CALIFORNIA STATE UNIVERSITY SAN MARCOS

THESIS SIGNATURE PAGE

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS IN EDUCATION

TITLE: The Effects of Technology When Teaching Alphabet Knowledge to Kindergarten Students

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DATE OF SUCCESSFUL DEFENSE: 12/04/2018

THE THESIS HAS BEEN ACCEPTED BY THE THESIS COMMITTEE IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS IN EDUCATION

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The Effects of Technology When Teaching Alphabet Knowledge to Kindergarten Students

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Fall 2018

Abstract

The purpose of this study was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds. The computer program Imagine Learning and the application ABC Magic were used during this study. Quantitative and qualitative data collected. Quantitative data were collected using Educational Software for Guiding Instruction and Imagine Learning. Qualitative data were collected in the form of anecdotal notes.

The question that was asked to direct the research was can technology be used effectively to help teach letters and letter sounds? The results of the data did not provide enough evidence to prove that technology programs can be used to help teach letters and sounds. Students made growth in the area of alphabet knowledge during the study however, it could not be credited to the technology programs used during the study solely. Future research will need to be conducted in order to discover how technology can be useful in assisting students learning of the alphabet.

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Introduction

Throughout my career, I have traditionally worked at Title 1 schools, with over 90% of students receiving free lunch at school and a high English Language Learner (ELL) population. Each year I have taught there have been fewer than seven students who attended Transitional Kindergarten or Head Start Preschool, and the majority of my students began kindergarten with no formal schooling. Throughout this time, I have noticed a pattern in the students' alphabet knowledge.

There has been a small portion of students who arrive in kindergarten being able to recognize half of the letters in the alphabet and sounds. These students usually quickly pick up the rest of the alphabet. Then there is a large portion that knows about a quarter of the alphabet. These students probably have been exposed to the alphabet by their parents or older siblings, and typically do not have trouble learning the rest of the alphabet. Another small portion of the class come in not knowing anything about the alphabet. These students are the ones I am always concerned about because their alphabet background knowledge is limited. These particular students are expected to learn the entire alphabet within four months. This task is easier for the students that have some alphabet knowledge, because they have less to learn in the same about of time, and they are familiar with the concept of letters having a corresponding sound/s.

"Knowledge of letter names and sounds helps young children to see that words are not simply whole units but are made up of patterns of letters" (Baliklock, 2004). With this skill, children are able to use their knowledge of letter names and sounds to decode unknown words in grade appropriate texts.

Roberts and Harris (2003) concluded:

> The study shows young children, including those who are learning English as a second language, were able to use letter-name knowledge enhanced by instruction for learning words represented by simplified phonetic spellings and that they figured out on their own how to do so. This is the first study we are aware of showing that instruction in letter-name knowledge (rather than some mediating variable) can have an independent, direct effect on learning to read words represented with simplified phonetic spellings because letter-name knowledge was experimentally induced. (p. 50)

Statement of the Problem

At the beginning of each school year, I have students coming into my class with varying levels of letter knowledge. Their letter knowledge can be anywhere from not knowing a single letter or sound to knowing all of them. No matter where they start at, there is an expectation that they learn to recognize and produce all letter sounds with automaticity. The goal is for students to master the alphabet by January. Once January comes, instruction moves away from practicing recognizing letters and sounds to blending, segmenting, and reading consonant-vowel-consonant (CVC) pattern words. Without the knowledge of letters and their sounds, it is impossible to learn how to read (Adams, 1990; Piasta & Wagner, 2010). The purpose of this thesis was to explore the most effective ways teachers can use technology to help kindergarten students learn the 26 letters of the alphabet and 31 letter sounds. The question of this study is can technology be used effectively to help teach letters and letter sounds?

The kindergarten team I work with, our administration, and I expect kindergarten students to recognize all 26 letters and know all 31 sounds by the time we hit winter break. In January, the kindergarten team starts releasing students at a quicker pace to read and write independently. The team replaces the explicit instruction on alphabet knowledge to instruction

on teaching students reading and writing strategies. This is another reason why it is so important to get the kindergarten students to the point of alphabet mastery.

There are seventeen weeks from the first day of school to the first day of winter break. I often have eight students who know less than twenty letter sounds, and without a great understanding of letters and phonological awareness, students will have a harder time with reading and writing.

Response to Problem

Many researchers have conducted studies on reading and the skills that are required in order for a child to develop reading skills (Bowman & Treiman, 2004; Cardoso-Martins, Resende, & Rodrigues, 2002; Castles, Anne, Coltheart, Max, Wilson, Katherine, Valpied, Jodie, & Wedgwood, Joanne, 2009; Farrall, 2012; Piasta, 2010). With this information on how students learn to develop reading skills and the process students must go through to master these skills, educators can teach their students how to read. Based on my experience as an educator, technology is becoming more a part of students' education. Minimal research has been conducted on how technology and learning reading skills can work together to assist in teaching students how to become readers (Campbell, 2008; Volpe, 2011). This study will help to bring more insight into how technology and reading strategies can be brought together by a classroom teacher to help emergent readers successfully move through the reading process.

Preview of Literature

Themes that arose from the review of literature include the ways students become readers, letter knowledge and phonological awareness, and technology. Young students need to master an understanding of letter sounds and the meaning of print before they can become proficient readers (Foulin, 2005). Evans (2006) and Treiman (2008) examined whether being able to recognize letters helps in the process of learning the letter sounds that go with individual

letters. The studies also look at the necessity of phonological processing skills in learning letter sounds and which skills are necessary in order to develop an understanding of letters and sounds (Piasta, 2010). A few of these sources look at the way technology can be used to teach children to recognize letters and their sounds (Campbell, 2008; Volpe, 2011). Students have an easier time learning the letter sounds of vowels because one of the sounds they make is also the name of the letter. Students also have an easier time learning the letter sounds of consonants when the letter name starts with the sound the letter makes. (Evans, 2006; Treiman, 2008).

Phonological processing does not have a significant effect on predicting students learning letter sounds or letter names. Letter name structure and phonological processing skill can be used to teach specific letter types. Phonological skills were more highly related to the learning of CV letters over VC letters. (Piasta, 2010).

Technology is becoming predominant in the classrooms of today's students. “The saturation of technology in students’ lives has produced an entirely different type of student, shaping the way they think, learn, and experience the world around them” (Hicks, 2011, p. 188). Educators need to move away from more of the older teaching strategies which have been successful in the past but no longer fit the students of today. “With ready access to computers and a wide range of mobile devices, many students already are familiar with available technology tools and use them all the time, particularly for entertainment purposes” (Dessoff, 2010, p. 40). When looking at how technology has been used in the classroom, a common thread that came up throughout the research is repetition is necessary in order for a learning strategy to be successful. When using a program or method, it must be used for multiple sessions for students to learn letter names and sounds.

Feedback is also important when using computer-assisted instruction. If students do not know whether they are answering correctly or not, they cannot learn the names of letters or

sounds (Campbell, 2008). Students need to have opportunities to see where their own needs are so they can change what they do not know.

Preview of Methodology

Quantitative and qualitative data were collected for the purposes of this study. Annotated notes were collected by the teacher during whole group lessons. A simple chart was created to easily tally correct responses from the students in Group B. The chart has the letters that were explicitly taught during the first trimester located in the column in the order they were taught. Across the first row lists the week number the student was asked a question about the alphabet and had a correct response. The teacher asked questions similar to, “What sounds does the letter m make?” When a student in Group B answered correctly a tally mark was made in the correct location on the chart. This chart was able to reveal how often a student was able to identify a particular letter name or the sound(s) a letter makes. It is of most interest if the students are able to identify the letters and sounds which the students are practicing while using the app ABC Magic. The program Imagine Learning collects data as the students use the program. The teacher of the student has the ability to log onto Imagine Learning and review what the student did during their twenty minutes. Imagine Learning provided data on the alphabet lessons students worked on, how long they spent on the lessons, and how they scored. The data collected from the use of Imagine Learning and ABC Magic was analyzed to see the letter knowledge students were gaining. The collection of data revealed if students mastered the letters they were explicitly being taught.

Data from the Educational Software for Guiding Instruction (ESGI) assessment was collected and used as baseline data and post-assessment scores. The baseline data and post-assessment scores were compared to each other to look for student growth. This data analysis

was able to reveal which letters students gained during the study and if there was any relationship between what students practiced and what they mastered.

Definitions

Title 1

The U.S. Department of Education defines title one as, "Title I, Part A (Title I) of the Elementary and Secondary Education Act, as amended (ESEA) provides financial assistance to local educational agencies (LEAs) and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards."

Free or reduced-priced lunch

The National Center for Education Statistics defines free or reduced-priced lunch as "…the program is a federally assisted meal program operated in public and private nonprofit schools and residential child care centers. To be eligible for free lunch, a student must be from a household with an income at or below 130 percent of the federal poverty guideline; to be eligible for reduced-price lunch, a student must be from a household with an income between 130 percent and 185 percent of the federal poverty guideline." ("Glossary", n.d.)

English-language learner

The glossary of education reform defines an English-language learner as "students who are unable to communicate fluently or learn effectively in English, who often come from non-English-speaking homes and backgrounds, and who typically require specialized or modified instruction in both the English language and in their academic courses." ("Partnership", 2013)

Transitional Kindergarten

Transitional kindergarten is available for students who turn five between September 2nd and December 2nd. These students are able to attend a year of school before starting Kindergarten.

Head Start State Preschool

The Office of Head Start defines the program as, "designed to help break the cycle of poverty, providing preschool children of low-income families with a comprehensive program to meet their emotional, social, health, nutritional and psychological needs." ("History of Head Start", 2018)

Alphabet knowledge

In this study, alphabet knowledge will refer to recognizing the 26 letters of the alphabet. It will also refer to knowing and being able to produce the 31 sounds the letters make, which are the 26 short sounds made by all 26 letters and the 5 long sounds made by all vowels.

Master

In this study, referring to having mastered a skill means that a student has complete understanding of a Common Core State Standard (CCSS). During this study the standards CCSS.ELA-Literacy.RF.K.3.a and CCSS.ELA-Literacy.RF.K.1.d will be discussed.

Phonemic Awareness

The skill to hear, identify, and manipulate sounds.

Summary of Chapter

For most students' kindergarten is their first experience with school. It is important that their teacher(s) help them master the ELA CCSS by the end of the year. Many standards need to be mastered long before the end of the year, so students need to have a solid understanding of the alphabet by the end of the first semester. They need this knowledge so that they can begin to develop reading skills. If this is not achieved by the end of the year, they may spend the rest of

their education trying to catch up. The purpose of this study was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds.

Chapter 2

Introduction

The purpose of this study was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds. "Alphabetic writing systems use individual letters or groups of letters (graphemes) to represent the sounds in spoken words (phonemes)" (Bowman & Treiman, 2004, p. 295). Students need an understanding of the alphabet in order to become proficient readers (Foulin, 2005).

Research has shown students need to receive consistent intervention for it to be the most beneficial (Volpe, 2011). There are factors out of the control of the classroom teacher which prevent consistent intervention. Students are absent, teachers are pulled from their classrooms for trainings, and district mandated minimum days occur. When an intervention is used consistently, the educator is able to collect more data on the progress of the student. With more information on what the student is learning, the educator can determine whether students are making progress with a specific type of intervention. Along with using the same intervention, the assessments used to measure student progress need to be consistent. While using the same assessment over time, test results will be consistent with student progress (Blaiklock, 2004).

During intervention, students need to know whether they are answering correctly or not. If students do not know how they are performing, they are not able to build on their strengths or address their needs. When students are receiving feedback, those are learning moments for the student. "Studies that measured effects of instructive feedback on future learning of stimuli have found that students acquired future target stimuli more quickly and required fewer sessions to criterion compared to initial instruction of target stimuli" (Campbell & Mechling, 2009, p. 55).

For technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds, a few topics need to be understood. First is the process by which students become readers. There is an order in which literacy skills are developed in children (Bowman & Treiman, 2004). Knowing what this order is will help the classroom teacher assign technology which is appropriate for the step a particular student or students are on. Second, Evans (2006) and Adams (1990) have concluded there are a few strategies that can be used to help students gain alphabet knowledge. With an understanding of these strategies, they can become applied to the technology used to assist students. Third, is the type of technology that can be used. There are a few features of computer programs which have been identified in making a quality program. These three major themes will be discussed in the following chapter.

How Students Become Readers

Once a student has developed literacy skills, there is nothing that can stop him/her from gaining any amount of knowledge. Those literacy skills will benefit a student throughout his/her lifetime (Bowman & Treiman, 2004). In order for students to become beginning readers, they need to have knowledge of the alphabet (Ehri & Wilce, 1985). Students need to have mastered letters and their sounds early on to continue to develop literacy skills. Understanding and mastering the relationship between letters and sounds is the very beginning in the processes of learning to read (Bowman & Treiman, 2004).

Children go through stages of literacy development. The first phase is referred to as logographic or pre-alphabetic, where children are not making connections to letters and sounds in an orderly way (Bowman & Treiman, 2004). This stage occurs at home and during the beginning of the child's schooling. This is where children are identifying words only by the context in which they appear (Bowman & Treiman, 2004). For example, a child may "read" the McDonald's sign, yet they are not able to read the word when it is written in a black neutral font.

They are not truly reading these words but recognizing them within the environment they are located. A child's ability to read these environmental texts does not mean they are closer to becoming a reader than the children that cannot do this (Masonheimer, Drum, & Ehri, 1984).

When children enter into school and begin to receive explicit instruction in the alphabetic principle, they will enter the next stage of literacy development: alphabetic principle. During the alphabetic period, students began to make the connections between letters and the corresponding sound(s) they produce (Bowman & Treiman, 2004). This is when students start to recognize letters in any forms they may occur. Harn, Stoolmiller, and Chard (2008) explains children are in a partial alphabetic stage when they need to take the time to decode words. Students learn to focus on the initial and final sounds of a word as clues to pronounce the word. To enter the full alphabetic phase, students need to become more familiar and comfortable with written letters and sounds (Harn, Stoolmiller, & Chard, 2008). The more practice students receive with printed words and decoding, the more skilled they will become over time (Farrall, 2012).

Letter Knowledge and Phonological Awareness

Adults and children come into contact with the alphabet each day. For this reason, it is only natural to expect children to start school with some understanding of what the alphabet is. Children are often introduced to letter names before being enrolled in school between parents, educational media, and preschool teachers (Ellefson, Treiman, & Kessler, 2009). Once enrolled in school, all students are explicitly and simultaneously taught letter names and sounds (Evans, 2006). Whether it is prior knowledge or knowledge they picked up from school, students who know the names of letters may have an advantage in learning about the relationship between letters and phonemes (Cardoso-Martins, Resende, & Rodrigues, 2002; Castles et al., 2009; Evans, 2006). Sound-at-beginning-of-name letters are just what the names says. These letters make sounds which produce the letters name at the beginning of the sound. Teaching these

letters first may help students grasp the skill of alphabet knowledge. This connection may not work with every child, but it is still something educators should be aware of when deciding which order to teach the alphabet. It can be used as another teaching strategy in an educator's toolbox. Knowing letter sounds before letter names will not help students in the process of learning letter names. Students who know letter sounds cannot use the same linkage to learn letter names (Evans, 2006).

Evans, 2006:

> Thus letter-name knowledge appears to reinforce letter-sound learning, in a linkage that may help draw children's attention to the sounds of spoken language and provide a name and symbol to anchor this knowledge and break the code of alphabetic writing systems.

Many researchers believe the skill of phonological awareness is needed in order for students to use letter names to learn the sounds associated with them. Researchers have concluded mixed results between phonological awareness and letter sound learning (Treiman, Pennington, Shriberg, & Boada, 2008).

Technology

Technology is becoming predominant in the classrooms of today's students, and teachers can use this to assist in their teaching of letters and sounds.

Repeated use of computer programs will help the classroom teacher give student more exposure to the alphabet and practice (Volpe, 2011). For example, a teacher can hold up a flashcard with the letter A and ask a student what the letter name is. The student may be able to answer correctly, yet a day later are not able to identify the capital letter A. In this case they have not mastered the particular letter. When a student has repeated opportunities to engage with the alphabet, his/her teacher will be able to use the collected data to determine what he/she really knows. If he/she cannot consistently identify the capital letter A, for example, he/she has not

mastered the letter. If the data shows the student has identified the capital letter A during three sessions, it can be considered as mastered (Baranek, Fienup, & Pace, 2011). Over three sessions, data can be looked at to determine what students have learned based on using a particular program or application (app). Applying this repetition to a computer program may help with student independent exposure and learning of the alphabet.

Volpe (2011) used computer-assisted tutoring conducted three times per week over the course of 25 sessions. Students were timed on how long it took them to complete each session and each session lasted anywhere between one and seven minutes. (Volpe, 2011). This repeated use of one computer program gave Volpe the data to determine the effectiveness of the computer-assisted tutoring program.

Feedback is also important when using computer-assisted instruction. If students do not know whether they are answering correctly or not, they cannot learn the names of letters or sounds. One form of feedback while using a SMART Board is to ask a question and have students answer using the SMART Board to find the answer. If they pick the correct letter the board will move to the next slide. The next slide will say, “Yes, (letter name) says (letter sound)” (Campbell, 2008). This method prevents the student from moving on until they get the correct answer. A computer program with audio recordings gives students the question, such as, “Which is the letter ‘b’?” When students click on their choice, the audio will tell them if it is correct or not (Campbell, 2008).

Summary of Chapter

Pre- reading skills include letter recognition, letter sounds, and book handling skills. Students can use some of the letter names to help them remember the sound the letter makes. Rote memorization is also discussed within the research and has been effective in teaching students in danger of not mastering letter sounds in an appropriate amount of time. My research

will look at the most effective practices teachers can use to teach all students letter sounds. I will also look at how these practices can be combined with technology to assist teachers in lessons which teach all students letter sounds.

Chapter 3

Introduction

Students enter kindergarten with varying levels of letter knowledge at the beginning of each school year. Their letter knowledge can be anywhere from not knowing a single letter or sound to knowing all of them. No matter where they start, there is an expectation they all learn to recognize letters and produce all letter sounds with automaticity by winter break. The purpose of this thesis is to explore the most effective ways teachers can use technology to help kindergarten students learn the 26 letters of the alphabet and 31 letter sounds.

The students in this study received consistent intervention during the school week. Eight students were identified as not being on track to mastering the alphabet by the end of the first trimester. These students were divided up into two equal groups. Each group used a different type of technological program. All students received 20 minutes of intervention, four days a week. Like most districts, we have a minimum day once a week and intervention lessons on those days are difficult to fit in. To ensure each week is consistent, I did not have intervention on Wednesdays, the day of our weekly minimum day. Students received feedback from their teacher and monitored their own progress during intervention. Each student knew exactly which letters with which they had automaticity and which ones they still needed to master.

Design

My impetus of this study was to support students who did not meet the trimester one benchmark goals to prevent them from falling further behind. I explored ways in which technology might assist them in learning at least 25 of the 31 letter sounds. Programs I will use to help assist in teaching letters and sounds to the kindergarten students I have identified are Imagine Learning and ABC Magic. To start, I created two small groups for intervention containing the students who currently would not score At Level or Above Level on the

benchmark assessment in the area of letter recognition and letter sounds. I took the eight students and placed them in two different groups. As the eight students consisted of four girls and four boys, they were evenly split into the two groups of two girls and two boys each. I called the small groups “Group A” and “Group B.” Placing students into their assigned group was random since the collected baseline data of the eight students were very similar, as all eight participating students demonstrated roughly the same alphabet knowledge. After creating the groups, I randomly assigned each group to a computer program. Students in Group A used the program Imagine Learning four times a week and students in Group B used the app ABC Magic four times a week. Both Group A and B used their assigned computer program for 100 minutes each week. All students received daily whole group instruction in phonemic awareness. We used the frame “The letter is___. The sound is___” during the whole group instruction.

Qualitative and quantitative data were collected for this study. After collecting and analyzing the data, the goal was for this data to inform what alphabet knowledge students knew before the intervention, what letters and sounds of the alphabet they worked on during the intervention, and what they learned after the intervention period ended. The Imagine Learning computer program collects data as the student plays on the program, and I was able to log onto the teacher’s account to check data. It recorded which lessons the students passed, how many times they were given a particular lesson, how many attempts it took to pass a lesson, and which lessons they tried, but did not pass.

ABC Magic does not have the ability to collect data for the teacher to review. Instead, I listened in when the students were playing the app. I was able to take anecdotal notes of what I observed the students doing. For both groups, I used the ESGI progress monitoring app to test the students every two weeks on their progress with letter recognition and letter sounds.

I also used Education Software for Guiding Instruction (ESGI), a computer program assessment administered to a student in a one-on-one setting, to collect data. ESGI was created by Greg Gorman, a kindergarten teacher who did not like paper-based assessments. The catalyst in creating this program was to have real-time student performance data to guide student instruction ("Our Story", 2018). ESGI allows the assessor (in this case the teacher) to assess and record which uppercase, lowercase, and letters sounds a student knows. Immediately after assessing a student, the teacher can look at pie and bar graphs of the student data. Teachers can also use the item analysis feature to see which letters and sounds are least or most known in the class. Kindergarten teachers at my site are required by the district to assess using ESGI three times a year, and the data collected from this program is used to complete student report cards. I chose to use this form of data collecting because it is an assessment tool I am familiar with and it allows me to quickly obtain data from any one student at any time.

During this study, ESGI was used for baseline data, progress monitoring, and end of the trimester assessment for both focus groups. Since each group will be using a different technology program, the use of ESGI data will give comparable results.

Setting

The research was conducted with kindergarten students at a Title 1 elementary school in Moreno Valley, California. Forty-seven percent of the students at the school are designated as English learners. Ninety-seven percent of students at the school come from low-income families. The classroom consists of 23 students, an instructional assistant (90 minutes a day), and one certificated teacher. Both groups will receive their intervention in the classroom with 19 other students present.

I chose to work with students at this particular elementary school because of the student demographics. Many of the students are learning English as their second language. This poses a

challenge for the students learning the English alphabet. These students are being asked to learn letters and sounds they might not even be hearing at home.

With this school site being a Title 1 elementary, I know many of the parents have more than one job and/or are single parents. Unfortunately, these parents may have minimal time to help their student practice academic skills at home.

Participants

The sample size for this study is eight kindergarten students. The kindergarten teachers at the site expect for kindergarten students to recognize all 26 letters and know all 31 sounds by the school's winter break. In January, we aim to start releasing the students to read and write more independently. For the first benchmark test, which is given at the beginning of November, students are expected to know at least 14 letter sounds. After assessing my students for the first time, I had eight who did not meet the mark of 14 letter sounds. These eight students scored between 0-8 sounds known. I chose these eight students because they were the only ones who did not meet the trimester one benchmark for the current school year.

Data Collection Instruments

Data collection started with the beginning of the year ESGI test given to all focus students to see which letters, both capital and lowercase, they recognize and letter sounds they know. I also took their results from the trimester one benchmark test which was used to give the students their grades on their report card. Analysis of these data informed which students were selected to receive the intervention. The beginning of the year and trimester one data was all collected by the computer program ESGI. To continue with data collection, I used the progress monitoring tool within ESGI, observation, and notes were taken during whole and small group instruction. I also used the data collected from the Imagine Learning program itself.

To collect anecdotal notes, I created a folder labeled with each of the focus students names. Under each student's name, I placed a sticky note to write down notes. Each day I wrote down the date on a new sticky note and collected free-hand notes. I chose to collect notes in this manner because it is a quick way to collect up-to-date notes on the focus students. I was able to teach and collect information on the focus students' progress on their alphabet knowledge.

Procedures

All eight students received whole group instruction on a daily basis. This instruction included two new "letters of the week." The whole group instruction was current with the pace of the curriculum and did not slow down for the few students who need intervention. During this time of instruction, I collected anecdotal notes specifically for the eight students I identified as needing intervention. At a later time in the day, I placed Group A on Imagine Learning and Group B on ABC Magic for twenty minutes.

During literacy centers, Group A logged onto their assigned Chromebook to use the Imagine Learning program. These students had headphones with an attached microphone during this time. This served two purposes: to block out any classroom noise and to record a student's verbal response when prompted by the program. After twenty minutes, the program would automatically pause and shut off. Students knew it was time for them to put their Chromebook away once this happened. The data was collected by the program for the teacher to look at daily or weekly.

Group B used the ABC Magic app on iPads. They also had headphones on when using the app to block out any outside classroom noise. The iPad itself was set to lock once twenty minutes of activity time had passed. The students knew a locked iPad meant it was time to put the technology away.

Data Analysis

During the data analysis process, I first looked at the number of letters students were able to identify before intervention started. Next, I looked at the letters students mastered by the end of intervention. I also looked at how quickly or slowly students mastered these letters using ESGI. Students with zero alphabet knowledge needed to master about two letters a week in order to master the entire alphabet by winter break. I tested all eight students using ESGI each week and was able to use the bar graph tool in ESGI to see the progress students made or did not make over time.

The data collected using the Imagine Learning computer program was used to look into which letters and sounds students practiced using the program. The letters practiced using the Imagine Learning were compared to the letters and sounds taught during whole group instruction. The correlation between the letters taught during whole group instruction and the computer program were compared to ESGI to see if the letters were mastered according to ESGI data.

The anecdotal notes collected for Group B were analyzed to check for a correlation between the letters the students practiced using ABC Magic and the ones marked correct on the ESGI assessment.

Piasta and Wagner (2010) found students were more likely to learn the sounds of letters whose names included cues to their sounds. For example, the letters t and p have the sound they produce at the beginning of their letter name. The letter t says /t/ in the beginning of the letters name, and the letter p says /p/ at the beginning of this letters name. I looked at the assessment data I collected and examined which letter sounds the focus students knew. I looked to see which letters they do not know which included cues in their name. I monitored the progress of these students to see if they were picking up on any new information. I also held conferences with students about their progress.

Positionality

Above everything, I wanted my students to be successful. It did not make a difference to me which strategy worked best for an individual student. It is my job to try a researched based strategy with students, and if that strategy does not work, I need to find another one.

My own perspective and opinions did not influence my data collection, as the Imagine Learning data was collected by the program itself. During small groups, I followed my procedures of giving students three seconds to answer when assessed and recorded whatever answer they gave or do not give during that time.

Summary of Chapter

The purpose of this study was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds. To do this I created two separate groups of four students each. One group received traditional instruction and the other used technology. Both groups received 20 minutes of instruction four times a week. I chose students who could not identify many letters and their sounds. I also took into consideration the attendance of the individual students. When days are taken off for holidays or district non-student days, my groups will miss intervention those days. Data collected on the daily and the Imagine Learning data collected will be looked at weekly.

Chapter 4

Introduction

As students enter kindergarten, it is the goal of the teacher to get every student to master the alphabet. Mastering the alphabet includes having letter recognition of all 26 letters and knowing the sound or sounds that correspond with each particular letter. This is a goal because, without alphabet knowledge, students will not be able to learn how to read (Bowman & Treiman, 2004; Ehri & Wilce, 1985). Teaching students to read in kindergarten starts with decodable books. These decodable books are composed of high frequency words and CVC words, and students cannot possibly decode unknown words if they do not have alphabet knowledge. The purpose of this study was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and the 31 letter sounds.

The problem arises when students are tested two months into an academic year and do not know at least 14 letters and sounds. Again, the goal is to have them master all letters and sounds by winter break, the district benchmark, however, is to have at least 14 of those letters and sounds mastered. If students are not able to master the alphabet by winter break, they may struggle for the rest of the school year and possibly the rest of their academic career. Once the kindergarteners return from winter break, the teacher begins to release more responsibility onto the students, as they will be asked to read and write more independently. This cannot be done with the students who are struggling with alphabet knowledge.

The question that guided this study was: Can technology be used effectively to help teach letters and letter sounds?

Review of Methodology

A mixed method of data collection was used during this study. For the purposes of analyzing the effects of Imagine Learning and ABC Magic on student learning, collecting qualitative and quantitative data was most appropriate for this study. The computer program Imagine Learning, used by Group A, collects data as the student who is playing goes through the lessons. Quantitative data was also collected when assessing students using the assessment ESGI. ESGI is a computer-based assessment tool used primarily by kindergarten teachers to benchmark test and progress monitor. The data collected from Imagine Learning and ESGI gave insight as to whether using the technology programs affected students learning of the alphabet. For these reasons, collecting quantitative data was appropriate for this portion of the study. The ABC Magic app used by Group B did not collect data within the program like Imagine Learning did. Therefore, qualitative data was collected from the students in Group B and notes needed to be taken to track the progress the students in Group B were making.

Findings

I noticed in the data students who received lessons on letter names and letter sounds performed better on ESGI for the particular letters on which they received both types of instruction. This instruction included the whole group which all focus students received and the technology program that was assigned to the student. Since Imagine Learning does not give the teacher the option to assign letters, the students might have not practiced the same letters that were taught during whole group instruction. If the teacher had control over which lessons students received and when all four students might have performed better on the ESGI assessment. Students using ABC Magic did well identifying the letters and sounds they had most encounters with. All students received the same whole group alphabet instruction. The students using ABC Magic got a double dose because they had the whole group instruction and practiced the same exact letters using the ABC Magic app.

Alphabet Knowledge Baseline Data

I began collecting data by administering the ESGI assessment to the kindergarten class. Letter sound, capital letter, and lowercase letter recognition were tested. The data was able to tell me which students needed support in gaining alphabet knowledge, if any. It was discovered that eight out of the 24 students in the class had a need in alphabet knowledge. Besides giving baseline data, the ESGI assessment helped to determine the focus students for this study. These students were divided into two groups (A and B) and randomly assigned to either Imagine Learning or ABC Magic.

Table 1 below shows the baseline scores for Group A using the assessment ESGI. The average score for Letter Sound Recognition were 3 letter sounds identified out of the 31 sounds tested. Student 1 and Student 2 came into kindergarten without any knowledge of letter sounds. Student 3 and Student 4 knew 5 to 7 sounds. Group A students scored the highest in Capital Letter Recognition with an average score of 8.5 out of 26 capital letters. Student 4 had a strength in Capital Letter Recognition with 19 out of 26 capital letters known at the baseline. Students 1, 2, and 3 scored between 2 and 8. Students scored an average of 5.75 out of 26 in the area of Lowercase Letter Recognition. Student 1 scored a 0 and Student 3 scored a 1 revealing that these two students do not have knowledge of lowercase letters. Student 4 was able to identify 16 lowercase letters showing that she does have an understanding of letters. However, she struggled with identifying sounds.

Table 1

Group A Baseline ESGI Scores

Student Name	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Student 1	0	2	0

Student Name	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Student 2	0	8	6
Student 3	5	5	1
Student 4	7	19	16
Average Score	3 out of 31	8.5 out of 26	5.75 out of 26

Table 2 shows the baseline data for the students in Group B using the same ESGI assessment as Group A. The baseline average scores for Group B were higher than the average scores for Group A. Student 6, Student 7, and Students 8 did not score higher than a 3 on Letter Sound Recognition. Student 5 scored an 11 on Letter Sound Recognition, while this is much higher than the other students it is still below benchmark. Student 7 scored a 4 on Capital Letter Recognition this reveals the lack of capital letter recognition in the student. Student 5, 6, and 8 all scored above a 9 on capital letter recognition. Group B scored similar in Lowercase Letter Recognition as they did in Capital Letter Recognition.

Table 2

Group B Baseline ESGI Scores

Student	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Student 5	11	24	19
Student 6	3	14	8
Student 7	1	4	4
Student 8	3	9	9

Student	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Average Score	4.5 out of 31	12.75 out of 26	10 out of 26

Group B's average baseline scores are higher in all assessment categories compared to Group A's average scores.

Findings from Group A Imagine Learning

Figure 1 shows the number of upper- and lowercase letter lessons which were taught to each of the students in Group A. Each lesson taught the letter name and sound and provided practice with writing the letter. Imagine Learning as a program gives lessons based on adaptive instruction. Student 1 and Student 3 received lessons on multiple letters, because according to Imagine Learning, they showed mastery of letters previously taught. The data reveals Student 2 only received lessons on two letters, and this is because he/she was unable to master the first two letter lessons Imagine Learning assigned to the student.

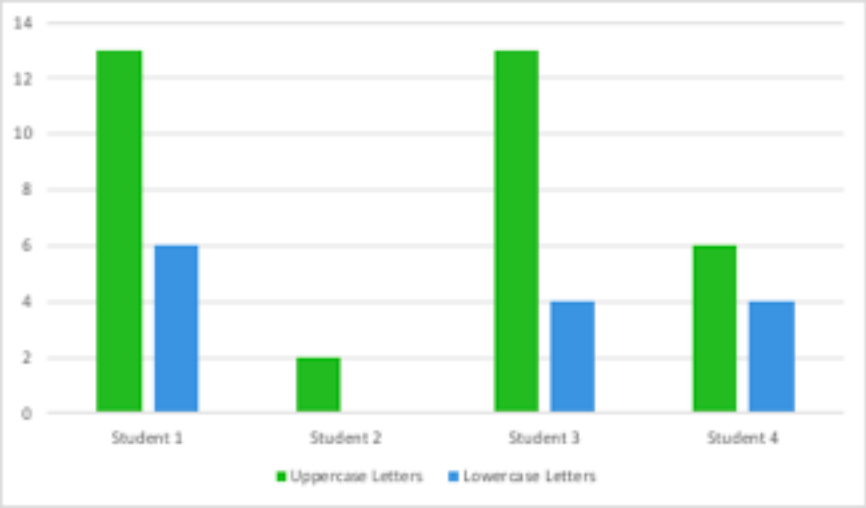

Figure 1. Lessons on Uppercase and Lowercase Letters.

During whole group class instruction, the students were explicitly taught the letters and corresponding sounds to: m, a, s, p, t, i, n, c, o, d, h, and e.

Table 3 reveals which letters the focus group students received lessons on within Imagine Learning, and which of those letters they got correct when assessed with ESGI. The table shows the uppercase letters, lowercase letters, letter sounds, and number of letters mastered. For the purpose of this study a letter is considered mastered when a student can recognize both the upper- and lowercase letter along with the sound(s) it makes. This is the criteria that was decided upon, because each letter has two forms, the upper- and lowercase and a sound. A student needs to be able to look at an uppercase "K" or look at a lowercase "k", for example, and know that they have the same name and make the same sound. When a student is reading or writing, knowing the name and sound of the capital T will not do them any good when they want to read/write "cat," because that is only part of that particular letter. To be able to completely use a particular letter, students need to know everything about said letter. He/she should also be able to write the letter, but for the purposes of this study it is not necessary. Students 1 and 2 mastered 1 of the 13 letters they were exposed to while using Imagine Learning. Student 2 did not master any and Student 4 mastered 4 out of the 6 letters he/she were exposed to.

Table 3

Letters Taught on Imagine Learning That Were Marked Correct on ESGI

Student Name	Uppercase Letter Names	Lowercase Letter Names	Letter Sounds	Number of Letters Mastered
Student 1	S	s, t	/s/	1 out of 13
Student 2	A		/a/	0 out of 2
Student 3	A, D, I, M, P, R, U, V	c, i	/a/, /c/, /i/	1 out of 13
Student 4	A, D, M, P, S, T,	d, p, s, t	/a/, /d/, /m/, /p/, /s/, /t/,	4 out of 6

Findings from Group B ABC Magic

Unlike Imagine Learning, ABC Magic does not assign lessons to students. The app displays the 26 letters of the alphabet on the home screen for the player to choose from. Students open up the app and have the freedom to click on which letter(s) they would like to practice for that day. For the purposes of this study, the students were told to practice the letters which were also being taught during whole group instruction. Students started out by practicing only the first two "letters of the week" on ABC Magic the teacher was focusing on, M and A. A different pair of letters were of focus for every subsequent week. When the focus letters were S and P, students were told to practice those letters. If they had extra time, they could go back and practice "letters of the week" from previous weeks. Figure 2 and Figure 3 show the amount of times students correctly identified a particular letter and its sound. During whole group instruction, if/when a focus student identified a letter and its sound, a tally mark was made next to the letter and the week it happened. The letters that a student identified correctly more often during the course of this study also ended up being the letters students showed mastery of using the ESGI assessment.

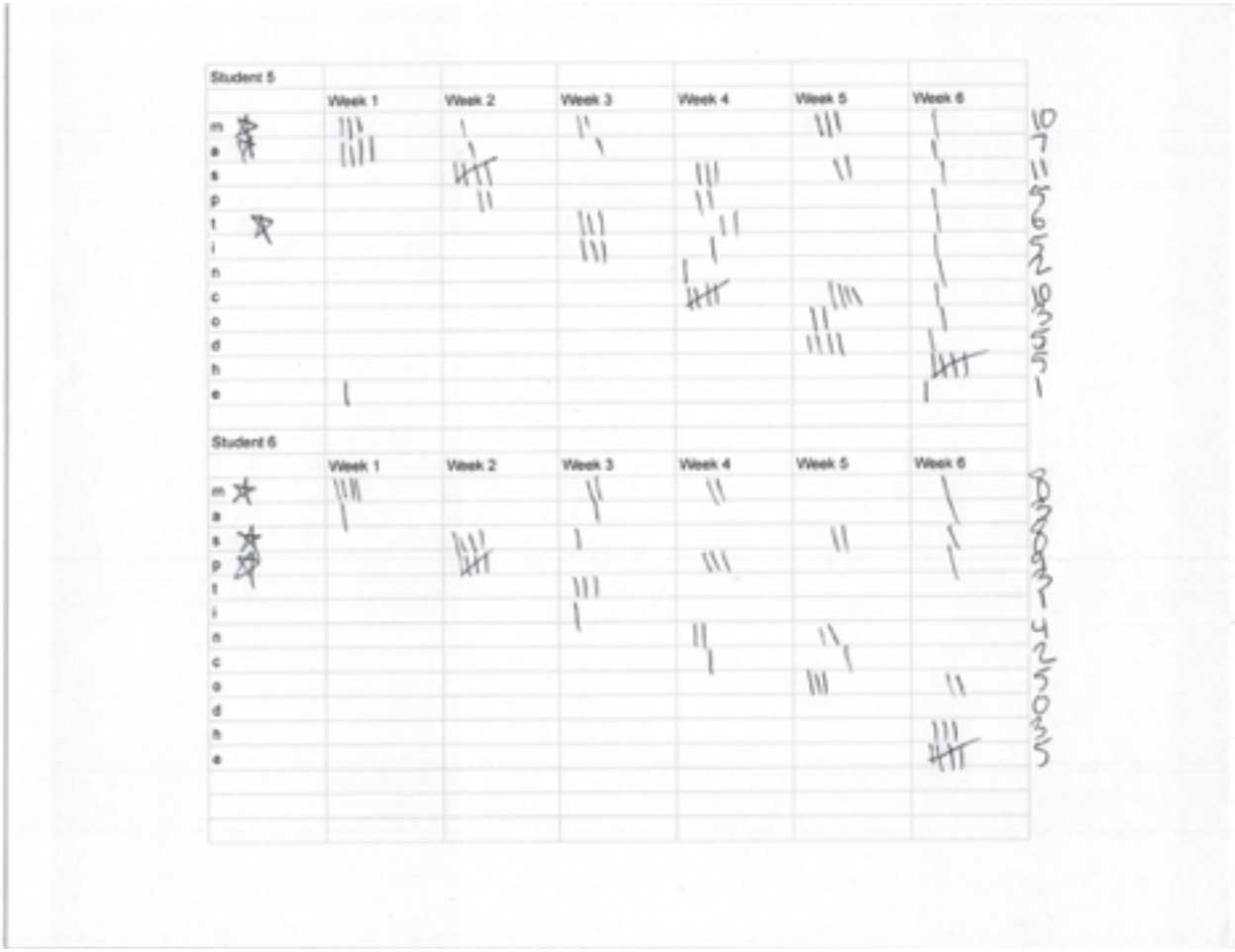

Figure 2. Notes for student 5 and student 6.

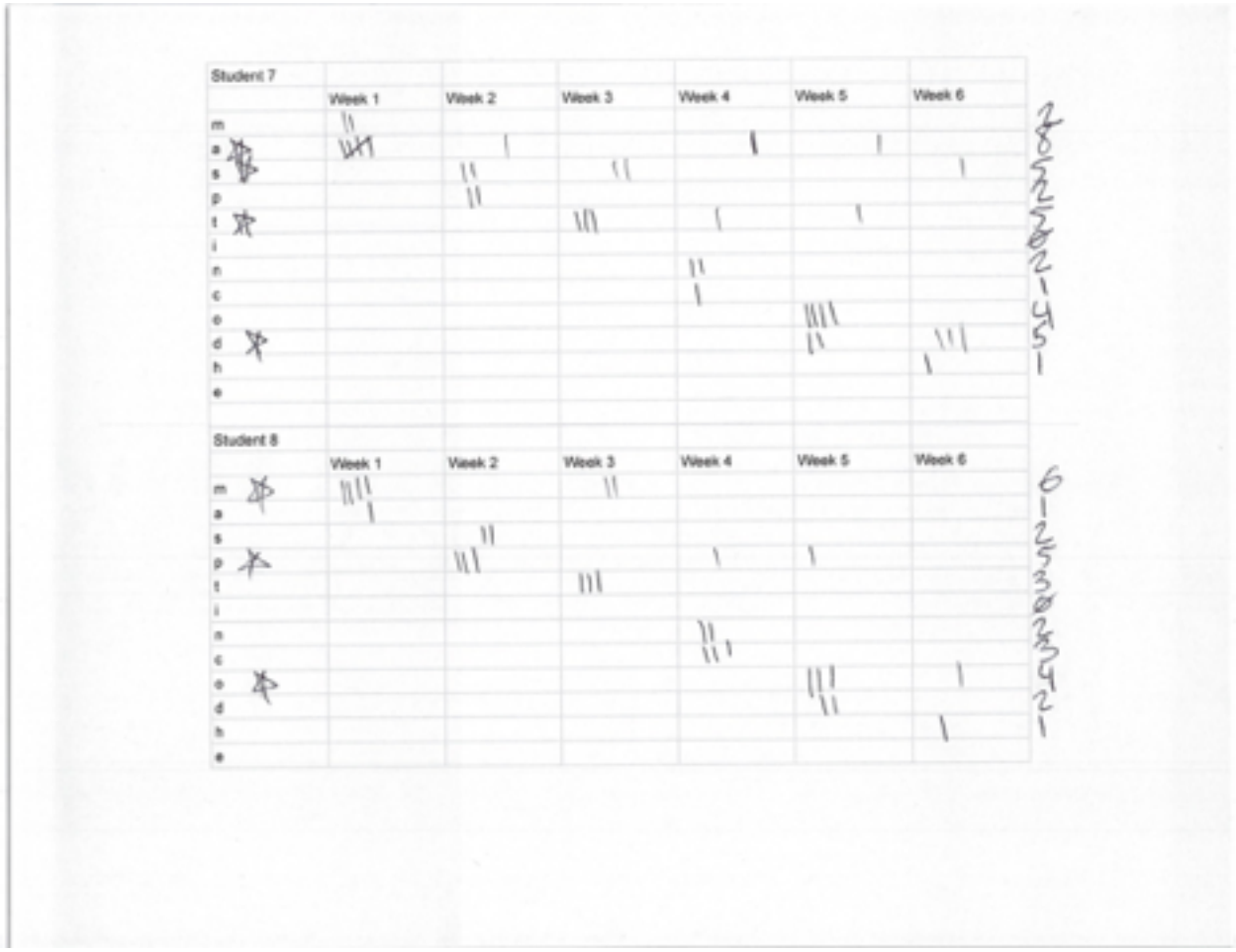

Figure 3. Notes for student 7 and student 8.

Table 4 shows which letters and sounds the students in Group A identified correctly when assessed with ESGI. Student 5 showed the most success with 10 out of the 12 letters mastered. Student 6 mastered 6 out of the 12, and Student 7 and 8 mastered less than 3. Overall the students in Group B were able to identify more of the letters they practiced on in comparison to the students in Group A and the letters they practiced. This could be attributed to the fact that Group B encountered the same letters more often they practiced the same letters during whole group instruction and while using the app ABC Magic. This gave the students more of an opportunity to interact with letters during different parts of his/her school day.

Table 4

Uppercase, Lowercase, and Sounds Marked Correct on ESGI

Student Name	Uppercase Letter Names	Lowercase Letter Names	Letter Sounds	Number of Letters Mastered
Student 5	A, C, D, E, H, I, M, N, O, P, S, T	a, c, d, e, h, i, m, o, p, s, t	/a/, /c/, /d/, /h/, /i/, /m/, /n/, /o/, /p/, /s/, /t/	10 out of 12
Student 6	A, C, E, H, I, M, N, O, P, S, T	a, c, e, h, i, m, o, p, s, t	/e/, /m/, /n/, /o/, /p/, /s/, /t/	6 out of 12
Student 7	A, C, D, I, N, O	a, c, h, i, o, p, s, t	/a/, /o/, /p/, /s/	2 out of 12
Student 8	A, C, H, I, M, N, O, P	a, c, m, o, p, t	/m/, /n/, /o/, /p/, /s/	3 out of 12

End of Trimester One Assessment

Near the end of the first trimester, students where once again assessed on letter recognition and letter sounds using ESGI. The same exact ESGI assessment used to collect baseline data was used again for the end of the trimester one data collection. Using the same ESGI assessment allows the baseline results and end of trimester one results to be equally compared. Growth can easily be identified when looking at both ESGI assessments. Table 5 reveals the amount of sounds and letters the students in Group A were able to identify. Student 1 was not able to meet the goal of identifying 14 uppercase, lowercase, and sounds. Student 2 and 3 meet the goal for recognizing upper- and lowercase letters. However, they did not meet the goal for letter sounds. Student 2 was close to meeting the letter sound goal by knowing 12 letter sounds. Student 4 meet all three alphabet goals for the trimester.

Table 5

End of Trimester One ESGI Scores - Group A

Student	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Student 1	1	5	7
Student 2	12	17	14
Student 3	9	16	16
Student 4	21	25	26
Average Score	10.75 out of 31	15.75 out of 26	15.75 out of 26

Table 6 shows the amount of sounds and letters the students in Group B were able to identify. Student 5 and 6 meet the alphabet goals for trimester one by scoring a 14 or higher on the tests. Student 7 met the goal for lowercase recognition, and Student 8 met the goal for upper- and lowercase recognition.

Table 6

End of Trimester One ESGI Scores - Group B

Student	Letter Sound	Uppercase Letter Recognition	Lowercase Letter Recognition
Student 5	24	26	22
Student 6	15	24	21
Student 7	9	12	15
Student 8	9	18	16
Average Score	14.25 out of 31	20 out of 26	18.5 out of 26

When comparing the beginning of the trimester ESGI assessment with the end of the trimester ESGI assessment, it was revealed that the students in Group A had a strength in lowercase letter recognition and Group B had a strength in Letter sound identification. Group A grew 10 points in lowercase letter recognition, and Group B grew 8.5 points. In the area of letter sound identification, Group A made a 7.75 point growth, while Group B made a 9.75 point growth. Both Group A and B made a 7.25 points growth in the area of uppercase letter recognition.

Summary of Chapter

I learned with the way Imagine Learning and ABC Magic are currently designed, they are not the most efficient in teaching all students letter names and sounds. Both have qualities which make them worth having as a part of a classroom routine. However, with the lack of teacher control, I cannot consider them reliable in teaching alphabet knowledge to children.

Chapter 5

Introduction

The purpose of this thesis was to explore the most effective ways teachers can use technology to assist in helping kindergarten students recognize the 26 letters of the alphabet and 31 letter sounds.

According to the district benchmark, kindergarten students should have mastered 14 letters and their sounds by the end of trimester one. It is a goal of the kindergarten teachers and administration for students to master all 26 letters and 31 sounds by the start of winter break. Students come into kindergarten having an array of alphabet knowledge; whether they know zero about the alphabet or half of the alphabet, it is important they are able to master the alphabet. After winter break, kindergarten teachers want to gradually release their students to read and write more independently. In order for teachers to guide their students to do this, the students need to have alphabet knowledge. The problem comes when students are having difficulties mastering the alphabet. This is where the question of whether or not technology can be used effectively to teach letters and letter sounds came into question.

Summary of Findings

The data collected for this study showed each of the focus students made growth in the area of alphabet knowledge between the beginning of the trimester to the end. With there being 26 letters in the English alphabet, the 12 that were explicitly taught during the first trimester were much of the focus when analyzing the data. Group B was able to master more of the letters which were explicitly taught in whole group instruction. Group A made gains, but they did not master as many of the explicitly taught letters.

Group A had a strength in the area of lowercase recognition and Group B had a strength in letter sound recognition. Both groups grew the same amount in uppercase letter recognition.

Lessons Learned

I learned the technology program used to assist in helping students gain alphabet knowledge needs to allow the teacher the flexibility to control what the student is able to practice on the computer or app. The students who had more purposeful lessons with the technology had more letters mastered. Students in Group B had the opportunity to practice specific letters during whole group instruction and the same letters while using ABC Magic. The data for the students in Group B showed these students mastered more of the letters taught during whole group instruction. Even though Group B showed better results in regards to the specific letters taught during whole group instruction, they did not necessarily gain more alphabet knowledge compared to Group A. When examining the specific letters taught during whole group instruction, Group B mastered more of those letters. When examining all 26 letters of the alphabet, both groups made equally comparable gains. While each group had their own strengths, they both showed the same amount of growth during trimester one. If there are specific letters a teacher wants a student to focus on and master, it seems it may be best to let the student encounter the letter multiple times a day/week. Letting a student focus on letters during whole group instruction and randomly practicing letters during independent times may result in the student mastering letters at a more random account.

The data show the students who received a double dose of alphabet knowledge mastered more letters compared to the students who did not receive this double dose. The more encounters with a particular letter allowed the student to become more familiar with the letter and eventually master the letter. For example, when the letters of the week were taught whole group, the students in Group B received practice with those same letters later on in the day during centers using the ABC Magic app. Based on the data analyzed, I recommend schools purchase an app or computer program which allows the teacher to have control over which letters and sounds

students get to practice. Allowing a student to practice different letters throughout the school day does not necessarily mean they will not master as many, but the result of this study suggests it does benefit students when they have the opportunity to engage with the same letter and sound during different points of their school day/week. This idea corresponds with the study conducted by Volpe (2011), where students received intervention in which they practiced the same letter sounds over multiple sessions.

Group A might have made more gains if the instruction they received had more of a focus. The students in this group did not have the opportunity to encounter specific letters of the alphabet the way Group B was able to. It is possible the technology program itself is not as important as the way is it used alongside classroom instruction. Educators should consider technology programs which allow teachers to give students the opportunity to encounter the same letters of the alphabet at different points in the school day/week. This allows students to have multiple encounters with letters being taught and to receive feedback from the teacher. Campbell's study from 2008 discusses how feedback is important in helping students learn letter names and sounds.

The amount of time spent on a computer program does not equate to a student having a better chance of mastering the alphabet. Purposeful whole group instruction along with a connection being made with technology may be effective to teach letters and sounds. It was discovered the time on the program may have been less important than the amount of lessons completed during each session or each week. It became a challenge to monitor the amount of time students spent on their assigned program because not all students received the exact amount of technology time. When looking at Imagine Learning data, the students who competed more letter lessons also mastered more letters. With the time complication and correlation between lessons completed and letters mastered, it is not clear if time was a factor in mastery of letters.

Implications for Educators

It is useful for educators and parents to know repeated encounters with a specific letter and its sound are helpful to children learning to master the alphabet. (Volpe, 2011) Educators should be informing parents weekly on which letters will be explicitly taught each week. This will give parents the opportunity to practice the same letters at home. Students would have the opportunity to work with the letters at school and at home, which means they would have more encounters with specific focused letters. Any intervention teachers who may be working with the students might also be interested in this information so they can practice the same letters with the students, too.

Educators can give parents the names of any technology apps used in class. Parents reading this thesis may be informed to ask their child's teacher for information on letters being taught each week, if the teacher does not already provide this information. With this school-to-home connection, parents can reinforce what their student's teacher is working on at school.

Knowing the process in which students become readers is important for educators to know when choosing a technology program to use. There needs to be a connection between what the program has to offer and what students need in order to master the alphabet. Being aware of background knowledge students have as they enter kindergarten is also important for educators to know. Using the letter name knowledge students possess may help assist students in mastering the sounds. Teachers can take the letter names students know and help them learn the corresponding sound. Researchers Cardoso-Martins, Resende, & Rodrigues, (2002) ; Evans, (2006) ; Castles et al., (2009) have reported students who know sound-at-beginning-of-name letters may have an advantage in learning letter sounds. This is because the letters name also makes the sound of the letter. If teachers have data on student's alphabet knowledge as they enter

kindergarten, the teacher can focus on the sound-at-beginning-of-name letters to help students gain alphabet knowledge.

Limitations

An issue I came across was keeping track of the amount of time a student spent on the Imagine Learning computer program. As stated in chapter two, the program gives the teacher the option to set an amount of active time for the whole class or individuals. I set the time for 20 minutes, but discovered the Imagine Learning program would at times end the program early for students. For example, if a student finished a lesson after 17 minutes, the program would log the student out instead of starting a new lesson. Thus, the student did not receive the full 20 minutes of scheduled computer time.

I addressed the issue of time by raising the amount of active time a student receives by 10 minutes. By raising the time to 30 minutes, students received at least 20 minutes of active computer time. There was not a way to ensure all students received the exact same amount of time during this study because the students were on Imagine Learning during literacy centers, when the classroom teacher was working with small groups. In the future, it may benefit the teacher to set the timer for 30 minutes and tell students to pause Imagine Learning and log out after 20 minutes of computer time. This way the teacher knows all students received the same amount of computer time. If using this suggestion, there will need to be an adult monitoring the students to ensure they are actively playing and not just setting there. Another suggestion would be for the students to complete the same amount of lessons each day and not base it off of the amount of time played.

Another limitation is the number of students in the focus groups. With data only being collected from eight students, it makes it harder to determine if the technology programs, classroom instruction, or the students themselves contributed to the mastery of letters in the

alphabet. In the future, looking at an entire class of kindergarten students could provide enough data to determine if a particular technology program would be more effective in helping all students master the alphabet.

Future Research

Research on the process in which students become readers, the connection between phonological awareness and reading, and technology in the classroom are plentiful. Minimal research has been conducted on which technology programs can be useful in helping students master the skills of reading. Volpe (2011) brings awareness to the success of computer-assisted tutoring. Future research could be conducted in how other computer programs, apps, and/or electronic devices can be useful in helping students learn to read.

This study, along with the review of existing literature, shares with educators that along with knowing how students become readers, technology may be able to assist educators in helping their students master the alphabet. Further research can be conducted to see how technology can help different types of students. While this study looked at students in dire need of alphabet knowledge, it could be interesting to research how computer programs might help the students who enter into kindergarten already having a basic understanding of the alphabet.

Volpe (2011), along with this study, shares how multiple encounters with the alphabet is important to students learning alphabet knowledge. Further research is needed to examine how teacher instruction and technology can come together to benefit student learning.

Conclusion

The study presented in the previous chapters explored how students become readers, letter knowledge, and technology and the way they might work together in helping kindergarten students learn alphabet knowledge. The study explored the question of if technology can be used effectively to teach letters and letter sounds.

This was a mixed-method study which collected qualitative and quantitative data to explore how technology may benefit students' learning of the alphabet, using the ESGI assessment to collect baseline data and end of the trimester data. Using the same assessment for both focus groups made the comparison of growth between the groups clearer to identify. Data collected from the computer program Imagine Learning was used to analyze letters students practiced and alphabet lessons completed. Anecdotal notes provided information on the letters and sounds students were able to identify during whole group instruction.

Students in the focus groups made gains in the area of alphabet knowledge. However, during this study it was inconclusive as to how much the computer program and app played a role in assisting the students in making alphabet knowledge gains.

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