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A Study of the Effect of iPad Use for Reading Intervention at the Kindergarten Level

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By

Lori R. Motsch

Joliet, Illinois

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Abstract

This study explored the effect of utilizing technology for implementing reading interventions at the kindergarten level. Student achievement data from the AIMSweb Test of Early Literacy areas letter naming fluency, letter sound fluency, and phoneme segmentation fluency were analyzed throughout the study. In this study, 58 kindergarten students were identified as at-risk in the area of reading, which qualified them for Response to Intervention (RTI) services. In 2014, the control group of 29 RTI-qualified students received reading interventions through a direct-instruction model from January through May for 60 minutes per week. The group was compared to a group of 29 RTI students who received interventions through 30 minutes per week of direct instruction, as well as 30 minutes per week of iPad utilization, from January through May of 2015. Analysis of data determined that utilizing the iPad for reading interventions at the kindergarten level had a statistically significant effect on students in the area of letter naming fluency and letter sound fluency. However, the implementation of the iPad did not have a statistically significant effect in the area of phoneme segmentation fluency.

Certification: In accordance with college and university policies, this dissertation is

accepted in partial fulfillment of degree requirements.

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Dissertation Advisor

_____June 20, 2016_____

Date

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Program Coordinator

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Date

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TABLE OF CONTENTS

LIST OF TABLES

Chapter 1

Introduction to the Study

The widening gap between good and poor readers can be identified as early as kindergarten. Initiatives, such as Response to Intervention (RTI), have focused on detecting students who would benefit from early support in the area of reading. RTI is regarded as a model for school-age children who are at risk for learning disabilities; it emphasizes pre-referral prevention and intervention (Coleman, Buysse, & Neitzel, 2006). RTI enables educators to deliver early and intensive interventions based on student need. Alphabetic knowledge and phonemic awareness are the specific areas in which interventions are conducted at the kindergarten level. However, there is minimal research on the best method to deliver interventions. The purpose of this quasi-experimental study is to determine the effect of utilizing technology for implementing reading interventions at the kindergarten level. In this study, the control group of 29 students from a previous school year received reading interventions solely through a direct-instruction model. This group was compared to 29 students who received interventions through a combination of direct instruction and the utilization of an iPad application. The 2014 spring AIMS benchmark scores were compared to the 2015 spring AIMS benchmark scores in each of the following areas: letter naming fluency, letter sound fluency, and phoneme segmentation fluency. Analysis of data determined the effect of utilizing an iPad to administer reading interventions at the kindergarten level.

Background of the Study

The RTI model for school-age children who are at-risk for learning disabilities emphasizes pre-referral prevention and intervention (Coleman et al., 2006). RTI enables

educators to deliver early and intensive interventions based on student need, and it does not wait for children to fail before providing such services. The major premise of RTI is that by administering early interventions, educators can prevent academic problems for many students who experience learning difficulties, as well as identify students with actual learning disabilities. Research conducted by Torgesen and Davis (1996) provides preliminary evidence that kindergartners who are at risk for learning difficulties can catch up by first grade, if they are provided the appropriate supports in kindergarten.

The academic supports focus on early literacy skills, such as alphabetic knowledge and phonemic awareness. The importance of early identification and the importance of administering interventions in alphabetic knowledge and phonemic awareness to kindergarten students have both been determined.   Yet, the best strategy for implementation has not been as clearly identified. Typically, students are provided interventions through direct instruction either individually or in a small group setting, with the implementer guiding the intervention. As technology becomes readily available to more kindergarten students nationwide, it is important to find out if utilizing technology for interventions would have an effect on reading achievement at the kindergarten level.

American children are growing up in increasingly media- and technology-saturated environments (Vandewater & Lee, 2009). Often referred to as "digital natives," students are exposed to technology from birth (Prensky, 2001). Technology use is intrinsically motivating to young children, and a tablet computer appears to be a viable tool for preschool children to incorporate into their daily routine (Couse & Chen, 2010). The most significant results from a study conducted in Maine, showed that iPad use

produced an increased performance on a child's level of phonemic awareness and ability to represent sounds with letters (Bebell, Dorris, & Muir, 2012). Such data suggests further exploration of iPad utilization for interventions at the kindergarten level.

The Purpose

Struggling readers have made gains when they are provided with early intervention in the areas of alphabetic knowledge and phonemic awareness. The question remains whether or not the teaching strategies being utilized to implement interventions are providing students the best opportunity to produce such gains. Traditionally, teacher-led interventions are conducted either individually or in a small group setting. One could question whether this is the best method to utilize. Also, are students motivated by teacher-led interventions, or would students prove to be more engaged in utilizing an alternative strategy for receiving interventions? In an era in which children are exposed to technology the moment someone takes a photo of them using a smartphone, it is logical to question whether or not utilizing technology for early literacy interventions has an effect on student achievement in the areas of alphabetic knowledge and phonemic awareness. Many children entering school today are considered "digital natives." Digital natives are defined as people who have grown up in social conditions where technology has been an integral part of their lives (Zevenbergen & Logan, 2008). Technology in the classroom has become a more frequent teaching tool because of 21st-century learners who use video games, computers, and other technology tools to learn and gather information. Due to young children's significant amount of exposure to technology, the effect of utilizing a tablet computer (the Apple iPad) to administer reading interventions to kindergarten students was explored. The purpose of this study is to determine whether

or not iPad use impacts early literacy skills for kindergarten students falling below grade level in the area of early literacy in a suburban school district.

The study focused on students who qualified for services based upon the AIMSweb benchmark. Students from this study were identified for needing RTI based upon the winter benchmark scores, recorded in January. The RTI identification was based on the benchmark scores in Letter Naming Fluency (LNF), Letter Sound Fluency (LSF), and Phoneme Segmentation Fluency (PSF) on the early literacy AIMSweb assessment. Students who scored below the 25th percentile in LNF, LSF, or PSF were identified as needing additional reading interventions. The control group of 29 students from the 2013–2014 school year received reading interventions through direct instruction. The group was compared to 29 students from the 2014–2015 school year who received interventions through a combination of direct instruction for 30 minutes per week and the utilization of an iPad application for 30 minutes per week. A consistent reading specialist conducted the implementation over the course of both years. The selected iPad application was Jolly Phonics. The 2014 spring AIMSweb Early Literacy benchmark scores were compared to the 2015 spring AIMSweb Early Literacy benchmark scores in letter naming fluency, letter sound fluency, and phoneme segmentation fluency.

Research Questions

This quasi-experimental design study posed the following research questions:

1. Does utilizing an iPad for interventions have an effect on letter naming fluency in kindergarten?

$H_0$1. There will be no difference in letter naming fluency between those who utilize an iPad and those who do not.

2. Does utilizing an iPad for interventions have an effect on letter sound fluency in kindergarten?

$H_0$2. There will be no difference in letter sound fluency between those who utilize an iPad and those who do not.

3. Does utilizing an iPad for interventions have an effect on phoneme segmentation fluency in kindergarten?

$H_0$3. There will be no difference in letter naming fluency between those who utilize an iPad and those who do not.

Significance of the Study

Teachers are currently educating a generation of students identified as digital natives. Digital native is a term used to describe an individual who has been born or brought up after the widespread adoption of digital technology (Prensky, 2001). Digital natives have grown up exposed to technology, such as computers, the tablets, and mobile devices. Additionally, research has indicated that young students are motivated by the utilization of technology. Yet, the majority of the methods to deliver interventions to students at risk for reading failure in kindergarten continue to be administered through traditional modes.

The findings of this study demonstrate the correlation of iPad use to student achievement, creating the need to consider the following implications. The results of this study could change the mode in which interventions are delivered. If so, additional funding may be considered to provide kindergarten classrooms with the technology

needed to effectively implement reading interventions with iPads. School board members and administrators may be more likely to purchase additional iPads with the knowledge that iPad utilization for interventions has a positive effect on student achievement. If additional iPads were purchased for the kindergarten classrooms, then kindergarten teachers may have endless opportunities to incorporate iPads beyond the intention of utilizing them for interventions. The incorporation and ample supply of technology might prompt additional studies related to the effects of iPad utilization in a kindergarten classroom.

Most importantly, the largest group affected by this study could be the struggling readers at the kindergarten level. Utilization of an iPad may be the key to unlocking the code for some of the most struggling kindergarten readers.

Scope of the Study

The purpose of this quasi-experimental research study was to determine the effect of utilizing technology to implement reading interventions at the kindergarten level. Student achievement data from the letter naming fluency, letter sound fluency, and phoneme segmentation fluency components of AIMSweb Early Test of Literacy assessment were analyzed. In this study, 58 kindergarten students were identified as at-risk in the area of reading, which qualified them for RTI services. In 2014, the control group of RTI students (N=29) received reading interventions through a direct-instruction model for 60 minutes per week from January through May. The treatment group of RTI students (N=29) received interventions through 30 minutes per week of direct instruction and 30 minutes per week of iPad utilization from January through May of 2015. Analysis

of data determined the effect of utilizing an iPad to administer reading interventions at the kindergarten level.

For 60 minutes per week, the control group received interventions administered by a reading specialist in the form of direct small-group instruction utilizing the reading intervention K-Pals (Mathes, Menchetti, & Torgesen, 2001), along with additional direct instruction utilizing the core kindergarten curriculum for the district which included Jolly Phonics (Lloyd, 1992) and Heggerty Phonemic Awareness (Heggerty, 2010). The treatment group received a combination of both direct small group instruction and iPad instruction. Students used the Jolly Phonics application on the iPad. A comparison and analysis of the spring AIMSweb benchmark results was conducted for this study. The study took place over two school years. LNF, LSF, and PSF data were compared separately for the purpose of triangulation.

Limitations of the Study

The focus of this study was to examine the effect of iPad use in relation to kindergarten reading interventions. Factors to increase validity and reliability of the study were implemented. Additionally, careful consideration was placed on ensuring that the interventions for the control and the treatment groups were deemed appropriate for the study.

To ensure treatment fidelity, the same specialist delivered the interventions to each group. The highly qualified staff member was a certified teacher with a master's degree in reading and served as the reading specialist for the building. For consistency, the direct-instruction interventions were delivered in the same manner to students in both groups. However, while the control group received 60 minutes of direct instruction, the

treatment group only received 30 minutes of direct instruction, since the remaining 30 minutes were replaced with iPad use. The program used on the iPad was the Jolly Phonics application in the designated 30 minutes of iPad use. To curtail multiple treatment interferences, classroom teachers did not have access to the Jolly Phonic application during regular class time.

One final threat to the external validity for this particular study was how narrowed and controlled the groups were. Based upon the demographics of the school district, it may be difficult to generalize this study to all kindergarten students. The school district in which the study took place is predominantly White and has a large number of parents who are actively involved in their child's education. If one chose to replicate the study, then perhaps it should be replicated in an environment with different demographic information to ensure validity.

Definition of Terms

For the purpose of this study, the following terms are defined.

AIMSweb. A web-based assessment tool utilized for screening, progress monitoring, and data management for Grades K–12 (Shinn & Shinn, 2002).

AIMSweb TEL. The AIMSweb Test of Early Literacy is utilized to identify students at risk for reading difficulties and to monitor the progress of students in kindergarten and early Grade 1 (Shinn & Shinn, 2002).

Alphabetic knowledge. Alphabetic knowledge is the recognition of letters as symbols that have specific names and specific sounds associated with them (Lonigan, C. J., Burgess, S. R., & Anthony, J. L., 2000)

App. An app is a mini-program that can be downloaded onto an iPad from the iTunes App Store (Goodwin, 2012).

Early childhood. Early childhood is a stage of development that ranges from ages 3 to 8. In a formal educational setting, early childhood includes preschool through Grade 3 (NAEYC, 2012).

Heggerty Phonemic Awareness curriculum. Heggerty refers to a curriculum that contains daily lessons to enhance letter naming, rhyming, onset fluency, blending, identifying final and/or medial sounds, segmenting, adding phonemes, deleting phonemes, substituting phonemes, and language awareness. Lessons are conducted completely auditory for 12–15 minutes per day (Heggerty, 2010).

iPad. An ipad is a tablet personal computer designed by Apple Inc. The iPad is a portable device with a touch screen (Goodwin, 2012).

Jolly Phonics. Jolly Phonics is a phonics curriculum that employs the synthetic phonics method of teaching the letter sounds in a way that is fun and multisensory, enabling children to become fluent readers (Lloyd, 1992).

K-Pals. K-Pals is a 20-week research-based peer-tutoring program that employs literacy activities to improve early reading skills—especially for prekindergarten and kindergarten students who are performing below benchmark in phonemic awareness, phonics, and fluency (Mathes, Torgesen, & Menchetti, 2001).

LNF. LNF represents letter naming fluency. LNF is a component of the AIMSweb Test of Early Literacy wherein students identify as many upper- and lower-case letter names as they are able in one minute (Shinn & Shinn, 2002).

LSF. LSF signifies letter sound fluency. LSF is a component of the AIMSweb Test of Early Literacy wherein students identify as many sounds as they are able in one minute (Shinn & Shinn, 2002).

NWF. NWF represents nonsense word fluency. NWF is a component of the AIMSweb Test of Early Literacy wherein students put together as many of the sounds of non-real words as they are able in one minute (Shinn & Shinn, 2002).

Phonemic Awareness (PA). PA refers to the ability to focus on and manipulate phonemes in spoken words (National Reading Panel, 2008).

PSF. PSF signifies phoneme segmentation fluency. PSF is a component of the AIMSweb Test of Early Literacy wherein students segment words into individual phonemes as they are able in one minute (Shinn & Shinn, 2002).

Rapid automatic naming (RAN). RAN refers to a rapid automatized naming task or process (Norton & Wolf, 2012). For the purpose of this study, the task is rapid naming of letter names and letter sounds.

Response to intervention (RTI). RTI is regarded as a model for school-age children who are at risk for learning disabilities; it emphasizes pre-referral prevention and intervention (Coleman et al., 2006). RTI enables educators to deliver early and intensive interventions based on student need.

Summary

This study identified the importance of early identification and the importance of providing interventions for kindergarten students who have delays in the areas of alphabetic knowledge and phonemic awareness. This study determined the effectiveness of technology use with young children as well as with struggling readers. These findings

provided a plausible case to conduct a study on utilizing iPads to provide interventions in

both alphabetic knowledge and phonemic awareness for kindergartners who are identified

as struggling readers.

Chapter 2

A Review of the Literature

Current educational research indicates a widening gap between good and poor readers, which is evident as early as kindergarten and growing wider as students enter third grade and beyond (McNamara, Scisson, & Gutknecth, 2011). Initiatives, such as RTI, have focused on identifying students who would benefit from early support in the area of reading. Letter knowledge and phonological awareness skills are predictors of future literacy success. Alphabetic knowledge is the recognition of letters as symbols that have specific names and specific sounds associated with them (Griffin, Burns, & Snow 1998). Alphabetic knowledge is a strong predictor of later decoding and overall reading achievement (Lonigan, Burgess, & Anthony, 2000). Along with simply identifying letters and sounds, the rate at which a child identifies the letters and sounds is significant. Rapid automatic naming (RAN) performance assessed in the beginning of first grade has been reported to be a unique predictor of later reading skill in samples of typically developing readers (Compton, 2003). While the fluency of alphabetic knowledge is relevant to early literacy success, phonemic awareness has been considered a critical component in learning to read (Oudeans, 2003). Phonemic awareness refers to the ability to focus on and manipulate phonemes in spoken words (National Reading Panel, 2008). According to Griffith and Olson (1992), phonemic awareness has been shown to be a very powerful predictor of later reading achievement. It is known, for example, that poor readers who enter first grade phonemically unaware are very likely to remain poor readers at the end of fourth grade, since their lack of phonemic awareness contributes to their slow acquisition of word recognition skill (Juel, 1988).

A common universal screening tool utilized to measure fluency in the areas of alphabetic knowledge and phonemic awareness is the AIMSweb assessment. In this particular study, data from the Test of Early Literacy (TEL) components of AIMSweb were analyzed. TEL is utilized to identify students at risk for reading difficulties and to monitor the progress of students in kindergarten and early Grade 1 (Shinn & Shinn, 2002). TEL measures letter naming fluency, letter sound fluency, and phoneme segmentation fluency. This study compared 60 minutes per week of direct reading intervention instruction with 30 minutes per week of direct instruction, along with 30 minutes per week of iPad time to work on letter naming, letter sounds, and phoneme segmentation.

Educators implement research based interventions when implementing RTI. At the kindergarten level, Kindergarten Peer Assisted Intervention (K-Pals) is considered research based. K-Pals includes 60 scripted lessons that can be implemented in sessions of 20 minutes each. Lessons include game sheets consisting of letter knowledge, phonics, phonological, and phonemic awareness. K-Pals was utilized in this study for both the control and treatment groups. Additionally, educators may reteach core curriculum in order to reinforce skills taught within the classroom as a form of an intervention. In this study, students were retaught the core curriculum which included direct instruction using Jolly Phonics and Heggerty Phonemic Awareness.

To fully understand each element of the literature review, four topics will be discussed: response to intervention (RTI), alphabetic knowledge, phonemic awareness, and utilizing technology in kindergarten.

Response to Intervention

The RTI model for school-age children who are at risk for learning disabilities emphasizes pre-referral prevention and intervention (Coleman et al., 2006). In 2004, the Individuals with Disabilities Act (IDEA), Public Law 108-446, introduced RTI language (National Center for Education Evaluation, 2011). In an RTI model, the "tests" of whether students possess learning disabilities are not standardized measures; rather, they are students' measured responses to interventions (Mesmer & Mesmer, 2008). RTI enables educators to deliver early and intensive interventions based on student need, and it does not wait for children to fail before providing such services. The major premise of RTI is that by administering early interventions, educators can prevent academic problems for many students who experience learning difficulties, as well as identify students with actual learning disabilities. Torgesen and Davis (1996) provide preliminary evidence that kindergartners who are at risk for learning difficulties can catch up by first grade, if they are provided the appropriate supports in kindergarten. Additionally, the findings from their study indicate that gains made by these children were sustained through the first part of first grade. O'Connor, Harty, and Fulmer (2005) also support the use of a multi-tier approach prior to first grade. The findings from their studies demonstrate that intervening in kindergarten, and possibly earlier, could produce positive outcomes for kindergartners who are at risk for learning difficulties in the primary grades. In one longitudinal study conducted by Smith, Scott, Roberts, and Locke (2008), two groups of children were assessed at the beginning of kindergarten and again prior to first grade. One group of children was identified as reading-disabled, and the other was considered normally reading. Results from the study indicated that differences found between the groups in the areas of alphabetic knowledge and rapid naming skills

diminished prior to first grade due to early identification. The study supports the

relevance of RTI for early literacy skills in kindergarten.

In a study conducted in 2008 by Vellutino, Scanlon, Zhang, and Schatschneider,

children entering kindergarten were given a test of letter identification. Students who

scored at or below the 30th percentile on the test were classified as "at risk" for early

reading difficulties. Half of the students identified were randomly assigned to a group

receiving prescribed supplementary intervention in small groups (project-based

intervention) until the end of the school year, while the other half received available

remedial services at their home schools (school-based intervention). The students were

assessed again in first grade to determine if the services were still needed. If students

qualified once again in first grade, then they received either project-based or school-

based intervention. Project-based intervention discontinued at the end of first grade.

Literacy development in both groups was tracked until the end of third grade. Of the

total sample of students who received the project treatment, 84% were meeting grade-

level expectations in reading by the end of first grade. The findings suggest there is a

need to identify students with reading difficulties as early as the beginning of

kindergarten to maximize the benefit of intervention instruction.

The effectiveness of RTI has limitations. The first issue is the manner in which

instructional treatment is delivered.   Ensuring that schools provide proper support to

teachers implementing RTI is necessary for the success of RTI as it is widely

implemented. Additionally, ensuring the utilization of scientifically based interventions

is a concern. If the label scientifically based, is misused by publishers and companies,

then that could present a challenge to implementing RTI with integrity. Despite such

challenges, the RTI approach increases the quantity and quality of instruction for

struggling readers (Mesmer & Mesmer, 2008).

Alphabetic Knowledge

One component of early literacy skills is alphabetic knowledge. According to

Lonigan et al. (2000), alphabetic knowledge is the recognition of letters as symbols that

have specific names and specific sounds associated with them. Alphabetic knowledge is

a strong predictor of later decoding and overall reading achievement. Along with simply

identifying letters and sounds, the rate at which a child identifies a letter and sound is

significant. Rapid automatic naming (RAN) performance assessed in the beginning of

first grade has been reported to be a unique predictor of later reading skill in samples of

typically developing readers (Compton, 2003). While alphabetic knowledge and RAN

are relevant to early literacy success, phonemic awareness has been considered a critical

component in learning to read (Oudeans, 2003).

Phonemic Awareness

Phonemic awareness (PA) refers to the ability to focus on and manipulate

phonemes in spoken words (National Reading Panel, 2008). According to Griffith and

Olson (1992):

> Phonemic awareness skill enables children to use letter-sound correspondences to
>
> read and spell words. For example, children segment the phonemes of a word to
>
> invent a spelling by assigning letters to represent its sounds. Children have to
>
> blend sounds together when they use letter-sound correspondences to read words
>
> they have never before seen. However, phonemic awareness is not synonymous
>
> with phonics. It is not learning spelling-to-sound correspondences, and it is not

sounding out words. It is an understanding of the structure of spoken language.

In fact, it is unlikely that children lacking phonemic awareness can benefit fully

from phonics instruction (Juel, Griffith, & Gough, 1986) since they do not

understand what letters and spellings are supposed to represent. Phonemic

awareness has been shown to be a very powerful predictor of later reading

achievement. In fact, it [phonemic awareness] is a better predictor than more

global measures such as IQ or general language proficiency. (p. 518)

In summary, the research identifies the importance of alphabetic knowledge and

phonemic awareness as key components of future success in reading. However, there is

minimal research regarding the best method to administer interventions in these areas to

students identified as having reading difficulties.

Technology Use in Kindergarten

The importance of early identification of reading difficulties and administering

interventions in alphabetic knowledge and phonemic awareness to kindergarten students

has been determined. Yet, the best strategy for implementation has not been as clearly

identified. Therefore, an exploration of the utilization of technology for reading

interventions should be considered.

According to surveys conducted by the Kaiser Family Foundation (2003), 99% of

families with children own televisions, 97% own video or DVD players, more than 80%

own a video game system, and 86% own a computer. American children are growing up

in increasingly media- and technology-saturated environments (Vandewater & Lee,

2009). Technology use is intrinsically motivating to young children, and a tablet

computer appears to be a viable tool for preschool children to incorporate into their daily

routine (Couse & Chen, 2010). In a different study, children were intrinsically motivated

to use computers, as evidenced by the fact that they spent a longer time and had more

focused sessions at the computer compared with non-computer related activities (Talley,

Lance, & Lee, 1997).

An important factor to consider when utilizing technology with young children is

finding proper software. NAEYC (National Association for the Education of Young

Children) and the Fred Rogers Association suggest that evaluating educational

technology is the best way to determine if new technologies are educationally sound. To

support early learners' development while utilizing technology, three areas to consider

are developmental appropriateness, supported implementation, and classroom and

curriculum integration (McManis & Gunnewig, 2012).

Research Question One: Does utilizing an iPad for interventions have an

effect on letter naming fluency in kindergarten?

Research on whether or not utilizing an iPad specifically for letter recognition

skills in kindergarten, is sparse. Typical findings demonstrate a positive effect on iPad

use in the areas of letter and sound recognition and phonemic awareness. Brown and

Harmon (2013) conducted a study of 20 four-year-old Head Start children. The children

were randomly assigned to a treatment or control group. Both groups received

instruction using iPad applications for one hour per week. The treatment group utilized

applications specific to alphabetic knowledge, matching, or number concepts. The

control group was instructed with iPads but without the identified academic areas.

Pre and posttests were administered to the students in the study. The PALS-Pre-K

Upper and Lower Case Alphabet Knowledge subtests were given. The study found that,

while statistical significance was not obtained, practical significance was found for the

use of iPad applications to support learning in the preschool skill areas of alphabet

knowledge and number concepts (Brown & Harmon, 2013).

   Research Question Two: Does utilizing an iPad for interventions have an

effect on letter sound fluency in kindergarten? Although not abundant, research

specifically focused on achievement in the area of sound recognition is available.

According to a recent student conducted by Bebell et al. (2012), a district in Auburn,

Maine, randomly assigned eight of their 16 kindergarten classes iPads to utilize for a

nine-week period during the first trimester of the school year. In the study, 266

kindergarten students participated in pre/post literacy assessments (129 iPad students;

137 students without iPads). The most significant results from the study indicated a

child's increased performance on level of phonemic awareness and ability to represent

sounds with letters.

   Additionally, two studies conducted by Macaruso and Rodman (2011) researched

the effect of using computer-assisted instruction to enhance a phonics-based reading

curriculum for preschool and kindergarten-aged students in an urban public school

system. In the first study, 14 preschool classes consisting of both morning and afternoon

classes, with a total of seven teachers, were invited to participate. Each teacher was

randomly assigned one session consisting of a treatment group and one session consisting

of a control group. The final sample involved 19 students in treatment classes and 19

students in control classes. For the treatment, students were provided computer-assisted

instruction two to three times per week, with each session lasting 10–15 minutes (p. 179).

The control group was engaged in free-choice activities related to language arts

instruction. Pretest and posttest scores from the Group Reading Assessment and

Diagnostic Evaluation, Level P (GRADE) were obtained. GRADE measured

phonological awareness, early literacy skills, letter-sound correspondence, listening

comprehension, and word reading. After analysis, the study displayed significant score

gains with the treatment group. The researchers of this particular study concluded the

gains were made based upon computer-assisted instruction given to the treatment group.

The same research team conducted a second study of low-performing

kindergarten students. Macaruso and Rodman (2011) identified a student as being a low

achiever if the student scored 85 or below on GRADE. The final sample consisted of 47

treatment students and 19 control students. For treatment in this particular study,

students were given computer-assisted instruction two or three times per week for 15–20

minutes per day. As in the first study, pretest and posttest scores of GRADE, Level P

were examined. An analysis of covariance comparing total test scores at posttest as well

as pretest confirmed the significant group effect.

Research Question Three: Does utilizing an iPad for interventions have an

effect on phoneme segmentation fluency in kindergarten? In a study conducted by

Cubelic and Larwin (2014), the impact of the use of iPad 2 literacy-based applications

demonstrated significant gains on higher learning skills of phoneme segmentation and

nonsense word fluency. The year-long, quasi-experimental investigation examined data

from 291 kindergarten students. The treatment group consisted of 144 students who used

early literacy iPad applications in conjunction with traditional teaching methods. The

control group consisted of 147 students who were not exposed to iPad use. Significant

gains were made in the area of phoneme segmentation fluency and nonsense word

fluency using the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). The

study analyzed variables such as gender, race, and socioeconomic status. Low-SES

students (defined as eligible for the free/reduced lunch program) significantly

outperformed the students not identified as low-SES in phoneme segmentation fluency

and nonsense word fluency. The researchers concluded that it would be unlikely that

low-SES students would have access to technological resources at home; therefore, iPad

exposure enabled these students to close the achievement gap within the treatment group.

Overall, the literature suggests technology can have a positive effect on early

literacy skills in kindergarten. Further review of which technological tool has the most

effect prompts the study in pursuit.

Conclusion

This review of the literature indicates the importance of early identification and

the importance of providing interventions for kindergarten students who have delays in

the areas of alphabetic knowledge and phonemic awareness. This review also identifies

how effective technology use is with young children as well as with struggling readers.

A driving force behind this study is the absence of research pertaining to utilizing

an iPad for interventions in kindergarten. There are additional factors contributing to the

interest of conducting research on utilizing iPads specifically. With school districts

encountering limited resources, iPad purchases could get costly. There is a need to

investigate whether the move toward iPad use will have enough of an effect on students

to warrant purchasing. Another factor contributing to the interest of this study is to

establish whether the iPad is an advantageous tool to utilize with digital natives. There

are many technological tools on the market; therefore, conducting research that features

iPad use may provide insight as to whether or not an iPad provides a better educational experience for young learners who struggle with early literacy. For all of the stated reasons, a case to conduct a study utilizing iPads to provide early literacy interventions in kindergarten is plausible.

Chapter 3

Methods

Research Design

As the literature indicates, struggling readers at the kindergarten level have made

gains when provided early intervention in the areas of alphabetic knowledge and

phonemic awareness (Griffith & Olson, 1992). However, there is little research on the

effect concerning the method of intervention implemented. Traditionally, teacher-led

interventions are conducted either in a small group or individually, without the assistance

of technology. The purpose of this study was to determine if iPad use impacted early

literacy skills for kindergarten students who qualified for RTI.

In this study, kindergarten students were identified as at-risk in the area of reading

based on the winter benchmark scores of the AIMSweb Early Literacy Assessment,

which was administered to all kindergarten students in January, 2015. Based upon the

AIMSweb aggregate norms, students who fell below the 30th percentile in either LNF or

LSF qualified for RTI assistance. Once identified, students were placed in the treatment

group, in which they received direct instruction from a reading specialist for 30 minutes

and an additional 30 minutes per week of using the Jolly Phonics application on the iPad.

Data from the spring AIMSweb benchmark collected in 2014 (RTI instruction

without the use of an iPad) was compared to the spring AIMSweb benchmark data

collected in 2015 (RTI instruction with the use of an iPad). The data comprised scores in

the areas of letter naming fluency, letter sound fluency, and phoneme segmentation.

The study examined data from quantitative measures, requiring a quasi-

experimental research design. A quasi-experimental design was deemed the best research

method based upon the selection process of subjects who were not randomly assigned but rather identified through the RTI process. A quasi-experimental method was used to predict the causal impact of an intervention to its population (Creswell, 2012).

Operational Definition of Variables

  Independent variable. The use of an iPad was the independent variable that was manipulated to determine whether it caused an impact on the AIMSweb scores in the areas of letter naming fluency, letter sound fluency, and phoneme segmentation. Students in the treatment group received 30 minutes per week of instruction using the Jolly Phonics App on the iPad. The iPad implementation occurred in combination with 30 minutes per week of teacher-directed sessions of intervention instruction.

  Dependent variable. The dependent variable was student achievement among kindergarten students in the areas of letter sound fluency, letter naming fluency, and phoneme segmentation. For purposes of this study, a summative evaluation was completed comparing two years of AIMSweb spring growth scores. The growth scores consisted of subtracting the winter AIMSweb benchmark scores from the spring AIMSweb benchmark scores. The control group contained students who had not received iPad use as part of RTI intervention instruction (year 1 growth scores). The treatment group utilized iPad applications as part of the RTI intervention instruction (year 2 growth scores).

Threats to Validity

  The focus of this study was to examine the effect of iPad use in relation to kindergarten reading interventions. Factors to increase validity and reliability of the study were implemented.

To ensure treatment fidelity, the same specialist delivered the interventions to each group. The highly qualified staff member was a certified teacher with a master's degree in reading and served as the reading specialist for the building. For consistency, the direct-instruction portion of the interventions was delivered in the same manner to students in both groups. However, the treatment group received 30 minutes less of the direct instruction, which was replaced with 30 minutes of iPad use. To curtail multiple treatment interferences, classroom teachers did not have access to Jolly Phonics on the iPad during regular class time.

One final threat to the external validity of this particular study was how narrowed and controlled the groups were. It may be difficult to generalize this study to all kindergarten students based upon the demographics of the school district. The school district in which the study took place was predominantly White and had a large number of parents who were actively involved in their child's education.

Participants

The study was conducted in a public school district in a south suburb of Chicago, Illinois. The community is located approximately 36 miles southwest of downtown Chicago. The community has a total population of 24,394 residents (New Lenox, 2010). At the time of the study, the school district educated 5,357 students from pre-kindergarten through eighth grade.

This quasi-experimental study included the kindergarten students who attended a public kindergarten center in the previously mentioned school district. The kindergarten center served approximately 460 students, which constituted the entire kindergarten population for the district. At the kindergarten center, approximately 10% of the students

were identified as receiving special education services, while six percent of the students

were considered low income. The student mobility rate for this school was seven

percent. The attendance rate was 96%, and the chronic truancy rate was two percent

Among the students, 90% were White, five percent of the students were Hispanic, three

percent of the students were two or more races, one percent of the students were Asian,

one percent of the students were African American, and one percent of the students were

Pacific Islander. The average class size for this school was 20 students. The students

attended kindergarten for half-day sessions for 2.5 hours, five days per week.

In this district, the average instructional spending per student is $4,586, and the

average operational spending per student is $9,826.

The selection of participants in this study was based upon a stratified sample.

This sampling method was chosen to exclusively include students who qualified for RTI

based upon AIMSweb benchmark scores that fell below the 25th percentile on the winter

benchmark of the AIMSweb assessment.   As illustrated in Table 1, the groups were close

to being equal in regards to gender; the control group hosted 17 males and 12 females,

while the treatment group hosted 15 males and 14 females.

Table 1

Gender Frequency

Gender	Frequency	Percent
Male	32	55.0
Female	26	45.0
Total	58	100.0

Instrumentation

The assessment instrument utilized in this study was AIMSweb. AIMSweb is a

web-based assessment tool utilized for screening, progress monitoring, and data

management for Grades K–12 (Shinn & Shinn, 2002). For students in kindergarten, the

TEL of AIMSweb is utilized; it identifies students at risk for reading difficulties and

monitors the progress of students in kindergarten and early Grade 1 (Shinn & Shinn,

2002). Table 2 lists a description of the components of the TEL utilized in this study.

Table 2

Test of Early Literacy (TEL) Measures

Name of TEL Assessment	Expectation	Length of Assessment
Letter naming fluency (LNF)	Student says names of visually presented letters	1 minute
Letter sound fluency (LSF)	Student says sounds of visually presented letters	1 minute
Phoneme segmentation fluency (PSF)	Student identifies the specific phonemes in orally presented words	1 minute

AIMSweb Reliability

A study, conducted by Elliott, Lee, and Tollefson (2001), determined reliability of probe

scores.   The study involved 75 children at three schools, in a midwestern city. A replica

of the AIMSweb naming letter fluency, letter sound fluency, and phoneme segmentation

fluency probes were administered. Students were assessed in three testing sessions each

two weeks apart. Additionally, 50 cases of each measure were independently scored

from audio recordings. Table 3 represents retest reliability, alternate-form reliability, and

interscorer agreement for each measure.

Table 3

Reliability of TEL Scores (Elliott et al., 2001)

Type of Reliabilty	Letter Naming Fluency	Letter Sound Fluency	Phonemic Segmentation Fluency
Retest	.90	.83	.85
Alternate-form	.80	.82	.84
Interscorer agreement	.94	.82	.87

Validity of AIMSweb

According to the *AIMSWeb Technical Manual* (2012), criterion validity is the

relationship between test scores and a criterion, such as scores on other tests. In addition

to taking the aforementioned TEL replica, the same students were administered additional

assessments throughout the school year. Table 4 represents the correlations of each

student's average score on the three administrations of each curriculum-based measure

with each of the criteria.

Table 4

Criterion Validity of TEL Scores (Elliott et al., 2001)

Criterion	Letter Naming Fluency	Letter Sound Fluency	Phonemic Segmentation Fluency
Woodcock-Johnson Revised, Broad Reading	.63	.58	.44
Woodcock-Johnson Revised, Reading Skills	.75	.72	.60
Test of Phonological Awareness	.50	.68	.52
Teacher rating	.63	.62	.53
Developmental Skills Checklist	.67	.69	.54

Procedures

This study followed a quasi-experimental design. The reading specialist participated in the study by administering RTI interventions utilizing teacher-directed interventions as well as the Jolly Phonics iPad application. The Jolly Phonics application was chosen as an extension of the Jolly Phonics curriculum being taught in all of the kindergarten classrooms. The reading specialist spent one month learning how to use the Jolly Phonics application before implementing the intervention with students.

As represented in Table 5, 29 kindergartners represented the group who received interventions utilizing the iPad Jolly Phonics application. The students were compared to 29 kindergarten students who received RTI services in the previous school year but had not used an iPad application as part of the RTI intervention. The relationship was

explored through an analysis of student achievement results as measured by three

components of the Test of Early Literacy (TEL) on the AIMSweb assessment. The

components of TEL were letter naming fluency (LNF), letter sound fluency (LSF), and

phoneme segmentation fluency (PSF).

Table 5

Study Participants by Group

Group	Intervention Utilized	Number of Students
A-Control Group	Direct Instruction utilizing K-Pals, Jolly Phonics, and Heggerty Phonemic Awareness	$N = 29$
B-Treatment Group	Direct Instruction utilizing K-Pals, Jolly Phonics, and Heggerty Phonemic Awareness iPad Application, Jolly Phonics	$N = 29$

Analysis

This quasi-experimental design study poses the following research questions:

    1. Does utilizing an iPad for interventions have an effect on letter naming

        fluency in kindergarten?

$H_0$1. There will be no difference in letter naming fluency between those who

utilize an iPad and those who do not.

2. Does utilizing an iPad for interventions have an effect on letter sound fluency

in kindergarten?

$H_0$2. There will be no difference in letter sound fluency between those who

utilize an iPad and those who do not.

3. Does utilizing an iPad for interventions have an effect on phoneme

segmentation fluency in kindergarten?

$H_0$3. There will be no difference in phoneme segmentation fluency between

those who utilize an iPad and those who do not.

The scores were analyzed to decide whether there were any significant differences

between the groups using iPad applications for interventions and those who were not

using them.   The model used was a general linear model and an independent sample t-

test analysis was conducted. The t-test compared spring benchmark scores of the control

group and treatment group to determine if there was a significant difference between two

groups in terms of one dependent variable: iPad use as part of the RTI intervention.

Additionally, a Levene's Test for Equality of Variance determined if the two conditions

had about the same or different amounts of variability between scores.

Chapter 4

Results

The purpose of this study was to determine the effect of utilizing technology for implementing reading interventions at the kindergarten level. Statistical Package for Social Sciences (SPSS), published by IBM, was used to analyze the research questions. In this study, kindergarten students were identified as at-risk in the area of reading, as identified by the AIMSweb assessment. The control group of 29 students from a previous school year received reading interventions solely through a direct-instruction model. This group was compared to 29 students who received interventions through a combination of direct instruction and the utilization of an iPad application. The 2014 spring AIMSweb growth scores were compared to the 2015 spring AIMSweb growth scores in each of the following areas: LNF (letter naming fluency), LSF (letter sound fluency), and PSF (phoneme segmentation fluency). Growth scores were calculated by subtracting spring benchmark scores from winter benchmark scores for each year of the study in the areas of LNF, LSF, and PSF. Growth scores were used to determine the actual impact of the intervention to control for differences in students' prior knowledge. Analysis of data determined the effect of utilizing an iPad to administer reading interventions at the kindergarten level.

Effect on Letter Naming Fluency

Research Question 1: Does utilizing an iPad for interventions have an effect on letter naming fluency in kindergarten? $H_0 1$. There will be no difference in letter naming fluency between those who utilize an iPad and those who do not.

Table 6 represents the means and standard deviations of the group utilizing an iPad for intervention, as well as the control group, comparing the performance in LNF from spring 2014 to spring 2015.   C represents the control group of students receiving interventions without an iPad. T represents the treatment group of students receiving interventions with iPad use. Table 7 signifies data from an independent samples t-test that was conducted to compare the mean growth scores of the LNF for the treatment and control groups.

Table 6

Descriptive Statistics for Letter Naming Fluency Comparison 2014-2015

Group	*N*	Mean	Student Deviation	Student Error Mean
C	29	1.38	8.020	1.489
T	29	13.07	8.053	1.495

Table 7

Independent Samples Test Letter Naming Fluency Comparison 2014-2015

		Levene's Test for Equality of Variances		*t* test for Equality of Means		
(2tailed)		F	Sig.	*t*	df	Sig.
LNF Compare	Equal variances assumed	.102	.750	-5.539	56	.000
	Equal variances not assumed			-5.539	55.999	.000

The mean of the LNF spring benchmark for the control group was 1.38. The mean of the LNF spring benchmark for the treatment group was 13.07. A Levene's Test for independent variables was conducted. Because the Levene's Test for Equality of Variances did not show statistical significance at the $p \leq .05$ level, equal variances were

assumed. The t-test yielded a t = -5.5 with 56 degrees of freedom and p = .000. Thus the

difference in means was statistically significant at the p ≤.05 level. In fact, the gains

made by the group of students receiving interventions utilizing the iPad were over nine

times higher than the control group. H_o1 is rejected based upon the findings that students

made statistically significant gains utilizing an iPad for intervention in the area of LNF.

Effect on Letter Sound Fluency

Research Question 2: Does utilizing an iPad for interventions have an effect on

letter sound fluency in kindergarten? $H_0 2$. There will be no difference in letter

sound fluency between those who utilize an iPad and those who do not.

Table 8 represents the means and standard deviations of the group utilizing an

iPad for intervention, as well as the control group, comparing the performance in LSF

from spring 2014 to spring 2015.   C represents the control group of students receiving

interventions without an iPad. T represents the treatment group of students receiving

interventions with iPad use. Table 9 signifies data from an independent samples t-test

that was conducted to compare the mean growth scores of the LSF for the treatment and

control groups.

Table 8

Descriptive Statistics for Letter Sound Fluency Comparison 2014-2015

Group	N	Mean	Student Deviation	Student Error Mean
C	29	7.79	6.114	1.135
T	29	15.24	10.568	1.962

Table 9

Independent Samples Test Letter Sound Fluency Comparison 2014-2015

		Levene's Test for Equality of Variances			t test for Equality of Means		
		F	Sig.		t	df	Sig.
(2tailed)							
LSF Compare	Equal variances assumed	5.119	.028		-3.285	56	.002
	Equal variances not assumed				-3.285	44.856	.002

The mean of the LSF spring benchmark for the control group was 7.79. The mean of the LSF spring benchmark for the treatment group was 15.24. A Levene's Test for independent variables was conducted. A Levene's Test for independent variables was conducted and found to be statistically significant. Because the Levene's Test for Equality of Variances did show statistical significance at the $p \leq .05$ level, equal variances were not assumed. The t-test yielded a $t = -3.2$ with 44 degrees of freedom and $p = .002$. Hence the difference in means was statistically significant at the $p \leq .05$ level. In fact, the gains made by the group of students receiving interventions utilizing the iPad were close to twice as high as the control group. H_o2 is rejected based upon the findings that students made statistically significant gains utilizing an iPad for intervention in the area of LSF.

Effect on Phoneme Segmentation Fluency

Research Question 3: Does utilizing an iPad for interventions have an effect on phoneme segmentation fluency in kindergarten? $H_0 3$. There will be no difference in phoneme segmentation fluency between those who utilize an iPad and those who do not.

Table 10 represents the means and standard deviations of the group utilizing an iPad for intervention, as well as the control group, comparing the performance in PSF from spring 2014 to spring 2015. C represents the control group of students receiving interventions without an iPad. T represents the treatment group of students receiving interventions with iPad use. Table 11 signifies data from an independent samples t-test that was conducted to compare the mean growth scores of the PSF for the treatment and control groups.

Table 10

Descriptive Statistics for Phoneme Segmentation Fluency Comparison 2014-2015

Group	*N*	Mean	Student Deviation	Student Error Mean
C	29	11.31	15.229	2.828
T	29	18.76	15.788	2.932

Table 11

Independent Samples Test Phoneme Segmentation Fluency Comparison 2014-2015

		Levene's Test for Equality of Variances		*t* test for Equality of Means		
(2tailed)		F	Sig.	*t*	df	Sig.
PSF Compare	Equal variances assumed	.194	.661	-1.828	56	.073
	Equal variances not assumed			-1.828	55.928	.073

The mean of the PSF spring benchmark for the control group was 11.31. The mean of the PSF spring benchmark for the treatment group was 18.76. A Levene's Test for independent variables was conducted. Because the Levene's Test for Equality of Variances did not show statistical significance at the p ≤.05 level, equal variances were

assumed. The t-test yielded a t = -1.8 with 56 degrees of freedom and p = .073. Thus the

difference in means was not statistically significant at the p ≤.05 level. H_o3 is accepted

based upon the findings that students made gains utilizing an iPad for intervention in the

area of PSF.

Chapter 5

Conclusions, Observations, and Recommendations

Chapter 5 serves as an outline and summary of the results of this study. It includes a discussion of the findings, the limitations of the study, and the recommendations for further research on the topic of utilizing an iPad for reading intervention at the kindergarten level.

Statement of the Purpose

This study was conducted to determine the effect of utilizing an iPad for reading interventions at the kindergarten level. Specifically, this study pursued the following research questions:

1. Does utilizing an iPad for interventions have an effect on letter naming fluency in kindergarten?

   $H_0$1. There will be no difference in letter naming fluency between those who utilize an iPad and those who do not.

2. Does utilizing an iPad for interventions have an effect on letter sound fluency in kindergarten?

   $H_0$2. There will be no difference in letter sound fluency between those who utilize an iPad and those who do not.

3. Does utilizing an iPad for interventions have an effect on phoneme segmentation fluency in kindergarten?

   $H_0$3. There will be no difference in phoneme segmentation fluency between those who utilize an iPad and those who do not.

Conclusions and Discussions

In the following subsections, conclusions for each research question will be stated based on the data presented and analyzed in Chapter 4. A discussion is presented following each conclusion.

Research Question One: Does utilizing an iPad for interventions have an effect on letter naming fluency in kindergarten? The results of the study were analyzed in an attempt to answer each stated research question. In the area of letter naming fluency, an independent samples t-test was conducted to compare the mean growth scores of the LNF treatment and control groups. The difference in means was statistically significant at the p ≤.05 level. In fact, the gains made by the group of students receiving interventions utilizing the iPad were over nine times higher than the control group.

This study differs from the results of a study conducted by Brown and Harmon (2013) that found no statistical significance with iPad use and letter naming fluency. However, the aforementioned study was not conducted with the Jolly Phonics iPad application. In fact, no research was found using the Jolly Phonics application on the iPad using similar participants to this study.

Research Question Two: Does utilizing an iPad for interventions have an effect on letter sound fluency in kindergarten? In the area of letter sound fluency, an independent samples t-test was conducted to compare the mean growth scores of the LSF treatment and control groups. The difference in means was statistically significant at the p ≤.05 level. The gains made by the group of students receiving interventions utilizing the iPad were almost twice that of the control group.

According to research conducted by Macaruso and Rodman (2011), students demonstrated an increase in performance on both phonemic awareness and the ability to represent sounds with letters, due to the utilization of an iPad intervention. Such research concurred with the results of this study.

Research Question Three: Does utilizing an iPad for interventions have an effect on phoneme segmentation fluency in kindergarten? In the area of phoneme segmentation fluency, an independent samples t-test was conducted to compare the mean growth scores of the PSF treatment and control groups. Since $p = .073$, the difference in means was not statistically significant at the $p \leq .05$.

This researcher's findings contrast with those of a recent study conducted by Bebell et al. (2012) that resulted in an increase of phonemic awareness after utilizing iPads for nine weeks. Although the Bebell et al. study did not focus on reading interventions targeting students at risk in the area of reading, the study did demonstrate a direct correlation with students utilizing iPads and gains in phonemic awareness ability. No research was found using similar participants to this study.

Study Limitations

As with most studies, this one contains limitations. In Illinois, kindergarten students in public school must be five years of age on or before September 1. Comparing students who have just turned five versus students who turn six the first week of September could be considered a limiting factor, due to the difference in maturation.

One might perceive incidental instruction by the classroom teacher as a limitation as well. Interventions were administered from the same certified reading specialist over the course of two years. However, students also received instruction from their

classroom teacher throughout the school day. One might argue that a teacher could unintentionally provide students with iPad interventions as part of their teaching method. Facilitating iPad use could be viewed as additional instruction, thus creating a limitation.

Along with the aforementioned limitations, consideration to the time devoted to phonemic awareness in the intervention process could be a limitation. Perhaps, an equal amount of time spent on letter naming fluency, letter sound fluency, and phonemic awareness would have provided different results. Also, the use of the Jolly Phonics App could be considered a limitation if the students were not expected to access the phonemic awareness components of the application. Lastly, perhaps phoneme segmentation interventions need to be administered in a direct-instruction model, rather than through the use of an iPad.

Implications for Future Current Practice

In relation to this study, New Lenox School District #122 has purchased the Jolly Phonics application for all iPads at Spencer Trail Kindergarten Center. Research regarding the utilization of the app for the entire kindergarten population is recommended. New Lenox School District #122 will provide all kindergarten students with individual iPads to be used during the school day, for the 2016-2017 school year. This researcher highly recommends a comprehensive study of the effects of 1:1 iPad utilization at the kindergarten level.

Recommendations for Future Studies

For educators seeking to determine the best use of iPads among kindergarten students, this study may serve as a starting point. A study reflecting a student population of lower socioeconomic status should be considered. In regards to population, this study

focused solely on students qualifying for RTI services. It is the opinion of this researcher to conduct a study looking at the effect of iPad use among an entire population of students utilizing iPads. The length of this study was two years. Those choosing to replicate this study should consider examining data over multiple years.

In conclusion, children are growing up in social conditions where technology has been an integral part of their lives (Zevenbergen & Logan, 2008). Such digital natives may not respond well to traditional methods of teaching as they will not capture, or sustain, their interest (Harvey-Woodall, 2009). This factor, along with the results of this study, substantiates the need to utilize the very tool that appeals to young children in order to ensure progress. As technological advances continue at a rapid speed and school districts continue to spend millions of dollars per year on technology, further research on how to maximize technology for young learners is essential. This researcher challenges the reader to ponder the idea that perhaps the funding for technology should be placed in the hands of the digital natives in order to both maximize the expense as well as prepare students for the future.

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Appendix

Appendix A

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August 28, 2014

Ms. Lori Motsch
1107 Windsor Dr.
Shorewood, IL 60404

Dear Lori:

The Institutional Review Board has reviewed your research project: *"Technology in Kindergarten for Reading Intervention Instruction" (IRB # 2014-15-0021).* Your research project has been **approved as an exempt study.**

This approval is valid for one year from the date of this letter. Should there be any changes to your study, you are required to submit additional documentation to the IRB **prior** to implementing those changes. **You are also required to close out this study once it is complete.**

If you have any questions regarding this letter, please contact me at lwhitemcnulty@stfrancis.edu. Good luck with your study.

Sincerely,

Lisa White-McNulty, Chair
Institutional Review Board