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Effect of a Modified LINCS Learning Strategy on the Achievement of 4th Grade Students with Learning Disabilities

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**Effect of a Modified LINCS Learning Strategy
on the Achievement of 4th Grade
Students with Learning Disabilities**

**Thesis submitted to
The Graduate College of
Marshall University**

**In partial fulfillment of the
Requirements for the degree of
Education Specialist
School Psychology**

by

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ABSTRACT

Effect of a Modified LINCS Learning Strategy on the Achievement of 4th Grade Students with Learning Disabilities

By Shelby Brooke Haines

The LINCS learning strategy, published by Edwin S. Ellis (1992), University of Kansas Institute for Research of Learning Disabilities, is a starter strategy used as a memory device for vocabulary. The goals of the strategy were to increase independent learning, memorize key vocabulary, provide a sense of control over learning and to promote motivation about learning new strategies. It is also clearly defined in the instruction manual that for students to effectively utilize this strategy they must perform with a fourth grade reading level or above (Ellis, 1992). It was hypothesized that by making modifications to compensate for the students' low spelling and writing abilities through drawings and visualizations the strategy was equally effective for students with reading levels lower than fourth grade. Using a pre test, post test single group design and pretest to posttest percentage comparison for each student and as a group, the effectiveness of a modified LINCS learning strategy was determined after approximately 6 - 7 weeks of instruction.

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CHAPTER I

Introduction

The purpose of this study was to investigate the effect of a modified LINCS learning strategy on the achievement of two fourth grade students with learning disabilities. One major difficulty for students with learning disabilities is defining and recognizing vocabulary terms throughout their content areas. Correctly learning and storing vocabulary terms and their meanings becomes an integral portion of elementary, secondary and higher education (Bradley, 1994). As many learning disabled students reach the secondary education level, they have experienced so much failure that they doubt their intellectual abilities. These students tend to give up easily and when they do succeed they often give credit to teacher assistance or just plain luck (Bradley, 1994). The LINCS modified LINCS strategy sheds focus on these areas.

Participants in this study were selected on the basis of their fourth grade educational placement and a pre determined label of learning disabilities. Both of the female students were Caucasian, which was reflective of the school's cultural basis. They both received one hour of instruction in the resource room five days a week, following the regular education fourth grade curriculum designed by the county during the school term. Both of the students read on approximately a second to third grade fluency level and had language difficulties especially in the area of vocabulary. Both students also had communication difficulties.

It is clearly defined in the LINCS instruction manual that for students to effectively utilize this strategy they must perform on a fourth grade reading level or above (Ellis, 1992). It was hypothesized that by making modifications to compensate for the students' low spelling and writing abilities through drawings and visualizations the strategy was equally effective for

students with reading levels lower than fourth grade. The instructional process of describing the strategy was also modified to assure that the students completely understood the strategy, its purpose and design.

The strategy was taught following the eight stage strategy instruction process including: pretest, describe, model, verbal practice, controlled practice and feedback, advanced practice and feedback, posttest and make commitments and generalization. To utilize the strategy, study cards were created. The strategy also involved activating prior knowledge, imagery, keyword mnemonic devices, mnemonic stories and self-evaluation to enhance the students' memories of the vocabulary.

CHAPTER II

Review of Literature

Learning strategies such as the LINCS vocabulary strategy, developed by researchers at the University of Kansas Institute for Research of Learning Disabilities, can give students the means of "learning how to learn" (Lerner, 1993). Modifying how students think through strategies like LINCS assist learning disabled students into being efficient learners (Clark, 1993). If learning disabled students are taught this type of strategy they can generalize it for use in all curriculums to assist in improving achievement (Lerner, 1993).

The frustration students with learning disabilities experience is partially due to basic skills instruction given in integrated classrooms that does not always work for students with learning disabilities (Bradley, 1994). Students in both the "normal" population as well as those receiving specialized instruction can benefit from the use of learning strategies (Lerner, 1993). The use of learning strategies can increase educational success for students with and without disabilities. Elliot and Gentile (1986) found that the tested vocabulary memory of students without disabilities increased by as much as 30% when using a learning strategy. Elliot and Gentile also found that using mnemonic learning strategies increased vocabulary test scores of students with learning disabilities to the equivalent or higher of their nondisabled peers.

Researchers at the University of Kansas Institute for Research in Learning Disabilities were also questioning the traditional teaching approaches in the mainstream classroom and the preparation of the learning disabled students to enter the regular education environment (Deshler and Schumaker, 1993). Deshler and Schumaker (1986) noted that the development of these metacognitive skills is significantly related to age; that is, the older a student is the more

proficiently he or she used these skills. In addition, students who learn to utilize these strategies will respond more rapidly to changing information conditions in the future and accept responsibility for their learning progress.

The research conducted using these learning strategies showed much success with high school and middle school students. In one such study strategy instruction replaced the regular English curriculum, which takes about 7 weeks to complete. Overall, the results of the study showed those students in experimental classes performed significantly better than students in comparison classes ($p < .0005$). The Learning disabled students in the strategy instruction classes performed better than students with learning disabilities in comparative classes ($p < .02$) (Deshler and Schumaker, 1993).

Using a variety of instructional approaches in these strategies, such as linking to prior knowledge and focusing on learning how to learn, students are able to learn material faster, understand it better, and retain the information longer. These strategies turn students on to learning by making students active learners who utilize self monitoring tactics, find success in themselves, find meaning during learning, and attend to instruction (Mayo, 1993).

Two important domains that have an effect on the success or failure of strategy instruction are student motivation to learn and the strategy instruction itself. Both of these domains are directly related to the instructor (Clark & Schumaker, 1991). This may explain why despite its worth, strategy implementation is not widespread and is lacking in most classrooms. To change this, teachers need to be trained in strategy use including how to instruct strategies. In classrooms today it is not unusual for students to be taught strategies and never generalize them to new learning situations or content areas due to incorrect instruction (Clark, 1993). Students with learning disabilities may lack organization, motivation, and the ability to develop their own

cognitive strategies for learning. These students need to be taught the strategies they need to better succeed and hopefully lessen the drop out statistics (Lerner, 1993).

CHAPTER III

Methods

The purpose of this study was to investigate the effectiveness of a modified LINCS learning strategy on 4th grade students with learning disabilities. The LINCS learning strategy was originally designed at the University of Kansas for learners with 4th grade reading levels or higher. The strategy was modified to meet the subjects' lower reading levels and tested for effectiveness. The LINCS strategy was designed to improve vocabulary test scores of students with learning disabilities. LINCS is a mnemonic device for the five steps used to perform the strategy, which are:

- L = list the parts
- I = imagine a picture
- N = note a reminding word
- C = construct a LINCing story
- S = self-test

The strategy was modified to lessen the required writing for note card completion and utilized more visual imagery and picture drawing. The effectiveness of the modified LINCS learning strategy was determined by comparing the pre-test scores to the post test scores of the pre-published pre and post tests by the University of Kansas Institute for Research in Learning Disabilities for this particular strategy.

This study combined qualitative and quantitative analyses. The design used was one group pretest - post test to determine the effects on the group after treatment, of a modified learning strategy, was given.

Group strategy instruction took place in the summer during tutoring time. One hour a day for five days a week for six weeks was spent learning the strategy until planning for and initiating the generalization process began.

The sample size was small for many reasons. The number of fourth grade students with learning disabilities in the school is six and only two students were available five days a week for an hour a day during the summer break. Fourth grade students with learning disabilities were chosen to extend the literature in proving that students with reading levels below the fourth grade level can also benefit from learning strategies.

LINCS is a starter strategy for vocabulary development. The goals of the strategy are:

1. To increase the students' ability to independently learn key vocabulary.
2. Provide students with a sense of control over their own learning.
3. To promote student motivation about learning strategies.

Any starter strategy like LINCS can be taught in mainstream settings, improving students' with learning disabilities vocabulary test scores by 20% and students in regular education test scores by over 10%, an entire letter grade (Ellis, 1992). LINCS is a mnemonic device for the five steps used to perform the strategy which are:

L = List the parts

I = Imagine a picture

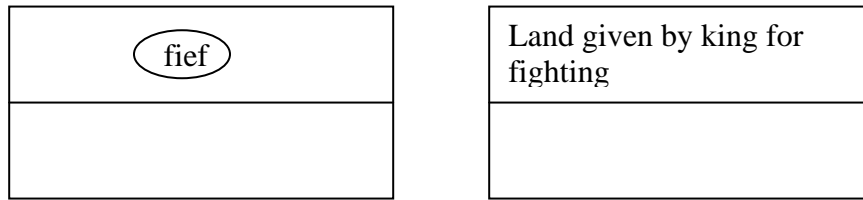
N = Note a reminding word

C = Construct a LINCing story

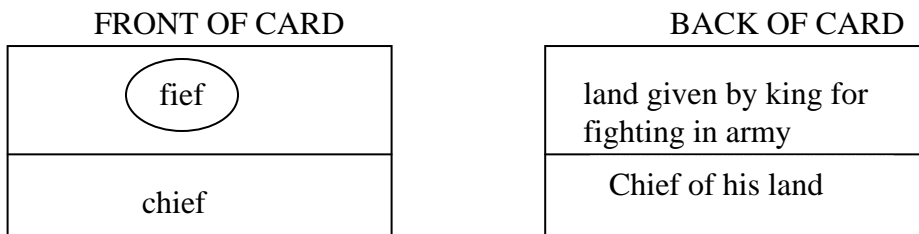
S = Self-test

Through this five step process note cards are created and utilized. Each side of the card is divided into two sections by a horizontal line half way through. The students began creating

note cards with "list the parts". In this step, the students evaluated what word they needed to know and what information is important about it. The strategy may not need to be applied to every word the students need to learn. The students recorded the word on the front top half of the created study card and circled it so they are reminded of what word they are learning. The important parts of the definition were then written on the back top half of the card (Ellis 1992).



After completing this step, the students moved to the next step, "imagine a picture". During this step the students created mental images combining the word and its definition. While combining the word fief and its' definition, the students visualization could sound like, "I'm picturing a big fat king, a knight, and a large piece of land shown on a map. Then the knight is marching off in the king's army in a cloud of dust" (Ellis, 1992). The students then noted a reminding word in the next step of the strategy such as chief. The LINCing story was, "chief of his land" which links the word fief, chief and the definition together. The students in this study drew a picture of their story with the LINCing story to accommodate for their low reading and writing abilities. An example card is shown below.



The students were taught the learning strategy through the eight-step learning strategy instruction model (Ellis, 1992). The first stage of instruction was pretest. The purpose of this step was to see what strategies the students use in attempting to learn new vocabulary on their own. Describing the strategy in stage two allowed the teacher to ensure that the students understood the reason for using the strategy. Stage three, model, is not a lecture section, the teacher actually completed the use of the strategy aloud for the students to observe and possibly assist. Stage four then assured that the students had memorized all five LINCing steps while stage five gave an opportunity for practice under supervision and get feedback from the instructor. At last, in the sixth stage students experienced LINCing words used in their curriculum. Through stage seven, the students made commitments and took a posttest while stage eight generalized the strategy to their regular classroom environment.

Both students were given the same instruction as well as pre and post exams. Two steps in the strategy were modified, imagine a picture and construct a LINCing story. When the students imagined a picture, they were to imagine an entire scene and discuss it with the instructor for most of the training sessions. As instruction continued, the students began talking themselves through the story instead of to the instructor. Due to the lack of sufficient writing skills to complete the strategy at this young age, the step of creating a LINCing story was also modified. During this step the students simply wrote a few words and drew a LINCing picture rather than writing a LINCing sentence. The quality of their drawings was irrelevant although they were instructed to take their time and draw the story out. The strategy was then generalized to their regular education social studies vocabulary.

Stage 1 / pretest

A list of ten vocabulary words was given to each student. During stage one of instruction, the vocabulary list and definitions were read to the students and the students were directed to study that evening for a quiz the next day. They were instructed to use their best study skills that evening to learn the words and their meanings. If the quiz scores came back and they were agreed by both parties to be sufficient, they could keep learning vocabulary any way they wanted, but if not, we would try a new way.

The following day the students were asked how they studied. Student one said she wrote the words and their definitions five times each and thought she knew them well. Student two said she read the words a couple of times and then her mother would say a word from the list and she would try to recite the definition. This procedure was repeated numerous times. Student two also stated that the words were "sort of neat" and she thought she would remember them.

The girls were given 20 minutes to finish the quiz that consisted of knowing the definition or filling the vocabulary word in a blank. They were also instructed not to worry about spelling and to do the best they could. The students worked with great trouble on the quiz. Student one twice verbalized frustration, saying she could not remember the words and the test was hard. She was instructed not to disrupt during the test and to do the best she could in finishing the test. Student two occasionally closed her eyes and put her hand on her head in disgust or looked up at the ceiling as if she were thinking very hard. She was also encouraged to do the best she could. At the end of 20 minutes the tests were collected and the students expressed their frustrations.

Before the tests were returned at the next meeting, it was discussed with both students whether they needed to learn new strategies and what would be considered acceptable quiz performance. It was agreed that 80%, a "B" level was sufficient. The students were reminded

that if they did poorly on the test not to get discouraged. The tests were distributed and it was agreed that LINCS could only help them with their vocabulary. The progress chart for the strategy was then reviewed as well as what each of the levels of starter, novice, player, expert and master meant. It was explained that the students would keep track of their own progress charts in a folder. Previously completed progress charts were also reviewed and discussed so the students could see an example of how to complete the chart. One chart discussed showed little progress while the other showed considerable progress so the students knew what each meant and looked like.

Stage 2 / describe

In this stage a group lecture/discussion was conducted starting with discussing what a strategy is and how it can help. A chart was created to list activities that could inhibit or improve their vocabulary knowledge. LINCS was described using a chart as well as when it is appropriate to use the strategy. It was also described using all eight steps of learning strategy instruction and the work they must commit to completing. The students made their own cue cards using construction paper, making them as creative as they wanted.

Stage 3 / model

This stage began with a review of what the students remembered from stage 2. The students remembered almost all of what strategies were for and what strategies could do for them. When the students entered the room, a note card labeled front and back was already created out of a piece of poster paper. A word list was also displayed and given to each student. It was explained that these words would be studied as a group using our strategy. The students were instructed to watch as the LINCS strategy was modeled by the teacher on the first two words on a poster board so everyone could see. After completing the first note card through

modeling, the students assisted the teacher and eventually completed their own with considerable teacher guidance. The students had a difficult time at first choosing reminding words, they had a tendency to use nonsense words.

Before writing the LINCing story on note cards, the students were instructed to discuss their stories with each other and the instructor along with drawing a reminding picture on the card. This method was used for the remainder of the strategy. The students enjoyed making up the reminding stories and occasionally even traded because they liked each others or collaborated to create one story. The pictures came quite natural to them as well as the mental pictures they were discussing. Through questioning, the students determined that they could "question study" as student one called it "frontward and backward". Meaning they could start with the word and create a definition or they could start with the definition and remember the word. They also thought it was quite fun to quiz the instructor, so it was permitted because it would be good practice for them.

When the students felt they knew all of the words, the practice test was administered. The students lead themselves through each step as they stared at the ceiling or looked out the window this time moving their lips saying the words to finally come to the answer and wrote it down as quickly as possible. After 20 minutes the tests were collected and graded. The students were pleased with their grades and their progress. The scores were recorded on their progress charts. Student one earned a perfect score and student two missed one question out of ten. Student two received partial credit for one term because she wrote the definition but omitted one key word.

Stage 4 / verbal practice

The purpose of this stage was to insure that students comprehend and had memorized the process involved in performing the strategy. Students participated in rapid fire method questioning about the strategy steps. The students were both given an award to take home for completing the starter level and recorded the date in the box on the progress chart.

Stage 5 / controlled practice and feedback

The students were given a pre created sample list of words and meanings to apply the LINCS strategy to. The word list given promoted the learning of the LINCS strategy and its steps. During this practice, assistance and guidance were provided as needed as well as a multitude of feedback. The students still needed guidance at this point selecting the important words to write down for definitions and the LINCing story. They were also encouraged to discuss their stories as before. This section of controlled practice and feedback continued until novice sets 1 - 3 in the LINCS manual, containing five words each were completed and quizzed separately.

The students' pictures became more vivid through this practice. One student's reminding word for zoke meaning corn was "yoke". She pictured and drew herself splitting open an ear of corn and a "slimy egg yolk" coming out of it and going all over her. The visual image was so graphic that student two asked if she could use it also. Student one allowed it so so the instructor did as well.

Results from the three quizzes were as follows:

Student one: 80%, 75%, 78%, consecutively

Student two: 99%, 90%, 95%, consecutively

It is possible that student one's test scores may have been slightly low due to the amount of images and information she had received in a short period of time. On the third vocabulary

set she began to relate back to words and images she had already used and began to cause confusion. It was also found that nearly two weeks after modeling together the two students remembered nine of ten words from stage 3.

Stage 6 / advanced practice and feedback

There were two types of practice in this stage, the first of which is cooperative practice where the instructor chooses words closer to that used in their classes. Due to the lack of time and the young age of the students two sets of five words were selected by the instructor for cooperative practice. These quiz grades were reported on the player level of the progress chart. The quiz scores were as follows: student one, 82%, 88%, student two, 84%, 92%.

Through the second type of practice, the students choose their own words and are quizzed. The scores for the second type of practice were recorded on the expert level of the progress chart. Again due to the young age of the students, they did not entirely choose their own words. Through a series of mental modeling by the teacher and great discussion of prior knowledge of the words, five words were chosen from the social studies text and utilized for the expert level. Due to the lack of time, only one expert quiz was administered on the social studies words. Scores for this quiz were students one, 85% and student two 90%.

Stage 7 / posttest and make commitments

During this stage it was determined if the students who needed the strategy have mastered it and celebrate the success from pre test to post test score comparison. The students also signed a contract saying they would generalize the strategy to regular education classes. The commitment process will be followed up during the regular school year.

Stage 8 / generalization

The primary concern in this stage was to assist and monitor student use of the strategy in other settings beginning with one subject and with time continuing to generalize to other school subjects as needed. Due to lack of time, this stage will be completed during the regular school year.

Following completion of the first 7 stages pre to post test scores were compared to determine success or failure of the strategy use in these situations.

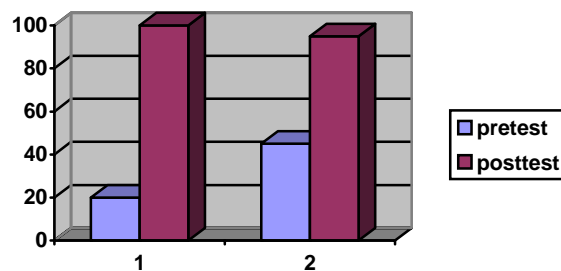
CHAPTER IV

Results

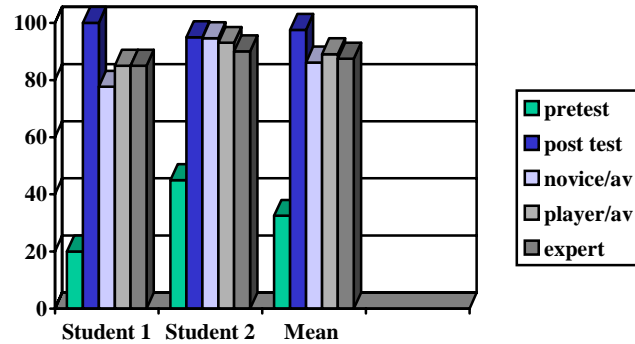
Two fourth grade students with learning disabilities participated in strategy instruction. There are limitations to researching strategies because not all students need to use every strategy. This study was also limited due to timing. The research was conducted during the summer months so there were only two available participants, both females. Advantages to using these participants are that they are from the same location, attend the same school, both have learning disabilities, read on the second to third grade level and had communication difficulties.

Although research had been carried out on the effects of learning strategies on students with learning disabilities, most of the reports involved secondary education learners. It was hypothesized that the 4th grade learning disabled students taught a modified LINCS learning strategy instruction will exhibit higher achievement comparing pre-test to post test scores.

At the completion of the seventh stage of strategy instruction and implementation, an increase of pre to post test mean scores of 75 percentage points was displayed. Student one exhibited an 80 percentage point score increase. Student two exhibited a 50 percentage point increase of scores from pre to post test.



The mean pretest score of the two students was 32.5%. Following interventions of the modified strategy, mean scores rose to 97.5%. Compared scores indicate that the original hypothesis that "4th grade learning disabled students taught a modified LINCS learning strategy will exhibit higher achievement pretest to posttest" was accepted.



CHAPTER V

Summary and Conclusion

The results of this study support the original hypothesis: 4th grade students with learning disabilities did exhibit higher achievement shown through pretest to post test score comparisons. The students' scores raised an average of 75 points pre to post test. Deschler and Schumaker (1986) suggest that metacognitive skills relate directly to age however, these young students utilized the strategies following effective instruction.

It was also observed that the students were excited to learn and use the strategy even though it took a lot of time, work and dedication from the students. Motivation was definitely a factor as Clark (1993) stated from both the students and the instructor. The modification of visualization was by far one of the most effective tools for these two students. When trying to recall the words, over 50% of the time the first thing the students would think of was what they had visualized. The drawing on the note cards were also effective. The students always knew what their picture represented even though the instructor did not.

It was also found that at this young age it was effective to number and label the card quadrants for at least the first two weeks. When the students were given homework cards to make they often came back out of order such as having the LINCing story on the back top half of the card instead of the bottom which did not effect the strategies effectiveness, only its consistency. Results could not be generalized for all students due to a sample size of only two students all of similar environments and cultures. It must also be noted that all students do not need to use learning strategies to succeed in the regular classroom environment. It

must also be acknowledged that not only students with learning disabilities can benefit from strategy instruction (Elliot, 1986).

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