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Utilizing iPad Applications to Increase Preschool Students' Knowledge of Rhyme

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in Partial Fulfillment of the Requirements
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Table of Contents

Abstract.....	4
Introduction.....	5
Literature Review.....	8
Importance of Rhyme.....	8
Phonological Awareness.....	8
iPads and Literature.....	9
Increased Motivation.....	11
Social Development.....	12
Language Development.....	13
iPads and Students with Special Needs.....	14
Home-School Connection.....	16
Applications.....	16
Screen Time.....	17
Concerns with Technology.....	18
Methods.....	21
Participants.....	21
Data Collection.....	21

Findings.....25

 Data Analysis.....25

Discussion..... 29

 Summary of Major Findings.....29

 Limitations of Study.....29

 Further Study.....30

Conclusion.....32

References..... 34

Abstract

The purpose of this study was to determine if utilizing iPad applications (apps) in a preschool classroom can increase students' phonemic awareness skills, specifically knowledge of rhyme. Research completed by Hornsby and Wilson tell us that rhyme is a great opportunity for students to practice phonics, which in turn enhances literacy skills. Rhyme allows them to play with the sounds within words and helps them to understand the sounds that letters make. A classroom of ten preschool students were allowed to utilize ABCmouse (2005) and Montessori-Rhyme Time learning games for kids (2013) applications on iPads during free choice times for six months. The class was assessed using the Teaching Strategies GOLD (2019) continuum throughout the year, focusing on three main checkpoints. Data shows that there was a statistically significant increase in students' knowledge of rhyme scores throughout the year after utilizing the applications. This study may be beneficial to other early childhood educators trying to determine whether or not to utilize technology in their classroom.

Keywords: iPads, rhyme

Utilizing iPad Applications to Increase Preschool Students' Knowledge of Rhyme

In order to help a child learn to read teachers and parents must use a rich vocabulary with early learners, students need multiple opportunities to hear and use language (Lennox, 2014). Lennox (2014) shares that poetry and rhyme are wonderful opportunities to introduce such rich language and they also help to gain a child's attention. Rhyme helps teach students phonics, the relationship between letters and sounds (Hornsby & Wilson, 2014). Children learn phonics while talking, reading, and writing. Rhyme is a great opportunity for students to practice phonics, thus enhancing their literacy skills (Hornsby & Wilson, 2014). Several studies have been completed to determine the effects of iPad use on students' literacy skills (DaCunha, 2016; Beschorner & Hutchinson, 2013; Motsch, 2016; Neumann et al., 2017). Each of these studies found that utilizing iPads in the classroom helped to increase students' literacy skills.

This research project aims to look at the use of iPads applications (apps) in an early childhood classroom and the effect they may have on students' phonemic awareness skills, particularly rhyme knowledge. Technology has become more and more prevalent in classrooms across the United States. Schools have begun a push to use more and more technology at younger and younger ages. Tools such as iPads, desktop computers, and even SMART board technology are available in many classrooms across the United States. Technology is an important tool for students, it is important that they understand how to use different types of technology as a tool and how to be a responsible digital citizen, as it is something that they will use for their entire lives.

The amount of screen time that is appropriate for a child is an ever-changing debate. While children continue to have access to more and more screens, at all times, the question becomes if it is appropriate to increase the amount of screen time preschool students have each day by utilizing them in the classroom as well. Organizations such as the American Association of Pediatrics (AAP) and the National Association for the Education of Young Children (NAEYC) have taken a closer look at the effects of screens on young children and have come up with their own guidelines for screen times. Both NAEYC (2012) and the AAP (2016) have suggested that young children should only have a short amount of time, around one hour or less, of developmentally appropriate and interactive screen time a day. While we know technology, such as an iPad, is an important tool for students throughout their lives, we also want to be mindful of the amount of screen time that children have throughout each day. More and more companies are creating apps targeted at young children, claiming to be educational. This research project aims to look at two specific applications for iPads; ABCmouse (2005) and Montessori – Rhyme Time learning games for kids (2013), to see what effects, if any, they have on student learning.

Further research is needed to find out the implications of the use of screens in preschool classrooms in order to increase literacy skills, such as the ability to rhyme. Rhyme is an important phonological awareness skill which helps children learn to read (Mihai et al., 2015). This action research project looks to explore the impact that the use of iPad apps may or may not have on preschool students' knowledge of rhyme. For the sake of this action research project, the teacher researcher was only able to download free applications onto the iPads available in the

classroom. These applications were available for free on the Apple store for any teacher to download for their classroom. Findings from this study could help other early childhood educators decide if it is beneficial to utilize screen time in their classrooms. The importance of reading and being literate in the world is immeasurable, they are important lifelong skills that every student needs. Increasing these literacy skills in preschool could affect students' learning throughout their academic lives, potentially lifelong.

Literature Review

Importance of Rhyme

The purpose of this study is to determine if the use of iPad apps increase a preschooler's phonemic awareness, specifically rhyme knowledge. Early literacy skills are important to help children learn to read (Watson & Terrell, 2018). Some literacy skills predict children's literacy development, such as alphabet knowledge and phonological awareness. Nursery rhymes, songs and fingerplays are activities that develop an awareness of rhyme, prosody and rhythm that help build a foundation for reading (Watson & Terrell, 2018, p. 150). Rhyme helps strengthen students' oral and written language abilities. It helps provide students opportunities to develop clear articulation in speech and phonological awareness. Chanting rhymes help exercise the muscles in the mouth and tongue which enhances speech development (Lennox, 2014).

Phonological awareness

Phonological awareness consists of identifying and manipulating units of sound. It is recognizing words, syllables, onset and rime in spoken language. Phonological awareness encompasses phonemic awareness. We move from awareness of words to syllables, the ability to distinguish rhyme to making up our own rhyming words, to alliteration and finally, to manipulating the individual sounds in words, which is phonemic awareness (Lennox, 2014). The focus of this research project is phonemic awareness which consists of rhyming, segmentation, isolation, deletion, substitution, and blending sounds. Phonemes are the sounds within spoken words; the ability to hear and identify those sounds, as well as change or move the

sounds in words is phonemic awareness (Lennox, 2014). Alghazo and Al-Hilawani (2010) remind us of the importance of teaching phonological awareness, the ability to manipulate and detect sounds in words, independent of their meaning. The study completed by Alghazo and Al-Hilawani (2010) found that teacher training was the most important factor in students' phonological awareness learning, even over teachers' years of experience.

Phonics is the next step in phonological awareness. Phonics is the relationship between letters and sounds (Hornsby & Wilson, 2014). Hornsby and Wilson (2014) remind us that even though there are 26 letters in the English language, there are approximately 44 sounds. Rhyme helps teach phonics, it can be a valuable resource for teaching not only the sounds in language, but also the letters that represent those sounds (Hornsby & Wilson, 2014). Supporting the development of young children's phonological awareness is an important part of helping a child learn to read. (Mihai et al., 2015, p. 15). These are skills to focus on in preschool classrooms, as they are lifelong skills for students.

iPads and literacy

Improving phonemic awareness in children is an important building block of early literacy skills, several studies have been done on the use of technology to aid in learning. Watson and Terrell (2018) caution about the use of digital media when teaching early literacy skills, especially in younger children. They argue that children in the sensorimotor stage of development experience the world through all of their senses and motor movements. While using applications, children can see and hear them, though they cannot taste, feel, or manipulate

them (p. 157). However, DaCunha (2016) pointed out that children learn in many different ways: visually, auditory, tactile, and kinesthetically. DaCunha found that using iPads reaches three out of the four learning styles, visual, auditory and tactile (p. 3). Merchant (2015) argued that kinesthetic skills are needed to access meaning in story and game applications, thus iPads reach all of the different ways that children learn. Additionally, Neumann, Finger, and Neumann (2017) found that digital texts have the potential to engage a wider range of senses than non-digital books, because of the features that can stimulate visual, auditory, and tactile, as well as, kinesthetic senses.

A number of studies have been conducted to determine the impact of technology on the literacy skills of young children (DaCunha, 2016; Beschorner & Hutchinson, 2013; Motsch, 2016; Neumann et al., 2017). DaCunha (2016) completed a study on iPad use to increase phonological awareness. She found that scores in alliteration and knowledge of syllables increased while using several apps that she chose for their focus on phonological awareness. Beschorner and Hutchison (2013) also completed a study that allowed students to explore different types of apps. The study suggested that an iPad can be used in multiple ways as an instructional tool, to support the teaching of emergent literacy in an early childhood classroom (p. 20). In addition, Motsch (2016) conducted a study with students who had qualified for reading interventions. Motsch provided thirty minutes of direct instruction and thirty minutes of student iPad use, specifically utilizing the app Jolly Phonics, per week to find if there was an effect on letter naming fluency, letter sound fluency, and phoneme segmentation fluency.

Motsch (2016) concluded that the participants scores increased nine times in letter naming fluency, nearly two times higher scores in letter sound fluency, and her study found there was no increase in the students' phoneme segmentation fluency scores.

Neumann, Finger, and Neumann (2017) found that there is a benefit to utilizing both digital and traditional books to support a child's early literacy skills. Some benefits they found to using an iPad were that applications act as environmental print; applications are often displayed on the home screen as a picture icon with the written name underneath it. Students recognize the icon for the app and then later begin to recognize and read the names of the applications (Neumann et al., 2017). Beschoner and Hutchison (2013) agreed that iPads help create an awareness of print with icons helping students transition from environmental print; recognizing a logo, to sounding out and reading the name of the application. Neumann, Finger and Neumann (2017) found that students were also more motivated and engaged in the activities, along with digital texts potentially engaging more senses than traditional book reading.

Increased Motivation

Several studies have found that the use of technology, namely iPad use, increased student's motivation to complete required activities (Neumann et al., 2017; Huang, Clark, & Wedel, 2013; Flewitt, Messer, & Kucirkova, 2015; Ralph, 2018). Neumann et al. (2017) speculate that digital text reading may be more motivational for students because there is more engagement with the text. The digital text can allow for hyperlinks to games, videos, and other explanations of the text. Huang, Clark, and Wedel (2013) found in their study of two struggling

readers with ADHD that the students had longer attention spans while using the iPads, they gradually gained confidence in their skills and it helped them learn independently and develop positive attitudes about their learning. The iPads served as motivation for both of the students. Additionally, Flewitt, Messer, and Kucirkova (2015) discovered students were motivated by the ability to immediately use what they learned on the iPads. For example, the students involved in their study took pictures while out on a nature walk, they were then able to go inside and immediately upload them into a story app to create their own story about the walk. Teachers reported the students had increased motivation during the activity since it was all so fresh. Furthermore, Ralph (2018) also found that using technology increased the students' interest and motivation in the activities. Students were asked to work together to create a puppet and then record a puppet show, they were very engaged in the activity and exhibited excitement while working with the other students.

Social Development

There may be other benefits to using iPads in the classroom in addition to academic development. Beschoner and Hutchison (2013), as well as, Kirova and Jamison (2018) found that while using iPads students frequently talked or worked together, iPads helped increase cooperation between students. Ralph (2018) completed a study of the prosocial behaviors of students while using iPads. She found that prosocial behaviors, including sharing, were seen the most when the students were using technology in a group. In fact, Ralph (2018) noted that while

using iPads 1:1, students were more likely to exhibit antisocial behaviors, avoiding contact with other children while they were engrossed in their activity.

Flewitt, Messer, and Kucirkova (2015) completed a study of three early childhood locations in the United Kingdom. The first location was a 3- to 4-year-old nursery school classroom with 16 children. The second was a preschool classroom with 30 students aged 4-to 5-year-old. Thirdly, was a school classroom with 7- to 13-year-old students with varying learning disabilities. Flewitt et al. (2015) reported that most of the staff involved in their study commented on the children's collaboration with the iPad. The teachers, across the settings, reported that the children often shared activities, took turns, and celebrated the accomplishments of the other students. Additionally, DaCunha (2016) stated that sharing became a big theme of her study that she was not expecting. Throughout her study, DaCunha recorded anecdotal notes in a journal, at the end of the study she coded her journal and noticed a common theme, sharing. DaCunha noted that students were helping each other through the app while sharing and taking turns (DaCunha, 2016, p. 59).

Language development

Flewitt, Messer, and Kucirkova (2015) noted that most of the staff involved in their study noticed an increase in students' language and communication. The staff in the 3- to 4-year-old room noted how children who were English language learners were able to name items on the apps and that shy children started talking more. One teacher found that the students who usually made the most noise were quieter because they were concentrating on the iPad and it

gave the quieter students the chance to use more language. All students in Chmiliar's 2017 study increased their vocalizations and vocabulary both at home and in school after using iPads in both settings. Turkestani (2015) observed that language scores increased and were noted higher in students with hearing impairments using iPads.

iPads and Students with Special Needs

Chmiliar (2017) conducted a study of eight preschoolers, ages 3- to 5-years-old, with a range of disabilities. Each student received an iPad for use at home and at school for 21 weeks. Chmiliar found that all of the students eventually learned to use the iPads independently and all eight students made learning gains in multiple areas, including tracing letters and printing their names. Several students made gains in letter recognition and letter sounds, some even learned simple words. Two students became very interested in reading sentences within the apps. All of the students increased vocalizations and vocabulary, both at home and at school. Three of the eight students were observed sustaining attention for longer and longer periods of time (Chmiliar, 2017). Additionally, Huang, Clark, and Wedel (2013) found that using iPads to assist two struggling readers with ADHD helped them to feel successful, gain confidence and was a motivating tool for the students.

Nepo (2017) looked at the use of technology as tools to help improve all students overall learning. The Individuals with Disabilities Act (IDEA) was amended in 1997 to include assistive technology; meaning any equipment used to increase, maintain, or improve the capabilities of a child with a disability. Ok (2018) found that iPads are often used as assistive

technology because they are small, light and easy to use. iPads have multiple built-in functions that include internet access, built in camera, video and microphone, including Siri which can function through voice commands. iPads are also more socially acceptable than other adaptive technology built for specific functions (Ok, 2018). Chmiliar (2017) adds that iPads provide easy interaction on a touch screen with access to many intuitive, engaging learning applications. For all of these reasons, Turkestani (2015) completed a study of 15 students, 4- to 6-years-old with hearing impairments, all of the students use a hearing aid. Half of the students began to utilize an iPad in the classroom and the other half continued without. These students had no computers or other devices at home and no previous internet experience. Results of the study show that the group of students that used iPads increased in all areas, language, cognitive, motor, and social/affective. The group of students that did not utilize iPads only showed growth in the motor and social/affective areas. The language, cognitive, and social/affective scores were higher in the group of students with iPads than those without (Turkestani, 2015).

Nepo (2017) claims that the use of technology in a classroom could ultimately, and ideally, lead to reduced need for self-contained classrooms and there would possibly be no further need for a special education classification, as the technology would be available in every classroom to every student. Nepo also claims that this could lead to less discrimination of students with special needs, as it would not be anything different for individual students, but instead, would be available in all classrooms for all children. Though he also admits that currently this is not the situation and often time technology is only used as adaptations for

students with Special needs, therefore furthering stigmas and discrimination by pointing out their need for such accommodations.

Home-School connection

Neumann and Neumann (2014) found that if preschoolers also had access to technology tools at home as well as school, that there was a positive correlation to the child's letter sound knowledge and their ability to write their name. Additionally, Neumann, Finger, and Neumann (2017) also found that if a student was allowed to use the technology at home there was a correlation to a higher proficiency academically. Chmiliar's (2017) study involved determining the effects of students using the iPads both at school and at home with parents. Similar to Neumann and Neumann (2014), Chmiliar found growth in several areas of learning, including letter recognition, letter sounds and the ability to trace or print their name. Flewitt et al. (2015) found that teachers acknowledged that most children are already familiar with using touch screens at home, mainly through smartphone use.

Applications

It is important when deciding whether to use an iPad or not, to determine the applications (apps) to be used with students. Neumann and Neumann (2014) state that there are three types of apps for children: gaming apps, creating apps and interactive e-books. Literacy apps should have the following features in their design according to Neumann and Neumann (2014). First, the applications need to be age appropriate and linked to the school's literacy curriculum. Secondly, that they stimulate all of the senses and are highly interactive. It is also important that

apps build on the student's previous knowledge and encourage critical thinking, problem solving skills, and creativity. Apps should have clear instructions, so the child has full understanding of what to do and should also provide opportunities for students to work together. Finally, it is important that the application gives the child feedback regularly and guides the student learning instead of ending with the right or wrong performance (p. 234). Beschorner and Hutchison (2013) agree that teachers should choose apps that allow students to make choices, allow opportunities to discover, explore, imagine and problem-solve.

Screen Time

The National Association for the Education of Young Children (NAEYC) worked together with the Fred Rogers Center for Early Learning (2012) to develop a position statement on screen time for early childhood. Their findings were, among other things, to choose technology tools intentionally and use them in developmentally appropriate ways. Early childhood educators should also use technology as a tool to support hands-on learning, not replace it. They emphasized finding applications and activities that are developmentally appropriate for children and do not replace active learning within the classroom.

In 2016 the American Academy of Pediatrics (AAP) recommended that children ages 2- to 5-years-old should have screen time limited to one hour per day and only with the use of high-quality programs. The AAP also suggests designating media-free times together as a family and media-free zones in a household, such as no screens in a child's bedroom. They recommend that an adult always be near children while they are using screens, especially those ages 2- to 5-years-

old, in order to help them understand what they are seeing on the screen. Neumann and Neumann (2017) also noted that in the classroom, teacher scaffolding was the best way for children to learn from their time utilizing technology tools.

Concerns with utilizing technology

The American Academy of Pediatrics (2016) stated that there may be other health concerns associated with the use of technology. They suggest that a child's risk of obesity and the possibility for developmental delays rises with the amount of media they use. Teachers also have concerns with the additional use of technology in classrooms. Flewitt, Messer, and Kucirkova (2015) performed a study of iPad use in three different early childhood settings. They found that at the beginning of the study, the teachers in all settings, who were given iPads, voiced concerns about the addictive and over stimulating nature of games. The teachers and staff felt as if children don't spend enough time outdoors and do too much sitting already. The teachers also felt that including the iPads would deny language opportunities for students. Throughout their study, Flewitt et al. (2015) found that the power balance in the classroom between students and teachers was tipped, the students often became empowered in the expert roles, sometimes even teaching the staff how to use different applications. They also found that, especially in the 3- to 4-year-old children, that the children may become frustrated if they were uncertain of how to complete the task. The younger learners also often argued over whose turn it was or were all trying to touch the screen at once, causing frustration (Flewitt et al., 2015).

There were other concerns with using technology in the classroom that came up in several studies, not only for the students, but also for teachers. Flewitt, Messer, and Kucirkova (2015) found that the teachers had to spend many hours on their own time looking for different applications that were both appropriate and also supported the specific learning targets. There were times that Flewitt et al. (2015) noted that the teachers ran into technical difficulties which interrupted learning. Teachers were hopeful that the longer they used the technology, the more well versed they would become and there would be less time dealing with such interruptions. It was also noted that technology seems to be thrown at schools and teachers without proper education for the adults as well, adding to frustration (Flewitt et al., 2015).

Parents also had concerns when it came to their children utilizing technology tools. O'Connor and Fotakopoulou surveyed 226 parents and grandparents across the United Kingdom in 2016 to see how they felt about their 0- to 3-year-old children's use of technology. They found that parents have beliefs about technology that are based on the parents' own ideas of what they consider to be a good parenting. Parents surveyed often put time limits on their child's use of technology and preferred that their children played, what they deemed, 'educational' games while using it. The survey by O'Connor and Fotakopoulou (2016) showed that the majority of parents believed that introducing the technology tools at an early age helps to better prepare their child for the workforce. A third of the parents surveyed believed that their child may fall behind in school if they limited their child's access to technology. Over half of the parents reported that their children involved in the study use a smartphone or iPad daily, the vast majority of those participants say that their child uses the technology to play games. Of that large

majority of students playing games, two-thirds of those parents report that it is used primarily to play learning games or educational apps. Many of the parents reported that they believe that allowing the use of technology is an investment in their child's future. Conversely, the parents also reported that they worry about their children becoming addicted to the technology, it having negative effects or the possibility of causing developmental delays. Parents also worried that it may have negative effects on their child's social interactions or that their child may use the technology tools to access inappropriate content (O'Connor & Fotakopoulou, 2016). Parents in Chmiliar's (2017) study noted that it was also difficult to set limits around the use of the iPad, especially when they considered the progress that their child was making with it.

Though literature specific to increasing rhyme with iPads is sparse, literature does exist on the benefits of using iPads in an early childhood classroom. Sharing (DaCunha, 2016; Beschorner & Hutchison, 2013), aiding in individualizing instruction (Nepo, 2017), increasing language development (Flewitt, Messer, & Kucirkova, 2015; Turkestani, 2015; Chmiliar, 2017), and increasing reading environmental print (Neumann, Finger, & Neumann, 2017; Beschorner & Hutchison, 2013) were themes that these studies found while utilizing iPads with children. There were gains in phonological awareness shown through the literature as well. DaCunha (2016) found that alliteration and syllable knowledge scores increased after incorporating iPads in the classroom. Several studies showed an increase in both letter naming fluency and letter sound fluency after including iPads (Motsch, 2016; Neumann & Neumann, 2014; Chmiliar, 2017). More study needs to be done to determine the influence of iPads on phonemic awareness.

Methods

Participants

This action research project was conducted throughout the 2018-2019 school year in a district run, inclusive Pre-Kindergarten classroom. The class meets for 2.5 hours each morning, Monday through Friday. There are ten students ranging from 4- to 5-years-old. There are five females and five males in the classroom. Seven of the students attended three-year-old classes of the same preschool program. Two students are receiving special education services, and another is receiving speech services. There are three English language learners in the classroom as well. There is an itinerant special education teacher that comes into the classroom for 30 minutes five days a week. One student moved into the classroom at the end of October, after the first GOLD checkpoint.

Data Collection

The teacher researcher began the school year teaching students about rhyme through story times. While reading a book each day during circle time, the teacher researcher would point out if there were rhymes and have the students listen for and repeat the rhyming words. The researcher taught the students rhyming songs and fingerplays. Data was compiled using Teaching Strategies GOLD (2019) assessment which is based on a continuum from birth through third grade. The students were placed on the continuum after the first month of school as a baseline. For the purposes of this research project the teacher researcher looked specifically at objective 15a. notices and discriminates rhyme (Teaching Strategies 2019).

iPads were introduced to students as a partner activity in December. The first day the students were introduced to the ABCmouse (2005) application. In this app the students were able to navigate a learning path that allows them to work through lessons and activities in order to earn tickets to spend on their avatar, pets, and virtual room. The students worked together to navigate the site and work through an activity assigned to them by the teacher. The second day the students were introduced to Montessori - Rhyme Time learning games for kids (2013) app. In this app the students are shown pictures on the screen and asked which pictures rhyme. The students were allowed to navigate together through the app and complete the activities they chose. After a week of using the iPads as partner work, the teacher researcher put all five iPads out at choice time and the students were able to use one after their small group work was completed. The teacher researcher noticed that a few children were rushing to get through their small group work or would become upset if they did not get an iPad for the day. There were also a few students who never got the chance with an iPad as they are so quiet, so the way students got an iPad was changed. The class was already split up into two groups of five students for small group activities, the red group and the blue group. The teacher researcher placed a colored square, either blue or red, next to the free choice time on the visual schedule so that the students would know when they would get a turn on the iPads, without having to worry or rush. It would alternate every other day, red then blue, and if there was an event or visitors scheduled for that day, the iPads would not be out. The students were very receptive to this idea and the transition went very smoothly.

The students had free choice on the iPads throughout the 45-minute free play time, when it was their turn. They were able to use ABCmouse, Montessori – Rhyme Time learning games for kids, or PBS kids apps. The teacher researcher would note which application the student clicked on first each day when they got the iPad. The teacher researcher noted that the students overwhelmingly chose the ABCmouse app first. The students would play a few games or do a few activities where they could earn tickets, and then they would go to their virtual room and purchase items for their pets, new clothing for their avatar, or items for their room. The teacher researcher assigned activities for each child to complete on the ABCmouse app, but the students did not need to complete these in order to move on in the application. The teacher researcher, because of this, would occasionally use the iPads for the small group time activity for the day and allowed the students to work as partners to play on the Montessori Rhymes app.

Quantitative data was collected on Teaching Strategies GOLD. GOLD has been found highly valid and reliable. To determine reliability and validity the infit and outfit mean square error was used. If fit statistics ranges from 0.6 to 1.4 it is considered to measure effectively. Every item on the six scales of Teaching Strategies GOLD, except one item on the literacy scale, met that criteria. Person and item reliability were tested. Scores of 0.8 or higher are considered strong indicators of reliability. Person reliability ranged from .90 to .97 and item reliabilities were .99 for all scales on Teaching Strategies GOLD. Scores of .8 or higher in internal consistency reliability are strong indicators of reliability. The internal consistency

reliability statistics ranged from .94 to .97 on Teaching Strategies GOLD. (Teaching Strategies GOLD, 2012, p. 6)

GOLD uses a continuum of growth from birth through third grade, age categories are placed on the continuum by color bands. Teaching Strategies (2019) describe the color bands as widely held expectations for typically developing children in each age group. The color bands also overlap because growth and development can happen differently for every child, this is to be used to help guide teachers to work with children at any level, as it is a progression throughout the early childhood years. The objective that the teacher researcher focused on for the purposes of this study was objective 15a: notices and discriminates rhyme (Teaching Strategies, 2019). The color band for 4-5-year-olds is blue and stretches from level 4: fills in the missing rhyming word and/or generated rhyming words spontaneously to level 6: decides whether two words rhyme. GOLD data is collected throughout the school year, but the preschool program utilizes three checkpoints, the first in October as a baseline, the second in February, and the last in May at the end of the school year.

Findings

Data Analysis

The teacher researcher collected data from observations, student journals, and conversations with students in order to place the students onto the Teaching Strategies GOLD continuum. The teacher researcher is looking to see growth on GOLD objective 15a between the checkpoints. GOLD (2019) states that a typical 4- to 5-year-old would range from level four to level six on the continuum for objective 15a. notices and discriminates rhyme. Table 1 shows only four students began the year at a level four or above, but by the end of the school year nine out of ten students had met the age appropriate levels in GOLD.

Table 1

Student GOLD Objective 15a Levels

<u>Student</u>	<u>Fall data</u>	<u>Winter data</u>	<u>Spring data</u>
A	2	3	3
B	3	6	6
C	4	5	5
D	3	4	4
E	4	5	5
F	4	5	5
G	3	4	5
H	2	3	4
I	4	5	6
J	3	4	5

Note. student J moved into the classroom after Fall checkpoint, this level is their baseline in Nov.

The first checkpoint was completed in mid-October, after six weeks of school. This serves as a baseline for the students' growth. The winter checkpoint was completed in mid-February, two months after the introduction of iPads. The spring checkpoint was completed in May, at the end of the school year. Every student made growth in the area of rhyme from the

beginning of the year. The average growth for the students was 1.6 levels throughout the year. A one-way repeated measures *ANOVA* was conducted to compare the effect of the use of iPad apps on the students' rhyme knowledge in the fall, winter, and spring GOLD checkpoints and there was a statistically significant difference between groups with .00001 practical significance, $F(2,18) = 36.00, p < .05, \eta^2 = .39$.

As stated before, the teacher researcher found that the students were overwhelmingly choosing the ABCmouse application. The teacher researcher found that the students chose to work their way through the learning path, which includes many learning activities on letter recognition and sounds, number recognition and counting, colors and shapes, as well as rhyme. As a result, the teacher researcher was curious to see if those scores were affected as well. Table 2 shows the students levels on GOLD objective 16a. identifies and names letters. GOLD (2019) states that a typical 4- to 5-year-old would range from level two: recognizes and names a few letters in their own name, to level five: recognizes and names more than ten letters in both upper- and lowercase, on the continuum for objective 16a.

Table 2

Student GOLD Objective 16a Levels

<u>Student</u>	<u>Fall data</u>	<u>Winter data</u>	<u>Spring data</u>
A	Not yet	Not yet	1
B	2	3	3
C	1	2	3
D	1	4	4
E	2	2	3
F	5	6	6
G	2	2	3
H	1	4	4
I	6	7	7
J	1	2	3

Note. student J moved into the classroom after Fall checkpoint, this level is their baseline in Nov.

Again, every student made growth in letter knowledge. The average growth was 1.6 levels. By the end of the school year 90% of students met or exceeded the age appropriate level in GOLD. Table 3 shows the students levels on GOLD objective 16b. identifies letter-sound correspondence. GOLD (2019) states that a typical 4- to 5-year-old would range from level two: identifies the sounds of a few letters, to level five: not yet consistently producing the sound for each letter of the alphabet, on the continuum for objective 16b.

Table 3

Student GOLD Objective 16b Levels

<u>Student</u>	<u>Fall data</u>	<u>Winter data</u>	<u>Spring data</u>
A	Not yet	Not yet	Not yet
B	Not yet	2	3
C	Not yet	1	2
D	Not yet	1	1
E	1	1	1
F	1	4	4
G	1	1	2
H	Not yet	1	1
I	2	4	4
J	1	1	2

Note. student J moved into the classroom after Fall checkpoint, this level is their baseline in Nov.

Eighty percent of students made growth with letter sound knowledge. The average growth was 1.4 levels over the course of the school year. Overall, the students made growth in each area.

Discussion

Summary of Major Findings

The findings of this study indicate that the use of the iPad applications ABCmouse (2005) and Montessori – Rhyme Time learning games for kids (2013) have a positive impact on preschool students' rhyme knowledge. Data shows that there was a statistically significant increase in students' knowledge of rhyme scores throughout the year after utilizing the applications. The use of the ABCmouse app may have also led to an increase in other literacy skills for students, specifically letter identification and letter sounds.

Limitations of the Study

The number of students involved in the study is a limiting factor, there were only ten students in the classroom. The study was conducted in only one preschool classroom, the age of the children could also be a limitation. The children involved in the study were four and five years old. If this study were completed in one of the preschool program's three-year-old classrooms, or in one of the district's Kindergarten or first grade classrooms, the results may have been affected.

Another possible limitation of this study could be that students were not 1:1 with the iPads. There were five student iPads available in the classroom with ten students, the students had a rotation, not every student would use an iPad every day. The teacher researcher is not aware of how much time the students were or were not spending on devices at home. Time spent on a device at home could be another factor in students' scores, some students may have

these applications, or others on devices at home, allowing for more time spent actively working on these skills. Another possible limitation is students who are not native English speakers, there were three English Language Learners in the class. If a student is just learning the English language it may be more difficult for them to rhyme or distinguish rhyme in a new language. Students on an Individual Education Plan, especially those with cognitive or hearing problems may have a harder time distinguishing rhyme.

The applications used by the students could be another limitation. There may be other apps out there to help the students better learn and practice rhyme that were not explored. The teacher researcher had not utilized the apps used in the study before. The researcher found that the students were drawn towards the ABCmouse app, with the variety of activities that could be completed, not all pertaining to rhyme, or even phonemic awareness skills. The Montessori app appeared to be fun and engaging for students for a short time, it was not the first choice for most students and was only chosen occasionally. There is not as much diversity in this app, students were able to play one of three levels, but always the same type of rhyming activities in each level. Another application may have been more engaging for students and focused more on literacy skills. The teacher researcher was limited by the cost of apps as well, all of the apps on the iPads needed to be free to download.

Further Study

The teacher researcher would like to see the students' scores throughout their kindergarten year to determine if these students retained their knowledge of rhyme. The

researcher would like to continue this study in the next school year with more students, including at least one of the three-year-old classrooms. Focusing on one application would be beneficial to see if there is a difference in results between the use of the ABCmouse app or the Montessori – Rhyme Time learning games for kids app.

Conclusion

The findings of this study suggest that using specific iPad applications, ABCmouse (2005) and Montessori-Rhyme Time learning games for kids (2013), increase students' knowledge of rhyme. The classroom consisted of ten students with ranging academic abilities. Students were allowed to use iPads during a free choice time, every other day. As shown in Table 1, all students knowledge of rhyme increased throughout the year.

Throughout the literature phonological awareness skills, including phonemic awareness skills such as rhyme, are shown to be so important to learning to read (Alghazo & Al-Hilawani, 2010; Hornsby & Wilson, 2014; Lennox, 2014; Mihai et al., 2015; Watson & Terrell, 2018). Students' motivation to complete the tasks could be a factor in teachers choosing to utilize iPads in early childhood classrooms as well. Many studies found that the students motivation increased (Neumann et al., 2017; Huang, Clark, & Wedel, 2013; Flewitt, Messer, & Kucirkova, 2015; Ralph, 2018) and there was more sharing and collaboration between students while utilizing iPads (Beschorner & Hutchinson, 2013; Flewitt, Messer, & Kucirkova, 2015; DaCunha, 2016; Kirova & Jamison, 2018; Ralph, 2018). This study did reveal some students to be highly motivated by iPads while others were satisfied to play with their peers in the classroom without a device. At the beginning of the study some students were rushing through work in order to get time with iPads each day before the teacher researcher changed to assigning specific days for the students to use the iPads. This change was implemented without issue in the classroom.

ABCmouse and Montessori-Rhyme, as well as other applications need to be explored further to determine their effects on learning and how beneficial they may be. There were also concerns pointed out throughout the literature (Flewitt, Messer, & Kucirkova, 2015; O'Connor & Fotakopoulou, 2016; AAP, 2016; Chmiliar, 2017) that iPad use can be detrimental. This study did find that there were a few students who did become engrossed in the iPad, seemingly unaware of what was happening in the classroom around them while they were utilizing the iPads. The majority of the students were content to play on the iPad while allowing, or even asking, for a peer's help to navigate the app, or even just to sit by them and watch.

These findings can be used to assist other early childhood educators in determining whether or not to utilize devices in the classroom. The results show that there was a statistically significant increase in students' knowledge of rhyme, however screen time for these students increased and some students were totally engrossed in the technology for entire free choice times. The teacher researcher believes that there needs to be a balance for early childhood students; both hands-on play times, as well as, utilizing technology sparingly and with purpose.

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