How might the use of LINCS increase student vocabulary in ESE students?

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Abstract

One of the key components of reading is the ability to recognize and understand vocabulary, yet so many students are struggling in that area, leading to huge gaps in their learning. To facilitate in the inquiry of learning new vocabulary words, a method known as LINCS, a mnemonic strategy, was utilized on four high school ESE students of varying exceptionalities attending an alternative school. LINCS stands for: list the parts, identify a reminding word, note a LINCing story, create LINCing picture, self test & supervised practice. This intervention included modeling, guided practice and independent practice for six weeks to determine if LINCS would increase the vocabulary of the ESE students. After six weeks of the intervention, one student demonstrated greater mastery of the strategy as indicated by classroom data. While success was achieved at varying levels for all but one student, lack of fidelity to the process by the student lead to lower levels of achievement. Study time played a major role in whether or not the student made academic gains.

Introduction

How would the classroom experience of a student who has low reading comprehension differ from a student with higher reading comprehension? What factors influence whether or not a student is able to master reading content? What type of strategy might help a student with low reading performance increase their understanding of grade level text? Perhaps the student will struggle or fall into a defeatist mentality. In a classroom with many students, these students can go unnoticed, slipping under the radar of the teacher by just doing the minimum necessary to earn a grade. As a result, students gain a shallow understanding of the classwork. Over time, this minimalist understanding builds until the student is years below their expected reading level. This effect can be compacted when the student has a disability.

Four High School students were selected to participate in this systematic inquiry based on a level one score on the Florida Standardized Assessment (FSA). A score of level one indicates that the student is performing well below grade level. All four students attend an alternative school due to previous rule infractions at their zoned school such as drugs and fighting. Two high school students were selected from an English 3 class to participate. These students were chosen based on observed behavior of task avoidance such as sleeping and disrupting class. Two high school students were selected from a Learning Strategies class, which is a class meant to address learning strategies for the student's other classes. All students in the study are identified as receiving Exceptional Student Education services, further referred to as ESE. Each student has an IEP (individualized education plan) to address to their disabilities.

Bill is a 16 year old male student in the 10th grade. His primary exceptionality is Emotional/Behavioral disability, further referred to as EBD. When Bill is unable to understand a task, he avoids the ask by disrupting the class. Maria is a 9th grade female student who sleeps

when she is unable to comprehend the content. Her primary exceptionality is Deaf/Hard of Hearing. Benny is a 9th grade male student with a primary exceptionality of Other Health Impaired, which he qualifies for due to Attention Deficit Hyperactivity Disorder, further referred to as ADHD. When Benny is unable to comprehend, he avoids the task by doodling in his notebook. Finally, Earl is a 10th grade male student with a primary exceptionality of EBD. He avoids reading classwork by interrupting the class with Bill. Over the course of this study, classroom vocabulary tests, student interviews and anecdotal notes were used to track data for each student.

Would increasing the student's vocabulary knowledge lead to higher classroom test scores? The goal of this intervention is to increase awareness of the vocabulary used in the assigned classroom text so that the student will be able to understand the passage and answer associated questions. Would the students continue to use LINCS as a viable tool to help them study beyond the timeframe of the intervention? If this intervention is successful, it would lead to sustained understanding of vocabulary generalized across all academic classes. This systematic inquiry set out to address these questions over the course of six weeks.

I consulted with the classroom teacher about the intervention and my intentions. I was granted permission to work with the students in a small group twice a week for twenty minutes each session. Over the course of this study, the teacher and I worked together to choose vocabulary words from the text, *The Crucible*, which would most likely aid in increased student comprehension.

Literature Review

Reading comprehension is important outside of the reading/English class as it affects all areas of

student learning such as social students, science, math and even elective classes. The knowledge of these subject areas as well as the ability to read and comprehend continues well into adult life. However, before a student can comprehend a reading passage in any class, previous research agrees that students need the foundation of vocabulary. “In 2000, the National Reading Panel identified vocabulary instruction as one of the five essential components of reading instruction, and a large body of research indicates the critical role vocabulary knowledge plays in reading comprehension” (Manyak, Autenrieth, Gillis, Mastre-O’Farrell, Irvine-McDermott, Baumann & Blachowicz, 2014, p. 14) If a word is unknown to a student, he or she will not fully understand a passage that includes those words, leading to a gap in instruction and difficulty adding on further knowledge to this concept. Harmon, Buckelew-Martin & Wood (2010) pointed out that “Important aspects of word learning include the ability to recognize unfamiliar words as well as to determine how important the words are for comprehension” (p. 101). Some words in a sentence can change the entire meaning of the sentence if read incorrectly or not at all. It’s important for a student to grasp the whole meaning of a sentence, passage or story.

Additionally, the total improvement of a student’s vocabulary will not happen overnight, or even within one school year. “The vocabulary deficit experienced by many students is so large that it will take a multiyear approach to vocabulary instruction to substantially impact it” (Manyak et. al, 2014, p. 14). This statement shows that students continue to fall behind in vocabulary even when they’re already far behind. This can affect them later in life into their literacy success in adulthood while using resources like the newspaper to find a job or to read the news, to read legal documents or important paperwork, to understand which health insurance plan is best for them and many other areas. Finally, Harris, Schumaker & Deshler (2011) explain that “According to the National Assessment of Educational Progress results, 26% of eighth-grade

students cannot read materials essential for daily living, such as road signs, newspapers, and bus schedules. Overall, 68% of secondary students score below the proficiency level in reading" (p. 18). With this hefty gap how can we work toward closing it? How can a classroom teacher ensure literacy for all students?

To be successful in school, students need strategies they can use for learning vocabulary words as well as other tools they will need to succeed in all of their content area classes. Learning how to use these tools can take the form of an intervention for that student. O'Brien (2005) states "Learning strategies are typically thought of in relation to interventions for students with LD that focus on teaching skills to students so they can work independently and experience success with the general curriculum" (p. 3). Some students can innately figure out the meaning of a word based on their background knowledge, but what if those students have no background knowledge because they've been struggling and falling behind for years without the issue being addressed? These students do not have the strategy or skillset for learning new vocabulary, so they fall further behind.

One common form of studying vocabulary is a strategy in which the students use cards to write a vocabulary word on the front of the card and the definition on the back of the card. This method may work for some students for memorizing words by their definition, but this method gives little context and is not as useful to ESE students because they have a comparatively higher delay in their memory. This method also leads to memorization, which is of low cognitive complexity, rather than learning and keeping the word to utilize when working within the subject area. The vocabulary words may also seem too long, too complex and too difficult. The words may have unfamiliar stems, roots and structures. "Struggling students often shy away from multisyllabic words, regarding them as too difficult to decode, until they are

taught that these words by their structure, offer many clues to pronounce and to meaning" (Palumbo, Kramer-Vid, & Hunt, 2015, p.111) The students have no background knowledge to learn these words not because they are intellectually low, but because they haven't had the exposure.

Something more, such as imagery, is needed for students to improve their comprehension of more difficult academic vocabulary. In a study by Campos, Camino & Perez-Fabel (2011) they suggest "Immediate recall was considerably greater for high imagery words than for low ones." and that "When keyword mnemonics, i.e. mental imagery is used, concrete words are

stored both as imagery and as language. Therefore, they are processed in both brain hemispheres; consequently, recall is greater both immediately and at a one day". This statements suggest that creating an image for a word can cause the word to become more lasting in a student's mind and that the effects last longer than by simply memorizing a word and definition. Additionally, the study suggests using mnemonics is an effective method to learning new words.

In addition to the struggle that students with special needs face, " Students with Learning Disabilities (LD) often experiences significant difficulty with academic content at the secondary level due to weaknesses in reading comprehension, written expression, math skills, and vocabulary learning skills" (O'Brien, 2005, p. 2). This again supports the fact that ESE students need something more than general education students in order to be successful in all areas, especially as they move on to secondary grade levels where more is expected of their reading, writing, and vocabulary.

ESOL (ESL) students also struggle with vocabulary. As Nam states, "In the ESL context, vocabulary not only supports the four language skills, listening, speaking, reading, and writing,

but also mediates between ESL students and content-area classes in that these students often find that lack of vocabulary knowledge is an obstacle to learning" (2010, p. 127) . ESE and ESOL are sometimes compared due to the use of additional strategies used to help them learn new vocabulary words such as tying to other words by using the word structure, using images, and repetition of exposure.

But, how can vocabulary strategies fit into classroom instructional time? With standardized assessments and Common Core standards, along with all the other demands that a classroom teacher must fulfill, it can seem difficult to fit necessary time into studying much needed vocabulary. According to Palumbo e.t. al (2015) "Teachers can deal with these curricula demands and help their students advance their reading ability and their subject learning by combining vocabulary instruction with word recognition skills and by incorporating the meaning of vocabulary words with subject knowledge" (p. 110). Studying vocabulary is as important as reading from an assigned grade-level passage because it ensures that students are *able* to read said passage with the appropriate vocabulary and background knowledge, which ensures that they are able to more efficiently digest the passage. This is a sound idea, but time and other constraints still come into play when assigning time to address and reinforce vocabulary. Harmon et.al (2010) also agree that classroom teachers must meet a variety of demands:

> English teachers face myriad demands every day that include not only helping students read literature in interesting and engaging ways but also attending to the needs of students challenged by the demands of more complex and sophisticated texts. Vocabulary learning is at the heart of this struggle for many students, especially for English language learners and students who have difficulty with literacy skill development. Obviously, a lack of vocabulary knowledge limits students' understanding of a passage and also

hinders their ability to engage in the deeper reading we aim for in our teaching (p. 100). As one can comprehend, English teachers are faced with many challenges when trying to work in an inclusive setting to meet the needs of all levels of learners. It isn't always for lack of trying that vocabulary sometimes gets glazed over.

In regard to the Common Core standards, Palumbo e.t. al state (2015) "Vocabulary knowledge is emphasized throughout the highly influential Common Core State Standards, with the word vocabulary occurring more than 150 times in the document. Specifically, the standards make the requirement to 'Acquire and use accurately a range of general academic and domain-specific words and phrases'" (p. 13). By this statement, we can see that policy makers who contributed to the Common Core standards also see the importance of vocabulary words in relation to student success. Even with time constraints, it's important to note that, "A vocabulary learning strategy should be part of an overall instructional design assisting learners to discover meaning as well as memorize and internalize vocabulary" (Nation, 2001 as cited in Yang & Wu, 2015, p.1)

So, how is a mnemonic strategy known as LINCS relevant to studying and remembering new vocabulary? LINCS is part of the Strategic Instructional Model (SIM), rolled out by University of Kansas, meant to be used as part of the Learning Strategies Curriculum. LINCS makes use of a couple of mnemonic strategies to enhance a student's ability to learn new vocabulary. Students would, for example, draw a picture to help them learn the new vocabulary word. As Estefania & Perez-Fabel (2011) stated "The literature of the last 40 years has sustained that recall is enhanced if mental imagery is used: i.e.,words with greater image vividness can be remembered better than words with less image vividness" (p. 237). So, what is LINCS? O'Brien (2005) states that:

> The Learning Strategies Curriculum developed by the University of Kansas assigns the strategies to three groups: strategies for acquisition, storage, and expression or demonstration of comprehension. Strategies in this curriculum include strategies for reading comprehension (e.g., The Word Identification Strategy, The Paraphrasing Strategy), memorization of information (e.g., The FIRST-Letter Mnemonic Strategy, *The LINCS Vocabulary Strategy*), expression of information (e.g., The Sentence Writing Strategy, The Paragraph Writing Strategy), and demonstration of competence (e.g., The Test-Taking Strategy) which have been shown to be effective in improving student learning and performance (as cited in Lenz, Deshler, & Kissam, 2004)(p.3)

However, despite the number of strategies that the University of Kansas provides, including LINCS, O'Brien (2005) states that "special education is often said to suffer from a gap between research and practice" (as cited in Deshler, 2003). It's great for an educator to have knowledge of strategies to enhance student learning, but the knowledge itself does not help students learn. What helps students learn is the *implementation* of the strategies, with fidelity, by the teacher. To add to that, O'Brien (2005) also states that "Essentially, teaching students with LD to use learning strategies is like ensuring they have all the necessary tools to do their job in the classroom" (p. 3). Further supporting this information, O'Brien states that "Although this strategy (LINCS) has been shown to be effective in previous research, (Ellis, 2000), a strategy is only useful if it is fully accepted by students and included in their learning repertoire (p. 6)."

To further discussion on this topic, Cantrell, S. C., Almasi, J. F., Carter, J. C., & Rintamaa, M describe the efficacy and adherence to LINCS in relation to student outcomes:

> The Learning Strategies Curriculum directly addressed vocabulary development,

> specifically through the LINCS strategy, and it is interesting that, unlike with comprehension and overall reading, teachers' adherence to the Learning Strategies Curriculum was related to vocabulary learning. Similarly, teachers' efficacy was not related to improvements in vocabulary. Thus, this study suggests that while teachers' efficacy was more important than program adherence in students' comprehension and overall reading improvement, teachers' adherence to the program was more important than their efficacy in improving students' vocabulary knowledge (p. 49).

This suggests that sticking to the program is more important than any other factor, which also agrees with O'Brien's stance that interventions/strategies should be used rather than just known.

Deshler et. al (1993) noted that in a LINCS study "All students in the experimental class mastered the use of the strategy within about 3 weeks. Additionally, they made substantial mean score gains across pre- and post intervention social studies vocabulary tests (75% vs. 88%), whereas the comparison class (which had no LD students enrolled) made no gains (86% vs. 85%). In the experimental class, the LD students' mean score on the pre-instruction vocabulary test was 53% and their score on the post instruction vocabulary test was 77%. In the same class, the non-LD students' mean score on the pretest was 84% and on the posttest was 92%" (p. 160). In contrast, " Some of the LD students required more time than allotted for the strategy instruction in the regular class" (p. 160).

This can be expected due to the slower processing time of ESE students. These numbers highlight the successful gains a student can make while using the LINCS strategy- whether ESE or a general education student. Schumaker & Deshler (2011) noted this about the effect of LINCS instruction. NSWD are students without a learning disability and SWD is a student with a learning disability:

> The results showed that both groups made significant and comparable gains on the Strategy-Use tests and SWDs and NSWDs scoring above a mastery level (mean percentage scores= 87%). Thus, the interventions were effective in teaching the strategies to both SWDs and NSWDs. Additionally, scores on the Word Knowledge test demonstrate that both interventions resulted in both SWDs and NSWDs learning word knowledge at comparable levels (i.e., mean percentage scores= 70% [or a "C" grade in today's schools]) (p. 29).

The same study by Deshler and Shumaker (2011) describes the components of the LINCS strategy as a non-generative strategy, meaning not based on roots or affixes in a word, only by association to a word already known):

> " Set of cognitive and behavioral steps that students can use to help memorize and recall the meanings of vocabulary words. This process involves the use of a set of mnemonic strategies that include (a) a keyword strategy, (b) a visual imagery strategy, (c) a story strategy to link known words and information to new vocabulary words and their definitions, and (d) a self-testing method used while practicing recalling the meaning of the word."

Cantrell, Almasi, Carter, Rintamaa & Madden (2010) said this about LINCS:

> From the storage strand, students were taught the LINCS vocabulary strategy, which involves using a mnemonic to memorize word meanings. This vocabulary strategy has yielded positive results in research studies measuring vocabulary acquisition (p. 260 as cited in Wedel, Deshler, Schumaker & Ellis as reported in Ellis, 1992, as cited in Schumaker & Deshler, 2006).

Spencer & Logan (2005) explained that "Use of the LINCS Vocabulary Strategy by students with

learning disabilities in the general education classroom has been found to increase gain scores on vocabulary recall tests" (p. 87 as cited in Wedel, Deshler & Schumaker, 1988; Wedel, Deshler, Schumaker & Ellis, 1993). "The LINCS Vocabulary Strategy is a component of the Strategies Intervention Model (SIM) developed at the University of Kansas Institute for Learning Disabilities (as cited in Deshler & Lenz, 1989). Spencer et. al (2005) also say that "the LINCS Vocabulary Strategy is a starter strategy for learning vocabulary" (p. 89 as cited in Ellis, 1992) As such, it is designed to be taught quickly, to efficiently improve recall of new vocabulary words, and its use does not require extensive instruction for the teacher or the subject (p. 89 as cited in Ellis, 1992).

In a study by Spencer et. al, (2005) 8 students were chosen to participate in a LINCS study. All 8 students scored 0% on their pre-tests, which qualified them to participate. Students received 8 hours total of LINCS instruction (one per day). At the end of the study, each student indicated they "had used the LINCS strategy to study for the social studies vocabulary test. The group mean for their scores was 90% correct and the LINCS mnemonic appeared on each of the four papers supporting generalization of the LINCS strategy to the social studies classroom" (pp. 90-93).

The steps of the LINCS strategy is explained by Deshler et. al (2011) as:

> In the first step of the strategy, students write the word and its definition. Second, students identify a Reminding Word that sounds or looks like the new word. Third, students create a LINCing Story, a statement or phrase that includes both the Reminding Word and the definition. Next, students draw a picture that includes the important parts of the story.

The fourth step of LINCS, which is create a LINCing picture, corresponds with creating

imagery for the student to increase their ease of remembering the new vocabulary word. In this way, LINCS cards act as graphic organizers rather than flashcards, which allows a student to create a powerful semantic mapping tool. Semantic mapping is a tool in which students use a word to link to another word with similar meaning or concept. As Little & Ann (2011) state,

> The strategy of semantic mapping, as with all advance and graphic organizers, is based on the theory that a student's structure of prior knowledge and experiences (schemata) related to the acquisition of new concepts is a critical element in the student becoming a successful learner and reader (p. 24).

In a study by Scruggs, Mastropieri, Berkeley & Marshak (2010), a Science teacher used a strategy which included picture drawing, which resulted in great success within her classroom.

> The teacher reported that she selected information students had difficulty learning and developed her materials. Using combinations of stick figures, simple line drawings and pictures taken from magazines. For example, to teach that herbivores are animals that eat plants, she created a keyword, herd, and then created a picture of a herd of herbivores eating plants. She implemented the materials and reported students learned, and retained, virtually all information taught mnemonically, which contrasted dramatically from the amount of information students learned with traditional instructional methods (p. 81).

This is a great example of using mnemonics such as drawing and creating a reminding word as successful strategies not only for English class, but also for other content area classes, including Science and Math to learn domain specific vocabulary words. Scruggs et. al also go on to say:

> A middle school teacher of students with mild intellectual disabilities adapted materials or Science and Social Studies for her students. She first employed researcher-developed materials to help her students remember the states and capitals, which they had

> previously had difficulty learning. For example, to help students remember that the capital of Maryland is Annapolis, students learned keywords, then viewed and practiced retrieving information for a picture of two apples (keyword for Annapolis) getting married (keyword for Maryland). She also created thinking-sequence cards that helped students think through the steps of the procedure. She introduced five new states and capitals per week over a period of 4 weeks. At the end of this time, she was surprised to report that students averaged 94% correct on the recall test (p. 81).

This instance is a fantastic example of using a "reminding word" (as LINCS utilizes) as well as imagery to help students remember unfamiliar words and to be successful with the content. This research also suggests that students of all cognitive levels, as well as students with various disabilities, can benefit from using the mnemonic strategies associated with LINCS.

Research by Shore, Ray, Gooklasian (2015) tells that "Because understanding terms and definitions is a first step in learning science, we hypothesise that inability to grasp content vocabulary could create a barrier to further understanding of science topics" (p. 234). Students will not often be exposed to Science content area words in other subject areas, so the Science classroom is the place to acquire and master these words. Words such as "mitosis" and "photosynthesis" may have never been heard by a student before, and they will not benefit from repeated exposure other than in the Science classroom.

Additionally, Shore et. al state that "Although there has been increased emphasis placed on the importance of mathematics and science curriculum in K-12 instruction, indicators show that student achievement in mathematics and science has not been improving uniformly" (p. 233). Although there is much more push in these subject areas, with the idea that students will become more science and math inquisitive and possess the literacy required of both, this push

falls short of meeting the intended goal because without a strategy, students are not making the gains expected.

The paper also explains their own picture strategy as: Stimulus items presented as pictures and as spoken words were recalled (and recognized) equally well or better than printed words" (p. 236). Finally, the authors state that:

The second strategy, 'pictionary' required the students to read the definition in the back of the book and then draw pictures that represented the science words on three by five index cards using colored pencils. Students were encouraged to create a picture that reminded them of the meaning of the word and not necessarily an actual picture of the word (p. 237-238).

Mulcahy & Maccini (2014) describe the need for mathematics vocabulary instruction as:

> The need for effective mathematics instruction for all students in the United States, including students with disabilities, has been a priority in national reform over the last two decades" and that "Cade and Gunter (2002) conducted a study to evaluate the effects of using mnemonic songs and flashcards to help students learn basic division facts.Three students with EBD learned a mnemonic technique for recalling division facts. The authors reported that each student improved their accuracy of simple division calculations based on results from intervention and maintenance probes" (p.146).

These ideas supports the spoken word, index card use, mnemonics and picture aspects of the LINCS strategy.

When students are introduced to new vocabulary words using the LINCS strategy, the words are modeled and read aloud for them. This action is supported by the 'Production Effect (PE) which "In memory refers to a familiar phenomenon- reading a word aloud improves its memory relative to reading it silently" (Icht & Mama 2015, p. 1102). Michal and Yaniv also state

that “The innovative finding of the present experiment is that PE occurs with new, unfamiliar vocabulary. Accordingly, vocal production can be considered a beneficial learning tool for vocabulary acquisition,”

Another noteworthy component of LINCS, which also includes vocalization, is the self-test stage of LINCS, which could also be considered as the traditional ‘studying’ component. Deshler et. al (2011) had the following to say about the self-test procedure of LINCS:

> They self test using a procedure that helps them recall both the word and its meaning. During this self-test procedure, the student says the word to his or herself, think of the Reminding Word, think of the LINCing Story, think of the picture, and then remember the definition (p. 22).

Intervention

I was support facilitating in several classrooms at the time this intervention took place. I attended one English class and noticed that students were struggling with multi-syllabic new vocabulary words within the literature in their textbooks. In a training over the summer, I was introduced to a strategy from Kansas State University called LINCS, which is a vocabulary strategy using flash card graphic organizers. This classroom of 7 included 5 students with exceptionalities receiving ESE services within the general education classroom. Through observation, research of prior standardized test scores and discussion with the classroom teacher, I picked an EBD male student and a deaf/hard of hearing female student to participate in the intervention in hopes of improving their vocabulary knowledge as well as their level of reading comprehension.

The intervention began the following week on Tuesday. Due to the structure of the classroom, I made an arrangement with the classroom teacher to do a pull-out model of instruction with the students I chose on Tuesdays and Fridays while the remaining 5 students

completed opening exercises, known as bell ringers. She would give credit to the students for working on this strategy rather than doing the bell exercises.

The layout of the building at this alternative school has 4 classrooms within a quad setting so that students must walk into the quad to get to their classroom. Inside the quad is a table bench. Since this table bench is close to the classroom, I decided to utilize this space so that students were able to leave the classroom quickly and re-enter the classroom quickly. No time would be wasted walking to and from my classroom to complete the intervention when students were steps away from their English class. Due to the setting, students would be able to give full attention to the intervention since there were minimal to no distractions in that area.

The first task the students completed was to learn about LINCS, why we were working on LINCS, how it would benefit them and the mnemonics involved with LINCS. Students were encouraged to ask questions to clarify the instructions and steps to the LINCS strategy. On that same day, students were given a list of ten difficult, unfamiliar new words. Students were given a pre-test and informed that they would be tested on them the next day.

Students were instructed to use whichever strategies they normally use to study these new words. They were sent home with the list of words and their definitions. The next day, students came to our meeting having studied the words. One student had chosen to read the words over and over. The other student chose to write the words by copying them off the word list. The student who read them repeatedly scored a 70% on this pre-test, but could have scored an 80% by not erasing one of his responses.. The student who wrote the words repeatedly scored a 0%.

The students were then given the words from their English classroom. I modeled how to complete a LINCS card. They were then instructed to follow the steps of LINCS to complete their flashcards. Students first wrote the unknown word on the front of their notecard. Beneath

that word, students drew a line horizontally across their notecard. Under that line, the students thought about and created a reminding word that either looked like, sounded like, rhymed with, or had the same beginning or end. This step proved the most cognitively challenging for the students to complete. Once the student wrote down their reminding word, they flipped the note card over. On the back they drew another horizontal line across the middle all the way to the edges. Above the line they wrote the actual definition of the unknown word. Underneath the line, they drew a vertical line which started at the horizontal line and continued to the bottom of their notecard. On the left side of this vertical line, students created an LINCing picture to remind them of their reminding word. On the right side of the vertical line, students created a LINCing/ reminding story using their reminding word but also included the meaning of their unknown word. Example: Profligate with a reminding word of procrastinate, which means "to waste". Students used the word procrastinate as their reminding word. In their LINCing picture, students drew a clock. In their LINCing story, students wrote "When it's time to do homework, I procrastinate." The idea behind their story was that they are wasting time.

On Tuesday, both students met with me to have a pre-test on the English classroom vocabulary words. Students completed a pre-test of the words first, then received the words and their definition. There are usually 5-6 words per week. Students were told that the expectation was the completion of 3 words per session, with the remaining words as homework. On Friday, the students would be post-tested. Once post-tested, I recorded their pre and post data on a chart using Microsoft Word. This data was later converted into Excel. This Tuesday/Friday structure remained the same throughout the intervention. Positive reinforcement was used during the course of this intervention in the form of a cookie every Friday while students completed their Marzano scales reflections. The purpose of these scales was for students to identify where they

believe they performed, as well as to give rationale why. Example: “I am a level 3 because I used the cards to study this week.” Students also wrote a free-form answer in response to the prompt: How did LINCS help you this week? The same study structure was performed in a Learning Strategies class with the same vocabulary as students had the same English teacher.

Data Sources

During the six week intervention, student data was collected through various formative assessments. A formative assessment consists of assessments made, by the teacher, during instructional time. All students were assessed with pre and post tests to determine how they were scoring using their own background knowledge or exposure to the word previously. Post tests are meant to represent how a student can perform after the intervention and studying.

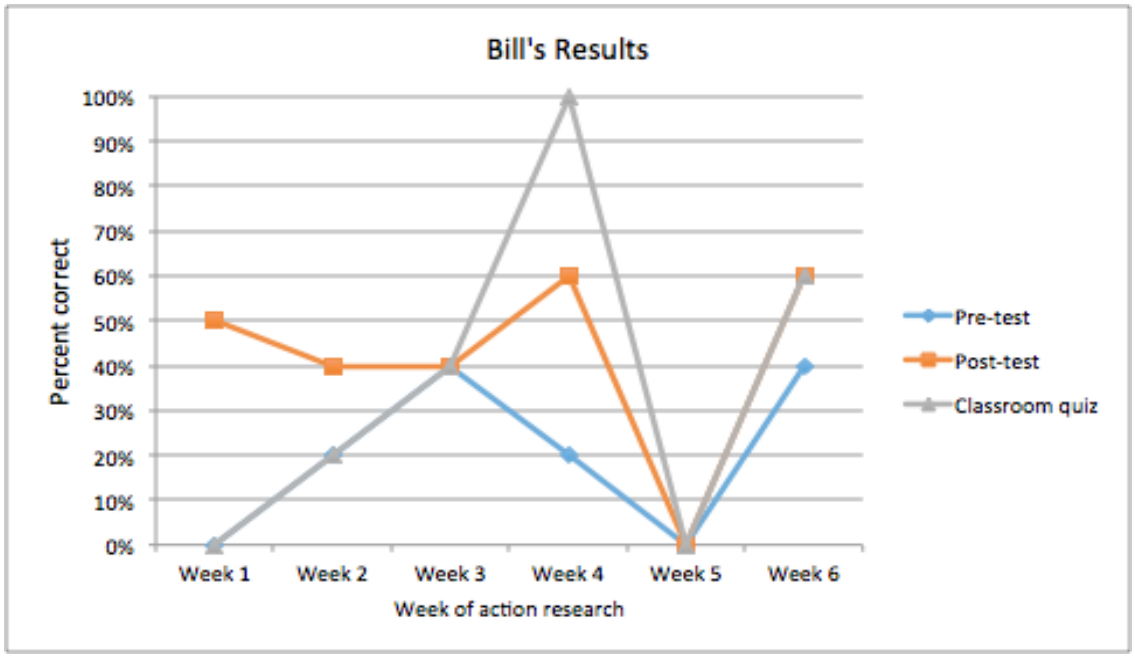
In addition to that, other data was collected. Students were selected based on their 2015-2016 FSA level one scores. Follow-up data from standardized tests would indicate how a student is performing on reading assessments after instruction. Student data was also collected from classroom vocabulary test grades to determine if a student would generalize the information learned during our pull-out sessions from the intervention setting into the classroom setting., Interviews with the teacher as well as the student were conducted to get information on how the intervention is affecting the student as well as to get a second opinion on student performance and student observations post intervention. Finally, anecdotal notes were taken during the course of the intervention.

The data sources would be used in different ways. The original pre and post test using difficult and unfamiliar words was measuring their studying habits. I wanted to know how they studied as well as if that strategy was effective for that particular student. No study tips were

given to the student during this time. My anecdotal notes reflected that one student chose to use a highlighter during his study sessions. This was observed when the student showed me how he had studied, as the highlighted marks were visible. The pre and post data was originally stored in a self-created table in Microsoft Word. However, because this is longitudinal data (taken over time) it is now represented as a line graph to show student results over the course of the study.

Classroom vocabulary tests were given during this study. This data is best represented in a bar graph to show how each student performed on each set of words. Information on the words studied each week will be labeled. Interviews with the student will reveal how they feel about the intervention, if it is helping them, if they are studying- am I getting a true representation of what the intervention can do or am I getting results which demonstrate that the student did not study? These pieces of data are best represented as scan-ins into this paper to use each student's own words as an example of their ability to reflect. Finally, I will use my anecdotal notes to guide my interpretation of the data. In my anecdotals, I have noted if the student has studied, if the student seemed tired, stressed, ill-prepared, hungry or distressed on the days of the intervention. These factors could and may have had an effect on student outcome.

Figure 1. Bill's performance results



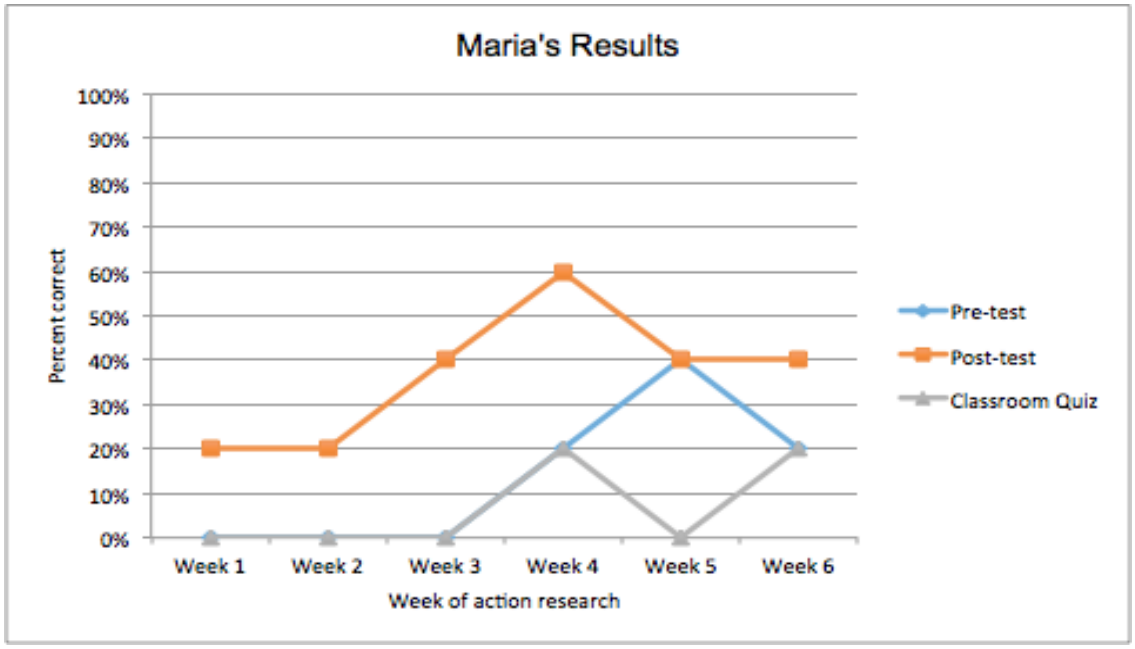


Figure 2. Maria's performance results

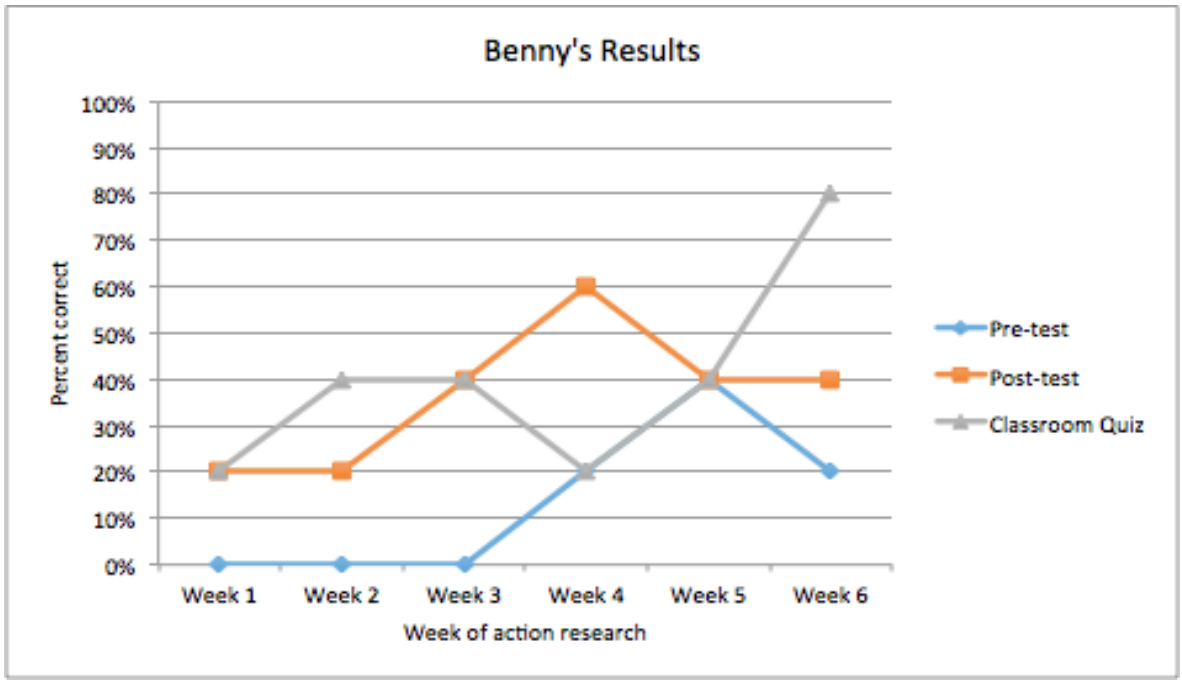


Figure 3. Benny's results

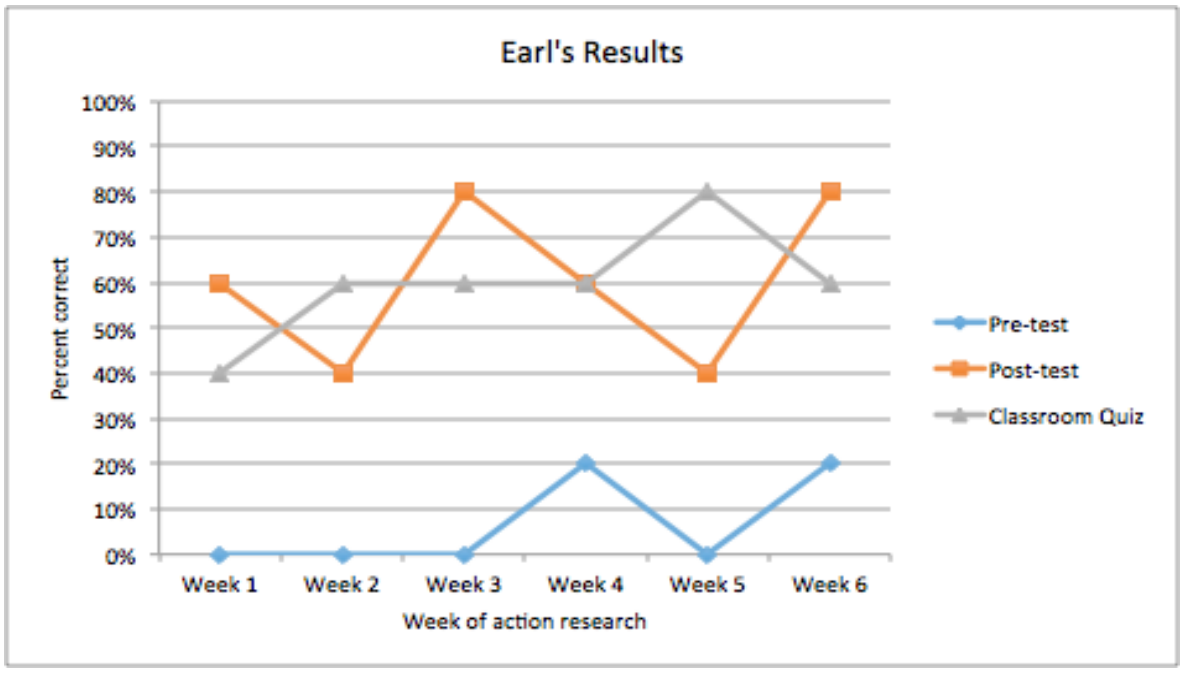


Figure 4. Earl's results

Results

The results of this six week action research study were not conclusive. Some students performed well consistently in comparison to their pre-tests. Other students did well on the pre-test but poorer on their classroom quiz. Others performed at an elevated level above their pre-test on the classroom quiz.

Bill, a sixteen-year-old EBD student entered this study with a zero on his pre-test. (See figure 1). The words used were words from the literature the class was currently reading. Though the intervention was in place in week one, Bill scored a zero on his classroom quiz. Conversely, Bill scored a 50% on his post- test in our pullout group. 50% indicates that he know two vocabulary words and one half of another. During this first week, it could be interpreted that Bill was not using the strategy to study or was confused about the strategy's linkage to the vocabulary test. He may have also been uncertain how to generalize our strategy into his classroom work, or he simply forgot the words in the time between the post-test and quiz. In week 2, Bill scored a 20% on his pre-test and a 40% on his post-test. This means that he had learned two words. On the classroom quiz, he also scored a 20%. Again, it is not clear if Bill used the LINCS cards to study since his score shows a regression of score to his pre-test. During week 3, Bill scored 40% on both his pre-test and his post-test. On his classroom quiz, Bill scored a 40%. Although no regression occurred, Bill may have used the cards to maintain the words he knew, or he may have set the cards to side and legitimately knew these words from previous experience. During week 4, we finally see a gain. Bill scored a 20% on his pre-test and a 60% on his post-test. On the fourth week class quiz, he scored 100%, which is a 5x gain from his pre-test. During week 5, there was a field trip scheduled. Bill scored 0% on his pre-test, post-test and quiz. Finally, during week 6, Bill scored 40% on pre-test, 60% on post-test and 60% on classroom quiz. These numbers demonstrate that Bill may have studied between pre and posttest but not before the

classroom quiz.

Maria, a 17-year-old student who is deaf/hard of hearing entered this study with a week 1 pre-test, post-test, and classroom quiz study of 0%. (See figure 2). Second week, Maria scored a 0% on the pre-test, a 20% on her post-test and a 0% on her classroom quiz. I am not convinced Maria gave her full effort on her quiz as she put her head down afterward. During week 3, Maria scored a 0% on her pre-test, a 20% on her post-test and a 0% on her classroom quiz. Again, I am not sure if she is using the strategy or is just not applying the skill during her classroom quiz, or even the pre and post tests. Week 4 showed some promise. During this week, Maria scored a 20% on both her pre-and post-test, but scored a 20% on her classroom quiz. This is an improvement on her 0% score during previous weeks, but not an improvement between her post test and quiz score. Week 5 Maria scored a 0% on her pre-test, 20% on her post-test and a 0% on her week 5 quiz. Finally, during week 6, Maria scored a 0% on her pre-test, 20% on her post-test and a 20% on her classroom quiz indicating that a word may have been learned that week. For the second time during this action research, Maria scored above 0% on her classroom test. These results may be related to Maria's home duties, which take time away from doing homework and studying.

Benny, a 16-year-old student with ADHD, scored 0% on his pre-test week 1. (See figure 3). The post-test for week 1 indicated a 20% score, as does the classroom quiz. During week 2, Benny scored a 0% on his pre-test and a 20% on his post-test, however he scored a 0% on his classroom quiz which brings to question if he guessed on his post-test or if he did not study and therefore 'lost' the vocabulary word between the post test and quiz. Week three is another anomaly. Benny scored 0% on his pre-test, 40% on his post-test, but yet scored 0% on his post-test. During week 4, Benny scored a 20% on pre-test, post-test and classroom quiz.

Although this indicates no increase, it also does not indicate a loss of a vocabulary word. Week 5 saw Benny scoring a 40% pre-test, a 20% post-test and a 0% classroom quiz. This demonstrates an underlying problem such as a lack of effort or something going on in the student's personal or academic life. Finally, week 6 Benny scored a 20% pre-test, 40% post-test and a 20% classroom quiz score. These results indicate that Benny either was not motivated to complete the classroom quizzes or he was inconsistently studying.

Earl is a 17 year old male student with EBD. During week 1, Earl 0% on his pre-test. (See figure 4). On his post-test, her performed at 60% on post-test and 40% on his classroom quiz. These results indicate that perhaps he studied that week but forgot one of the words in the time between the post test and the quiz. Week 2, Earl 0% on his pre-test, 40% on his post-test and 60% on his class quiz. This would indicate that the student studied between his post-test and quiz. Week 3, Earl scored 0% on his pre-test, 80% on his post-test and 60% on his quiz. Again, a positive result for Earl, but also a week he may have lost a word by quiz time. Week 4 of the action research, Earl scored 20% on his pre-test and 60% each on both class quiz and post-test. Earl maintained the words he learned this week. At week 5 of the research, Earl was scoring 0% on pre-test, 40% on his post-test and 60% on his class quiz. This is a sign that Earl was actively studying. At week 6, he scored 20% on his pre-test, 80% on his post-test and 60% on his classroom quizzes. Overall, Earl gained the most number of correct vocabulary words week by week.

Implications (working on- in progress)

I originally began this study with two EBD males. Unfortunately, during this initial intervention, one of the students with EBD became a distraction to the other EBD student by becoming defiant during our session. Due to the nature of his behavior, I replaced this student

with a female student whose primary exceptionality is deaf/hard of hearing. She began on a Friday. She was pre-tested using the list of ten difficult words, just as the other two had. On Monday, the student was tested on these words individually, with the other student remaining in the classroom. She scored a 0% but also shared that she did not have enough time to study over the weekend.

At the conclusion of this study, several things were evident. Motivation of the student varied, absences/weekends greatly affected the outcome of the student, and students would score above or below achievement on post-tests vs. in the classroom quizzes.

When it came to motivation, students were not just motivated or not, but they also had their own reasons to be motivated. For instance, there was a field trip during this study that the students were expected to do well in their classes in order to go. This led to a bit of resistance on the part of the students who were pulled out from English class because they were rushed to finish the task. They feared that if they were not in their classroom long enough, they would be missing assignments and then they would not get to go on the field trip. Students were hard to reason with, although they had previously received explanation that our work together would be counted as classroom work.

Another factor that influenced motivation was the physical needs of the student. Students would come to this class right after being outside for recess. Students would enter exhausted, in need of water, and needing to cool down from being out in the heat. This did not affect this study immediately, but rather came later when the High Schooler's lunch schedule was split in two to accommodate a growing number of students. This meant that students were now going to lunch #2, which is directly before this class. They have the option of going to recess after they eat.

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