

The Effects of Technology versus No Technology

On Sight Word Retention

Of At-Risk Students

by

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Abstract

The purpose of this study was to determine whether technology would have a bigger impact on increasing at-risk students' ability to identify and retain sight words versus the use of traditional flash cards. The measurement tool was the set of questions asked to the participants, seeing if they could correctly identify sight words with and without technology. This study involved use of a pretest and posttest, along with an interactive *SMART Board* and flash cards containing twenty sight words from the kindergarten Wonders sight word list. Achievement of sight word retention was evident during posttest scores for the participants after conducting this study. These findings suggest that the use of technology can be beneficial for students, although due to the small sample size of participants, further research is recommended.

CHAPTER I

INTRODUCTION

Overview

In any walk of life, particularly education, reading is one of the most essential tools for any student to have in order to learn and have lifelong success. Learning to read can start as early as toddlerhood, helping children become phonemically aware, gain a strong vocabulary, and relate reading to their own experiences, thus making connections. As the old saying goes, “We learn to read so that we can read to learn”. This stands true in any classroom. Without accurately recognizing printed words, understanding the meaning of those words, and creating a connection in and beyond the text, the reader is not getting the full grasp of the content that they’re trying to understand. There are so many reasons why reading is such an important tool for any student to have, and it is a fundamental skill that every child needs. If a child struggles to gain the proper reading skills, this can cause further struggles in other areas of their curriculum.

One of the more commonly taught skills in the area of reading for primary grade students is sight word identification and retention. Sight words, also known as high-frequency words, are words that are commonly used for elementary aged students in reading and writing. The goal for the child is to recognize these words instantly, or in other words, at first sight. Because there are new sets of sight words in each grade level, these words build upon each other. For example, students in kindergarten will be expected to identify the words they learn during the school year and retain that knowledge going into first grade, where they will learn new sight words as well. This can be a difficult task for many students, especially those considered at-risk.

The term “at-risk” is widely regarded to describe students who are struggling with their academics, and require temporary or ongoing interventions to help them achieve success academically. Kelley, Cunningham and Branscome (2015) stated that a student with an at-risk

classification serves as an indicator to counselors and others in the education system that these students are failing or near failing school due to environmental or personal obstacles in their lives. These students may have emotional or behavioral problems, show a lack of interest while in school and the material being presented to them, have attendance issues, or face circumstances within their family and personal life that prevent them from succeeding. All students, especially at-risk, need guidance and support from their teachers and parents to help them to learn to read. Identifying sight words is a starting point for all successful readers.

The researcher has been teaching for eight years, all in first grade and kindergarten. All the researcher's experience with teaching has been with students ranging from ages five to seven. Although the researcher participates and volunteers in other aspects of school that allow them to interact with older students, they have only taught this age group. One thing that has remained consistent each year of teaching is how broad the researcher's group is when it comes to reading skills. The researcher has always been very adamant to their colleagues and the parents of their students that reading sets the tone for all academics. If a child struggles to read, this can impact their learning in other subjects.

Every year, the researcher teaches their students 65 sight words from the Wonders Kindergarten Sight Word List, and every year the scores of their students range dramatically. The researcher has students who can identify all 65 words by the time winter break rolls around, and some students who still struggle to make it halfway through the list when we are entering the 4th quarter of the school year. The researcher works in whole groups, small groups, and one-on-one practices to help their students identify these words so that they can continue to make progress in the area of reading. Like in every classroom, students learn at different paces and in different ways. The researcher sees firsthand which students struggle and need more

interventions than others to help them succeed. This is an area of teaching that has always given the researcher a plethora of interest. Growing up, the researcher struggled for a long time in the areas of reading and comprehension. Now as a teacher, they strive to ensure that all students can be successful.

For centuries, reading came strictly from books. Teachers depended on textbooks and other various types of literature in order for their students to comprehend and learn the material being presented to them. However, over time, classrooms and education in general have come a very long way in the advancement of educational technology, and what types of tools teachers can use to help their students read and learn. One of the more effective tools used in today's classrooms is the *SMART Board*, an interactive whiteboard that has essentially replaced chalkboards and is used numerous ways to help children not only read, but learn a plethora of subjects while in school. For many years, educators and policymakers looking for strategies to close the achievement gap and improve student learning have sought solutions involving new uses of technology, especially for students placed at-risk (Goldman, Hammond & Zieleski, 2014). The *SMART Board* is a technological tool that the researcher used with the participants in this action research project.

Statement of Problem

The point of this study was to determine whether technology, specifically the use of a *SMART Board*, would have a bigger impact on increasing students' ability to identify and retain sight words versus the use of flash cards. Mechling, Gast & Thompson (2008) describe a *SMART Board* as a touch-sensitive screen that connects to a computer and digital projector in order to show images on the screen from the computer. The study was implemented with ten kindergarten students, five of them considered "at-risk" due to their academic scores and

participation in ongoing interventions each day during school. These interventions take place both in and out of the classroom, and vary from small group settings to one-on-one lessons. The problem statement that guided this action research project was: *Will at-risk students in my kindergarten class be able to identify and retain high frequency sight words better with or without the use of technology?*

Hypothesis

A statistical hypothesis for this study looks to identify improvement in student achievement following a given treatment, such as the use of technology. Based on the results from this study, it can be looked at as an expectation from other classes using this same imitative. For this study, a hypothesis was created in null form. It can be decided that based on the results, no improvement, on average, for similar classes will occur when increasing students' ability to identify and retain sight words using technology.

Operational Definitions

An operational definition describes in measurable or observable terms the item that is being defined. For this study, the use of technology, specifically the *SMART Board*, is used to determine whether students identify and retain high frequency sight words better while using it, versus the use of no technology, such as flash cards. Sight word identification for the researcher's kindergarten students can be operationally defined using the Wonders Kindergarten Sight Word List, and by using the flash cards and interactive whiteboard, the researcher can determine the results of which item had a bigger impact on students' ability to correctly identify high frequency sight words. While the independent variable is the use of technology or no technology, the dependent variable is whether students can retain their sight word knowledge, or the percentage of sight words correctly identified by them. High frequency sight words are

presented on both the flash cards and the *SMART Board*, and the data collected throughout the study helps conclude whether technology or no technology had a stronger impact on student learning.

CHAPTER II

REVIEW OF THE LITERATURE

The following literature review discusses sight word retention for at-risk students at an early reading age, as well as examines and compares the impact that technology/no technology has when incorporated into sight word instruction. The literature review will be broken up into three sections. Section one defines sight words and their importance to early reading instruction, as well as looking closer at the comparison of learning with and without the use of technology. Section two discusses whether technology helps at-risk students become and stay engaged in their learning of sight words, along with the various strategies and components that technology can offer. Section three examines whether student achievement improves overall with the use of technology compared to no technology.

Sight Word Retention and Technology

Sight word retention continues to be one of the most important and effective tools for early readers in becoming successful and understanding the text they are reading. It plays a large role in the overall scheme of comprehension, and is imperative when learning to read. Meadan, Stoner & Parette (2008) believe that reading sight words is necessary for young children's independence, safety, and more mature reading experiences as they grow older and progress in public school curriculum. Sight words refer to the words that are most frequently used in books, often seen multiple times throughout a story. "Sight words account for more than half of the words students will be required to read" (Cullen, Keeseey, Alber-Morgan & Wheaton, 2013, p. 88). It has been estimated that the same 100 words or so make up more than 50% percent of the text that students read whether they're at school or at home. "Therefore, learning to read should be an important skill for across a wide range of student populations" (Crowley, McLaughlin & Kahn, 2012, p. 1).

With sight words, the reader is tasked to memorize the word just by looking at it, or by sight. By doing so, the reader does not have to use any strategies to decode the word, since they can automatically recognize it and continue with their reading. This allows the reader to concentrate more on the story they're reading and overall comprehension, rather than having to stop and decode every single word in the text. Because many sight words cannot be sounded out using basic phonics skills and strategies, it is an advantage to the reader who already knows the words by sight prior to reading.

With the rapid increase of technology within society, it is no surprise that classrooms across the world are incorporating technology any chance they get. "Undeniably, technology has revolutionized the way that we live, work, and play" (Knight, McKissick & Saunders, 2013, p. 1). Technology can be used in numerous ways; computers, tablets, projectors, cameras, mobile devices, interactive games, and *SMART Board* technology. These can all be referenced as components of computer-assisted instruction. More so, various studies using this technology talk about how "information can be presented in an interactive medium using sound, video, animation, and text-enriched features" (Mechling, et al., 2008, p. 34). These features cannot be presented without technology, whereas the traditional flash card use for sight word retention play a different role, and may not be as impactful. "Therefore, the question is whether there is a difference between the use of traditional flash cards and SMART Board technology for teaching sight word reading to a small group of students" (p. 35).

Unlike traditional flash card use, Cullen et al. (2013) believes that "computer programs are ideal for independent sight word practice because they allow frequent response opportunities, immediate feedback, and individualized instruction" (p. 88). By using *SMART Board* technology in the classroom, whether it be individually or in a small group, students can receive

feedback for the work they're doing, along with any corrections, right away so that the process can continue to proceed ahead. A traditional method of retaining sight words, such as using flash cards, does not have the same impact because "computers are capable of presenting activities that are interesting and motivating to children" (Macaruso & Rodman, 2011, p.172).

When children become invested in an idea or particular learning experience, it allows them the "opportunity to practice at their own pace" (Sprague, 2013, p. 8). The advantage of having a *SMART Board* in the classroom when dealing with sight word retention, compared to sitting at a table and only using flash cards, is that the technology piece becomes a "valuable supplementary aid for reading instruction, allowing students to work at their own pace so that they receive sufficient independent practice to bolster word identification skills" (Macaruso & Rodman, 2011, p. 173). This is not only a confidence builder, but is imperative in the sense of not making the students feel rushed or overwhelmed when they are trying to retain sight words.

Engagement and Impact of Technology on At-Risk Students

In every school, there are students in the population who are considered "at-risk", meaning they are not experiencing academic success in school, and therefore require temporary or consistent interventions in order to achieve success. At-risk describes students from "culturally and linguistically diverse groups performing below grade level on measures of early reading skills" (Musti-Rao, Lo & Plati, 2015, p. 154). These students can range from the primary years of school, all the way up into their senior year of high school. For these students to understand the concepts being taught to them and to show progress, they must be engaged in what they are learning. Technology can play a large part in that.

A student who may be considered at-risk of failure will not always be identified for having social-behavior difficulties, although that can be the case sometimes. Even considered at-

risk, there is “an expectation that students will be reading at grade level before they enter middle school” (Englert, Zhao, Collings & Romig, 2005, p. 357). Instead, these students may just struggle with focusing on learning material because they are bored, tired, and simply just not engaged with how material is being taught to them. “Although many emergent literacy skills are acquired through active engagement in daily, meaningful activities and communication interactions with others, young children who are at-risk may not benefit from traditional emergent literacy instructional strategies as they progress in school” (Parette, Blum, Boeckmann & Watts, 2009, p. 393). It’s crucial for these students to have access to much more than paper and pencil during their time spent in school. In addition, when dealing with sight word retention, “technology allows students who are learning high frequency words to be actively involved” (McLaughlin, 2012, p. 4).

It has become evident over time that children are becoming more and more skilled with the use of technology, whether it be through a computer, tablet, video game console, or using their parent’s mobile device to play games and apps. Because of this, “it has become particularly important to better understand and use technology tools in classroom programming” (Parette et al., 2009, p. 395). All students, particularly at-risk ones who may need more engagement and prompts to help identify and retain high frequency sight words, benefit from having access to technology in their classroom. McLaughlin (2012) states that “possibilities are endless when discussing what an iPad or tablet can do with motivating and engaging students in learning high frequency words” (p. 4).

With the increase of technology amongst classrooms, “technology applications for typical, ‘at-risk’ young children, and those with disabilities, have drawn increasing attention from professionals worldwide” (Meadan et al., 2008, p. 46). Teachers and administrators alike

are noticing the impact technology has with not only their at-risk students, but the general student population as well. When most students have access to technology in their homes, while adding in time during school hours, they're in the presence of technology at all hours of their day. Because of this, no longer is there an issue of whether to use various technologies such as a *SMART Board* in school. Instead, education professionals must begin to focus on *how* to best use them in the classroom, especially for children who are at risk (Parette et al., 2009).

Student Achievement and the Use of Technology

Classrooms have functioned for many, many years without the use of technology. Chalkboards, paper and pencil, and textbooks have all done well over time in helping students learn and achieve their academic goals. However, in the year 2017, most schools and classrooms around the globe, particularly in the United States, have transformed into technological places where students have near unlimited access to the world outside of their classroom walls.

An aspect that could hinder technology in the classroom is the fact that not all schools have the funds or budget to provide these resources to their staff and students. McLaughlin (2012) feels that if a school does not have the necessary funds to make technology available in classrooms, it could have a large, negative impact on student achievement. Although funds could cause issues, there are many instances where technology in the classroom has helped to show improvement in student achievement when retaining sight words.

SMART Board technology is a thriving tool used in many classrooms, and continues to offer a different approach to teaching and learning. According to Musti- Rao et al. (2015), studies have documented the positive effects of this type of technology on the acquisition of word reading skills to struggling readers. By using a *SMART Board*, teachers can “individualize instruction for each student” (p. 154). This has a positive impact for the learning that the student

is trying to understand and accomplish. When an educator can adapt the material to fit the needs of a student, he or she is giving both parties a chance for success. A teacher cannot change the words or dialogue in a textbook, but he or she can adjust their technology, such as using a *SMART Board*, to the particular interests and needs of a student who needs help retaining sight words.

By using technology, teachers can differentiate the learning for their students. “In today’s classrooms, the ratio of computers to students is estimated to be 1:4, meaning that computer technology can be used to provide students with additional practice in specialized skill areas at relatively low cost” (Regan, Berkley, Hughes & Kirby, 2014, p. 106). They can decide how short, or long, an assignment should be given to a student. They can change items quickly and make them more effective, like pictures on a *SMART Board* or by adding sound effects so that the student can hear the sight words in various voices and volumes. In dealing with technology and differentiation, Musti-Rao et al. (2015) believes an area that can benefit from further inquiry and empirical validation is the use of education-based application, or ‘apps’. With these apps, they are “a key ally in supporting children’s learning” (p. 155). Students have almost limitless interactive games and websites they can use to help learn specific material and it can come in various forms.

CHAPTER III

METHODS

Design

In order to efficiently collect data and determine whether technology would have a bigger impact on increasing at-risk students' ability to identify and retain sight words versus the use of no technology, a quasi-experimental, single subject A-B-A-B reversal design was created for this study. This design allowed the researcher to look more closely at the impact that the independent variable, technology versus no technology, had on the dependent variable, sight word recognition and retention, of each participant. Data was collected for each participant through each phase of the A-B-A-B reversal design.

To begin, a pretest of twenty sight words from the Wonders Kindergarten Sight Word List were given to all ten participants, five at-risk students and five non- at-risk students, prior to the study to determine how many words were known versus unknown. This would allow the researcher to see growth, if any, by each participant when the study was over, and whether that growth came more from the use of technology or not. After the pretest was given, four weeks of research were conducted using the A-B-A-B reversal design and recorded daily on a spreadsheet to see the number of sight words correctly identified using technology or flash cards. Each week, the researcher presented five different sight words, thus completing all twenty words by the end of the fourth week.

Participants

The participants selected for this study were ten kindergarten students (P1-P10) from an elementary school in Baltimore County. The problem statement was created to see if the use of technology would have a bigger impact on these students than the use of flash cards when

identifying and retaining sight words. Out of the ten students, five students were classified as at-risk, who according to Kelley et al. (2015) are students who are failing or near failing school due to environmental or personal obstacles in their lives. These students have required ongoing interventions for a large part of the school year to help them achieve success academically in almost all areas of school, especially reading. More specifically in the area of reading, these students participant in interventions to help them with sight word recognition, identifying letters of the alphabet and their sounds, blending, concepts of print, and various reading strategies.

The other five students selected for this study were not classified as at-risk, and were selected randomly to make the group larger, thus providing more data to see if technology had a bigger impact on sight word identification than using flash cards. These students, much like the five at-risk ones, have experience working in groups for various activities and learning experiences in school.

All ten students selected for this study are in kindergarten and are either five or six years old at the time of the study. There was an equal split between genders, with five boys and five girls participating. Three boys and two girls made up the at-risk group, while two boys and three girls made up the non-at-risk group, thus equaling ten students total. Table 1 provides a description of the participants in this study.

Table 1.

Participants

<u>Participant</u>	<u>Gender</u>	<u>Age</u>	<u>Nationality</u>
P1	Male	Five	Hispanic
P2	Female	Six	Caucasian

P3	Male	Five	Hispanic
P4	Male	Five	African American
P5	Female	Six	Caucasian
P6	Female	Five	African American
P7	Male	Five	Caucasian
P8	Female	Six	Caucasian
P9	Female	Six	Caucasian
P10	Male	Six	Caucasian

Instrument

The instrument that was used by the researcher for this study were the set of questions asked to the participants, seeing if they, the students, could correctly identify sight words with and without technology. Although not exactly like a standardized test, the researcher did indeed ask the participants to answer the words that were shown to them in order to collect data of whether technology or no technology had a bigger impact on their sight word retention.

The test was normed so that the researcher could compare test takers in relation to one another, and to see how well they could identify sight words using technology and no technology. The researcher used a spreadsheet to gather data and see the percentage of words correctly identified by each participant on a daily basis. The test given to the participants was reliable because it produced stable and consistent results throughout the entire study. The test was also valid because it measured what it was supposed to, the percentage of sight words correctly identified by participants daily, and in the end, during the entire run of the study.

The dependent variable of the study was sight word recognition and retention. A test review from *Buros Mental Measurements Yearbook* has similar aspects to this study. The tool being used in the review, the Test of Word Reading Efficiency (TOWRE), were commended by both reviewers as being an instrument that was “well-developed” and “user appropriate” in each regard. Sight word efficiency and vocabulary identification are critical aspects of reading, and both reviews agree that the measure conducted is valid when trying to positively develop reading efficiency in the subjects of the study. “A rich sight word vocabulary is important for fluent reading and good comprehension” (Tindal, 1999, p. 1). This can be related to how the researcher of this study was trying to collect data on sight word efficiency and overall reading growth from the participants.

Procedure

The current study was given by the researcher in their kindergarten classroom. Materials for this study included flash cards, the interactive whiteboard, and Microsoft PowerPoint to show the sight words to the participants. The study included a pre-assessment of the twenty sight words, four weeks of data collecting using the independent variables, and a post-assessment of the twenty sight words. Each participant began the study by reading twenty words from the *Wonders Kindergarten Sight Word List*. These words were selected by the researcher. Of the twenty words, eight of them had been taught in class prior to this study, while the remaining twelve had not yet been. Although eight of the words had been taught to the participants, it did not necessarily mean that they had been able to successfully identify and retain them up to this point of the study.

Each phase of technology or no technology of the study lasted a week. During each week, the researcher would present five words to the participants, thus equaling all twenty words

by the end of the run. However, the order of the words would change daily during every phase so that the participants did not start to memorize the words because of the same order.

Participants would be working with the researcher individually during this study, not in a group. When participants were looking at sight words on flash cards, they were instructed to sit at a small table with the researcher, who would simply show them the words while holding the flash cards. When participants were shown words using the *SMART Board*, they would stand up in front of the board and click on the next slide of the PowerPoint to see a new word.

For the first week, participants were shown words on flash cards, and it was recorded on a spreadsheet whether the participant could correctly identify the word. The researcher would know this by whether the participant said the correct word that was shown on the card.

For the second week, the researcher used the technology piece of the study, a *SMART Board*, to show a new set of five sight words, always in a different order, through Microsoft PowerPoint. Participants would see the word, and whether they were able to correctly identify it or not, would then click on the next slide to see the new word. The researcher would again record the data on a spreadsheet daily to show how many words were correctly identified or not.

Leading into week three, the researcher withdrew the technology piece of the study and reverted to using flash cards. Again, five new words were presented to the participants, and the same procedure was conducted similar to week one. For the fourth week, the researcher again used the *SMART Board* and showed the last five sight words during that week to the participants. When the four weeks had finished their run, the researcher conducted a post-assessment the week after to measure each participant's sight word knowledge, and whether technology or no technology had a bigger impact. For each cycle of the study, paired t-tests and effect sizes were calculated separately for the at-risk and not at-risk students. The t-tests tested the null hypothesis

that there were no differences between the populations' mean sight word scores using flashcards or a *SMART Board*. In addition, paired t-tests and effect sizes were computed for differences between the pre-study and post-study tests.

CHAPTER IV

RESULTS

The purpose of this action research study was to determine if at-risk and not-at-risk students in the researcher's kindergarten class would identify and retain high frequency sight words better with or without the use of technology. The technology used for this study was the *SMART Board*, an interactive white board used in the researcher's classroom. The researcher used traditional flash cards with sight words as the non-technological tool. Sight words for this study were selected from the Wonders Sight Word List, a reading source used in the researcher's classroom throughout the entire school year.

The outcome variable was the number of sight words correctly identified out of twenty different words selected by the researcher from the Wonders list. There were five at-risk and five not-at-risk kindergarten students selected from the researcher's kindergarten class. Students alternated using flash cards and the *SMART Board* over the four weeks of the study. Additionally, a pretest was administered before the study began, while the students took a posttest after the study ended to see how well they did.

A series of paired t-tests were computed to test the null hypothesis that the population mean number of correct sight words is the same whether students used flashcards or the *SMART Board*. The population for this action research study is kindergarten classrooms similar to the researcher's classroom wherever they are located. Because the sample sizes were five students per group, effect sizes using Cohen's D were calculated. For this study, effect size measures the actual sample mean difference in standard units independent of the sample size; the "treatment effect." Cohen and others established "rules of thumb" for interpreting the effect sizes, i.e. (less than 0.2 = very small, 0.2 to 0.49 = small, 0.5 to 0.79 = medium, and 0.80 and higher = large).

Table 2 shows sight word scores for traditional flashcards v. the *SMART Board*, while Table 3 compares the pretest v. posttest scores for this study.

Table 2

Sight Word Scores for Flashcards v. SMART Board

Cycle	At-Risk	N	Flashcard		SMART Board		t-test	p-value	Effect Size
			Mean	SD	Mean	SD			
1	Yes	5	6.4	2.97	7.4	3.13	.63	.56	.28
1	No	5	14.2	2.59	13.0	.707	.97	.39	.43
2	Yes	5	6.8	2.86	8.0	2.74	.91	.41	.41
2	No	5	13.2	3.11	13.2	.837	.00	1.00	None

Table 3

Sight Word Scores for Pretest v. Posttest Board

Cycle	At-Risk	N	Pretest		Posttest		t-test	p-value	Effect Size
			Mean	SD	Mean	SD			
Pre-Post	Yes	5	4.2	1.30	7.4	1.51	6.53	.00	2.9
Pre-Post	No	5	9.8	1.92	14.2	1.10	11.00	.00	4.5

Cycle 1 consisted of weeks one and two for all ten participants, whereas Cycle 2 consisted of weeks three and four. During Cycle 1, the at-risk students mastered more sight words using the *SMART Board* than when they used traditional flashcards. The difference was not statistically significant at the .05 level, but there was a small effect size in favor of the *SMART Board*. This indicates that not reaching statistical significance was due to the small sample size rather than no effect of the technology.

During Cycle 1 for the not-at-risk students, they mastered fewer sight words when using the *SMART Board* than when they used traditional flashcards. The difference was not statistically significant at the .05 level, but there was a small effect size in favor of the traditional flashcards.

For Cycle 2, the at-risk students mastered more sight words using the *SMART Board* than when they used traditional flashcards. There was a small effect size (nearly medium) in favor of the *SMART Board*, even though the mean difference was not statistically significant in this scenario. Not-at-risk students during Cycle 2 had the same mean score whether they used flashcards or the *SMART Board*. Therefore, there was no effect size and the t-test for differences was not significant at any p-level. Regardless of risk status or treatment, students mastered more sight words post-treatment than pre-treatment. The t-tests were statistically significant at the 5% level, and the effect sizes were large.

CHAPTER V

DISCUSSION

This action research study was created to determine whether at-risk students in the researcher's kindergarten classroom would be able to identify and retain high frequency sight words better with or without the use of technology (*SMART Board*). A statistical hypothesis for this study looked to identify improvement in student achievement using a particular treatment, such as technology, which is the independent variable. A hypothesis was created in null form for this study, and while looking at the results, it was decided that no improvement, on average, for similar classes will occur when increasing student's ability to identify and retain sight words using technology. This study did not determine experimentally that other kindergarten classes will have greater results using technology, in this case a *SMART Board*, than not using technology.

Implications of Results

The use of technology in classrooms, in this case a *SMART Board*, are continuing to grow. Teachers are finding more inventive ways to use this type of technology in their classrooms for their students and the lessons are they teaching. "The prevalence and importance of technology in the lives of young children has been increasingly echoed in the field of early childhood education" (Parette et al., 2009, p.171). Today, using technology in the classroom is not just something for teachers to use because it's available to them; it's become a key tool for adapting lessons and teaching in different and more differentiated ways.

When looking at the results of this study, the researcher can determine that the at-risk students mastered more sight words while using the *SMART Board*, while the not-at-risk students did not show as much growth when using technology vs. no technology. However, regardless of risk status, students ended up mastering more sight words post-treatment than in pre-treatment.

This helps support the problem statement of this study and that at-risk students could identify and retain high frequency sight words more effectively with either technology or no technology, and in this case, the technology was the more beneficial factor.

Theoretical Consequences

When conducting this study, the researcher had a lot of prior experience with the high frequency sight words from the Wonders list, as well as using a *SMART Board* in their classroom. Before doing this study, the researcher has always implemented the use of technology when teaching their students high frequency sight words. This study looked at a specific set of students, some of those being at-risk, and tried to determine whether the use of a *SMART Board* would be more effective than traditional flashcards when identifying and retaining sight words.

Through the years and with further development of technological tools, studies are being conducted to help prove that using technology in the classroom can benefit students in a more positive manner. Englert et al. (2005) believe that technology programs are being viewed as resources for addressing the literacy needs of young readers. These programs might be especially suited to offer technical support in the development of word recognition by providing a large amount of extended practice and quick feedback to its users. The researcher uses their *SMART Board* on a daily basis, and overtime has noticed how engaged their students are when using this technology. The students can interact with it and use it in a variety of ways to help them learn, much more so than a typical flash card or paper and pencil scenario. This allowed the researcher to create a study where they thought growth could be shown by their at-risk students when identifying and retaining high frequency sight words.

In the past, the researcher had noticed some of their at-risk students responding in a more effective manner when using the *SMART Board* rather than working in a small group setting with no technology additions. This inspired them to focus their action research on whether the use of technology vs. no technology would have a bigger impact on sight word identification and retention. When looking at the results, it was clear that the use of technology had a bigger impact on their at-risk students' performance when dealing with sight words.

Threats to the Validity

After the study was completed, the researcher was able to identify some threats to the validity of their findings. One possible threat to the validity of this study was the length of time it was conducted. This can be observed in two ways. The participants took a pretest prior to the first week of testing. When they finally took the posttest at the end of the study, it had been almost a month and some of the sight words that they had encountered were from weeks one and two. By this point, students may have forgotten words that they successfully identified *during* the study. Retention can work in various ways, and time can play a part in that. The second way that time can be observed as a threat is the fact that the A-B-A-B reversal design was created to last over a four-week period, and this might have been too long of a study for kindergarten aged students, particularly those at-risk, to provide effective results.

Another threat was the small sample size of participants used during the study. The researcher selected five at-risk students and five not-at-risk students to see whether they would identify and retain sight words better with or without the use of technology. Because the number of participants was not large, this suggests that observing an entire kindergarten class ranging from twenty to twenty-five students might be more effective. Even more so, conducting a study with an entire kindergarten grade level, possibly four or five classes, could be even more

efficient with final results. With only ten participants in this study, the researcher might not have gained the amount of information needed to really see effective results when doing technology vs. no technology. To counteract the limiting effect of small samples on null hypothesis tests, the researcher included Cohen's Effect Size. This measured the standardized difference between the times when technology was used and when flashcards were used independent of sample size. The Effect Size statistic identified treatment differences that would have been unnoticed using only significance testing.

Connections to Previous Studies/Existing Literature

Using technology in the classroom has continued to gain momentum in schools that have access to it. Knight et al. (2013) believes that educators must now consider technology when preparing students for situations in which information is no longer predominantly presented in printed books, but more often over the Internet and other online resources. Because technology plays such a vital role in how educators teach, students must also learn how to use the technology shown to them in order to become successful workers now and in the future.

The current study has similarities and differences to a study done by Mechling et al. in 2008. With both studies, the researchers compared the effectiveness of a *SMART Board* and traditional flash cards, looking at technology vs. no technology, and whether one or the other had a bigger impact on sight word recognition. Another similarity was that both studies showed an overall greater percentage of sight words identified using *SMART Board* technology over traditional flash cards. A difference between both studies is that Mechling's study consisted of only three students, all with moderate intellectual disabilities, while the researcher of this study had ten participants, some at-risk and some not-at-risk.

Another study that showed similarities and differences to the researcher's study was conducted in 2008 by Meadan et al. In both studies, the researchers looked to determine how at-risk students, due to academic and social-behavior issues, recognized sight words. There were also twenty sight words selected in both studies. The students in these studies were similar in age as well, ranging in the five years old range. However, with Meadan's study, students were shown sight words on cards like the researcher, although pictures were not included in both. Another difference was that the researcher of this study used a *SMART Board* with just words on them, no picture included to possibly enhance engagement or to help students identify and retain sight words.

Implications for Future Research

When looking ahead to the future, it's evident that technology will play an important role in education. Schools all over the world are adapting to change and including some type of technology if not in their classrooms, at some level in their school. "People who are shown to be at higher levels of literacy typically make more money throughout their life, have more job success, and are found to have higher levels of self-sufficiency than those at lower rates of literacy" (Crowley et al., 2012, p. 297). The results of the researcher's study point to a few implications to future research.

There were only ten participants in the researcher's study, and future research might suggest having a larger number of participants to provide a bigger results sample. By adding more at-risk and not-at-risk students, the researcher might be able to see a much larger difference in high frequency sight word identification and retention with technology vs no technology than when having a smaller sample size.

Another item that can be addressed with future research could be adding more high frequency sight words to the lists of the study. Although twenty words may be effective for a sample size of only ten participants, adding more words may increase the percentage of correctly identified sight words in the posttest, or it may not be a factor at all.

Conclusion

In conclusion, at-risk students could identify and retain more high frequency sight words using the *SMART Board* over traditional flash cards, especially in Cycle 2. This indicates that technology may very well indeed play a significant role in student learning, especially those who have academic and social-behavior issues. Although there was not an extreme difference between technology or no technology with the non-at-risk students, the study overall showed that students mastered more sight words in the posttest than pretest.

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