The Effect of Vocabulary Lincing Routine for Learning Vocabulary to Students with Special Needs

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Abstract

Since the researcher, a second language learner, hade experienced learning new words explicitly via a vocabulary instruction that is similar to the Vocabulary Lincing Routine for decoding words and recalling their meanings, the strategy was used for students with special needs. The purpose of this study was to examine the effects of teaching the Vocabulary Lincing Routine (LINCs) to students with special needs at an elementary school. Three 4th grade students were selected according to their Individual Education Program (IEP) as having a learning disability (LD). Data were collected from different instruments including pre/post-tests, anecdotal notes, and personal journals. Students were taught eight words using the LINCs strategy via three phases of instructors (Cue, Do, and Review) in two 30-minute teaching sessions each week. After the eight words were taught, the students read a storybook that contained these words to increase their comprehension. The results of this study revealed that students' scores increased in their post-test with slight improvement in their reading comprehension. The findings suggested that although LINCs strategy had a positive impact for students with LD in acquiring more vocabulary words and recalling their meanings, there was only limited evidence that students could recognize the words and their definitions while reading a story. The study had some limitations; yet implications for future intervention were discussed.

The Effect of Vocabulary Lincing Routine for Learning Vocabulary to Students with Special Needs

After completing four years of work experience as a secretary in a hospital in Saudi Arabia, Jeddah City, I decided to travel to the United States to pursue my master degree in special education. I was nervous, anxious, and worried, as my past learning experience did not explicitly teach me about using learning strategies. As a second language learner, I had a lack of writing skills, reading comprehension skills, speaking and listening skills. Since moving to the United States, I have attended a school that encourages students to learn strategies that assist in learning. At first, my limited amount of English vocabulary had a negative effect on my communication skills, as well as my academic performance. Over time, my understanding of English grammar, vocabulary, listening, reading, and writing skills have improved greatly. In fact, learning by using strategy instructions and explicit methods were the best way for me to acquire these skills.

One of the most effective methods that I used for learning vocabulary at an English Language Center was a strategy that asked me to draw a picture and write a sentence using this word. My teacher would ask me to read a word, and then find the definition of this word. After that I would write the word in the graphic organizer and draw a picture that represented, or had a meaning related to the word. This is very similar to a strategy known as the "LINCs" strategy in the (Vocabulary Lincing Routine) (Ellis, 2001). Learning a vocabulary strategy had a positive effect for me in terms of learning new words. This method supported my memory retention, and enhanced my ability to decode the meaning of new words. This, along with other reasons, motivated me to learn more words without fear. All academic areas improved for me after using this powerful method. My writing became more refined, and my

reading comprehension skills increased. I noticed my listening skills started to improve as well because I knew more of the words and their meanings. Therefore, I am going to use a strategy developed by Edwin S. Ellis (2001) called *The Vocabulary Lincing Routine* (LINCs) for my current study, focusing on students with special needs at an elementary level where I am placed. Having realized how LINCs strategy increased my English vocabulary and enhanced my memory, I believe this method will support students with special needs as well.

LINCs strategy is defined as "a visual mnemonic strategy to help students learn and retain complex vocabulary developed by researchers at Kansas University Center for Research on learning" (Spencer, 2011, p.14). The word mnemonic comes from the Greek word Mnemosyne, and is defined as "any procedure or operation designed to improve one's memory" (Scruggs, Mastropieri, Berkeley, & Marshak, 2010, p. 97). The mnemonic method is an essential tool for enhancing students' ability to retain and recall information. This method teaches students how to enhance their memory capacity, and store the information in their brain. Therefore, the "LINCs" strategy supports the transfer of information from short-term memory to long-term memory. This strategy also helps students decode the information as well as they will be able to recall the information whenever it is needed.

As required by my degree program, I have been placed in one of the elementary schools in the Midwest. However, from my observations on students' behavior, more often than not, these students are not focusing on the task at hand. Students do not respond well when their teacher asks them a question about the novel that they have read, even though they may know the answer. In addition, based on my observations of the students' learning abilities, I noticed many of them have a

weakness in vocabulary, and that students do not remember the meaning of the words even though they have learned them within the last day.

The problems these students are having in class relate to decoding and recalling word meanings. Based on my observations of the two key issues in learning (attention and vocabulary knowledge), the purpose of this study is to examine the effects of teaching the Vocabulary Lincing Routine for learning vocabulary to students with special needs at elementary level. This method could improve their decoding skills and have a positive effect in gaining more vocabularies. My hypothesis is that students with special needs will improve their ability to acquire new vocabulary, increase their memory capacity, and improve their ability to decipher words by using the LINCs strategy. Students will also be motivated to learn more words as their confidence increases. Therefore, the research questions will be as follows:

If the "LINCs" strategy is taught to students with special needs at elementary level, will their comprehension skills improve?

Literature Review

From previous experience, I have seen the effectiveness of using strategies and explicit instruction for learning vocabulary. The positive impact of LINCs strategy to increase the word counts and develop word knowledge is well-documented in this literature review. Therefore, the use of the strategy for students who struggle in learning and acquiring vocabulary improves all academic areas. More important, the themes that informed my study were vocabulary instruction for students with disabilities, mnemonic devices, and The Vocabulary Lincing Routine. Henceforth, the theory that aligns with my study is the Cognitive Load Theory (CLT) developed by Sweller (1980). According to CLT research, this theory focuses on using instructional

design to force information to be retained in the working memory and ease the process of the converting the information from the short to the long-term memory (Van Merrienboer & Sweller, 2005; Driscoll, 2005). These CLT researchers assumed that people who have limited working memory in capacity can not absorb information that is presented simultaneously all at once, yet instead is presented in small chunks. Numerous research studies have proven that using evidenced-based strategies that teach students in small chunks of information has a strong impact on the retention of vocabulary by students with special needs (Jitendra, Edwards, Sacks, & Jacobson, 2004; Swanson, Hairrell, Kent, Ciullo, Wanzek, & Vaughn, 2012). The intervention used in this action research project for vocabulary acquisition and its effect is described in the literature reviews that follow.

Vocabulary instruction

Vocabulary knowledge. Over the years, much research has been done on vocabulary acquisition and vocabulary instruction (Blachowicz, Fisher, Ogle, & Watts-Taffe, 2006; Pearson, Hiebert, & Kamil, 2007; Roberts, Torgesen, Boardman, & Scammacca, 2008; Elleman, Lindo, Morphy, & Compton, 2009). These research studies reported that vocabulary learning is essential to reading instruction, and vocabulary is tightly related to reading comprehension. The importance of understanding vocabulary was essential to access the prior knowledge needed by students for reading text. The vocabulary is mostly related to reading comprehension because if the students do not know the word's meaning, the students will not successfully read and comprehend. Moreover, vocabulary knowledge is fundamentally responsible for students' performance and achievement, as well as accessing the academic content areas such as mathematics, social studies, and science (Harmon, Hedrick, & Wood, 2005; Blachowicz et al., 2006; Roberts et al., 2008). The

study showed that comprehension can be affected by vocabulary knowledge if the students do not know the word's meaning, they would not understand and comprehend text in their daily school learning or reading (Blachowicz et al., 2006). However, vocabulary knowledge can impact comprehension depending on the nature of what is being read. For example, the words that are in the narrative stories written by authors have fewer terms than the words that appear in the academic texts. Academically, each content area contains the same terms but has different meanings such as the differences between the term "operations" in math compared to the term's usage in science (Blachowicz et al., 2006).

Vocabulary and comprehension. Nonetheless, the relation between vocabulary and comprehension cannot be determined until we examine the effectiveness of the vocabulary interventions that are designed for improving comprehension (Elleman et al., 2009). The National Reading Panel (NRP) (2000) reported five critical areas of successful reading instruction. The five areas the students need are phonics, phonemic awareness, vocabulary, fluency, and comprehension. Students should have the ability to know the alphabetical letters, identify words in a text, recognize the words, and decode multisyllabic words in order to read. In other words, they should be able to understand the word that is made up of phonemes (units of sound) in the spoken and written language, and phonics (letter sound corresponding) that are essential for reading comprehension. Furthermore, fluency supports comprehension because fluent readers are able to identify text automatically. This ability allows them to focus on tasks such as inference, interpretation, and understanding. They have developed sight word repertoires that allow them to read fast. Comprehension also requires that the student should be able to link new information with past learning. In addition, in the case of a break in

comprehension, students can adjust their speed of reading or strategically reread the text.

A gain in vocabulary helps students enhance their word-meaning knowledge, increases their ability to decode words faster, and assists them to correct gaps in their understanding of text. Thus, it becomes clear that vocabulary plays a significant role in improved comprehension. Roberts and his colleagues (2008), citing the NRP report, stated that knowing the meaning of words is equally important for comprehension and overall performance in academics. The more a student reads, the larger his/her vocabulary will be; this will also impact his/her comprehension skills. Good readers need all of these five skills to support the ability of reading (Roberts et al., 2008).

The research showed that students are expected to work independently in each grade level in order to understand the text, to extract information, and to recall what they have read. Vocabulary instruction strategies that expose students to various words in different contexts can improve their understanding of the words and its usage in diverse contexts. As vocabulary expands, students can increase their reading comprehension and confidently read texts by themselves. The research has suggested the vocabulary instruction as promising intervention that has been found to be very effective to support students with their comprehension (Elleman et al., 2009).

Vocabulary instruction strategies. The questions raised in the majority of the studies with regards to which words should be taught to the students. Numerous research studies recommended effective ways for selecting words to teach children (Blachowicz et al., 2006; Beck, Mckeown, & Kucan, 2002; Pearson, Hiebert & Kamil, 2007; Roberts et al., 2008). Indeed, the vital procedure in selecting the words is to choose from those words that are firmly fit in students' vocabulary, the words

that are relevant to the subject, and the words that can be practically implemented in the future. Teaching the words habitually, that are useful and useable for students to know across their content areas, is important (Blachowicz et al., 2006; Pearson, Hiebert & Kamil, 2007; Roberts et al., 2008).

Beck and colleagues (2002) claimed that in order to persuade learners to build their vocabularies, the students should learn unfamiliar words from their environment, which are those unfamiliar words that children don't know the meaning of, plus learning words that appear frequently across the content areas, and learning the words from their particular context (specific words in the content) (Beck, Mckeown, & Kucan, 2002). In addition, the research recommended, "specific estimates of vocabulary growth vary widely, from three to 20 new words a day" (Beck, Mckeown, & Kucan, 2002, p.7). This encourages teachers to educate students, and invite them to learn at least three to 20 new words every day, in school, so that their vocabulary volume could increase.

The emphasis of good vocabulary instruction takes place in the research reviews (Blachowicz et al., 2006). The research synthesis of vocabulary instruction pointed out the three characteristics of good vocabulary instruction: First of all, present would be a word-rich environment where the kids can hear, read, use and talk about new vocabularies; this is the best way to encourage the word conciseness (an awareness of the words and their meanings as well as their meanings in different cases). Second, a good vocabulary instruction is when words are selected with elaborate information for explaining each word alone with more practice and repeated exposure. Third, the instruction should provide generative elements for learning strategies so that new words could be learned independently (Blachowicz et al., 2006). The NRP reported that students should use vocabulary that is presented in real

authentic context, and this is a proper way for questioning and remembering the words rather than presenting the words in listed formats (NRP, 2000). The more contextualization of the words (putting the words in sentences), the more the students can obtain different meanings of the words, and the more precisely the meaning will be acquired and gained (Pearson, Hiebert & Kamil, 2007). The research represents a variety of features of vocabulary instruction. One of these features is semantic mapping, in which students make connections among the words by listing and explaining or verbalizing their association. This instruction enhanced learning of vocabulary as well as its meaning (Blachowicz et al., 2006). According to the research synthesis, two studies implemented graphic organizer vocabulary instruction in social study class for students with LD in pre-K through 12. The results showed that all the students showed higher performance in gaining vocabulary in the post-test after using a graphic organizer (Swanson et.al, 2012).

The meta-analytic research reported other research findings that were conducted in the elementary level using 4th grade students who have LD or difficulty to understand the concept of the texts (Roberts et al., 2008). The research stated that vocabulary instruction such as word study strategy (e.g. suffixes, prefixes, and context clue) or direct instruction of keyword using examples and non-examples improved students with LD comprehension and their reading fluency. In addition, the vocabulary instruction enhanced them to either process the content area texts or into increase their new vocabularies (Roberts et al., 2008).

Similar to the prior study, Elleman and his colleagues (2009) conducted a research with meta-analysis and reported the effect of vocabulary instruction such as keyword mnemonic, semantic mapping, word meaning (providing antonyms) on reading comprehension had a positive effect. The participants were students from pre-

K through 12th grade who were identified as being LD, and the control group who were non-disabled and not having difficulty in reading were compared in the pre-test and post-test. As a result, although the insignificant effect and the weak relationship were found between the vocabulary and comprehension, the vocabulary instruction had a positive effect in increasing students' comprehension and acquiring more words in all grade levels especially for those with special needs (Elleman et al., 2009).

Although there are many instructional strategies for teaching vocabulary, the research stated, "There is no single mode that is uniformly effective" (Blachowicz et al., 2006, p. 528). This indicates that instruction procedures for teaching vocabulary vary in their characteristics and the research cannot confirm which instruction can be successful with all students because of the mixed results. Nevertheless, one strategy that has been very effective for me, personally, is using mnemonics in vocabulary instruction.

Mnemonic devices

A mnemonic is a memory enhancement device in which the instructional techniques increase memory capacity for processing new information and allows recalling information from the memory storage (Amiryousefi & Ketabi, 2011). There are two types of memory: short-term memory and long-term memory. These types are important to transform information from one memory to another. The short-term memory holds the information for the short time while being processed due to small storage capacity. However, long-term memory holds the information that is transformed for a long time because of large memory capacity (Amiryousefi & Ketabi, 2011).

Some studies have categorized the mnemonics in a different way (Scruggs et al., 2010; Amiryousefi & Ketabi, 2011; Mitchell, 2014). The research by Mitchell

(2014), classified the mnemonics strategies into four methods: Keyword, peg word, picture strategy, and letter strategy (Mitchell, 2014). Other research categorized mnemonics as linguistics (peg word, keyword, and spatial method), visual (picture and visualization method), verbal (semantic or grouping organization and story telling), spatial (logic, finger, and spatial grouping), and physical responses (Amiryousefi & Ketabi, 2011). On the other hand, some studies stated that mnemonics technique classes are representing verbal and visual strategies (Scruggs et al., 2010; Amiryousefi & Ketabi, 2011).

The Peg Word Method requires "rhyming" where the first vocabulary word will be linked to a word that sounds similar (i.e., one is a bun), then the word will be visualized and linked to the rhyming word (Scruggs et al., 2010; Amiryousefi & Ketabi, 2011; Mitchell, 2014). The keyword method includes mental image of the target word. Learners find a word that sounds similar to the target word to make relation between them (i.e., the target word is amazing and the keyword is maze). Then, the learners make mental picture for combining the keyword with target word. Learners recall the meaning of the target word relatively when they recall the keyword together with the associative picture of the word meaning. The keyword method draws connection between the keyword and its definition in interactive image in order to be remembered (Ebbers & Denton, 2008; Scruggs et al., 2010; Amiryousefi & Ketabi, 2011; Mitchell, 2014).

The research argues that the most influential instructional method in vocabulary learning is mnemonics devices because the mnemonics techniques can make connection between the word and the prior information that is already known (Amiryousefi & Ketabi, 2011). The usefulness of the mnemonics device has substantial benefit for all ages. The studies showed that the learners could benefit

from the mnemonics strategies in studying quickly and memorizing knowledge by merging the material into cognitive units and retrieval clues (Amiryousefi & Ketabi, 2011). Many studies agreed that mnemonic "keyword" method is a better technique for teaching specific words with their meanings because the strategy associates the words' definition with images (Blachowicz et al., 2006; Amiryousefi & Ketabi, 2011). The research stated that the keyword mnemonic strategy alone could be insufficient for improving the knowledge of students on vocabulary if the two critical principles of repetition and practice activities are not included. Teachers reported that these elements are vital to implement the strategy through practice during school days (Scruggs et al., 2010).

Across 4th to 12th grades levels, the researchers investigated 19 studies that using multiple vocabulary instructions (e.g. direct instruction, cognitive strategies, etc). The results indicated that the keyword method for vocabulary instruction was found to be the best successful strategy that has an effect on learning vocabulary, as compared to other vocabulary instructions. Keyword method showed its effectiveness on students with LD, and students were outscored when using the keyword strategy recalling the definitions of the words. Furthermore, the keyword method not only enhanced their memory but also improved their vocabulary and performance (Jitendra et al., 2004).

The research stated that the result of implementing keyword mnemonic in learning vocabulary in social study class was satisfying for the teachers who tutored students with special needs at elementary school. All students, especially those identified as having LD performed well on the test items after using the keyword method (Scruggs et al., 2010). Furthermore, the researchers reported a number of instances when mnemonic devices were more effective and beneficial for students

than traditional classroom instruction. When the students learned vocabulary traditionally, their score was 37% on tests, but when the vocabulary was learned using mnemonics like the keyword method, the score was up to 75% on tests (Scruggs et al., 2010; Mitchell, 2014).

When Burns and Ysseldyke (2009) examined the evidence-based practices used by teachers nowadays, it unfortunately showed that the teachers in special education did not favor the mnemonics keyword method. In addition, the survey on using the strategy from 147 schools was rated 60%, as the strategy is apparently implemented only once a week (Burns & Ysseldyke, 2009). Indeed, LINCs strategy is one of the best mnemonics techniques for vocabulary instruction.

The Vocabulary Lincing Routine

Vocabulary Lincing Routine is a powerful strategy for memory enhancement in order to influence the students while learning words and their meaning and definition (Wong, 2004). Vocabulary LINCs strategy is described as a link, image, note, construct, and self-interest. The Lincing Routine strategy is technique created to learn new vocabularies with their meanings through memory device. The Lincing routine teaches students to create link words as a reminder word that sounds similar to the new word. Then, the reminder words should be linked to the short story that describes the target words using elements from the definition. Next, students draw an image that tells the story which ties with the definition of the new word. Then, students test themselves on whether or not they remember the word meaning after using LINCs strategy (Farstrup & Samuels, 2008). Lincing Routine consists of such tools that could support students in understanding the new words' meaning and recalling the definitions via visual memory and auditory device (Ellis, 2001).

The Lincing Routine is based on the mnemonic method because each letter in the LINCS strategy aids students to follow the necessary steps to understand new vocabulary (Wong, 2004). Likewise, the use of keyword mnemonic is vital in LINCS strategy for the students to make a relationship between the elements of the word definitions, the prior knowledge, and the visual image (Farstrup & Samuels, 2008).

There are several factors that could impact the result of using the Lincing routine. These factors are in correlation with how the strategy is introduced to students, since the strategy may not be understood if it is not given using explicit instruction. Some students may be good at using the auditory method in LINCS strategy, which is based on writing a story and making a similar sound to the word, while others may only be good at doing the visual imagery, where they can make pictures for the words (Ellis, 2001).

Ellis' study (2001) described the results of using the Lincing Routine with sixth grade students in comparison with students who had not used the Lincing Routine (first group with LD, second group without disability). The study resulted in the positive effect of gaining higher scores on social study vocabulary tests for the first group students who used the LINCS device rather than the control group, who did not use the strategy in learning social study vocabulary. The score of students with LD pretest before using the strategy was 53%, and after the strategy was used, the score significantly raised to 77% (Ellis, 2001; Deshler & Schumaker, 2006).

In another study, the researchers examined four strategies in reading instruction including the LINCS vocabulary strategy. Twenty-seven students were compared including students who performed below their grade level and identified as LD and at risk in 9th grade (Schumaker, Deshler, Woodruff, Hock, Bulgren, & Lenz, 2006). They were collected in experimental groups and received the strategies,

whereas the control group received a traditional instruction. The result showed that experimental groups produced a bigger improvement in reading comprehension than the control groups, which was shown in the pre-test and post-test scores. The experimental groups scored 6.8-grade level in the post-test with the pre-test grade level of 5.8, while the control groups' score descends from 6.3 in the pre-test to 5.8-grade level in the post-test (Schumaker, Deshler, Woodruff, Hock, Bulgren, & Lenz, 2006). A similar study has been performed on adolescent students with LD at 6th and 9th grade levels to examine the effect of multiple strategies (e.g. visual imagery, self-question, etc), including LINCS method for improving the disabled students in reading comprehension. The study showed that students in 6th grade were outperformed in the post-test after LINCS method, but the 9th grade students did not show any improvement in the post-test compared to the control group, who did not use the strategy (i.e. LINCS) (Cantrell, Almasi, Carter, Rintamaa, & Madden, 2010). In fact, these studies' findings can be measured on students with special needs at elementary level.

Spencer and Logan (2005) investigated the effect of LINCS strategy on students with learning disability. The researchers conducted the strategy of LINCS device on eight students who had LD at elementary level. The students were assembled into two groups of four to learn vocabulary words in a social studies class. While one group received meta-cognitive instruction before the LINCS strategy implementation, the second group used the LINCS strategy only. The result showed that group one was outscored than the second group who did not us the meta-cognitive instruction before LINCS strategy. Moreover, because of the used of meta-cognitive strategy, there was evidence that the first group students were the only ones who generalized LINCS strategy in their study more than the second group (Spencer

& Logan, 2005). The result indicates that the meta-cognitive instruction prior the cognitive instruction (i.e., LINCS strategy) is important to increase students' scored in vocabulary tests.

In conclusion, knowing the meaning of the words is paramount for students to achieve their academic performance, and understanding vocabulary across the content areas is the key to students' success. Indeed, teaching the words explicitly to students with special needs through vocabulary instruction is suitable to develop their comprehension. Using mnemonic devices and imagery helps students with LD to retain word meanings for a long time. Meanwhile, vocabulary strategies such as Lincing routine, which combines the mnemonic method and uses words, pictures, and story telling, are an effective instruction technique for students with LD in learning new words and enhancing memory. Since the LINCS strategy focuses on both the word and its meaning, the student's vocabulary will increase along with their comprehension.

Methodology

Research Design

The research design that is incorporated in the current study is quasi-experimental design. The quasi-experimental is for non-randomized group using pre and post-tests for comparing the group to themselves (Mertler, 2014). This design measures the effect of Vocabulary Lincing Routine before and after the treatment. The participants were trained to utilize the Lincing Routine, which offers strategy to help students understand the words meaning and recall them. The participants were given the pre and the post-test that included a list of eight words with its definitions. After the pre-test, students were guided through three phases of the instruction (Cue, Do, and Review) for better understanding of the LINCs strategy. After two weeks of

learning vocabulary using the Lincing strategy from leveled reader of The Wonders Reading Program (The McGraw-Hill Companies, 2014), students demonstrated their knowledge in the post-test to determine the effectiveness of Vocabulary Lincing Routine.

Participants

The study was conducted in large elementary school at a large suburban school district. The racial ethnicity in this school is comprised of 68.9% White students, 5.5% of African-American students, and 8.8% Hispanic students. The average class size of this school year is 24 students in the 3th grade and 26 students in the 4th grade. The total number of the students enrolled at this school setting is 579. The students who participated in the study were chosen from a class of 12 students who were in 3 th,4th, and 5th grade. Three subjects were selected for participation in the current study based on need in their Individual Education Program (IEPs) as having specific learning disability in the area of reading (phonics, phonemic awareness, vocabulary, fluency, and comprehension) and math. The three participants were all in 4th grade: Zahra, Layan, and Justin.

Participant 1. Zahra, 10 years old, is a female in 4th grade. According to Zahra's teacher, she is identified with a learning disability in math and reading (phonics, phonemic awareness, vocabulary, fluency and comprehension). Zahra is receiving extra reading and math instruction in the special education setting.

Participant 2. Layan, 10 years of age, is a female in 4th grade. According to Layan's teacher, she is diagnosed with a learning disability in math and reading (phonics, phonemic awareness, vocabulary, fluency, and comprehension). Layan is getting additional reading instruction in the special education setting and math instruction in the general education setting.

Participant 3. Justin, 10 years old, is a boy in 4th grade. According to Justin's teacher, he is identified with a learning disability in math and reading (phonics, phonemic awareness, vocabulary, fluency and comprehension). Justin is receiving additional math and reading instruction in the special education setting.

Instruments

The pre-test was printed and given to the students to determine their baseline before the intervention (see Appendix A). The intervention was documented with fidelity for accuracy and consistency. The reliability of the independent variable in this research was implemented from (The Vocabulary Lincing Routine) manual developed by Eills (2002). The instructor followed the same steps of teaching and modeling the LINCS strategy with each student in the study. The teacher printed the same materials that were used in the manual of Vocabulary Lincing Routine (LINCS tables and cue cards # 5) (see Appendix B). Then, the post-test was given to the students to figure their baseline after the intervention (see Appendix A).

Procedures

The research took place in the special education setting at an elementary school in the Midwest. The three participants received the instruction of LINCs strategy twice a week in 30-minute sessions. They also received 30-minutes twice a week reading a classroom text that was modified based on their particular reading level. The students' teacher recommended the appropriate reading level for students based on their data on curriculum-based measures and common core aligned curriculum tests. The eight words were selected from classroom texts that rating in 500 to 700 Lexile scores. The words were chosen according to "tier two words" by Beck (2002), " That is, most of the words are likely to appear frequently in a wide variety of texts and in written and oral language of mature users" (Beck, Mckeown, &

Kucan, 2002, p.16). The tier two words are words frequently found across content areas, the words are literary and used in an academic setting, and not usually used in daily conversation life. A list of eight words was set for students' pre-test and post-test before and after the intervention. The pre and post-test were prepared with 10-questions asking about the eight words and their meaning. Both pre and post-tests contained the same questions and instructions that included matching the words with its meaning, and multiple-choice questions and writing sentences for those words (see Appendix A). The tables and graphs were used to record the results of both tests. In addition, the researcher wrote a personal journal of the teaching barriers and an anecdotal note of the student's work after each session, as well as the individuals' reading comprehension after reading the book with them.

Baseline. Since the research employs quasi-design, the baseline for these students before the intervention was based on their pre-test scores. The pre-test included a list of eight words with its definitions. The eight words were selected from reading in a book that had a Lexile rating of 660 levels for 4^{th} grade and corresponding with tier 2 words. The test consisted of 10 questions: matching words with its meaning, choosing the correct meaning for the word, and writing sentences for two words. The test scores were divided into one point for each question that was a score out of 10.

Intervention. In the fist week, the intervention was provided to the participants twice a week; four words were given in each session, and each instruction lasted for 30-minutes. Students received the instruction of LINCs strategy via three phases after passing out the LINCs tables: Cue, Do, and Review. The second week, the researcher was reading the book with the participants for two days in 30-miuntes each class; then the post-test was given to the students.

Cue phase. Before starting the lesson, students were asked if they used strategies to learn and remember information. At that point, the LINCs methodology was introduced to the students with its purpose. The purpose of LINCs technique was to bolster memory to recollect words and get the idea of the words meaning.

The researcher started with clarifying and naming the LINCs tables, which comprised of five areas: segment one was the term (the word you need to learn), segment two was the definition (the important meaning of the words), segment three was remaining word (clue word), segment four was LINCing story (short story to remember the word meaning), and segment five was LINCing picture (portraying the word by drawing picture) (see Appendix B). Students were informed that each section is a memory device designed to remember new word meaning. Last, students were aware of what was expected from them by the end of the learning Lincing Routine.

Do phase. In this phase, the participants were instructed with the five steps of LINCs routine. After students had had the LINCs tables, the researcher modeled each step first. Then, students were guided through each letter and did it together with their researcher.

During the first step with letter **L** (list the part), the participants wrote the word in section one under "term box", and wrote the most important parts of the word meaning under section two "definition box". During the second step with letter **I** (identify a remaining word), students were asked to think about real word that sounds alike or similar from the beginning, middle or the end of the new term. They were instructed to write the remaining word under "reminding word box" in section three. During the third step with letter **N** (note a Lincing story), students were encouraged to write the sentence story that included the remaining word and one part of the definition under the "LINCs story box" in section four. The fourth step with letter **C**

(create a LINCing picture), students imagined the story in their mind and created a picture under "LINCing picture box" in section five. The fifth step with letter **S** (supervise practice), the self-test step was modeled to the students in forward practice and back word practice that in the cue cards, which were given to the participants (see Appendix B).

Review phase. Students were asked questions to check their understanding of the Lincing Routine steps with reviewing the target words meaning.

Baseline. The baseline after the intervention was the post-test scores of these students. The post-test was in the same characteristics of the pre-test (see Appendix A). The post-test scores displayed how many correct answers the students performed after the intervention.

Data Collection

The data of each student pre and post-test were collected before and after the intervention. The instructor gathered the data of the participants' learning experience after each session by writing anecdotal notes on whether or not students understand the strategy, and on their reading comprehension with researcher's personal journals to determine any future instructional implementation. All scores of students in the pre and post-test were analyzed and shown in the tables and graphs as evidence for the effectiveness of LINCs strategy. The students' correct answers were recorded in the tables showing their scores out of 10, and also presented on the graphs in percentages (i.e., out of 100). The scores of students' pre-test were compared to their post-test.

Results

In the current study, the data were collected for the baseline via the pre-test and the post-test along with the data of the personal journals and anecdotal notes during the intervention. The results findings of the pre and post-test were presented on

the table and in the graph to show the baseline of the participants' performance before and after using LINCs strategy. The table displayed students' vocabulary knowledge and the number of their correct answers out of 10 points in the pre and the post-test (see Table 1).

Table 1

Pre-test and Post-test Scores

Vocabulary Knowledge Tests

Name	Pretest	Posttest
Justin	1	4
Zahra	2	5
Layan	1	3

Scores out of 10

The table showed low performance of all participants in the pre-test before the intervention. Justin gained the same score on the pre-test, as Layan achieved with only one correct answer (1 out of 10), while Zahra had two correct answers (2 out of 10).

However, the table presented that the score rose when the participants were given the post-test after the intervention. Zahra gained the highest score of five correct answers (5 out of 10), whereas Justin had four correct answers (4 out of 10), and Layan had three correct answers (3 out of 10).

Reading words in the context

Furthermore, students' comprehension was not quite developed after using LINCs strategy. Despite the fact that all of the participants were interested in reading the story, Zahra was only the student who quickly recognized the words and knew their meanings. She was able to provide a perfect explanation of the texts. The

remaining students could figure each of the words' meaning from the text, but they could only do so with the teacher's support.

Anecdotal notes

During the intervention, the anecdotal note stated, "Justin always was worried and not even focused on task, and Layan looked at the words, yet did not try to think of the answer. In addition, she is out of mind, sleepy, and yawning during the test. Zahra was getting the highest score in the pre-and the post-test although her mood was very bad per morning." The anecdotal note continued, "Zahra was very creative in making her own images; she even suggested to the class how to draw a good picture that related to the story". Moreover, the anecdotal notes stated, "Justin and Layan were giving a hint of the word's meaning, and each time they had a prompt to participate." In addition, the notes stated, "Justin was not following the reading, and Layan kept looking at her clothing."

Discussion

Notes taken during the intervention phase, students said in a sad voice, " Are we going to take this every day?" This was their reaction when I passed out the LINCs table. For sure, I was disappointed; however, after teaching the Lincing Routine, students remarked, " We want the LINCs table. Why did we stop?" In addition, the findings showed that all students' scores increased after the intervention, but there was little improvement in their comprehension. The results indicated that Zahra earned a higher score than her peers despite the fact that she was in a bad mood in the morning. Her teacher stated, "She is moving out of the district in upcoming weeks." In my prospective, I wonder if she could be in a good mood in the morning and not anxious about her leaving the class and friends, could her score be higher than 50%? Regarding the improvement that had been made after the intervention, it was

noted that Justin had been sick most of the classes, and Layan was sleepy. Justin was self-anxious, touching his face, hair, looking at the clock and wanting to leave before the end of the class. The note stated that he often does not pay attention. After the post-test, he stated, “You are staring at me.” I was sitting in the middle and watching students do the tests without any inclination to look at him. Because I was asked to read some words during the tests, I assume that students could not recognize some meaning of the words.

These issues might have been the factors that affected their performance. Furthermore, the current study was evidence of my hypothesis that students improved their academic performance in acquiring more words with LINCs strategy. The strategy enhanced both their motivation and their memory capacity in remembering vocabulary words.

Limitations of the study

During the intervention, due to the limited time and late students sharpening their pencils, taking class pictures and other routine tasks, I pushed them to learn the four words in 15-miuntes rather than go smoothly from word to word and not being worried about the time. Running out of time also prevented the participants to practice the self-test steps. In fact, there were a few variables I had in my action research such as distractions and lack of chalkboard that impacted negatively on students. The study pointed out the students’ anxiety could affect their responding to the intervention. Moreover, I have learned that if students with LD have extended time without distractions such as noises, they would concentrate better on their tasks. The longer time students spend in learning words with LINCs strategy, the better results they will get. Materials, such as chalkboard are significant to explain the lesson; otherwise, the

teacher could lose time to model, and students could find it difficult to absorb information.

Implications for future study

In brief, it was obvious that LINCs strategy had a positive effect on students with LD for gaining more words, but the strategy was little effective in their reading comprehension. Therefore, further implementation of Lincing Routine is needed. To guarantee students' academic performance, first the test accommodations should be applied for reading both tests aloud for the students so I could reduce the lack of reading skills. Second, I should foster the students having LINCs table with them while reading the story. Third, I would increase the number of session to teach the strategy three times a week with two words daily so that their time for practicing will be longer. In addition, I would provide a chalkboard and an isolation area for better teaching and a more comfortable quiet class.

Conclusions

Lincing Vocabulary Routine is a strategy that supports students with special needs. It offers a variety of diverse learning through steps like writing stories, drawing pictures, or creating reminding words. These enhance and ease the information being absorbed, because students can learn by ears and/or images. I have learned words easily via LINCs strategy as the students did. We enjoyed the LINCs table, laughing about some suggestions that we were discussing through reminder words, pictures or even stories. Each student was able to put the words in a sentence, so we ended up with divers contexts. When I asked the students about the meaning of the words, they did not remember the actual definition, but they immediately moved forward to think about each section such as the images or the reminding words by themselves. I witnessed their interest in learning words' meanings with this strategy.

I should take this knowledge with me to my hometown in Saudi Arabia, Jeddah City for improving students with special needs academic performance as creation of vocabulary instruction. I will encourage any Language Centers to teach students who aspire to learn any second language such as English the LINCs strategy in learning more words and building more confidence to practice them.

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Appendix

Appendix A

The pre/post-test for the baseline before and after the intervention

Name……

A- Match the vocabulary word on the right hand side with the correct meaning on the left hand side. Draw a line from the number to the letter for matching.

a- to receive from one's parents	1-characteristics
b- features or qualities	2-concerns
c- worried of interests	3-disagreed
d-the act of fighting against something	4- inherit
e- had a different opinion	5-resistance

B- Circle the correct meaning for the word:

6- Farming (prevalent- agriculture- disagreed)

7- Common or widespread (advancement- prevalent- concerns)

8-Progress and improvement (agriculture- inherit- advancement)

C- Choose two words from the box bellow and write your own sentence for each word.

resistance	**disagreed**	**characteristics**	**advancements**

9- ……..……

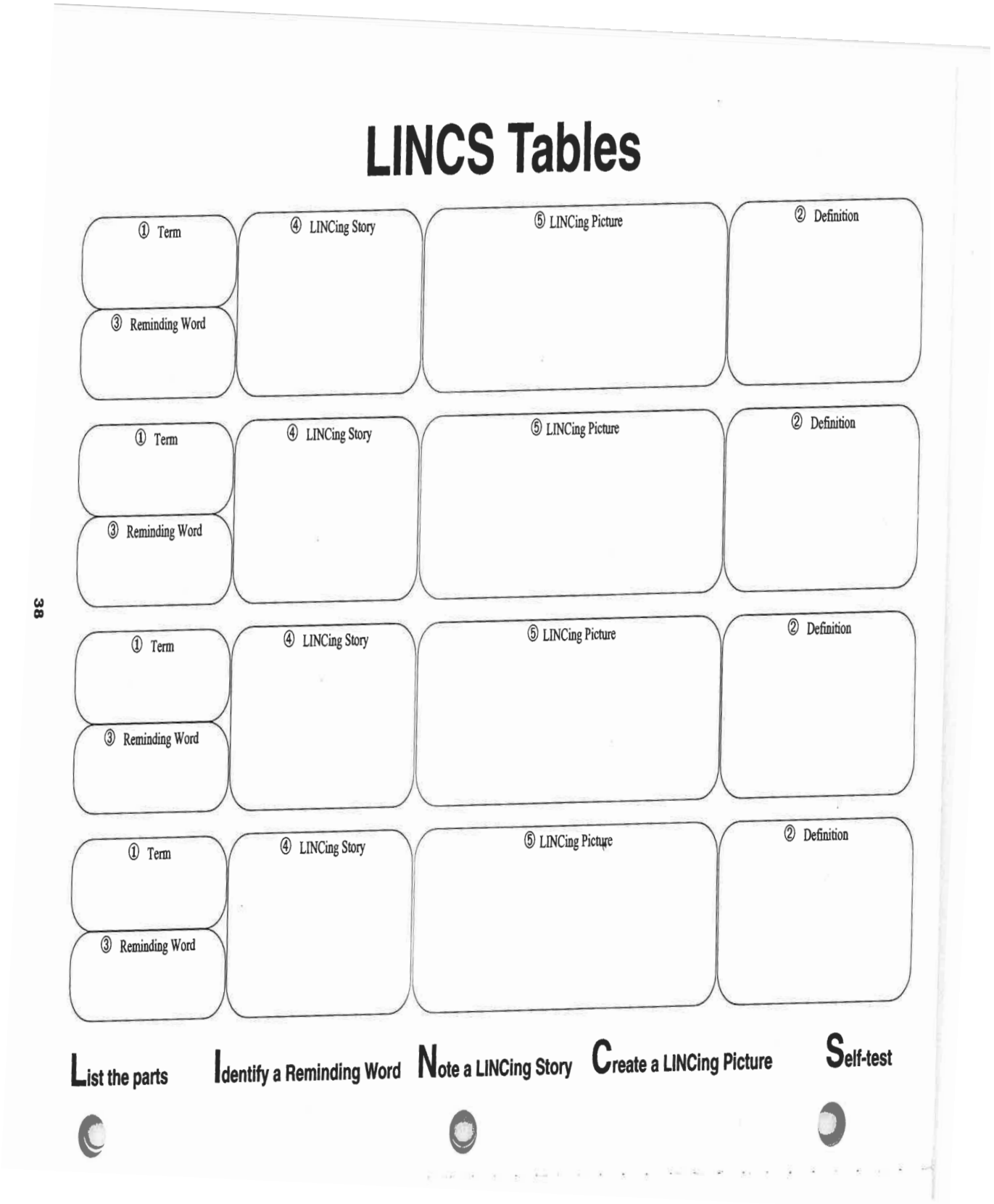
……..

10- …….....

……..

Appendix B

LINCs Table



Appendix B

Cue Cards for self-test forwards/ backwards #5

STUDENT PRACTICE

■ Self-test forwards:

1. Say the new word.
2. Say the Reminding Word.
3. Think of the LINCing Story.
4. Think of the image.
5. Say the meaning of the new word.
6. Check to see if you're correct.

■ Self-test backwards:

1. Say the meaning of the new word.
2. Think of the image.
3. Think of the LINCing Story.
4. Think of the Reminding Word.
5. Say the new word.
6. Check to see if you're correct.