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**USING THE KEYWORD METHOD AND
THE SMART BOARD IN VOCABULARY INSTRUCTION
FOR STUDENTS WITH LEARNING DISABILITIES**

by
Maria Grace Capozzoli Phillips

A Thesis

Submitted to the
Department of Special Educational Services/Instruction
College of Education
In partial fulfillment of the requirement
For the degree of
Master of Arts at
Rowan University
May 2013

Thesis Chair: Joy F. Xin, Ph.D.

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Dedication

I would like to dedicate this to my husband, Mark A. Phillips; to our children, Alexander, R. Michael, and Samantha; and to my father, Ralph R. Capozzoli without their love and support this would not have been possible. Also, I dedicate this to the memory of my Mother, Rose, and my Grandmother, Grace, for their endless belief in me and their continued aura.

Acknowledgements

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Abstract

Maria Grace Capozzoli Phillips
USING THE KEYWORD METHOD AND
THE SMART BOARD IN VOCABULARY INSTRUCTION
FOR STUDENTS WITH LEARNING DISABILITIES

2012/2013

Joy Xin, Ph.D.

Master of Arts in Special Education

The purpose of this study was to examine the use of the Keyword Method and the Smart Board presentation in vocabulary instruction for students with Learning Disabilities (LD). A total of five students, ages 8-10 participated in this ten week study. Students were taught using traditional instructional strategies in Reading and Social Studies vocabulary lessons during the baseline. During the intervention, weekly instruction was provided with a Smart Board presentation to demonstrate each vocabulary word with the Keyword Method presented on a Smart Board, such as a mnemonic “catch word”, and a visual picture to demonstrate the meaning followed by practice and review to reinforce their learning. A multiple baseline design with A B phases across the subject areas of Reading and Social Studies was used to compare student performance in word recognition, identification, and application. All students showed an increase of their quiz scores of vocabulary acquisition in both Reading and Social Studies.

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CHAPTER 1

Introduction

Statement of Problems

Understanding vocabulary words and how they relate to the context is essential for an individual to master reading (Foil & Alber, 2002) otherwise students are likely to have problems comprehending written material. The importance of vocabulary knowledge along with reading comprehension is a fundamental factor in reading proficiency (Foil & Alber) because as the text becomes more difficult and complex, the readers' comprehension success becomes challenged. The understanding of word meanings and the use of decoding skills provide reading fluency, hence improve comprehension skills. Difficulties that exist with vocabulary development consist of skills deficits in reading comprehension, word recall, fluency, decoding and phonetics. Individuals who experience slow vocabulary development are less able to comprehend text at grade level (Mukoroli, 2011).

A lack of vocabulary knowledge is the main barrier to students in reading comprehension of text (Foil & Alber). Individuals with Learning Disabilities (LD) experience many of these difficulties; therefore they require specialized instruction, accommodations, and adaptations in order to gain success (Foil & Alber). These students have difficulty retaining and learning information pertaining to memory of vocabulary words (Condus, Marshall, & Miller, 1986). Characteristics of these learners' include skill deficits, lack of learning strategies, and lack of application and active participation in learning process. These learners lack the understanding of word knowledge and word recognition. They are at a disadvantage with limited expressive and receptive vocabulary words (Goldsworthy, 1996). Frequently, there is poor vocabulary attainment among these learners because they experience very little independent reading

necessary to improve vocabulary development (Uberti, Scruggs, & Mastropieri, 2003). Research has shown that independent reading for 25 minutes a day has been proven to increase students' vocabulary acquisition (Jitendra, Edwards, Sacks, & Jacobson, 2004). Thus, these students continue to struggle with reading.

In order to help students with LD learn vocabulary words, a variety of instructional techniques should be considered, for example, multisensory approaches using visual, auditory, kinesthetic, and tactile teaching methods (Foil & Alber, 2002). This means that words should be taught in contexts, and student's prior knowledge should be stimulated. The known words should be reviewed to build relationships to the new words, and applied in different context (Reutzel & Cooter, 2011). It is found that Semantic Word Maps/Webs, Academic Word Walls, Five Step and Keyword Method are effective techniques to enhance vocabulary learning, especially using multiple sensory strategies such as say the word, view the word, say the picture, and view the picture.

Semantic Word Map/Web is a visual method to organize information to link a learner's prior knowledge to the new vocabulary word (Foil & Alber). The word map helps students to visually organize and think about new words or concepts. The way to use this strategy in the classroom is to implement a visual word map using the vocabulary word with the central concept, and then details are spun off to connect the major categories creating a web-like graphic (Foil & Alber, 2002). The new word goes in the center of the web and the map is filled in with related details such as, definitions, synonyms, antonyms, and pictures to reinforce the concept. Teachers have practiced this method with students in whole group instruction to introduce new vocabulary words. This strategy can be used for students at the elementary school through high

school. It also can be used in teaching large groups and small groups of students on classroom boards, paper tablets, or using graphic organizers. Often teachers have used this method to engage students into a newly introduced vocabulary lesson and to stimulate students' prior knowledge of a subject (Harmon, Wood, Hedrick, Vintinner, & Willieford, 2009). According to Harris, Schumaker, & Deshler (2011) both groups of students with and without disabilities earned higher scores using word maps than those in other groups without word map instruction (Harris, Schumaker, & Deshler, 2011). Thus this strategy has been proven to increase students' success in vocabulary development (Foil & Alber).

An Academic Word Wall is another strategy teachers use to teach high frequency words. These words are printed onto card stock and are posted on a wallboard. Hence, that is the name for this strategy of words on walls.

Teachers simply build word walls by incorporating them into daily activities such as Guess That Word, Rainbow Writing, and Be the Teacher. Generally, words are organized alphabetically as they are introduced in the lessons. Teachers can create their word walls to encourage and engage students' learning using different design variations such as: color coding words or paper to distinguish ideas; providing definitions with words; and using pictures with words to help visual learners. A word wall is an ongoing, structured display of vocabulary words that provide visual repetitive reminders for students. These words are constantly used by teachers and students during a variety of activities. Word walls provide many functions to reinforce and to build on the students' vocabulary instruction and understanding, and promote independent reading and writing by providing a visual reference for students (Jasmine & Schiesl, 2009). Word walls also help with students' memory of words and ideas. Word walls can be interactive and used in elementary school classrooms through high school classrooms. At the

primary grade a Sight Word Wall helps master sight words for the grade level. Older students can benefit from word walls when used as an effective literacy tool to promote vocabulary learning in combination with instruction. Other examples of word walls are: Literature Based Word Walls, Seasonal Word Walls, Writing Word Walls, and Standardized Test Word Walls. This strategy allows teachers easy access to vocabulary words when instructing students (Harmon, Wood, Hedrick, Vintinner, & Willieford, 2009). Research shows that students increase their comprehension scores by 33% when word walls and direct vocabulary instruction was provided (Marzano, 2004). By improving students' background knowledge and comprehension with systematic vocabulary instruction within context their scores have been proven to increase (Marzano).

Smith & Johnson (1980) introduced The Five-Step Method a strategy used to teach new vocabulary words for instant word recognition. It includes five steps which are: Step 1 is seeing the word. The word is shown on the board or overhead and used in a sentence or paragraph. Background knowledge is discussed through the use of vocabulary cards and visuals such as posters. Step 2 is listening to the word said by the teacher. The teacher discusses the word meaning and checks for understanding. This is to explore and model the vocabulary by involving students with hands-on activities. Step 3 is discussing the word with students. Students are asked to orally use the word in a sentence or to give examples of antonyms and synonyms. Step 4 is to define the vocabulary with the students' own definitions. Step 5 is to write the word. Students are asked to write the word on one side of an index card and on the opposite side they write the word in a sentence with an illustration. The index card is put into alphabetical order and placed in the student's word box for future reference. Teachers use multiple modalities to aid students in learning vocabulary words, so that students are able to see,

listen, speak, read, and write the new words using a variety of materials to learn vocabulary. This strategy is effective at every grade level and provides multiple exposures to vocabulary words. This type of teaching leads to a more effective understanding of words and concepts. Achievement is more successful because students are provided a description, explanation and an example of the vocabulary word and ask to restate using their own words (Smith & Johnson).

The Keyword Method is a mnemonic strategy using a means to aid in the information recall in learners with their short-term memory (Condue, Marshall, & Miller, 1986). It includes the following mnemonic techniques: recoding, relating, and retrieving. In the recoding stage the instructor has the student change the unfamiliar vocabulary word to a familiar sounding word that is easily pictured. Then the student should practice the vocabulary word and the keyword to promote association. The relating stage increases association by visualizing the keyword through a visual image or picture with the vocabulary word. In the retrieving stage the student is taught how to think of the keyword, visualize the picture involving the vocabulary word and the keyword, and retrieve the definition from the picture (Hughes, 1996). This method involves the association of phonetic and visual imagery components of a word with its definition (Atkinson & Raugh, 1975). It is a two step process combining the verbal and visual steps, and creates a concrete, acoustically similar keyword for the unfamiliar vocabulary word being taught to aid the learner's memory and understanding of words (Mastropieri & Scruggs, 1998). This method has become increasingly popular in the instruction of foreign language and teaching students with LD (Uberti, Scruggs, & Mastropieri, 2003).

It has been found that students perform significantly better when the keyword strategy was provided compared to other instructional methods (Mastropieri, Scruggs, Levin, & McLoone, 1985). This method has been proven to benefit and greatly increase vocabulary scores

of students with LD (Uberti, Scruggs, & Mastropieri). In addition, this strategy actively involves these students in vocabulary learning and allows students to see how vocabulary words relate to other words. Using a variety of methods to teach vocabulary and frequent practice with reading activities is beneficial to the success of students especially those with LD. However, limitations do exist with teacher's applications in the field. For example, questions have arisen on whether this method is effective with learning low-vividness vocabulary words (Uberti, Scruggs, & Mastropieri, 2003; Campos, Amor, Gonzalez, 2004). Thus, further studies in this area are needed to verify the previous findings.

Recently, the use of Smart Board technology has entered into the classroom setting allowing teachers to provide interactive vocabulary lessons (Preston & Mowbray, 2008). Smart Board is an interactive electronic, multiuser whiteboard that uses multi-touch detection. A projector is used to display a computer's video output on the interactive whiteboard, which then acts as a large touch screen. Various software applications may be used with the electronic whiteboard. Both teacher and student can use their hands or the Smart Board's special colored pens to write, draw, and move / drag images on the screen, or to erase images (Preston & Mowbray).

Studies report positive effects using Smart Boards with both general education and students with LD because it provides an opportunity for teacher and students to use educational multimedia activities in an interactive learning environment (Mechling, Gast, Krupa, 2007). It is found that learners are exceedingly motivated when lessons are presented using a Smart Board (Preston & Mowbray). Students become physically involved in touching and moving objects around the screen, as well as with the sounds and the visual effects provided (Preston & Mowbray). Images on such a board can be made large enough for all students in the classroom

to view clearly. Thus, the Smart Board helps promote learning in students with short attention spans by actively involving them in lessons (Preston & Mowbray). Despite positive comments, some limitations exist with Smart Board technology, such as its cost and technical setup. Also, teacher training and the selection of activities that provide appropriate interaction between the teacher and students in the classroom must be well designed. Therefore, using the Smart Board to develop effective instruction seems a long way to go, and evaluation on such Smart Board based instruction needs to continue.

Significance of the Study

There are many different strategies to effectively teach vocabulary words to students at all levels. The keyword method was chosen because it has been studied numerous times over many years with contradictory findings and weaknesses on its effectiveness based on various factors. Some examples of the problems and limitations have been with the experimental design, participant's choice, drawing illustration, and the absence of instructor training (Campos, Gonzalez, & Amor). Therefore, studies are needed in this area to use the keyword method in class to students with LD.

This study will incorporate the use of the interactive Smart Board technology and the mnemonic keyword method to instruct vocabulary words to students with LD. To date, the Smart Board is a new technological tool in classrooms; the intention of this study is to evaluate its effect on vocabulary instruction, especially for those with LD. It attempts to add information to the area of the use of the Smart Board and the keyword method.

Purpose of Study

The purposes of this study are to: 1) examine the effects on the keyword method using the Smart Board in vocabulary instruction; 2) evaluate vocabulary acquisition skills of students

with LD in terms of word identification, recognition, and application.

Research Questions

This study explores the following questions:

1. Will students with LD increase the number of vocabulary word recognition when the Keyword Method combined with the Smart Board presentation is provided?
2. Will students with LD increase the number of vocabulary word identification when the Keyword Method combined with the Smart Board presentation is provided?
3. Will students with LD increase the number of vocabulary word application when the Keyword Method combined with the Smart Board presentation is provided?

CHAPTER 2

Review of the Literature

Understanding vocabulary words is an important part of reading comprehension (Foil & Alber, 2002). A reader must recognize words and identify meanings of each word to understand the reading text. Students with LD struggle with these skills in their reading activities. The lack of word knowledge, independent reading skills, and learning strategies appear to be the problem with vocabulary development for these students (Jitendra, Edwards, Sacks, & Jacobson, 2004). There are many instructional strategies applied in the classroom to teach vocabulary words especially for those with LD. This chapter reviews four vocabulary instructional strategies for students with LD. These strategies include Semantic Word Maps/Webs, Academic Word Walls, Keyword Method, and Technology-based instruction.

Semantic Word Maps/Webs

According to Foil and Alber (2002) semantic mapping helps students with LD understand and synthesize new information. Semantic mapping is a visual method to teach students relationships between recognized words and new words by organizing content information. This can be accomplished by brainstorming, discussing words and concepts related to words, labeling, and categorizing words into groups (Kern, 2008). Semantic maps are graphic organizers that aid in identifying essential ideas and how these ideas go together (Jackson, Tripp, & Cox, 2011).

Bos and Anders (1990) examined the effects of Semantic Mapping on vocabulary learning compared to Direct Instruction. Participants included 61 junior high students with LD. Of these 41 were males and 20 were females. The students were randomly assigned into the intervention conditions using Semantic Mapping and instructed in groups of 6 to 12. The

intervention consisted of eight 50 minute sessions, for 7 weeks. Instructional materials included a written vocabulary word list to create a Semantic Map. Students worked with an instructor to create the relationship map using the words from the list to generate interactive activities. The testing materials consisted of a pretest to assess prior knowledge, practice and experimental instructional materials, in addition to interest assessment, and comprehension tests.

The results showed that students instructed using Semantic Mapping outperformed those instructed by Direct Instruction. Participants in the Semantic Mapping group significantly demonstrated higher scores on their recall and understanding of vocabulary words.

Although the findings were positive to support the effect of semantic mapping in teaching vocabulary to junior-high students with LD, a further study may be needed to investigate the performance of elementary school students using this strategy to learn vocabulary words. Additional research may be needed to verify the findings.

The Word Mapping strategy was taught to students to predict word meanings in Harris, Schumaker, and Deshler's study (2011). The participants included 230 public high school students in nine 9th grade English classes. There were two subgroups involved in this study. The first group included students with LD and the second group included students without LD. A total of 24 students with LD participated in the study. The nine classes were randomly assigned to one of two groups taught by three teachers to compare the difference. Group 1 used the Word Mapping and Group 2 used the traditional strategy to review the vocabulary words.

Students were taught a mnemonic device to help them remember and learn the 4 steps. Step 1 involved breaking word into morphemic parts, such as prefix, root, and suffix; Step 2 searching a meaning of each part of the word; Step 3 predicting the word based on the meanings of each section identified; and Step 4 checking the word meaning in the dictionary. Students in

each group were instructed over 10 lessons with each of 45 minutes over three phases. Phase I was the Orientation. In this phase, students were instructed on prefixes, suffixes, root words, and the above 4 steps. The instructor presented information orally and used cue cards to visually teach the procedures. Various activities were included in the lessons to provide practice in identifying morphemes and meanings. Students worked both individually and in groups. Phase II had three lessons including review of the target vocabulary word to practice. The students were instructed using guided practice to map out the parts of the vocabulary word by entering the prefix, suffix, and root word in the appropriate box in a worksheet. The instructor modeled and engaged the learners by calling on them to contribute word parts, and students were prompted to predict the word meaning. Then the instructor prompted learners to figure out how the meanings fit together and to predict the word meaning. This activity was repeated with each of the vocabulary words to reach the mastery level. Phase III, required students to work with a partner to apply the steps with a list of new vocabulary words. After completing all the Word Maps, students were asked to discuss and check the word meanings and predictions.

The results showed that students in the Word Mapping group earned approximately 60% of their post test compared to the 18% of their pretest. Significant gains in mastering word meanings were made by students with and without LD. It was clear that Word Mapping was a successful strategy to instruct students in understanding meanings of isolated words at a considerable level. Semantic mapping is proven to be beneficial in helping students with sufficient prior knowledge to link with the new words to understand their meanings (Harris, Schumaker, and Deshler, 2011).

Although the findings were positive to support the effect of semantic mapping in teaching vocabulary a small number of students with LD was included with limited instructional time in

the study. Further research may be needed to expand the participants to verify the findings.

Academic Word Walls

A word wall is a collection of high frequency words that are grouped into categories and posted on a classroom wall for students to review in order to provide a visual aide to learners. Presenting words on the wall for students to view and practice repeatedly provides an opportunity for their improvement in vocabulary learning (Jasmine & Schiesl, 2009).

This is apparent in the study by Walton (2000) involving word walls. The study investigated the effects of word walls and word activities in regards to reading fluency. Participants in this study involved 22 first graders, 9 girls and 11 boys from a rural public school over a period of four weeks. A comprehensive literacy program provided integrated skills and strategies by means of lessons incorporating phonics, grammar, spelling, and fluency. Students practiced reading words on flash cards and participated in word wall activities. To introduce new concepts, whole class instruction was provided. Students collaboratively worked together to reinforce lessons during small group instruction. Examples of various activities included read-alouds, partner reading, and independent reading. Daily writing activities were assigned to promote use of the word wall such as Rainbow Writing, Guess the Word, Be the Teacher, and Let's Be Creative. Multiple data collection strategies were used; such as pre-running and post running record, teacher observation, and student interviews. The purpose of the running record was to establish whether reading materials were on the proper level and to obtain information on word recognition process. Recordings consisted of miscues, self-correction rate, and words read per minute. Additionally, data was collected through teacher observations involving five randomly selected students completing word wall activities in classroom learning centers. The teacher recorded the observation of instances of a behavior, activity, and practice. Scoring was

based on a point system for mastering the word wall activity, completing the activity satisfactorily, having one or two mistakes but understanding the assignment, or having many errors as a result of misunderstanding the assignment. This was followed by 10 minute interviews with six randomly selected students to examine their understanding of and experiences with word wall activities.

Results showed that students demonstrated an improvement to recognize words, directions, and activities, indicating that word walls and word wall activities help increase reading fluency and identification of high-frequency words. As a result, students increased their reading fluency and comprehension.

Limitations of this study included the age and distractibility of the participants which could affect the performance. Also, student absences might have caused a lack of instructional continuity regarding the directions of each activity. Additionally, data collection was restricted and the lack of student with LD participation may indicate a need for further study.

In a second study conducted by Harmon, Wood, Hedrick, Vintinner, and Willeford (2009), the use of Word Walls to improve learning vocabulary is also evident. A total of 44, 7th graders in two reading groups participated. The group was diverse containing three special education students. Group 1, the word wall group, with 23 students self-selected their words, while the 21 students in Group 2 continued with their regular vocabulary curriculum using a vocabulary book.

Students in Group 1 were taught using a word wall and a variety of activities with multiple exposure and repetition of the vocabulary in their practice. For example, the students were directed to form associations of the words through color, symbols, and situations. A sequence of lessons was developed to allow students to be actively involved in activities to find

out each word's meaning. In addition, students worked in cooperative learning groups to actively manipulate and apply word meanings in various modalities, such as drawing/illustrating, writing, presenting, viewing, and talking. These activities helped students remember each word's meaning. A pretest was first administered followed by weekly tests for 7 weeks to evaluate student performance. Scores from both groups were collected from weekly assessments which included writing the definitions of words and responding to sentence prompts.

At first, results showed that there were no significant differences in scores between the two groups of students, however after two weeks a follow-up test was administered unknowingly to students to determine amount of information retained. This outcome showed that students in Group 1 demonstrated a sustained higher level of understanding of the vocabulary words. They were able to effectively apply these words to the meaningful prompts. This group proved to have a deeper and long-term understanding of the vocabulary words which might promote the possibility of increased reading comprehension.

The findings indicated the effect of an Academic Word Wall strategy as a tool to support vocabulary instruction in which the students were actively engaged. Because a small number of students with LD participated in this study further research may be needed to expand the participants to confirm the findings.

Keyword Method

The Keyword method according to Carney and Levin (1994) refers to mnemonic illustrations to present vocabulary words. It has two parts. The first part involves the association of the new vocabulary word with a familiar word that sounds similar to a significant part of the new vocabulary known as the keyword. The second part links the keyword and the definition of the new vocabulary word with a visual image (McDaniel & Pressley, 1989; Carney & Levin,

1994). This method has been used to teach vocabulary words to students with LD, as well as, to those learning a foreign language to reinforce memorization of the new words with their associative components.

According to Condue, Marshall, and Miller (1986), the keyword method is useful in teaching vocabulary to students with LD. These students demonstrated an increase in the achievement of vocabulary word meanings. This method can be helpful in a wide content area such as English, language arts, history, and science at both elementary and secondary levels (Scruggs, Mastropieri, Berkeley, & Marshak).

In their study, participants included 64, 12-year-old students with LD from four public elementary schools in a large Midwestern city. Of these, the 48 males and 12 females from diverse backgrounds were divided into four treatment conditions. These included keyword-image, picture context, sentence-experience context, and a control group. A total of 50 vocabulary words grouped in weekly sets of 10 were taught in small group instruction for 20 minutes, 3 days per week, over 5 weeks. Prior to instruction a multiple choice pretest was administered with the words used in the study. In the keyword-image condition, participants were instructed to learn word meanings using three steps. Step 1, students learned a keyword for each vocabulary word using an index card provided by the instructor with a vocabulary word on one side and the keyword on the other side. Participants were asked to recall appropriate keywords when vocabulary words were randomly presented. Step 2 required students to study and remember a lined drawing of the keyword interacting with the definition for twenty seconds. Step 3 students were presented the 10 vocabulary words to verbally recall the keyword and its drawing. Participants in the picture context condition studied drawings representing the definition of the vocabulary word with its meaning. Illustrations did not include keywords but

rather a noun with no acoustic resemblance to the vocabulary word. Students were asked to recall the drawing when presented the 10 vocabulary words. In the sentence-experience context group, students learned the vocabulary word meanings using two steps. Step 1 students listened and reread a three sentence passage written on paper and read by the instructor. Step 2 students read and answered a question relating the meaning to a personal experience. In the control group, students were provided the option of choosing their own method to study and learn vocabulary word meanings. Students in this group were only provided a list of words, meanings, paper and pencils. A total of four multiple-choice tests were administered and read by an examiner to assess students' recall on word definitions over the course of four time intervals. The first test was administered after each weekly instruction, a post test was given after each weekly test was completed, a third maintenance test was administered two weeks after the post test, and a follow-up test was given eight weeks after the maintenance test.

Results of this study showed all treatment groups outperformed the control group significantly. Participants in the keyword condition outperformed all other participants in the other groups. Although all treatment conditions demonstrated a high rate of word meaning recall, only the keyword participants were able to learn and retain significantly more definitions than those in other groups. The keyword method was proven to be the most effective method of teaching vocabulary words to students with LD.

Mastropieri, Scruggs, and Fulk (1990), further examined the effects of teaching vocabulary recall and comprehension using the keyword method. Participants included 25 middle school students with LD, from small communities in the Midwest. Of these participants, 17 boys and 8 girls were placed in resource rooms. Students were randomly divided into two groups, the keyword condition or the rehearsal condition and taught 16 difficult vocabulary

words. In the first group keyword instruction was provided using index cards with the vocabulary word, the keyword in parentheses, and the definition of the vocabulary word. In the center of the index card was a lined drawing of the keyword interacting with the definition. The participants in the keyword group were instructed using mnemonic pictures for each vocabulary word while the instructor provided an acoustic resemblance to the vocabulary words. The 16 vocabulary words were presented in random order for 30 seconds to participants. Students then defined each vocabulary word and described with the interactive drawing. In the second group, the rehearsal instruction was provided including index cards with definitions without keywords. Direct Instruction was used to teach the word definition, and the student repeated the definition. The instructor used the drill and practice process with questioning and corrective feedback. Two assessments were used to evaluate student performance. One was a literal recall test including an oral definition of each vocabulary word, and the second was a matching format to evaluate students' comprehension.

Results showed that students taught with the keyword instruction scored higher in recall and comprehension of vocabulary words than students in the rehearsal instruction, while keyword instructed students outperformed control students. Therefore, keyword method is effective in vocabulary instruction to students with LD.

Smart Board: An Interactive Whiteboard

A Smart Boards refers to an electronic white board used in classrooms (Preston & Mowbray, 2008). It serves as a tool to implement instruction using various modes, such as touching, moving, and working on the screen. As indicated by Giles and Shaw (2012), the Smart Board is a valuable device to engage learners through the use of interactive instruction with hands on activities. This tool bridges different learning styles, interests of learners, abilities,

along with their prior knowledge to review and practice on this electronic board with teacher and students.

Hall and Higgins's study (2005) examined the effect of Smart board to get input from students about their thoughts and feelings on the use of interactive whiteboards in the classroom. Participants included 12 groups of 72 students between the age of 10 and 11. Each group consisted of three boys and three girls. This age group was selected based on their technology experiences. Focus groups were used to collect data based on an open forum to encourage participants to speak and respond to questions. The main questions asked in this study focused on the advantages of using this type of technology over traditional boards, and problems with this interactive board.

Results indicated very favorable use of interactive boards among the participants. This was because it used all previous educational technologies such as, chalkboard, whiteboard, computer, overhead projector, television, and video wrapped up into one device but with the use of interactive capabilities. Additionally, students liked the shapes, colors, games, and interaction with the board. Moreover, participants expressed enjoyment with the multimedia capabilities of this technology.

Although the findings were positive to support the use of Smart Board/ interactive whiteboard, the findings were taken from students' opinions without an empirical study to evaluate their performances.

The effectiveness of Smart Board technology was an investigated in Mechling, Gast, and Krupa's study (2007) on learning sight words. Participants included 3 young adult learners, 2 females and 1 male, with moderate intellectual disabilities in small group instruction. These students were evaluated on their ability to read target grocery words, matching photographs to

target word, reading classmates target grocery word, and matching grocery item photos through observational grocery words. All students had experience with computer assisted instruction. Instruction included 15 minutes for individual lessons, and 30 minutes for small group practices, 3 to 4 days a week. Twenty-seven unknown grocery words were selected. Power point programs were created and presented during the screening, probe, and Smart Board instructional phases. Each slide contained a target word followed by photographs of three additional target and observational words. Participants answered a series of questions by interacting in the activity and touching the Smart Board to respond. Data was collected during the probe, pretest, and posttest generalization. Students responded 3 seconds after instructor presented the target word on the Smart Board and their correct responses were recorded.

Results showed positive effects of using Smart Board technology to instruct students with moderate intellectual disabilities. Effects of this study support the use of the large screen on the Smart Board by making images larger, more visible, and increasing interest to the task.

Although the results were positive, there were some limitations in this study. For example, this study failed to assess student generalization of learned words, objects, or photographs in the real world, but only applied in their classroom. More studies are needed.

Xin and Sutman (2011), further examined the effects of teaching social stories to students with autism spectrum disorder (ASD) using the Smart Board. Participants included two 9-year old students, one male and one female taught by two special education teachers. Using the Smart Board, the students were instructed on social stories with digital self-modeling images in a Power Point slide presentation for two weeks. Students were shown images of appropriate behavior modeled on the Smart Board slides. The students were instructed on social communication by viewing and touching slides of the modeled images. The two teachers

developed six steps to teach the students the acceptable behaviors by observing, imitating, reviewing, and practicing on the Smart Board. Step 1 identified the target behavior for each student. In Step 2 teachers developed appropriate social stories to help each student meet their needs. In Step 3 students were instructed using a computer Power Point slide program to touch, point, or circle images on the screen. In addition, the students were motivated with images and music from their favorite cartoons that were incorporated into the slide presentation. Step 4 allowed the students to use the self-modeling strategy to actively instruct and participate in the social story lesson. A digital camera was used by the teachers to photograph the students' demonstrating the appropriate behaviors and placed into the slide presentation. In Step 5 the social stories were demonstrated on the Smart Board by the teachers, students reviewed, and practiced the skills. This step engaged the students, in addition to promoting a desire to practice and learn the desired skill because they could repeatedly watch themselves on the Smart Board. Step 6 provided students the opportunity to practice the learned communication skills in real life situations.

The results show that both students benefited from the interactive learning experience provided by the use of the Smart Board. Although, the students improved their communication skills and the desired behavior, they still required prompting from their teachers. The use of the interactive Smart Board helped to motivate the two students to learn using visual self-imaging, social stories, with computer- assisted instruction (Xin & Sutman, 2011).

Although the findings were positive to support the effect of teaching ASD students communication skills using the Smart Board technology for students with ASD, a further study may be needed to investigate the effect on a larger pool of participants. Additional research may be needed to verify the findings. However, there are not many studies found in the area of the

Smart Board application in the classrooms. Much research is encouraged to examine this new technology and its impact on student learning, especially for those with disabilities.

While findings support the strategies mentioned in this chapter, there has been some contradicting information regarding the use of the keyword method in teaching vocabulary words to students. It has been noted in some studies that this strategy involves limitations, such as, too many long steps to instruct students' vocabulary words and the efficacy of this method for enhancing long-term recall (Campos, Gonzalez, and Amor, 2003). The intention of this study is to alleviate the limitations of the keyword method by incorporating the use of the interactive Smart Board.

CHAPTER 3

Method

Setting

The study was conducted in a 3rd grade inclusion classroom in a regional Catholic School. There were 25 students in the class. Of these, 15 were females and 10 were males. There were three adults in the class too. They were one teacher, one support teacher, and one teacher assistant. All students received instruction in the academic area in this classroom except for daily specials, lunch, and recess. Of those students, five males required additional individual assistance.

Participants

Five male students from ages 8-10 participated in this study. Two students had been diagnosed with Specific Learning Disabilities (SLD), two with Attention Deficit Disorder (ADD), and the rest had learning difficulties in language. All participating students were permitted by their parents through a written consent form to participate in the study. Table 1 presents the general information of participating students.

Table 1
General Information of Participating Students

Student	Age	Classification	Ethnicity
A	9.6	In the Process of Being Evaluated	African American
B	8.6	SLD	Caucasian
C	8	SLD	Caucasian
D	8	ADD, Learning Problems	Caucasian
E	9	ADD, Learning Problems	Caucasian

Student A is an African American boy in the process of further evaluation and diagnosis. He demonstrates a weakness in language decoding and phonemic sounds. In addition, he lacks skills to understand the meanings and interpretation of vocabulary words. Student A struggles to complete class work in the allotted time provided. He is easily distracted during lessons and has difficulty with basic math facts / calculations, and poor organizational skills. Student A was held back in first grade because of his immature behaviors.

Student B is a Caucasian boy, classified as SLD. He has difficulty processing information that requires expressive writing. He also has problems in spelling and handwriting. Student B displays anxious and nervous behaviors in the classroom. For example, he worries about his performance and constantly seeks teacher's attention and assistance. Sometimes, he cries in class when he becomes too uncertain or apprehensive about what he is doing.

Student C is a Caucasian boy, classified as SLD. He has visual perception and processing difficulties. For example, he has difficulty in copying information from the board to his paper. He also has difficulty with expressive writing and spelling. His fine motor skills are weak, thus he is unable to write legibly.

Student D and Student E are Caucasian. Both of them are not classified yet; however, each has learning difficulties in language with attention and focusing problems.

Materials

Instructional Materials. *Vocabulary Words*. These include words from students' Reading and Social Studies textbooks, teacher manuals, trade books, and worksheets used in class. Students learned 6 to 7 key vocabulary words weekly in Reading and 8 to 9 vocabulary words weekly in Social Studies. The Reading words were adopted from the Rewards Series published by Houghton Mifflin in 2005 and the words in Social Studies were from People and Communities

published by Harcourt Horizons in 2003. In addition, the chapter book entitled *Tornado* by Betsy Byars (1996) was used as supplemental Reading materials.

Smart Board and Computer Program. The software program used with the Smart Board was the Smart Notebook 11. Within this program there is the Gallery Essentials to provide a large array of special features such as graphics for Keyword Match, Keyword Pad, Fill in the Blank, True and False, and Multiple Choices. In addition, a Document Reader was used to scan pages and pictures onto the Smart Board using the Smart Notebook.

Images for the Keyword. The images used for the keyword method were made from graphics in Smart Exchange, an online resource, as well as the Gallery Essentials of the Smart Notebook 11, and scanned pictures on the Document Reader. Images were saved into the computer and presented with the vocabulary words on the Smart Board.

Measurement Materials. There were a total of two quizzes each week, one in Reading and the other in Social Studies. Each quiz was used to assess students' skills in vocabulary recognition, definition, and application. There are 20 questions in each quiz including multiple choices, matching words with definitions, and fill-in-the-blanks. Each question is worth 5 points with a total of 100 points.

Instructional Procedures

Baseline. During the baseline, students were taught using traditional instructional strategies including reading words in text, defining words into copybooks, and using words in sentences.

Table 2 presents the general procedures in language class. The same procedures were used in the Social Studies when vocabulary words were taught. Table 3 presents the Social Studies procedures.

Intervention. During the intervention, whole group instruction was provided with a Smart Board presentation to demonstrate each vocabulary word with the keyword method. Students were presented vocabulary words with definitions, a mnemonic “catch word”, and a visual graphic picture to demonstrate the meaning followed by practice and review to reinforce their memory of the word and its meaning. An example of some reading vocabulary words were “colossal, creature, heroic, horrifying, monstrous, terrifying, and tremendous”. Some vocabulary words in Social Studies were “desert, plateau, route, climate, valley, landform, crossroads, and geography”. A weekly test was administered in each subject to evaluate students’ performance. In addition, students had hand held devices called Response Simulators to enter their answers to oral questions directed during instructional time. Follow up worksheets with similar format of their weekly quiz were given to further practice.

Table 2
Teaching Reading vocabulary words during the baseline.

Reading Vocabulary	Lecture	Activity	Activity	Review	Quiz Administered
Week 1	<u>Monday-</u> Introduced, read, and defined 7 vocabulary words from textbook.	<u>Tuesday-</u> Wrote words and definitions into copybook.	<u>Wednesday-</u> Completed a vocabulary worksheet.	<u>Thursday-</u> Reviewed vocabulary words and meanings by playing a game.	<u>Friday-</u> Definition and application quiz was given using 7 words.
Week 2	<u>Monday-</u> Introduced, read, and defined 8 vocabulary words from textbook.	<u>Tuesday-</u> Wrote words and definitions into copybook.	<u>Wednesday-</u> Wrote vocabulary words in sentences on mini marker boards.	<u>Thursday-</u> Reviewed vocabulary words and meanings by playing a game.	<u>Friday-</u> Definition and application quiz was given using 8 words.
Week 3	<u>Monday-</u> Introduced, read, and defined 7 vocab. words from textbook.	<u>Tuesday-</u> Wrote words and definitions into copybook.	<u>Wednesday-</u> Completed a vocabulary worksheet.	<u>Thursday-</u> Reviewed vocabulary words and meanings by playing a game.	<u>Friday-</u> Definition and application quiz was given using 7 words.

Table 3

Teaching Social Studies vocabulary words during the baseline.

Social Studies	Lecture	Activity	Quiz
Week 1	<u>Tuesday</u> - Introduced and read 8 vocabulary words from Social Studies textbook.	<u>Thursday</u> - Made a vocabulary booklet by matching word with definitions.	
Week 2	<u>Tuesday</u> - Reviewed vocabulary words before quiz. Introduced and read 9 new vocabulary words from Social Studies textbook.	<u>Thursday</u> - Made a vocabulary booklet by matching word with definitions.	<u>Tuesday</u> - Definition quiz was given using 8 words.
Week 3	<u>Tuesday</u> - Reviewed vocabulary words before quiz. Introduced and read 8 new vocabulary words from Social Studies textbook.	<u>Thursday</u> - Made a vocabulary booklet by matching word with definitions.	<u>Tuesday</u> - Definition quiz was given using 9 words.
Week 4	<u>Tuesday</u> - Reviewed vocabulary words before quiz.		<u>Tuesday</u> - Definition quiz was given using 8 words.

Table 4

Teaching Reading Vocabulary words during the intervention.

Reading Vocabulary	Lecture	Activity	Activity	Review	Quiz
Week 1	<u>Monday</u> - Introduced, read, and orally defined 6 vocabulary words from textbook. Students were given mnemonics and pictures on Smart Board for each vocabulary word.	<u>Tuesday</u> - Wrote words and mnemonics for each vocabulary word. Then illustrated picture from Smart Board.	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 6 words.
Week 2	<u>Monday</u> - Introduced, read, and orally defined 6 vocabulary words from textbook. Students were given mnemonics and pictures on Smart Board for each vocabulary word.	<u>Tuesday</u> - Wrote words and mnemonics for each vocabulary word. Then illustrated picture from Smart Board.	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 6 words.
Week 3	<u>Monday</u> - Introduced, read, and orally defined 5 vocabulary words from textbook.	<u>Tuesday</u> - Students randomly divided into 5 groups to create a mnemonic and a visual picture of word. Then students presented to class as teacher put information and pictures onto the Smart Board	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 5 words.
Week 4	<u>Monday</u> - Introduced, read, and orally defined 5 vocabulary words from textbook.	<u>Tuesday</u> - (Same as week 3)	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 5 words.
Week 5	<u>Monday</u> - Introduced, read, and orally defined 7 vocabulary words from textbook.	<u>Tuesday</u> - (Same as week 3)	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 7 words.
Week 6	<u>Monday</u> - Introduced, read, and orally defined 6 vocabulary words from textbook.	<u>Tuesday</u> - (Same as week 3)	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 6 words.
Week 7	<u>Monday</u> - Introduced, read, and orally defined 6 vocabulary words from textbook.	<u>Tuesday</u> - (Same as week 3)	<u>Wednesday</u> - Students completed a mnemonic / picture matching activity on the Smart Board. Students completed a matching worksheet.	<u>Thursday</u> - Reviewed vocabulary words and meanings by playing a game.	<u>Friday</u> - Definition and application quiz was given using 6 words.

Table 5

Teaching Social Studies Vocabulary words during the intervention.

Social Studies	Lecture	Activity	Quiz
Week 1	<u>Monday</u> - Introduced and read 6 vocabulary words from Social Studies textbook. Students were given mnemonics and pictures on Smart Board for each vocabulary word.	<u>Wednesday</u> - Students played interactive game using vocabulary words.	<u>Friday</u> - Definition quiz was given using 6 words.
Week 2	<u>Monday</u> - Introduced and read 7 vocabulary words from Social Studies textbook. Students were given mnemonics and pictures on Smart Board for each vocabulary word.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators.	<u>Friday</u> - Definition quiz was given using 7 words.
Week 3	<u>Monday</u> - Introduced and read 7 vocabulary words from Social Studies textbook. Students were given mnemonics and pictures on Smart Board for each vocabulary word.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators.	<u>Friday</u> - Definition quiz was given using 7 words.
Week 4	<u>Monday</u> - Introduced and read 8 vocabulary words from Social Studies textbook. Students randomly divided into groups to create a mnemonic and a visual picture of word. Students presented to class as teacher put information and pictures onto the Smart Board.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators. Students completed a worksheet.	<u>Friday</u> - Definition quiz was given using 8 words.
Week 5	<u>Monday</u> - Introduced and read 8 vocabulary words from Social Studies textbook. Students randomly divided into groups to create a mnemonic and a visual picture of word. Students presented to class as teacher put information and pictures onto the Smart Board.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators. Students completed a matching worksheet.	<u>Friday</u> - Definition quiz was given using 8 words.
Week 6	<u>Monday</u> - Introduced and read 5 vocabulary words from Social Studies textbook. Students randomly divided into groups to create a mnemonic and a visual picture of word. Students presented to class as teacher put information and pictures onto the Smart Board.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators. Students completed a matching worksheet.	<u>Friday</u> - Definition quiz was given using 5 words.
Week 7	<u>Monday</u> - Introduced and read 8 vocabulary words from Social Studies textbook. Students randomly divided into groups to create a mnemonic and a visual picture of word. Students presented to class as teacher put information and pictures onto the Smart Board.	<u>Wednesday</u> - Students played interactive game using vocabulary words with Response Simulators. Students completed a matching worksheet.	<u>Friday</u> - Definition quiz was given using 8 words.

Measurement Procedures

Testing. During the baseline, students were given two tests in each subject area, language and social studies with a total of 6 tests for 3 weeks. When testing the teacher read directions aloud to the class, students were required to complete the test in 30 minutes. Their testing scores were calculated and converted into percentages. During the intervention, the same testing procedures were followed.

Research Design

A multiple baseline design with A B phases across the subject areas of Reading and Social Studies was used to compare student performance in each phase, in order to determine if the independent variable, the keyword method presented with computer program on the Smart Board would increase students' scores in learning vocabulary words.

Data Analysis

The dependent variables including word recognition, word identification, and word application were analyzed and presented in a table by calculations of students' weekly test scores. A visual graph of student performance in both A and B phases was displayed to compare student performance.

CHAPTER 4

Findings

Word Recognition. Student performance on word recognition was evaluated by a weekly test with 20 questions in both Reading and Social Studies classes. Table 6 presents the means and standard deviations of each student in the baseline and intervention.

Table 6
Word Recognition Scores in Reading and Social Studies Classes

Students	Reading				Social Studies			
	Baseline		Intervention		Baseline		Intervention	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
A	63.6	7.02	88.5	9.88	66.6	14.43	87.8	6.36
B	72.3	2.30	97.14	3.93	71	6.11	91.4	6.90
C	63	10.39	92.8	7.55	67	6.92	95	5.77
D	76.3	6.11	97.14	6.72	71	6.92	90	4.08
E	63.6	7.02	97.14	3.93	67	6.92	91.4	7.48

All five students' demonstrated their increased scores in Reading (a range of 88.5-97.14) and Social Studies (a range of 87.8-91.4) during the intervention comparing to those of the baseline (63.6-76.3 & 66.6-71).

Word Identification. Student performance on word identification was evaluated by a weekly test with 20 questions in both Reading and Social Studies classes. Table 7 presents the mean scores and the standard deviations of each student in the baseline and intervention.

Table 7
Word Identification Scores in Reading and Social Studies Classes

Students	Reading				Social Studies			
	Baseline		Intervention		Baseline		Intervention	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
A	63.6	7.02	93.5	6.9	66.6	14.43	94.2	6.90
B	72.3	2.30	94.2	6.0	71	6.11	95.7	6.07
C	63	10.39	95	6.45	67	6.92	95.7	6.45
D	76.3	6.11	98.5	3.77	71	6.92	93.6	3.77
E	63.6	7.02	97.8	3.93	67	6.92	97.9	2.8

All five students demonstrated their increased scores in Reading (a range of 93.5-98.5) and

Social Studies (a range of 93.6-97.9) during the intervention comparing to those of the baseline.

Word Application. Student performance on word application was evaluated by a weekly test with twenty questions in both Reading and Social Studies classes. Table 8 presents the mean scores and the standard deviations of each student in the baseline and intervention.

Table 8
Word Application Scores in Reading and Social Studies Classes

Students	Reading				Social Studies			
	Baseline		Intervention		Baseline		Intervention	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
A	63.6	7.02	97.1	5.67	66.6	14.43	94.2	5.67
B	72.3	2.30	95.7	5.35	71	6.11	95.7	5.67
C	63	10.39	97.1	3.93	67	6.92	95.7	6.07
D	76.3	6.11	97.8	3.93	71	6.92	93.6	6.36
E	63.6	7.02	97.8	4.50	67	6.92	97.9	3.78

All five students demonstrated their increased scores in Reading (a range of 95.1-97.9) and Social Studies (a range of 93.6-97.9) during the intervention comparing to those of the baseline.

Figure 1, 2, and 3 present individual student performance.

Correct Responses of Word Recognition Scores

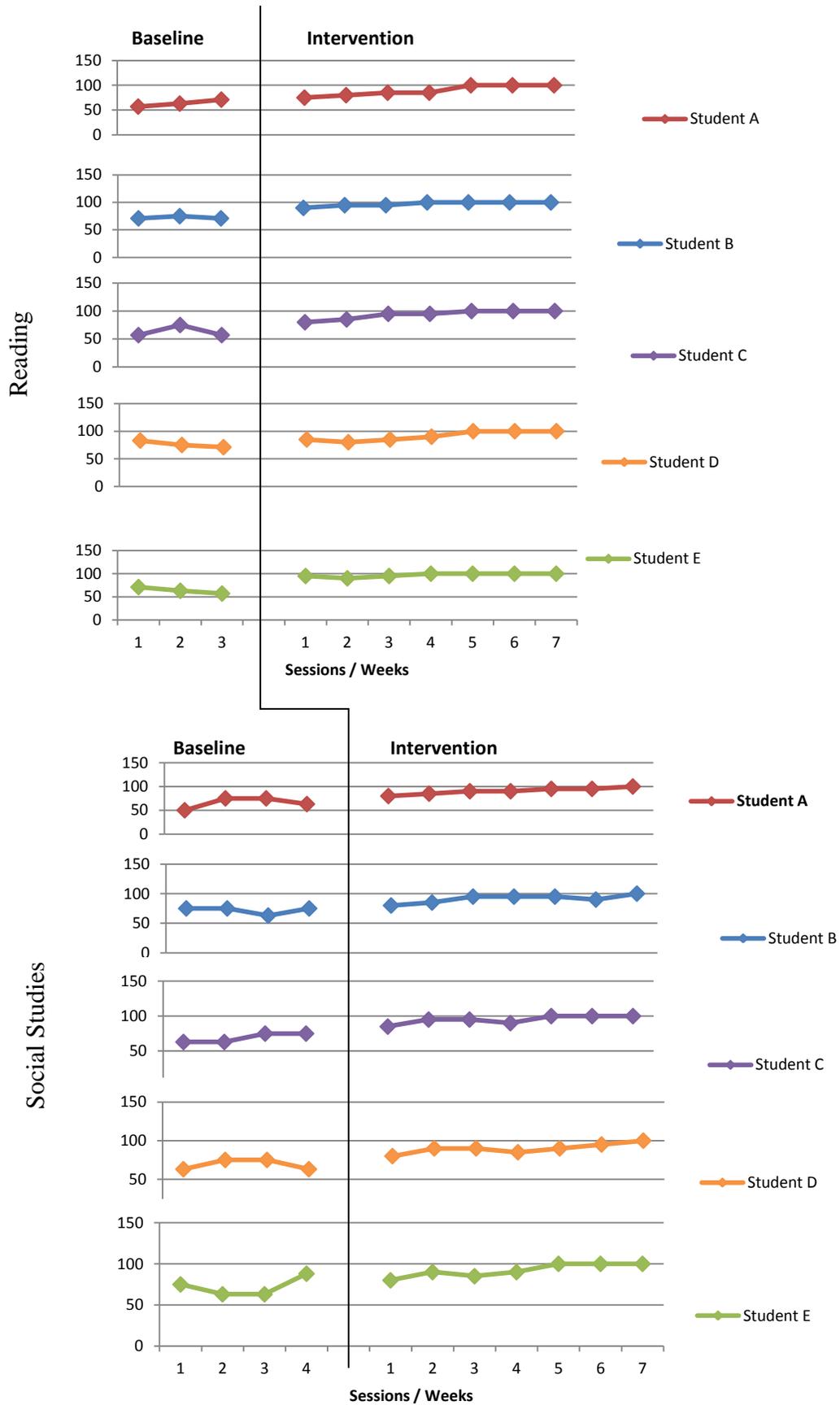


Figure 1. Individual student's scores of word recognition.

Correct Responses of Word Identification Scores

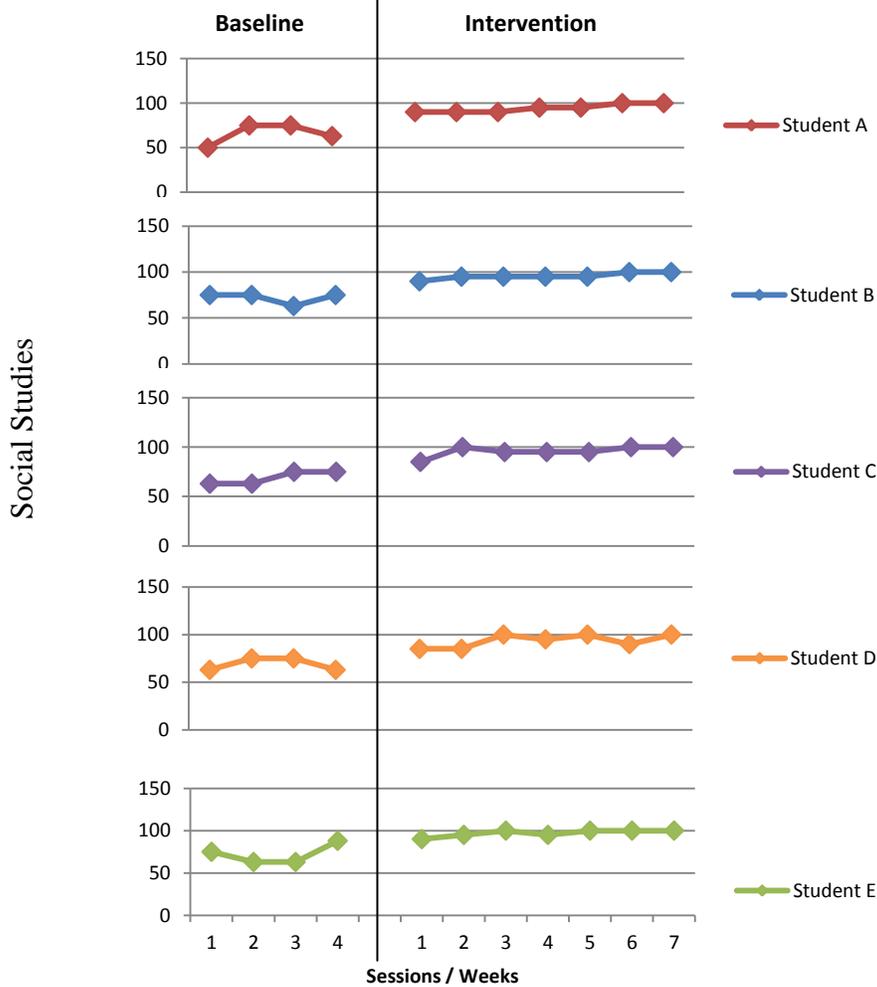
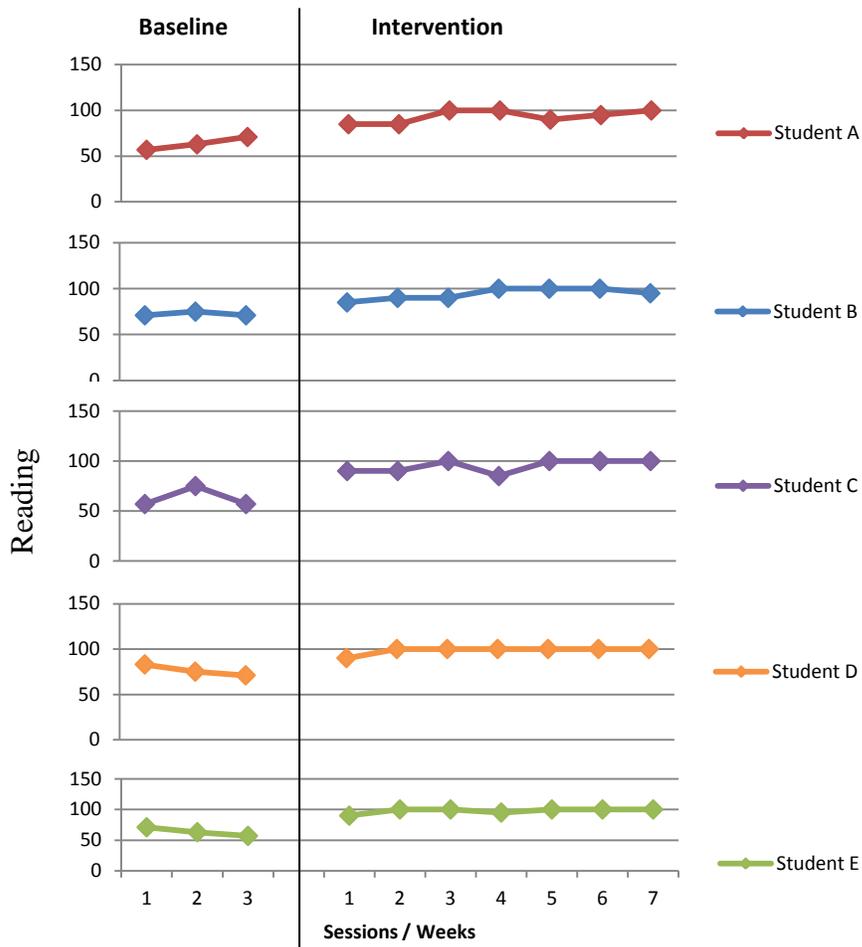


Figure 2. Individual student's scores of word identification.

Correct Responses of Word Application Scores

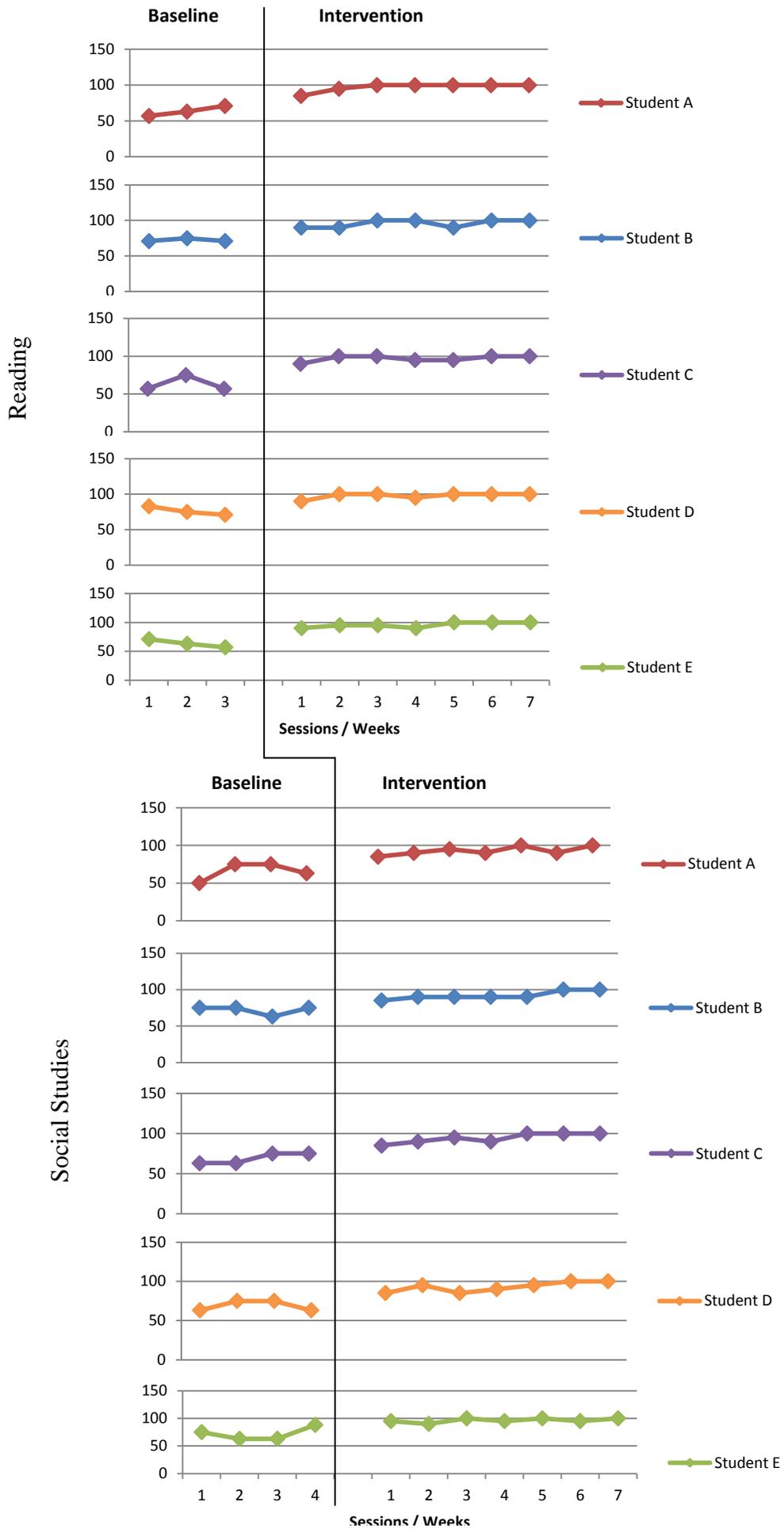


Figure 3. Individual student's scores of word application.

CHAPTER 5

Discussion

Five students with learning difficulties, struggling with vocabulary word recognition, identification, and application participated in this study. The experiment was designed to determine if these students would increase the number of vocabulary words recognized and identified with the use of the keyword method combined with the Smart Board presentation.

All students showed an increase in their performance on vocabulary acquisition in both Reading and Social Studies. Their scores on the Reading test, for example, ranged from 63 to 76.3% and 66.6 to 71% in Social Studies during the baseline. Over the 7 weeks of the intervention, all students gained their scores in word recognition, identification, and application in both Reading and Social Studies.

The first research question related to using the Keyword Method with the Smart Board to increase the number of vocabulary words recognized by the students with learning difficulties in Reading and in Social Studies. The results showed that the use of the Keyword Method with the Smart Board presentation did help increase the students' vocabulary word recognition. The participating students showed an increase in their scores during the intervention phase in both Reading and in Social Studies. For example their scores on the Reading test ranged from 88.5 to 97.14% and in Social Studies their scores ranged from 87.8 to 95% during the intervention. Students increased their overall word recognition scores in Reading by more than 34 points and in Social Studies their scores increased by more than 28 points. The whole the class's mean scores in Reading increased by more than 26 points and in Social Studies increased by more than 22 points.

The second research question addressed if using the Keyword Method with the Smart

Board presentation would increase the number of vocabulary word identification in Reading and in Social Studies. The results showed that the use of the keyword method with the Smart Board presentation did help increase the students' vocabulary identification scores. The students' scores demonstrated an improvement and they were able to increase the number of words identified in both subjects from 93.5 to 98.5% in Reading and 93.6 to 97.9% in Social Studies during the intervention. Students increased their overall word identification scores in Reading by more than 35 points and in Social Studies their scores increased by more than 29 points. The class's mean scores in Reading increased by more than 28 points and in Social Studies increased by more than 26 points.

The third research question addressed if using the Keyword Method with the Smart Board presentation would increase the application of vocabulary words in Reading and in Social Studies. The results showed that the use of the Keyword Method with the Smart Board presentation did help increase the students' vocabulary application scores. The students' scores demonstrated an improvement and they were able to increase the number of words applied in both subjects from 95.7 to 97.8% in Reading and 94.2 to 97.9% in Social Studies during the intervention. Students increased their overall word application scores in Reading by more than 34 points and in Social Studies their scores increased by more than 31 points. In general, the classes' mean scores in Reading increased by more than 29 points and in Social Studies increased by more than 26 points.

Limitations

There were some limitations in the study. The first was with the small sample size of only 5 males. In addition, the Smart Board and the projector used in the study were portable, sitting on moving carts, rather than permanently affixed to the wall and ceiling. The teacher had

to continually move the equipment around the classroom because the school did not have such equipment. The Smart Board was on loan specifically for the purpose of this study; therefore, the interactive board and the equipment were set up in the classroom as a temporary but flexible installation. As a result, the Smart Board required constant recalibration of the system each time it was moved, consequently taking time away from instruction. Also, there were times the computer system had “glitches” and did not work properly.

The other limitation was the instructional time of 7 weeks. Due to student absences, school assemblies, and scheduling interruptions this 7 weeks of intervention may not be enough for students to practice and reinforce their learning.

Recommendations

The Keyword Method with the use of Smart Board technology seems effective in teaching vocabulary words, specifically word recognition, word identification, and word application to students with learning difficulties. Because of the limited number of participants and only male students involved, the results need to be validated by future studies, with a larger sample including both male and female students. Further, the instruction should be continued for different students at different grade levels in learning vocabulary words. When the equipment is used, a permanent installation of the Smart Board should be considered to reduce the amount of technological interruptions during the instructional time. Also, the duration of the intervention may increase to allow students further practice to reach the mastery level.

Conclusion

It appears that the use of the Keyword Method with the Smart Board presentation for the participating students improved their performance in learning vocabulary word recognition, identification, and application in both Reading and Social Studies. The students

gained scores in their weekly quizzes. If this program is continually provided, it could possibly assist students in vocabulary learning that will benefit them in understanding of the context in Reading and Social Studies, as well as other academic areas.

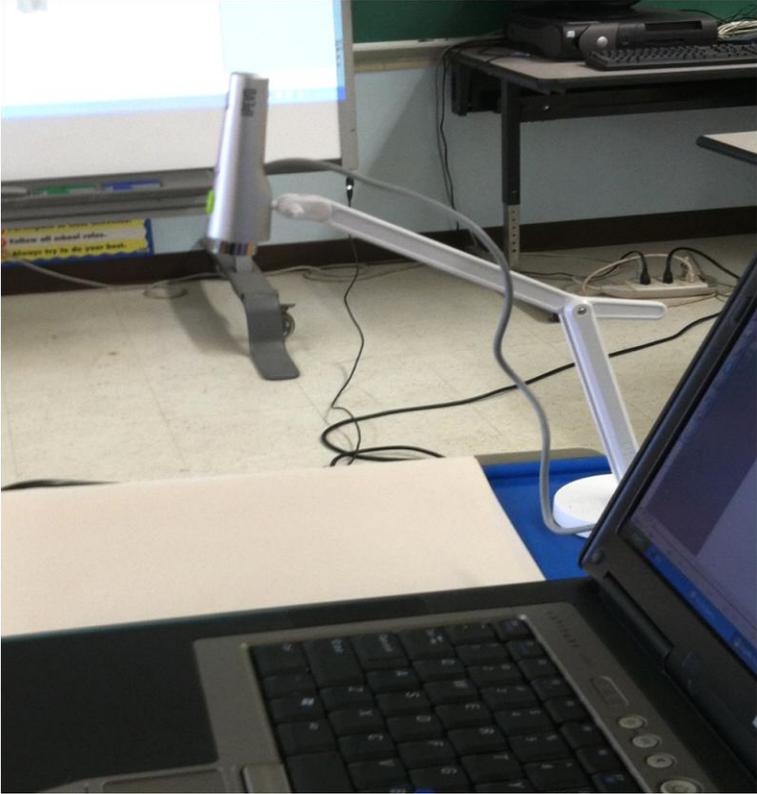
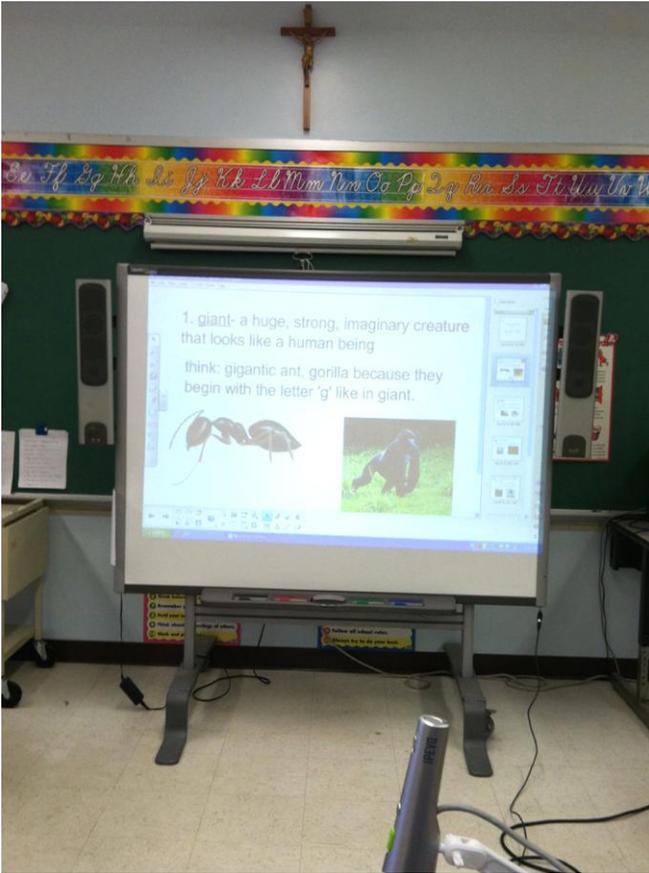
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Appendix A: Smart Board Used in the Study



Appendix B: Sample Vocabulary Words Using Keyword Method

1. **mysterious**- very hard to explain or understand

***Think:** (?) because it's a mystery, unique, odd mist, or myth

***Visualize:** a misty cemetery or grave, and a question mark.



2. **pedestal** - a base or support for a column or a statue

***Think and visualize:** pedal / foot and metal is held up by the pedestal



Appendix C: Sample Quiz for Word Recognition

Use the words from the word bank to match with the definition.

Word Bank

awesome	convinced	disappeared
discovered	impossible	incredible

1. _____ Too unlikely to be believed
2. _____ Not able to happen
3. _____ Found
4. _____ Feel certain about something
5. _____ Causing a feeling of respect
6. _____ Unable to exist
7. _____ Passed out of sight
8. _____ A feeling of wonder
9. _____ Made to do
10. _____ Astonishing
11. _____ Vanished
12. _____ Causing a feeling of wonder
13. _____ Made to believe
14. _____ Learned
15. _____ A feeling of fear
16. _____ Amazing
17. _____ Won over
18. _____ Without a solution
19. _____ Unbelievable
20. _____ Gone from sight

Appendix D: Sample Quiz for Word Identification

Choose the word whose meaning is suggested by the clue given. Then write the word on the line.

1. Seeing a bald eagle in your back yard may be described as _____.
a. brilliant c. endure
b. awesome d. discovered
2. It is _____ how the gardener created leafy animals from clipping plants.
a. incredible c. kind
b. thoughtful d. sitting
3. The teacher _____ the class that lions are part of the cat family.
a. read c. incredible
b. runner d. convinced
4. If you passed out of sight you _____ from view.
a. even c. least
b. frowned d. disappeared
5. In the refrigerator I _____ a delicious cheery cheese cake for dessert.
a. rewarded c. discovered
b. thought d. convinced
6. The elephants were so large they were _____.
a. impossible c. awesome
b. weak d. smart
7. My friend _____ me that some kinds of plants can eat insects.
a. disappeared c. discovered
b. rewarded d. convinced
8. I saw a bird in a tree, but it flew off and _____.
a. discovered c. grew
b. walked d. disappeared
9. In the pond, I _____ a frog that looked like a leaf.
a. thought c. convinced
b. discovered d. read
10. We thought the lion's loud roar was _____.
a. quiet c. incredible
b. tiny d. impossible

11. It was almost _____ to see the white polar bear sitting in the white snow.
- a. awesome
 - b. impossible
 - c. incredible
 - d. best
12. It is _____ for my dog to live without water.
- a. incredible
 - b. discovered
 - c. smart
 - d. impossible
13. The tornado made an _____ sound.
- a. discovered
 - b. convinced
 - c. incredible
 - d. impossible
14. The scientist _____ the cure for hiccups.
- a. awesome
 - b. discovered
 - c. smart
 - d. insects
15. The police were _____ the man did not break the law.
- a. found
 - b. refilled
 - c. select
 - d. convinced
16. It was _____ to hear the car backfire from underground.
- a. impossible
 - b. thought
 - c. important
 - d. quiet
17. At the ice cream parlor we _____ a new flavor.
- a. scooped
 - b. discovered
 - c. refilled
 - d. flew
18. The piercing sound of the Billy goat's cry was _____.
- a. quiet
 - b. discovered
 - c. incredible
 - d. weak
19. It was nearly _____ to see the road in the fog.
- a. disappeared
 - b. looked
 - c. impossible
 - d. easy
20. Dinosaurs were so large they were _____.
- a. awesome
 - b. grown
 - c. disappeared
 - d. impossible

Appendix E: Sample Quiz for Word Application

Word Bank

awesome	convinced	disappeared
discovered	impossible	incredible

Complete each sentence with a word from the word bank.

1. I am _____ that mystery stories are the very best kind of story.
2. I just read a mystery about a kitten that ran away from home and completely_____.
3. At first, the detective thought it would be _____ to find the kitten.
4. The detective followed the clues and finally _____ what happened.
5. The detective thought it was _____, but the kitten had run away to the zoo.
6. The kitten was playing with the lions, tigers, and other _____ cats of the wild!
7. The story told an _____ tale.
8. I was _____ that Rusty dragged Colin here.
9. The dog bolted when it saw our _____ garden.
10. I _____ that Rusty will need to walk the dog again in an hour.
11. The man stared at Rusty because he thought it was _____ to do.
12. Rusty found it hard to believe and _____ for the dog to become a duck.
13. He _____ the dog in its garden in the morning.
14. Rusty was _____ and learned a valuable lesson.
15. Mrs. Smith read the story over again but was not _____ it happened.
16. However, I'm _____ it did.
17. What would you do if you _____ a garden full of gigantic animals?
18. When you enter a garden of stone walls it's easy to be _____ that the rest of the
19. world had _____.
20. In a gardener's world nothing is _____.

Appendix F: Sample Lesson Plan

Objective: SWBAT recognize, identify, and apply reading vocabulary words by using the Keyword Method and the Smart Board presentation with 80% accuracy.

CCSS.ELA-Literacy.RL.3.4 Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.

Rationale: The purpose for using this assignment is to help students recognize, identify, and apply reading vocabulary words by using the Keyword Method. This will be done by students first observing the teacher demonstrate the use of the Keyword Method. Students will then work together in a group of 5 students to create a mnemonic for two assigned vocabulary words. Then each group will share their work as a class and with the assistance of the teacher will create a Smart Board presentation.

Materials:

1. Vocabulary words from Houghton Mifflin Reading Textbook
2. Paper and pencil
3. Computer
4. Smart Board.

Procedure:

Model: Teacher will introduce vocabulary words and meanings. Teacher will explain the purpose for the Keyword Method to the class. Teacher will model the use of the Keyword Method. Teacher will demonstrate ways to think of mnemonics to remember vocabulary word. Teacher will then demonstrate how to create visuals to help remember vocabulary word.

Guided Practice: Teacher will divide the class into 5 groups. Each group will be assigned two vocabulary words to work together, brainstorm, and develop a mnemonic with a visual. Each group will share their work as a class and together with the teacher will develop a Smart Board PowerPoint type presentation.

Independent Practice: Students will practice their vocabulary words by using the printed presentation.

Reflection: The entire class enjoyed and benefited from this lesson. It taught them the skills stated in the objective as well as cooperation, and focusing.