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Using the Raz-Kids reading program to increase reading comprehension and fluency for students with LD

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USING THE RAZ-KIDS READING PROGRAM TO INCREASE READING COMPREHENSION AND FLUENCY FOR STUDENTS WITH LD

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Dedication

I would like to dedicate this manuscript to my daughter, Ella Sophia Marchand

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I would like to thank Dr. Xin for advising me throughout my research seminar. I would also like to thank my co-teacher Lauren Smith, as well as my classroom assistants Linda Pino and Christina Ranson for helping to implement my research intervention as part of our classroom routine.

Abstract

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The purpose of this study was to determine whether the computer program, Raz-Kids will assist in supporting independent reading as well as increase a student's guided reading level, fluency, and comprehension. Four 1st graders with a learning disability in an inclusive classroom participated in the study. The Raz-Kids online reading program was provided individually for 15 minutes each session during the literacy intervention period, 3 times a week for 16 weeks. The Developmental Reading Assessment was given at the end of each month to evaluate student performance on a guided reading level, fluency and comprehension. A single subject design with A B phases was used in this study. The results showed participating students increased their guided reading levels and fluency. It seems that the Raz-Kids program would be beneficial as a supplement to reading instruction and small group guided reading for struggling readers.

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Chapter I

Introduction

Statement of Problems

Reading is considered to be one of the most important academic skills in schools (Gibson, Carledge, & Keyes, 2011). Being able to read is essential for students to learn other subjects. For example, students are required to read directions, word problems, and passages in textbooks when learning math, science and social studies (Gibson, Carledge, & Keyes, 2011). Students who are not successful to become independent readers will typically struggle in other academic areas, which will cause a wider achievement gap as they progress through school (Melekoglu & Wilkerson, 2013). Further, the importance of reading extends beyond schooling, literacy is necessary to function as a successful independent adult in our society. As an adult, he/she needs to be able to read notes in order to maintain a job, communicate with his/her family, and complete daily tasks. Thus, reading is listed as a primary requirement in the state's Common Core State Standards to prepare all students to be ready for higher education and career. These standards require students to retell stories with key details, read grade level texts with sufficient accuracy and fluency to support comprehension (CCCS, 2010).

Reading is a complex task which entails many skills including decoding unknown words, recognizing sight words, understanding vocabulary as well as recalling facts and events occurred in the story. According to Lacina (2006), there are five principles deemed necessary for reading instruction, such as phonemic awareness, phonics, fluency, vocabulary, and comprehension. Phonemic awareness begins at an early age. Most students entering school are already expected to know most of the alphabet letters and

their corresponding sounds. Phonics instruction focuses on individual vowel and consonant sound, and symbol correspondence to enable students to decode and encode words. Students are required to transfer these phonics skills when reading an unknown word. Fluency is the bridge between a student's ability to decode words and comprehend written text during reading. There are three elements of fluency: 1) accuracy which is the ability to decode words correctly, 2) automaticity which is the speed or ability to read words, and connected text automatically, and 3) prosody which is the rhythm and tone exhibited when reading orally. A fluent reader uses voice inflections with various pitches and tones, as well as reads through text in a fluid manner, free of errors (Thoermer & Williams, 2012). As indicated by Biemiller (2001), vocabulary words specific to lessons should be introduced to familiarize students with the subjects they are learning. As required by the CCCS (2010), students should read fluently and comprehend the text they are reading. Reading instruction should take place at a student's independent reading level (Allington, 2011).

According to the report of the National Assessment of Education Progress (2008), only one-third of students in the United States read at or above the proficient level; which means that two out of every three students are unable to read at a level proficient enough to function independently at their grade level (Allington, 2011). Students without the necessary reading skills cannot derive meaning from what they read, causing their reduced motivation in reading. They become unmotivated towards all activities involving reading and writing (Melekoglu & Wilkerson, 2013). Two thirds of children entering kindergarten already know the names of the alphabet letters, and one third of these children know the consonant sounds. The one third that does not know the letters

are most likely to become struggling readers (Allington, 2011). The expectations of students entering school has increased over the years, making it increasingly difficult for those not receiving literacy activities at home, as well as those that are developmentally delayed or have learning disabilities.

Students with learning disabilities (LD) have difficulty in reading, due to their poor cognitive skills, task avoidance, and lack of phonological awareness. It is found that these students typically spend less time reading independently (Eklund, Torppa, & Lyytinen, 2013). Limited time spent for reading books at their independent level will hinder their growth to become successful readers. Students with LD often experience social discomfort when struggling in reading contexts due to embarrassment, leading to a reduced motivation in reading (Oakley & Jay, 2008). Their lack of motivation at times causes them to avoid participation in class and small group activities in reading, while this missing engagement in the learning process will hinder these students from the instruction. It is found that acquisition of reading skills and comprehension has a direct impact on one's reading skills (Kotaman, 2013). Students with LD in upper elementary and high school often read below the basic level, causing them to be challenged by the demands of their grade levels (Melekoglu & Wilkerson, 2013). According to Hudson, Lane, & Pullen (2005), reading texts at their independent level can benefit these students enhancing fluency, comprehension, and positive attitudes toward reading. Incorporating digital texts in reading instruction can increase students' motivation to read and assist in increased reading fluency (Thoermer & Williams, 2012). Shared reading provides students with the opportunity to listen to different texts, which also can assist in increasing reading motivation (Thoermer & Williams, 2012).

Learning to become a successful independent reader begins much earlier than the time a child starts schooling. It is found that children that are read to regularly and have access to books at an early age would become successful independent readers (Fox, 2013). Young children learn from adults because adults model fluent reading, show expressions, make changes in their voice tones, and convey positive attitudes towards reading. With these positive attitudes they learned from adults, children will spend more time and enjoy their reading, eventually become better readers (Kotaman, 2013). It is also found that children reading books at their independent level are making greater gains in reading development than those instructed with classroom books only (Allington, 2011). It is expected that students should be reading books with 98% accuracy or better, and 90% comprehension when reading independently (Allington, 2011). Therefore, early exposure of books and practice of reading will benefit children to build their interests and become a lifelong reader.

One of the early reading practices is to use technology as a tool to support young children. There are many software packages available as well as websites developed for reading. Raz-Kids is an internet-based computer program for young readers (http://www.raz-kids.com). It was launched in 2004 as part of the Learning A-Z resources. The mission of this program is to make reading easier and more fun for children. The features of the program allow learners to listen to fluent reading, record their own reading for practice, and take a quiz at the end of their reading. It also allows teachers to set up individual accounts for each student, so that he/she is able to participate in independent reading on his/her individual level. The teacher can input individual students guided reading levels to ensure that they are reading at the most appropriate

level, with the flexibility to adjust levels at any time needed, and access to numerous books. As a motivation, points were provided as an award for listening to the story, reading the story, and taking the quiz. These points can be used to purchase items for their individual Raz Rocket that is a game feature included in the program. Learners work through each guided reading level, and their levels can be advanced as the books are read completely.

To date, technology has been used to support reading instruction in early elementary classrooms, such as electronic books, books on CD-ROM, and other software program. For example, using a web-based computer program called Living Letters with kindergarteners showed their increased phonological skills, invented spelling, and decoding skills (Van der Kooy-Hofland, Bus, & Roskos, 2011). It seems that using technology-based reading can improve students' motivation (eg. Melekoglu & Wilkerson, 2013), improve students' reading proficiency and fluency, as well as allow for independent practice of reading skills through repeated and silent reading while listening and following along with the captions demonstrated in the digital texts (Thoermer & Williams, 2012).

However, reviewing technology-assisted reading instruction, little has focused on internet- based reading programs for students with LD. Some studies, (e.g. Doty et al., 2001; Grimshaw et al., 2007; Matthew, 1997; Pearman, 2008) applied electronic books in CD-ROM format which differ from the features of internet-based programs, such as Raz-Kids, a particular reading program without animations. Schools are eager to provide instruction, and today's students are enthusiastic to use technology. Recently schools start purchasing internet-based supplemental reading programs for their students to enhance

their reading and enrich their after school activities. Raz-Kids is one of the programs used in school, while no data has been collected on learners' learning outcomes to evaluate such a program for reading instruction.

Significance of the Study

With the vast number of programs available, schools need to make a decision on purchasing the best to meet their students' needs. Unfortunately, many program reviews available are provided by the companies selling the products, while no data on students' learning outcomes to evidence the effect on their reading achievement. The purpose of this study is to examine the Raz-Kids program used for the first graders in my school. The main purpose of this study is to determine whether this program will assist in increasing guided reading level, reading fluency and comprehension for students with LD.

Statement of Purposes

The purpose of this study is to determine whether the computer program called Raz-Kids will assist in supporting independent reading as well as increase a student's guided reading level, fluency, and comprehension by evaluating student scores obtained using the Developmental Reading Assessment monthly.

Research Questions

1. Will the Raz-Kids computer program assist in the development of the independent reading skills of children with LD?
2. Will the children with LD increase their guided reading level when the Raz-Kids computer program is provided in reading instruction?

3. Will the children with LD increase their fluency scores when the Raz-Kids computer program is provided in reading instruction?
4. Will the children with LD increase their comprehension scores when the Raz-Kids computer program is provided in reading instruction?

Chapter II

Review of the Literature

Reading is the most important academic skill in school to enable students to acquire content knowledge of other subject areas. Students that do not become proficient readers in the primary grades are often unlikely to be successful in later grades (Carnine & Carnine, 2004; O'Reilly & McNamara, 2007; Roe et al. 1991; Visone, 2010). The importance of reading extends beyond schooling into adulthood, because literacy is necessary for an independent adult to function in the society.

Reading is a complex task consisting of many processes. The two areas focused on reading instruction are fluency and comprehension. Fluency is the ability to read texts with accuracy and proper expression. This is an important step to build skills for reading comprehension (Speece & Ritchey, 2005; NRP, 2000), because reading is more than simply saying the words on a page, but making connections from the text to the information for understanding which is the comprehension of the reading.

The U.S. Department of Education (2002) reported that due to a developmental delay in reading, the majority of school-aged children were identified as having learning disabilities (LD). For example, 90% of students with LD have significant difficulties in reading, especially combining the sounds of letters to decode words (Lyon, 1995; Vaughn, Levy, Coleman, & Bos, 2002). They are struggling in reading fluency, which makes difficult for them to understand the text they are reading (Manset-Williamson & Nelson, 2005). Their poor cognitive and phonological awareness skills cause them to spend more time to read, but less time to enjoy (Lyytinen et al., 2006). In addition, these students often struggle with reading comprehension, and have difficulty with

understanding of word meanings, recalling specific details, making inferences, drawing conclusions, and predicting outcomes (Denton & Vaughn, 2008; Newman, 2006). Many of these students also lack general vocabulary knowledge, which makes difficult for them to process phonological aspects of language, such as decoding unknown words and understanding word tenses (Swanson, 1999).

Therefore, teaching reading to these students is important, especially providing appropriate instructional strategies to meet their needs. It is found that shared reading, repeated reading, and technology-based instruction can be used to promote their comprehension and vocabulary development (Baker et al., 2004; Baker et al., 2006; Santoro et al., 2008; Santoro et al., 2005). This chapter reviews research about these reading strategies.

Reading Strategies for students with LD

According to the National Reading Panel (2000), instructional strategies for literacy development should focus on phonological and phonics skills, as well as encourage students to think about and understand their reading. Students should be actively engaged in the learning and encouraged to connect prior knowledge, make predictions and personal connections, and visualize before, during, and after reading (NICHD, 2000). New information should be tied to what the learner already knows for learning to occur, therefore appropriate text should be chosen according to students' ability as well as supplemental vocabulary instruction (Sperling, 2006). Learning outcomes should also be evaluated frequently to check for progress making and to drive for follow-up instruction. In addition to these strategies, it is essential that teachers create an environment in which students feel comfortable to overcome their reading difficulties

(Martin, Martin, & Carvalho, 2008). Educational success for students with LD is dependent on their emotional and psychological needs being met (Martin, Martin, & Carvalho, 2008).

Shared reading. According to the National Council of Teachers of English (1992), students benefit from telling stories, as well as being active listeners. Listening to stories enables students to be introduced to unfamiliar patterns of languages and practice new vocabulary words. Using shared reading as a teaching technique where the teacher models concepts and strategies is recommended for struggling readers (Allington, 2001). Listening to someone's fluent reading has been found to be beneficial for reading fluency and vocabulary development (Cunningham, 2005).

Kotaman's study (2013) focused on the impact of shared reading on a child's receptive vocabulary and reading attitude, including 40 preschool children and 40 parents as participants. The children's receptive vocabulary knowledge was measured using the Peabody Picture Vocabulary Test (PPVT) and their reading attitudes were measured by the Preschool Reading Attitudes Scale as pre and posttests. These children and parents were divided into a control and experimental group. Participating parents in the experimental group received training on dialogical reading techniques for two hours, in which they learned how to model and role play when reading to their children. These parents were given prepared reading passages to their children, and a survey to record how often they applied the techniques. After seven weeks, posttests were administered. Results showed statistically significant increases of scores in the Reading Attitude Scale and PPVT of the children in the experimental group comparing to those in the control.

Another study by Edwards, Santoro, Chard, Howard and Baker (2008) evaluated the effectiveness of shared reading to introduce content and to teach comprehension and vocabulary skills in a first grade classroom. A specific curriculum including text structure, text focused discussions and vocabulary was used in a general education classroom for shared reading which lasted 20 to 30 minutes per day for five days, for 15 units of study. The curriculum was designed to address the state standards including specifically selected narrative and information texts. Students were assessed in the experimental classroom and compared with students in another classroom in which the teacher used her own shared reading procedures. Results of this study showed that enhancing shared reading with comprehension strategies and text-based discussions made a positive difference in student performance. Students in the experimental classroom demonstrated higher levels of comprehension and vocabulary knowledge, and their retelling of stories included more information.

Wiseman's study (2011) focused on the implementation of interactive shared reading in a kindergarten classroom to examine if student learning was supported. The participants included 21 children, all of which were African American from low income families. The teacher selected specific literature based on the culture of the students. The shared reading was used to model oral reading, encourage discussion of texts, and to connect to students' individual reading and writing from 25 to 45 minutes each day for nine months. Data was collected four times a week through observations for eight months focusing on the teacher's instruction, students' interactions and responses to the shared readings. In addition to the observations, students' shared readings were audio-taped and their journals were reviewed as well as an interview with teachers and students.

It was found that the shared reading led to a positive classroom environment in which the students showed an increase in engagement in reading activities and academic performance (Wiseman, 2011).

It seems that shared reading in an elementary classroom can have many benefits. Students are able to experience different types of texts and learn how to become a better reader through teacher modeling. Students in a classroom with shared reading tend to have positive attitudes towards reading, as well as the knowledge of skills used to comprehend texts they are reading independently.

Repeated reading. Repeated reading refers to reading text several times with follow-up activities to assist students in reading concepts. It is noted that repeated reading in the same passage may enable children to have a deeper understanding of the story as well as vocabulary words (Philips & McNaughton, 1990).

In a case study by Ates (2013), the repeated reading technique was investigated along with feedback practices to determine if these strategies would benefit a 10 year old student with reading difficulty. In the beginning of the study, the student was tested and found to be at the frustrate level for word recognition. Data was collected using a video camera and computer software. The student's reading level was assessed before and after the intervention using narrative passages, and the teacher recorded the student's word recognition and reading miscues, as well as the number of correct words read in a minute. This intervention lasted a total of 38 hours. The student worked one on one with a researcher 2 to 3 times a week, and was given feedback on the prior session of reading before a new session started. It was found that the student showed an increase in word recognition and a decrease in miscues (Ates, 2013).

Another case study by Walker, Jolivette, and Lingo (2005) used the Great Leaps Reading Program to implement repeated reading with a 10 year old boy in 3rd grade diagnosed with a specific learning disability in reading. The students participated in this program in the resource room setting, as well as in a community environment for 20 to 25 minutes. This case study lasted from the time the student was in 3rd through 5th grade. Data was collected using the passages the student read aloud for one-minute timed sessions. It was found that the repeated reading program was effective for increasing his reading fluency. The student showed an increase in the number of correct words read in one minute (Walker, Jolivette, & Lingo, 2005).

Lo, Cooke, and Starling's study (2011) investigated repeated reading to determine the effects on participants' oral reading rates. The study included three 2nd graders for 15 to 20 minutes daily four times a week. The intervention included repeated readings of independent level passages four to five times with a preview of difficult words, unison reading, error correction, and performance feedback. Results showed improved fluency rates of all the participants (Lo, Cooke, & Starling, 2011).

It appears that repeated reading is another strategy that can be beneficial to students with LD. Students instructed with this technique have shown increases in reading fluency, as well as vocabulary development (e.g., Ates, 2013; Philips & McNaughton, 1990; Walker, Jolivette, & Lingo, 2005; Lo, Cooke, & Starling, 2011).

Technology-Based Instruction

The U.S. Census Bureau report (2009) stated that 77% of children between the ages of 3 and 17 use the Internet at home. The use of technology at home and in school is getting popular for today's children. There are many internet-based websites found to be

available for supplement materials in reading instruction. According to Leu (2002), the internet offers new tools for effective early reading instruction. It is found that young children are becoming increasingly exposed to, and interested in reading via online electronic storybooks (e-books), and this type of digital text can promote language and literacy skills such as phonological awareness, word recognition, and reading fluency (Plowman & Stephen, 2003; Valmont, 2000; Van Kleeck, 2008). Technology becomes an important part of literacy for educators to prepare their lessons and instruction for their students beyond a paperbound book (Lacina, 2006). In school, students are expected to navigate texts on a computer for their standardized assessments such as the Partnership for Assessment of Readiness for College and Careers (PARCC). Teachers are expected to expose their students to the different types of text media for these technology-based assessments. For example, an increase in the use of technology in elementary schools with computer programs for supplemental instruction, often found at a literacy center for students while the teacher is instructing a small group (Gibson, Cartledge, & Keyes, 2011). Thus, computer-assisted instruction in reading has become a new pathway to benefit students with reading difficulties, such as software programs, CD-Roms and e-books (e.g., Elbro, 1996; Jimenez et al., 2007; Saine, Lerkkanen, Ahonen, Tolvanen, & Lyytinen, 2011; val Daal & Reitsma, 2000; Wise, Ring & Olson, 1999).

Software programs. There are some software programs used in reading instruction as supplemental materials. These include Read Naturally, Living Letters, Omega-IS, and COMPHOT. A study by Gibson, Cartledge, and Keyes (2011) examined the effects of a computerized supplemental program on students' reading fluency, growth rates, and comprehension. The study included eight 1st graders that were determined to

have a potential risk for reading failure. The students participated in treatment sessions on the computer three to four times a week, for 14 to 16 weeks using the Read Naturally software program. The results showed an increase in reading fluency and comprehension for all the students. Of these, five reduced their risk status, and seven increased their reading rate (Gibson, Cartledge, & Keyes, 2011). These results appear to support the use of supplemental computer-based reading programs.

Another study by Van der Kooy-Hofland, Bus, and Roskos (2012) used the Living Letters software program with 110 at risk kindergarteners to determine the instructional effects of the program. The participants were divided into three groups. The first group received instruction using the Living Letters program, the second group used Living Books, and the final group used both programs. The kindergarteners in the first and second groups spent 10 to 15 minutes a week on the program, while those in the combined intervention group spent 15 to 30 minutes a week. All children were tested on letter knowledge, phonological skills, invented spelling, word recognition, and decoding prior to the start of the program. After 18 months of the implementation, the same test was given as a posttest to compare the difference. Results showed positive learning outcomes of participants in the Living Letters program. The kindergarteners outperformed the others in the area of decoding related skills and these gains were sustained beyond the kindergarten year.

In Falth, Gustafson, Tjus, Heimann, and Svensson's study (2013), the Omega-IS comprehension training program and the COMPHOT phonological training were used with 130, 2nd graders with reading disabilities. The participants were divided into four groups: phonological training, comprehension training, combined training, and special

instruction. They received 25 one to one sessions with a special education teacher in their specific program for 15 to 25 minutes per day. Participants in the phonological training group worked through four different activities involving word position, addition, rhyme, and segmentation. The focus of the training was on phonemes, letters, words segments, and words, and immediate feedback was provided after each activity. The participants in the comprehension training group focused on word and sentence processing. Their immediate feedback was given through speech and animations. Participants in the combined training group received both phonological and comprehension training. Those in the special instruction group received instruction with the teacher and focused on activities such as reading aloud, discussing stories, and spelling rules. At the end of the study, the participants were tested on sight word reading, word recognition, non-word reading, segment subtraction, reading comprehension, rapid automatized naming, processing speed, verbal fluency, short-term memory and working memory. The results showed that the group receiving the comprehension training improved in reading comprehension and working memory. The group receiving the phonological training showed improvement in reading comprehension and verbal fluency. The group that received both types of training showed gains in decoding, reading comprehension, and non-word reading that lasted even after a one year follow up, and was found to be the most effective.

CD-ROMs and electronic talking books. In addition to supplemental software reading programs, Electronic talking books (ETBs) are available to children. ETBs have support features, such as narrations, feedback, and sound effects. These features not only make reading easier but also attracting children to read (Glasgow, 1996; Passey, Rogers,

Machell, & McHugh, 2004). ETBs allow students to access the higher level of texts that they would not be able to read successfully on their own, because they can concentrate on meaning while listening to ETBs, instead of struggling to decode unknown words (McKenna, 2002). In Oakley and Jay's study (2008), the use of ETBs was provided as part of a home reading program. The participants included 41 students between the ages of 8 and 11 defined as reluctant readers. Students brought home one ETB per week for their reading activity for a total of 10 weeks. Interviews and surveys were completed at the end of the study to evaluate their satisfaction. The results showed that overall students enjoyed the ETBs and their reading time at home was increased.

However, research by de Jong & Bus (2002) found evidence that listening to ETBs was not as beneficial as listening to stories read by adults. Often times, children chose to use the play features included with ETBs instead of listening to the story for a repeated time. This study included 55 Kindergarteners assigned to four groups: a regular book group, restricted computer book group, unrestricted computer book group, and control group. Participants in the regular book group listened to a paper version of a book read by an adult examiner. The unrestricted computer book group explored the electronic version of the same book including games. Participants in the restricted computer group explored the same electronic version but were not allowed to play the games. There were six, 15 minute training sessions for two and a half weeks. All sessions took place in room free of interruptions with only the participant and examiner present. The participants were pre and post tested on letter knowledge, rhyming, name writing, word writing, and word recognition. The focus of the study was to compare book formats and its effects on attention for meaning, phrasing, and text features. It was

found that in the unrestricted computer book group, the children played games almost half the time. Only the children in the regular book group heard the entire story each session, and could retell the story content. Results of the post tests showed that participants in the regular book group and restricted computer group made progress in word recognition.

It appears that E-books can be utilized in a manner that would provide students an opportunity to listen to stories when a fluent model of reading, such as the teacher, parent, or another adult is not available. Ciampa's study (2012) utilized a researcher-developed online e-book guided reading program for six, 1st graders. The participants were involved in 12 e-book reading sessions for 3 months. They were able to access the program at home. Results showed that the participants showed a favorable rating when they were given the freedom to choose their reading selection, as well as an increase in the time they spent reading online at home and listening comprehension. This study differs from others on e-books involving in listening to texts on participants' guided reading level. It has been found that students make the most progress and increase their reading fluency and comprehension when they are given the opportunity to choose their reading material at their appropriate level.

Earlier studies also focused on comparisons of traditional books and computer or e-books. For example, Leong's study (1995) compared students' comprehension when computers were used in reading. The participants included 192 students categorized as poor, below average, and above average readers. Participants were placed into two groups, one group read from the computer either silently or aloud while the second group listened as the computer read to them. The Canadian Tests of Basic Skills was used to

measure their reading comprehension. Results showed that no advantage to using computer controlled reading could be concluded. The students did not show an increase in reading comprehension when the computer read to them in comparison to reading on their own. Greenlee-Moore and Smith (1996) completed a similar study in which 31, 4th graders were given either a book or an electronic version of a book to read for a period of eight weeks. The children were asked to complete comprehension questions at the end of the study. It was found that the longer and more difficult the text, the on-line reading made a positive difference on comprehension scores. Medwell (1996) also compared electronic books with paper books, to evaluate 16 student's performance. It was found that students reading from the electronic books showed a greater degree of increase in accuracy comparing to reading the paper book on their own. The result was supported by Matthew's study (1997) to evidence that reading comprehension increased when using an electronic book over a paper version. It is reported that the embedded hotspots in the e-books may encourage passive participation and distract learners from the printed text, hindering comprehension (Labbo and Kuhn, 2000; Lefever-Davis & Pearman, 2005). In addition, combining electronic books and printed books provided was found to be the most benefit to students (Sharp, 1996). The e-book allowed children to get immediate feedback on word meanings and pronunciations, and repeated readings of CD-ROM storybooks resulted in substantial gains in sight word acquisition by using the read aloud features (McKenna, 1994).

E-books for young children using Internet-based sites have become increasingly available and popular, however, the effectiveness of these new literacy tools have not been explored. In the past, research was focused on supplemental reading programs, CD-

ROM books, and electronic books, while learners with special needs, especially LD was not included, and most participating students were in third grade or above in the report (NICHD, 2000). Early elementary students at the beginning of their reading should be included, as well as diverse learners including those with LD.

Summary

The definition of reading has changed drastically due to advancements in technology. Reading includes texts in a variety of forms, such as the traditional printed text, CD-ROM versions, e-books, and internet-based reading. Studies have shown the benefits of utilizing alternate versions of books, such as e-books for students to improve reading comprehension, vocabulary, and word recognition (e.g., Gibson, Cartledge, & Keyes, 2011; Van der Kooy-Hofland, Bus,& Roskos, 2011; Falth, Gustafson, Tjus, Heimann, & Svensson, 2013; Oakley & Jay, 2008; de Jong & Bus, 2002; Ciampa, 2012). E-books should be provided for students in conjunction with printed text as part of the elementary curriculum in reading. As the needs of learners in a classroom continue to vary, e-books may become another way to differentiate instruction, which only need little planning and training on the part of the teachers and students. This present study will continue to use an e-book program to evaluate its effect for elementary children with learning disabilities in learning to read with fluency and develop comprehension.

Chapter III

Methods

Setting

Classroom. The study took place in a 1st grade inclusive classroom consisting of 18 students, one general education teacher, one special education teacher, and one assistant designated for two students with special needs. Of these students, 4 are classified with a learning disability.

School. This classroom is one of five first grade settings in an elementary school located in a middle class suburban area in southern New Jersey. There are 462 students from 1st to 5th grades in the school. Students with disabilities are placed in inclusion, resource, or self-contained classrooms based on their individual needs.

Participants

Students. Four 1st graders, classified with a learning disability in an inclusive classroom participated in the study. They were taught together with 14 general education students following the general education curriculum with additional support from a special education teacher. Each of these students has an IEP addressed in learning language with specific goals and objectives in reading fluency and comprehension. Table 1 presents the general information about participants. Table 2 presents different reading levels across grades.

Table 1

General Information of Participants

Student	Age	Grade	Gender	Special Education Service	DRA* Reading Level (Fall, 2014)
A	6	1	M	Since preschool	4C
B	7	1	M	Since preschool	3C
C	6	1	F	Since preschool	3C
D	7	1	M	Since preschool	8E

*Note: DRA: Developmental Reading Assessment (2001)

Table 2

DRA Reading Levels

Grade Level	Kindergarten	1st	2nd	3rd	4th	5th	6th	7th	8th
DRA Level	1A 2B 3C	4C 6D 8E 10F 12G 14H 16I	18J 20K 24L 28M	30N 34O 38P	40Q 40R	44S 44T 50U	60V 60W 60X	70Y	80Z

Student A is a six year old boy classified as LD with a teacher assistant to support. This student has difficulty in discussing stories read or answering questions, though he is able to read fluently. He often shuts down and refuses to speak, even when working with the teacher one to one which makes it difficult to assess his level of comprehension.

Student B is a seven year old boy classified as being Autistic. He is reading below the grade level, and needs support for reading fluency and comprehension. He struggles with sounding out sight words, and reads with a monotone voice without paying attention to the punctuations. When prompted by the teacher he is able to answer questions about a story but lacks details.

Student C is a six year old girl diagnosed as ADD, with reading problems. Her reading is below the grade level. She has difficulty recognizing sight words and needs many prompts when asked to recall the story. During reading, she often needs a teacher assistant to support.

Student D is a seven year old boy classified with LD. His reading is at grade level with fluency, but lacks comprehension skills. He is able to answer questions when prompted by the teacher with some detail, but generally is unable to recall what he reads.

Teacher. All lessons were taught by a teacher who has 15 years of teaching experience, 6 years in an inclusion classroom.

Materials

Instructional materials.

Raz-Kids online reading program. This program was purchased by the school for the 1st graders in learning reading. It is an internet-based computer program for young readers (http://www.raz-kids.com) launched in 2004 as part of the Learning A-Z resources. The features of the program allow learners to listen to fluent reading, record their own reading for practice, and take a quiz at the end of the reading. It also allows teachers to set up individual accounts for each student, so that an individual student is able to participate in independent reading on his/her own level. The teacher can input

individual students guided reading levels to ensure that they are reading at the most appropriate level with the flexibility to adjust levels at any time needed, and access to numerous books. As reinforcement, points were provided as an award for listening to and reading the story, and taking the quiz. These points can be used to purchase items for a learner's Raz Rocket that is a game feature included in the program. Learners work through each guided reading level, and their levels can be advanced as the books are read completely. A timer will be used to monitor and signal the students when they have completed 15 minutes on the program. This program was used as a supplemental activity to the general education curriculum.

Measurement materials.

Developmental Reading Assessment (DRA). This assessment was used to evaluate students' learning outcomes. DRA provides a guided reading level, scores of fluency and reading comprehension. It is a standardized reading test administered individually by a teacher or reading specialist. The assessment consists of a collection of leveled books starting with level 1A, and ending with 80Z. The teacher begins by introducing the text, the student then reads the leveled book and the teacher makes notes of oral reading behaviors; such as omitting words, adding words, reading words incorrectly, self-correcting after a miscue, and repeating words. After the reading, questions were provided and story retelling was requested. "Independent" level is considered when a student reads with 95 – 100% accuracy, and comprehension scores of 75 – 100%; 90 – 94% accuracy, and scores of 67 – 71% as "Instructional " level, and lower than 90% accuracy and less than 67% is the "Frustrational" level. A rubric with 4 points was used to evaluate reading comprehension with 4 points indicating very good

comprehension and 1 for very poor comprehension, (See an example in Figure 1). A fluency table was included to calculate percentages for reading fluency, while this table is different in each DRA book on the number of words in the selected story.

Very Little Comprehension 6 7 8 9	Some Comprehension 10 11 12 13 14 1 5	Adequate Comprehension 16 17 18 19 20 21	Very Good Comprehension 22 23 24
1 Tells 1 or 2 events or key facts	**2** Tells some of the events or key facts	**3** Tells many events in sequence for the most part, or tells many key facts	**4** Tells most events in sequence or tells most key facts
1 Includes few or no important details from text	**2** Includes some important details from the text	**3** Includes many important details from the text	**4** Includes most important details and key language or vocabulary from text
1 Refers to 1 or 2 characters or topics using pronouns (he, she, it, they)	**2** Refers to 1 or 2 characters or topics by generic name or label (boy, girl, dog)	**3** Refers to many characters or topics by name in text (Ben, Giant, Monkey, Otter)	**4** Refers to all characters or topics by specific name (Old Ben Bailey, green turtle, Sammy Sosa)
1 Responds with incorrect information	**2** Responds with some misinterpretation	**3** Responds with literal interpretation	**4** Responds with interpretation that reflects higher-level thinking
1 Provides limited or no response to teacher questions and prompts	**2** Provides some response to teacher questions and prompts	**3** Provides adequate response to teacher questions and prompts	**4** Provides insightful response to teacher questions and prompts
1 Requires many questions or prompts	**2** Requires 4 or 5 questions or prompts	**3** Requires 2 or 3 questions or prompts	**4** Requires 1 or no questions or prompts

Figure 1. DRA Comprehension Rubric

Procedures

Instructional procedure. The Raz-Kids online reading program was provided individually for fifteen minutes each session during the literacy intervention period, 3 times a week for 16 weeks. During each session, two students were required to log on the program. Each child had his/her individual login name and password, and the program was set to his/her independent reading level. The timer was set to fifteen minutes during which students listened to, read, and took quizzes on the books designated for their level. They were not allowed to access the play features during these sessions. In addition, students were instructed in small groups for guided reading focused on improving reading fluency and comprehension skills. Fiction and non-fiction stories were selected to teach specific skills such as: a) asking and answering questions about key details in text, b) retelling a story, c) describing characters, settings, and major events in a story using key details, and d) using illustrations and details in a story to describe its characters, settings, and events.

Measurement procedure. DRA was given at the end of each month to obtain a guided reading level, comprehension, and fluency scores. It is administered by a teacher to test an individual student. An estimated level of book from the DRA leveled books was selected, and the teacher read the title with an introduction. The student was required to read the story and his/her reading behaviors were recorded. After reading, the student was asked to recall the characters, setting, and main events with details. If needed, the teacher may prompt the student in order to attain more information to assess comprehension. All prompts must be documented on the scoring sheet, and the rubric was used for recording the comprehension scores. The teacher circled the number to the

left of one statement in each row that best described the student's retelling of the story read. The circled numbers were then added together to obtain a total score and level of comprehension. The fluency table for oral reading percentages was used to record student's performance. The teacher circled the number of miscues and looked at the corresponding percentage for the fluency score.

Research Design

A single subject design across students with A B phases was used in this study. During phase A, the baseline, each student was tested by DRA monthly, their guided reading level and comprehension and fluency scores were recorded. During phase B, the intervention, students were instructed using the Raz-Kids reading program 15 minute sessions, 3 times a week for 16 weeks. The same DRA assessment was administered monthly to record student performance scores and reading level.

Data Analysis

Each student's guided reading levels; fluency and comprehension scores were plotted on a line graph to demonstrate individual student's reading progress, as well as tables to present student's learning outcomes to compare their performance in the baseline and intervention, in order to evaluate the effects of the Raz-Kids program.

Chapter IV

Results

Each student was tested monthly using the Developmental Reading Assessment (DRA) to attain scores of guided reading level, fluency, and comprehension during the baseline and intervention. Growth in guided reading level was reported, as well as average fluency and comprehension scores. Data are also included on items of Raz-Kids, specifically the number of books listened to, read, and quizzes completed. The total amount of time spent was also recorded. Each student's performance is presented in Tables 3, 4, and 5 respectively.

Table 3

Student reading performance by percentage

	Baseline		Intervention			
	September	October	November	January	February	March
Student A Reading Level	4C	4C	8E	12G	18J	20K
Fluency	94	96	100	99	99	99
Comprehension	0	63	42	75	71	33
Student B Reading Level	3C	3C	6D	8E	12G	14H
Fluency	96	100	96	97	96	99
Comprehension	67	79	50	75	63	50
Student C Reading Level	3C	3C	4C	4C	8E	8E
Fluency	96	100	96	96	95	100
Comprehension	79	79	63	67	42	63
Student D Reading Level	8E	8E	12G	16I	18J	20K
Fluency	100	100	100	99	100	100
Comprehension	46	58	54	50	63	46

Table 4

Student growth and average scores by percentages across phases

	Baseline (phase A)			Intervention (phase B)		
	Reading Level Growth	Fluency	Comprehension	Reading Level Growth	Fluency	Comprehension
Student A	+ 0	95	31.5	+ 8	99.25	55.25
Student B	+ 0	98	73	+ 6	97	59.25
Student C	+ 0	98	79	+ 3	96.75	58.75
Student D	+ 0	100	52	+ 6	99.75	53.25

Table 5

Activities Student Completed in Raz-Kids

	Books (listened)	Books (read)	Quizzes taken	Total Time
Student A	161	31	86	12 hours 25 minutes
Student B	129	63	164	11 hours 53 minutes
Student C	126	52	78	11 hours 30 minutes
Student D	107	18	67	10 hours 44 minutes

Figures 2, 3, 4, 5 present each student's reading performance in fluency and comprehension.

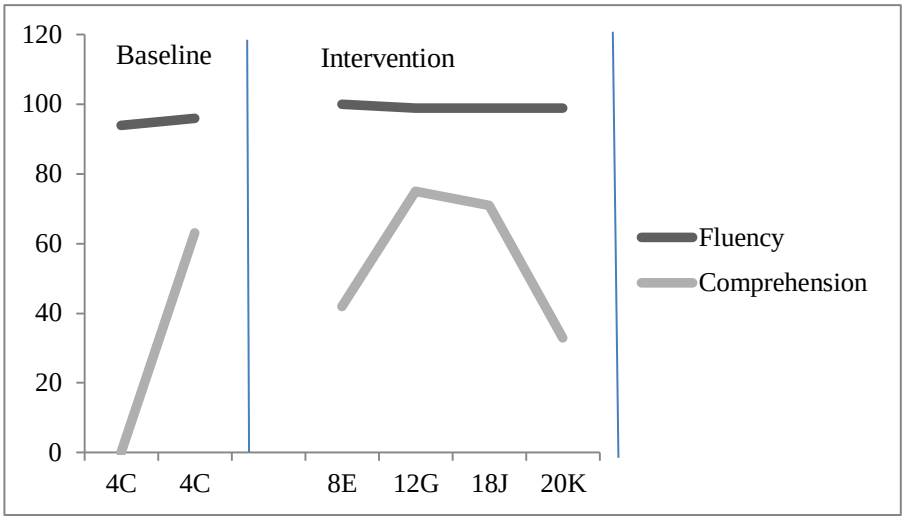

Figure 2. Reading performance of Student A.

At the reading level C, this student's performance scores were 63% for comprehension and 96% for fluency during the baseline. When using the Raz-Kids program, the student's reading level was increased 2 levels to 8E with scores of 42% for comprehension and 100% for fluency. The student continued to show growth in reading levels throughout the intervention. At level 12G, the scores were 75% for comprehension and 99% for fluency. At level 18J, the scores were 71% for comprehension and 99% for fluency. At level 20K, the scores were 33% for comprehension and 99% for fluency.

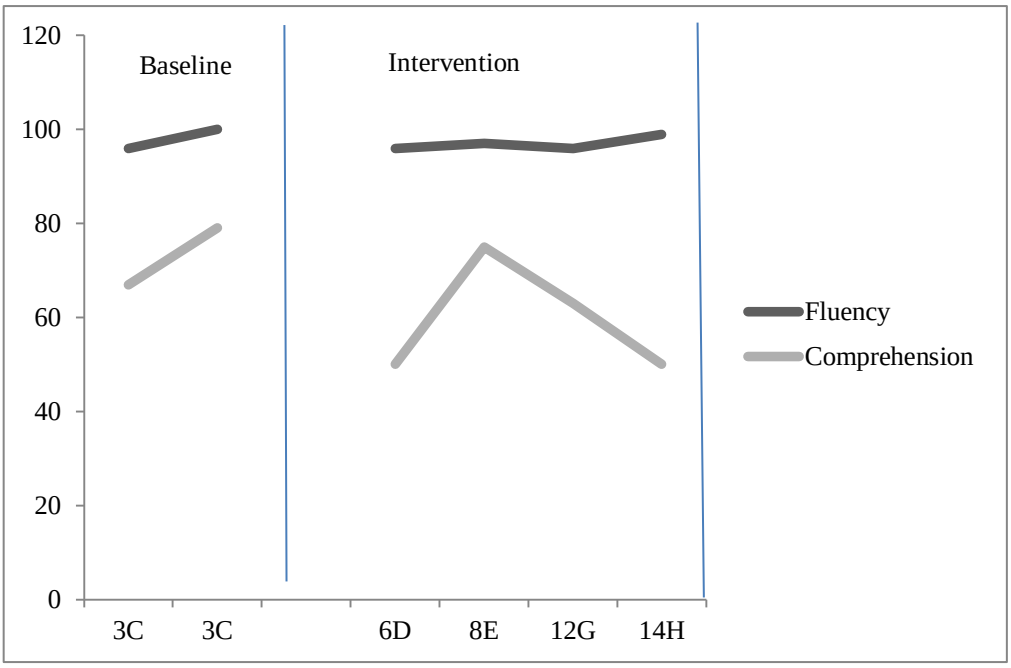

Figure 3. Reading performance of Student B.

At the reading level C, this student's performance scores were 79% for comprehension and 100% for fluency during the baseline. When using the Raz-Kids program, the student's reading level was increased 1 level to 6D with scores of 50% for comprehension and 96% for fluency. The student continued to show growth in reading levels throughout the intervention. At level 8E, the scores were 75% for comprehension and 97% for fluency. At level 12G, the scores were 63% for comprehension and 96% for fluency. At level 14H, the scores were 50% for comprehension and 99% for fluency.

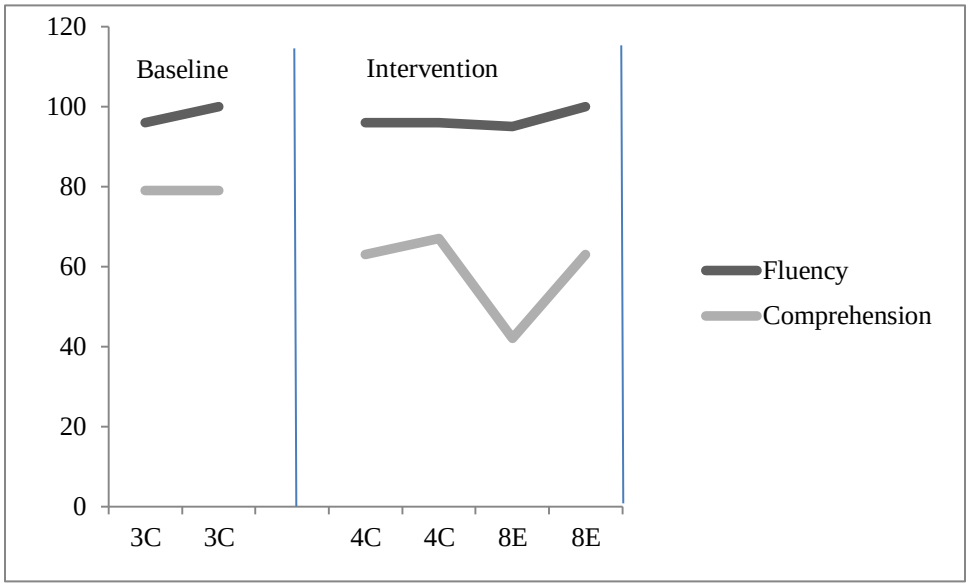

Figure 4. Reading performance of Student C.

At the reading level C, this student's performance scores were 79% for comprehension and 100% for fluency during the baseline. When using the Raz-Kids program, the student's reading level did not increase at first. At level 4C the scores were 63% for comprehension and 96% for fluency. The student continued on the same level with scores of 67% for comprehension and 96% for fluency. At level 8E, the scores were 42% for comprehension and 95% for fluency. The student continued at the same level with scores of 63% for comprehension and 100% for fluenc

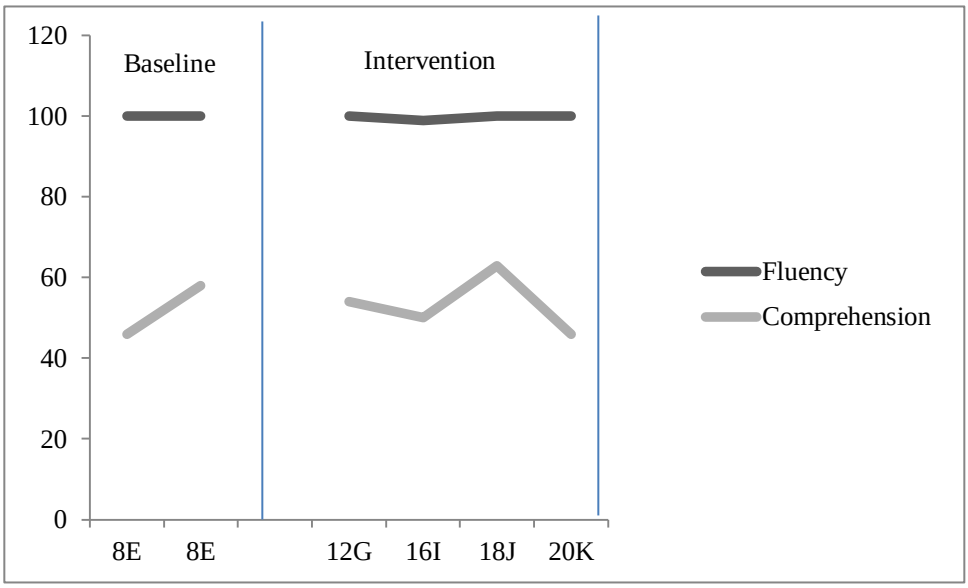

Figure 5. Reading performance of Student D.

At the reading level E, this student's performance scores were 58% for comprehension and 100% for fluency during the baseline. When using the Raz-Kids program, the student's reading level was increased 2 levels to 12G with scores of 54% for comprehension and 100% for fluency. The student continued to show growth in reading levels throughout the intervention. At level 16I, the scores were 50% for comprehension and 99% for fluency. At level 18J, the scores were 63% for comprehension and 100% for fluency. At level 20K, the scores were 46% for comprehension and 100% for fluency.

At the end of the study, all participating students were asked the following 5 questions: 1. Did you like using Raz-Kids? 2. Did you like listening to books on Raz-Kids? 3. Did you like reading books on Raz-Kids? 4. Did you like taking quizzes on Raz-Kids? 5. Do you prefer reading traditional books or books on Raz-Kids? Three out of the four students (75%) reported that they enjoyed using Raz-Kids. The same three

students also stated that they preferred reading books on Raz-Kids in comparison to traditional books. One student reported that she did not like using the program because the time spent on the program seemed too long for each session. The same student also stated that she did not like to read, but that she preferred reading traditional books over those on Raz-Kids. All four students (100%) reported that they liked listening to books, reading books, and taking quizzes on Raz-Kids. Overall, the students seemed satisfied with the Raz-Kids program.

Chapter V

Discussion

The purpose of this study was to determine if the Raz-Kids program would be a successful reading intervention for students with learning disabilities. The program enabled students to listen to, read, and take quizzes on stories at their individual reading level, as well as increased the amount of time for students involved in reading in their school day. Student scores obtained using the Developmental Reading Assessment (DRA) evaluated their learning growth in reading level, fluency, and comprehension.

The first research question focused on the development of the independent reading skills of children with LD when the Raz-Kids program was provided. Results showed that all students gained reading levels throughout the study. For example, Student A made the most growth with 8 reading levels from 4C to 20K, but struggled with comprehension as the stories increased with difficulty. Student B grew 6 reading levels from 3C to 14H, and Student D grew 6 reading levels from 8E to 20 K, but still had the same difficulty with comprehension as the stories increased with the difficulty level. Student C made the least amount of growth, from 3C to 8E, only 3 reading levels. Overall, all students gained their scores, though each gained at different levels. It seems that the Raz-Kids program helped these students develop reading fluency by listening to the stories, as well as the repeated reading of the stories. The Raz-Kids program did not seem to help students develop their comprehension, because all participants had overall low comprehension scores.

The second research question focused on guided reading levels to evaluate student performance. All students showed growth in reading levels once the Raz-Kids program

was introduced as part of the intervention. For example, prior to the intervention, the students had not made any growth in reading levels, while during the intervention, Student A made the most growth, increasing 8 guided reading levels. Students B and D increased 6 guided reading levels, and Student C increased 3 guided reading levels. These results are similar to the findings in Gibson, Carledge, and Keyes' study (2011) in which students showed an increase in fluency when using the Read Naturally, another computer program. This may mean that computer programs that allow students to listen to stories being read increase the amount of time spent on reading. It may also improve student's sight word vocabulary through exposure to the many stories available on the programs.

The third research question was addressed to evaluate students' reading fluency. Students' scores varied due to the increasing difficulty of the books being read to determine reading level. Overall, their scores were 95% or higher, which showed that the students were reading with sufficient accuracy. According to the DRA, "Independent" level is considered when a student reads with 95 – 100% accuracy, and comprehension scores of 75 – 100%; 90 – 94% accuracy, and scores of 67 – 71% as "Instructional " level, and lower than 90% accuracy and less than 67% is the "Frustrational" level. During the intervention, all students gained their scores to reach the "independent" level, for example, Student A had an average score of 99.25%, Student B, 97%, Student C, 96.75%, and Student D, 99.75%.

The fourth research question was asking about reading comprehension. Results showed that the Raz-Kids program did not improve student progress in this area. The average comprehension scores of all students during the intervention phase were below

67% that could represent "Frustrational" level according to the DRA. For example, Student A had an average score of 55.25%, Student B, 59.25%, Student C, 58.75%, and Student D, 53.25%. Comparing to fluency, the lower scores in comprehension can be explained due to the increasing difficulty of the books being read as reading levels increased. Lower scores can also be explained due to other circumstances, for example, Student A often has difficulty in testing situations, which accounted for lower scores for refusing to discuss the story. These results were similar to Leong's study (1995) which also found limited increase in comprehension when computers were used for reading. It seems that the Raz-Kids program did not assist in the increase of student comprehension when used as part of reading instruction. This may mean that comprehension skills need to be trained in a longer time by guided practice with a teacher. Listening to and reading stories may not result in immediate improvement in comprehension.

Limitations

Despite the positive results, there were some limitations in this study. The small sample size of four limited the amount of data that could be collected to determine if the Raz-Kids program was successful as a reading intervention for students with learning disabilities. Second, the study took place over sixteen weeks; however, there were some inconsistencies between the students and the amount of time spent on the program. Some students were absent from school due to illnesses and were not able to complete all of the sessions. Interruptions in the school calendar were also a factor, for example, schedule changes due to snow day closings and delayed openings, holidays, and school assemblies. Another concern is that the classroom setting with other students' noise might affect individual student's concentration. It was noted that when students used the program on

the iPad they seemed to be more engaged and focused comparing to the use of the desktop computer in the classroom. Because of the limited number of iPads available, most of the sessions of the reading instruction were completed on desktop computers.

Implications

The results showed an increase in guided reading levels for all participating students in reading fluency, though comprehension was an area of weakness. The Raz-Kids program would be beneficial as a supplement to reading instruction and small group guided reading. Teachers may encourage students to utilize the Raz-Kids program in a structured way, for example requiring students to listen to, read, and then take a quiz on each book in the designated level. Teachers should encourage school administrators to support technology application in the classroom. In the study, it is found that students benefited from an increased amount of time involved in reading when Raz-Kids on both desktop computers and iPads was provided. If schools could provide a designated room where students could read using technology, this would definitely increase their concentration and motivate their reading interests resulting in enhanced reading of books.

Conclusion and Recommendations

The results of this study showed an increase in guided reading levels of the students with learning disabilities by their growth in reading fluency. It seems that the Raz-Kids program would be beneficial as a supplement to reading instruction and small group guided reading for struggling readers. Future studies should include a larger sample size to validate the finding. It would also be beneficial if the sessions could be completed in a setting free of distractions. Future studies should also include groups in which the subjects are instructed with paper copies of the Raz-Kids books during small

group instruction. These books could be given to students for additional practice at home. Reading can be taught in various ways to encourage readers to be motivated in reading activities. Using technology for reading enables students to be engaged in their learning, increase time reading, and assist with fluency when listening to stories on the computer. The use of technology in reading can also provide the teacher with information about each individual student's progress in reading instruction.

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Appendix

Raz-Kids Reading Program