Adversative: but, however, yet, though, only except, in fact, actually, instead, anyhow, despite

**Conjunctive cont.**

Causal: so, because, as result of, consequently

Temporal: then, next, after that, finally, soon, up to now, from now on

Continuative: well, surely, now, of course, still, anyway

**Lexical**

- Repetition
- Synonymy
- Autonymy
- Part-whole

**Superordinate-subordinate**
Appendix E: Daily and final questionnaires

Parental Survey:

Daily survey:

Which book do you think your kid liked more?
1st book ______________________ 2nd book____________________________

Which book do you think will keep your child more engaged?
1st book_____________________ 2nd Book________________________

Do you think your kid liked one book over the other? If yes, explain why.
Yes No

________________________________________________________________________

Final Survey:

Which books do you think your kid enjoyed the most?
Highly interactive____________________ Minimally interactive________________

Which book do you think could be more beneficial for your kid?
Paper books____________________
Minimally interactive e-books________
Highly interactive e-books__________

Which one would your kid like more?
Paper books____________________
Minimally interactive e-books________
Highly interactive e-books__________

What do you think is important within a book?
________________________________________________________________________

What features do you think your kids like more? Circle the ones you think your kid liked.
Read aloud
Highlighted text
Sound effects (ex. Animal noises)
Touch interactive (ex. touch to influence story)
Animations (ex. Characters moving)
Games
Dictionary
Automatic page turn
Other____________________

If you read this type of books before what features do you think they liked?
  Read aloud
  Highlighted text
  Sound effects (ex. Animal noises)
  Touch interactive (ex. touch to influence story)
  Animations (ex. Characters moving)
Games
Dictionary
Automatic page turn
Other____________________

Do you think your kids have a preference of electronic books (e-books) or paper books? Please explain.
Yes  No
Jose Humberto Carrasco was born in El Paso, Texas, on 03 November 1988, the son of Jose Humberto Carrasco and Ana Rosa Olivas. After completing his work at Del Valle High School, he decided to study at The University of Texas at El Paso where he studied Pre-Speech language pathology for the next years. In fall 2009 he was admitted into the Graduate School at the University of Texas at El Paso for his Masters in Speech Language Pathology degree. During the following years, from 2012 through 2013, he worked as a Tutor for the Early Alert Student Initiative program (EASI) at the University of Texas at El Paso.

Permanent Address: 9450 Nottingham
El Paso, Texas 79907

This thesis was typed by Jose Humberto Carrasco.