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# The Effects of Visual Vocabulary Strategies on Vocabulary Knowledge

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The Effects of Visual Vocabulary Strategies on Vocabulary Knowledge

Research Paper

Submitted to the Special Education Faculty of Marshall University College of Education and  
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Masters of Arts

By

Maria Phillips

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*Keywords: vocabulary, strategy, visual*

### **Acknowledgments**

I dedicate this research to the students and faculty of St. Francis of Assisi School, who are now part of my family. I also dedicate it to my parents, Marcus and Barbara Phillips, and my brothers, Daniel, Palmer, and Kyle. Also, thanks to my cousin, Arthur for all of your help. Thank you to my beautiful friends who have been there for me since before I began this journey: Sarah, Vera, Shriya, and Alli; I love you girls! Lastly, this paper also goes out to my own little family: Jason, Bruce, and Penny. I love you. Thank you for the support and love you have given me when working on this research, despite my crankiness.

### **Abstract**

The purpose of this study was to examine the effects of picture word pairing and semantic mapping strategies on the vocabulary understanding of second grade students. Fourteen second grade students were given a teacher created pretest on vocabulary words found in their story for the week. Then, the teacher enhanced the usual vocabulary instruction with two visual strategies, picture word pairing and semantic mapping strategies. Finally, they were given a posttest to show how much they improved. Results indicated that the intervention improved all participants' scores by 15%. Eight out of fourteen had a score of over 80% on the posttest, suggesting that the visual strategies helped the students to learn vocabulary.

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## **Chapter One: Introduction**

The National Reading Panel has conducted research on the importance of components of reading, including vocabulary instruction (2000). Their research suggests that reading comprehension is closely related to vocabulary knowledge, meaning that students who have larger vocabularies tend to better understand text (National Institute of Child Health and Development [NICHD], 2000). It was shown that the methods of teaching vocabulary are vast, and that some will work better than others for certain readers (NICHD, 2000). Readers should encounter words in many ways: directly taught by a teacher, and indirectly by seeing the words in their environment, in different contexts, and before, during, or after reading (NICHD, 2000).

The research leads teachers and researchers to ask the question: which methods are most successful for teaching vocabulary to their populations of students? Teachers who work in both special and general education settings must find vocabulary teaching strategies that are effective for diverse populations of learners. In particular, teachers working with students with autism spectrum disorders in inclusive classrooms are faced with the challenge of teaching vocabulary to both groups successfully. This study pursues research in effective vocabulary instruction to these groups.

### **Visual Vocabulary Strategies**

Vocabulary can be learned in a variety of ways, including with visual aids and strategies. For some readers, this is as simple as adding a picture or diagram alongside the word. Students with autism learned vocabulary better with added features to the lessons provided to them, including sound, context, and visual aids such as pictures and labels (Moore & Calvert, 2000). Another study by Kim and Gilman suggests that for adult learners, visual aids alongside words

were effective to explain the meaning of the word, especially in the form of diagrams (Kim & Gilman, 2008). Both of these studies share that pairing vocabulary with pictures is helpful in learning word meaning, in their own populations of learners. However, it has not been used with all populations and is worth studying in another group of students.

Another visual strategy involves use of visually showing relationships between words known and unknown, as well as synonyms and antonyms of the word. This is called semantic mapping, and is strongly supported by a study on third grade readers conducted by Boulware-Gooden and company (2007). The study showed that when students related the new word to other words, their vocabulary measure increased more than those who only wrote the word in a sentence (Boulware-Gooden, Carreker, Thornhill & Joshi, 2007). The strategy, while used in a third grade classroom for the study, could be used with different words and in another grade of learners.

### **Statement of the Problem**

As the research lends, vocabulary instruction is imperative for a beginning reader. It is important for an instructor to understand which strategies will work best in his or her own classroom of learners. Teachers want more strategies in their arsenal to help their students to be successful readers and speakers. It is also helpful for the students to have strategies they can use when studying new concepts on their own. The research on visual strategies is promising for use on vocabulary instruction. If the strategies are successful, the students will know the meanings and be able to use these new words in their context, when reading, and when speaking. The only way to know for sure is to study the use of these strategies in new classrooms with new students.

### **Purpose of the study**

The purpose of this study is to examine the effects of picture word pairing and semantic mapping strategies on the vocabulary understanding of second grade students. The independent variables are picture word pairing and semantic mapping strategies. The dependent variable is vocabulary knowledge. Vocabulary understanding is defined as correctly defining the meaning of the words or name synonyms of the words with at least 80% accuracy on a posttest. Semantic mapping is defined as using a graphic organizer to map words related to the vocabulary word, naming synonyms, antonyms, and relationships between the words in the map. Picture word pairing is use of a diagram or picture along with the word to help students learn the meaning better.

### **Rationale for the study**

Students with autism often have difficulty with reading comprehension, particularly their silent reading comprehension (Heflin & Alaimo, 2007). The National Reading Panel purports that students who learn vocabulary have advances in reading comprehension (NICHD, 2000). It is clear from their research that teachers in any field would do well to teach vocabulary to their students (NICHD, 2000). This includes the teachers of children in general and special education, including students with autism. Vocabulary instruction with use of these visual strategies is appropriate for students in general education and also students with autism. The researcher wishes to use picture word pairing and semantic mapping to teach vocabulary.

### **Research Question**

Do visual strategies such as picture word pairing and semantic mapping increase vocabulary knowledge in second grade students?



## **Chapter Two: Review of the Literature**

The National Reading Panel defines vocabulary as instruction in word meanings and recognition (National Institute of Child Health and Development [NICHD], 2000). Recurring themes have been discovered that could have implications for future studies. Research has been conducted in vocabulary instruction with elementary students, particularly in the areas of special education. Pertinent studies include themes on the importance of teaching vocabulary, visual vocabulary instruction and successful teaching strategies in vocabulary for varied populations of students. All of these themes have relevance for teachers in any setting, including general education, inclusive environments, and particularly students with autism spectrum disorder. This paper will discuss the importance of teaching vocabulary as it relates to students of elementary school age, particularly those in special education classes. In addition, this paper will explore the techniques through which one can teach vocabulary using visual strategies. Lastly, this paper will also explain vocabulary-teaching strategies that appeal to different populations of learners.

### **A Rationale for Vocabulary Instruction**

There are several theories on the importance of vocabulary on an emerging reader. Learning new words has been found to affect the reading comprehension and ability of students (NICHD, 2000). Comprehension is important for understanding and applying information learned to new situations. Students who have more vocabulary understanding are likely to comprehend more text and learn new concepts (NICHD, 2000). Those who lack vocabulary are likely to struggle in reading as their school years continue and subjects become more complex.

According to the National Reading Panel, instruction in vocabulary had a profound effect on the reading achievement of students when measured by reading comprehension tests

(NICHD, 2000). The studies reviewed found that explicit and implicit methods of teaching vocabulary were effective. The panel calls for increased vocabulary instruction in both direct and indirect ways to provide students with word meanings as well as understanding of word relationships (NICHD, 2000).

The report means that while directly teaching definitions is important, giving the word a context such as explaining, connecting it to other words or a mental picture can further help the student recall of the vocabulary (NICHD, 2000). Strategies that use both visuals and meanings are more easily recalled than just one of these. It is clear from the research that the instruction of vocabulary is crucial. As such, instructors are forced to find ways to teach vocabulary that are meaningful, useful, and worth teaching to their students to further their comprehension skills. One such way is by using visual vocabulary instruction.

### **Visual Vocabulary Instruction**

One method of teaching vocabulary is by utilizing the visual modality. An instructor needs to choose a manner that suits his or her own classroom and the learning styles of the students in that room. Some teachers simply have students read or copy out definitions of the vocabulary to be taught, or have students memorize the word and meaning. In fact, studies propose a multitude of techniques for teaching vocabulary. But not all of those techniques are as conducive to capturing the attention of students or retention of material as that of visual vocabulary instruction.

One visual method involves addition of pictures or diagrams; another is teaching using visual strategies such as mapping. Visually teaching vocabulary has been shown to have benefits for learners.

For example, students with autism spectrum disorders have been found to be visual learners. It is considered by many professionals to use visual schedules, cueing, and pictures in lessons to better teach students with autism (Heflin & Alaimo 2007). Visual schedules are pictures for each part of the school day; this could be a picture of food next to the word lunch, or a picture of a toilet next to the label a bathroom break. These are used often for students who have autism spectrum disorders (Heflin & Alaimo 2007). Effectiveness rests on the visual. Students with autism tend not to make eye contact, and using visual and highly colored materials can draw their attention into the lesson (Heflin & Alaimo 2007). This style could work for multiple types of learners to create a more inviting lesson format.

In a study by Carpenter and Olson, use of visuals such as pictures when teaching vocabulary in a foreign language was found to be both effective and more easily remembered than independent use of words (Carpenter & Olson, 2012). While this particular study was used with adults, the strategy has been applied to a wider population of learners, and has often been successful.

It has been established that visuals are useful for the autism community. For some students with autism, highly visual and inviting computer programs have been developed for use in the classroom and at home. These have made learning not only visual, but also interactive with diagrams, sounds, and motion. In a study conducted by Moore and Calvert, students with autism were taught vocabulary by computer programs or by a teacher. The computer programs featured sounds, movements on the screen and bright visuals. The students were more attentive and learned more vocabulary on the computer program with visuals than the students who were taught solely by the instructor (Moore & Calvert, 2000).

Computer programs are not the highlight of this research; however, the program used visual strategies to help the child learn. This study, while giving implications for computer programs for students with autism spectrum disorder, furthers the argument for teaching students with autism vocabulary words and meanings with visual strategies. It shows that the use of visuals in the program worked for that group of learners.

As an instructor, it is important to teach to the strengths of the students. It would only be logical to teach anything, including vocabulary, in the manner that is best for the child. For many, this style of learning is visual. The next step for teachers is to find visual strategies for the child to find success in vocabulary.

### **Picture-Word Pairing**

One visual strategy to teach vocabulary is picture-word pairing, or the use of picture aids alongside a vocabulary word, which has been used in a variety of environments and populations. This simple strategy can help the visual learner or student with autism create a mental picture for the vocabulary learned to reinforce the learning.

In a case study by Lindsey-Glenn and Gentry, a student with autism is given a variety of assistive technologies for use in vocabulary interventions to reach a goal of reading an entire story with 100% accuracy (Lindsey-Glenn & Gentry, 2008). One of the assistive technologies used was a game using the cloze procedure, in which a picture replaces the noun in a sentence. The instructors also used picture to vocabulary flash cards to reinforce the vocabulary lessons (Lindsey-Glenn & Gentry, 2008). The researchers found that with the technologies in place along with these vocabulary games, their student was able to read the story with 100% accuracy at the end of the case study (Lindsey-Glenn & Gentry, 2008). This study, while not quantitative, shows that using visual supports when teaching a student with autism can offer a more

multifaceted and rich literacy practice. It furthers the support for teaching vocabulary with the aid of visual supports.

In a different study by Kim and Gilman, South Korean middle school students learned English vocabulary using a variety of methods, including text only, visual text with graphics, visual text with audio of the word spoken, or mixtures of all three methods in varying degrees (Kim & Gilman, 2008). After testing, the groups who remembered the most vocabulary words were those who experienced visual text and graphics, and visual text with audio and added graphics (Kim & Gilman, 2008). While the population did not include students with autism, this visual strategy was effective for the middle school population of English language learners. This study gave weight to the theory that words alone do not always appeal to learners, and that teachers should rethink their use of pictures as well as multimedia in lessons. The research also supports the notion that graphics and visuals should be appropriate and relevant to the vocabulary words they represent (Kim & Gilman, 2008).

Overall, all of these studies display success when using picture word pairing to teach vocabulary meanings. While they deal with different populations, the studies did have success, which means that the strategy worked for adults, middle school students, and children with autism.

### **Semantic Mapping Vocabulary Instruction**

While picture word pairing is one visual strategy used to teach vocabulary, there are more that are just as effective. Semantic mapping vocabulary instruction is a visual strategy that applies well in a number of learning settings. Semantic mapping is the use of a web to visually show relationships between words, including synonyms, antonyms, and related words. The semantic mapping strategy is versatile enough to be used in a whole group, in pairs, for

individual work, or even as a game. Semantic mapping and similar strategies have been the topic of many studies on their effectiveness in teaching vocabulary and comprehension. It uses schema to bring a deeper meaning to a new word, while still visually showing the relationships.

In a study by St. John and Vance, an attribute web similar to a semantic map is used as an activity with a small group of five and six year olds, most of whom have been identified as either learning English as a second language or students with poor language development (St. John & Vance, 2014). The activity included a new word in the center with various attributes of the word around it, including questions like: What does it look like? Can you show an action? Can you put the word in a sentence? (St. John & Vance, 2014). The researchers found that the students who received this semantic mapping technique had significant improvement on words taught, as well as overall improvement on the standardized measurement of vocabulary (St. John & Vance, 2014). The findings of the study support the theory that focusing on semantics is a successful strategy and could be used in other populations of learners.

One study found that students who were taught with the semantic mapping technique had a 40 percent increase in their vocabulary measure than students who used a strategy in which they only used the word in a sentence (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007). The students seemed to have a greater understanding of the word itself, which made their recall of the word and concept easier. This supports the semantic mapping technique for use of vocabulary instruction.

Another population with whom semantic mapping has been used with is middle school science students. In an observational study by Mercuri, two teachers were observed using graphic organizers in their middle school science classes in two different contexts (Mercuri, 2010). The researcher found that the teacher who used one graphic organizer in a manner like

semantic mapping helped the students to gain higher-order thinking about the scientific terms they were learning (Mercuri, 2010). This teacher also wanted the students to be able to use the new terms while writing reports, speaking in class, and describing scientific occurrences they encountered in class (Mercuri, 2010). While this study was not quantitative, it shows that the semantic mapping strategy has been used widely in another different population, leading to success in vocabulary instruction. The study supports semantic mapping use with any group of learners. Taken together, this research shows that semantic mapping can be used in a variety of populations as a visual way to teach vocabulary.

### **Conclusion**

Instruction in vocabulary is a crucial part of any reading curriculum, especially in the case of improving comprehension (NICHD, 2000). Vocabulary can help students to generalize words to other subjects, increase fluency, and overall improve literacy for the student. The concept of vocabulary should be taught to learners of all backgrounds and populations, in both special and general education. The concepts should be taught to the learning style of each group of students, which will be different in varying populations. For many students, teaching visually is effective and engaging. It is seen as a best practice for special educators to utilize visual schedules and pictures for communication with children who have autism spectrum disorder (Heflin & Alaimo 2007).

The instruction of vocabulary is imperative for all learners, and using visual strategies has been viewed as a good practice for certain populations. There are various strategies to teach vocabulary visually; these include semantic mapping and picture-word pairing.

Semantic mapping is a graphic organizer that helps students “map” the relationships between words they already know and the new, lesser-understood word. This method has had

success as shown in the research (St. John & Vance, 2014). It incorporates both prior knowledge and a visual map for the students to help visualize the connections between various terms.

Semantics has been seen as a useful strategy for a variety of populations.

Picture-word pairing is the use of visual support or pictures alongside a vocabulary word illustrating the use of the word or a graphic explaining the meaning further. In several studies, this method has shown success in word knowledge for students with autism, English language learners, and even adult learners (Lindsey-Glenn & Gentry, 2008; Kim & Gilman, 2008; Carpenter & Olson, 2012). The use of pictures helps visual learners to remember the word, meaning, and sometimes context--all of which can help students to better understand when reading.

All of this research supports the use of visual support strategies when teaching vocabulary, including studies on visual strategies such as picture word pairing and semantic mapping. The studies have worked with various children, strategies, and instructors. The National Reading Panel (2000) posed one thought: it asked what the overall effects of vocabulary instruction could be spanning all grades. Could more meaningful vocabulary instruction create better learners? Is it more important in a certain time in an academic career? These questions resonate with the reading teacher striving to find strategies to work in his or her own classroom. This researcher is proposing to work with second graders in a parochial school as a population that was not addressed in the studies previously discussed. Does the use of semantic mapping or picture word pairing improve the vocabulary of second graders? This study will investigate the success of the two visual vocabulary strategies, picture-word pairing and semantic mapping on students in a second grade Catholic school classroom.



## **Chapter Three: Method**

### **Hypothesis**

Second grade students who receive picture word pairing and semantic mapping strategy instruction will improve vocabulary understanding by 80% from teacher created pretest to posttest.

### **Setting and Participants**

The population identified for this study is a classroom of second grade students in a Catholic school setting. The target group is localized to second grade students in West Virginia. Participants are of all races and genders.

The sampling method used was convenience sampling. The researcher used students from her own classroom, because these students were most readily available to her. The advantage of convenience sampling is that it is simple to select individuals to participate. The disadvantages of this style of sampling are the difficulties to describe the population from which the sample is taken, and to whom the results of the study could be generalized. The teacher participant is a qualified teacher with the proper certifications who normally works with the students participating.

### **Variables**

The constructs of the study were teaching style of the teacher, previous student ability and prior knowledge of words to be tested. None of these constructs were defined or tested during this study, but could have affected the outcome. Thus, they present limitations to the study.

The independent variable of this study was the use of picture word pairing and semantic mapping strategies. The dependent variable was vocabulary knowledge. Vocabulary

understanding is defined as correctly selecting the meaning of the word from multiple choices, using the word correctly, and matching the vocabulary words to synonyms with at least 80% accuracy on a posttest. The measurement scale used was a ratio variable, meaning that respondents will be ranked using equal measure that includes a defined measure of zero. It was possible for a student to obtain zero items correct. This study is action research, to provide information on whether picture word pairing and semantic mapping are effective tools to teach vocabulary. Aggregate data were pooled for pretest and posttest scores for determining mean class averages. Data were analyzed via unequal variances Welch's t-test for significance.  $p < 0.05$  was considered statistically significant.

The limitations to the study included a small sample size of only 15 students and time constraints on the study. In an ideal study, these methods would be tested on more students and for a longer period of time with multiple groups of vocabulary.

### **Threats to Validity**

Threats to internal validity of the study are time period for testing, which is only a few weeks; and use of the same pre and posttest. External validity threats on the study were difficult to forecast. The study focuses on a small population, thus was difficult to generalize to a larger population. However, the researcher finds that the study will give the teacher valuable information about the way her students learn vocabulary, which aids the education of the group.

### **Procedures**

In order to conduct this research, the researcher had to determine the research topic and reason for research. This topic was chosen to give educators some ideas in teaching vocabulary with different strategies, and to see if the strategies actually helped the participants to use the words in a sentence or picture. This provides educators with more methods to teach vocabulary,

which is used in all subject and content areas. Learning new strategies can also help students to study better independently.

#### Chapter 4: Results

This study was designed to observe the effect of semantic mapping and picture word pairing strategies on vocabulary understanding on students in a second grade classroom. The participants ranged from age 7 to 8. The students were given a teacher-created posttest, and then received vocabulary instruction for twelve days. Typical vocabulary instruction occurred, with the addition of semantic mapping and picture word pairing strategies daily. After the twelve days of instruction had occurred, the teacher administered the posttest. The individual results from pretest and posttest are shown in Figure 4.1. The pretest and posttest scores and percentage increase results from pretest to posttest are shown in Figure 4.2.

Figure 4.1: Correct Responses on Pretest and Posttest

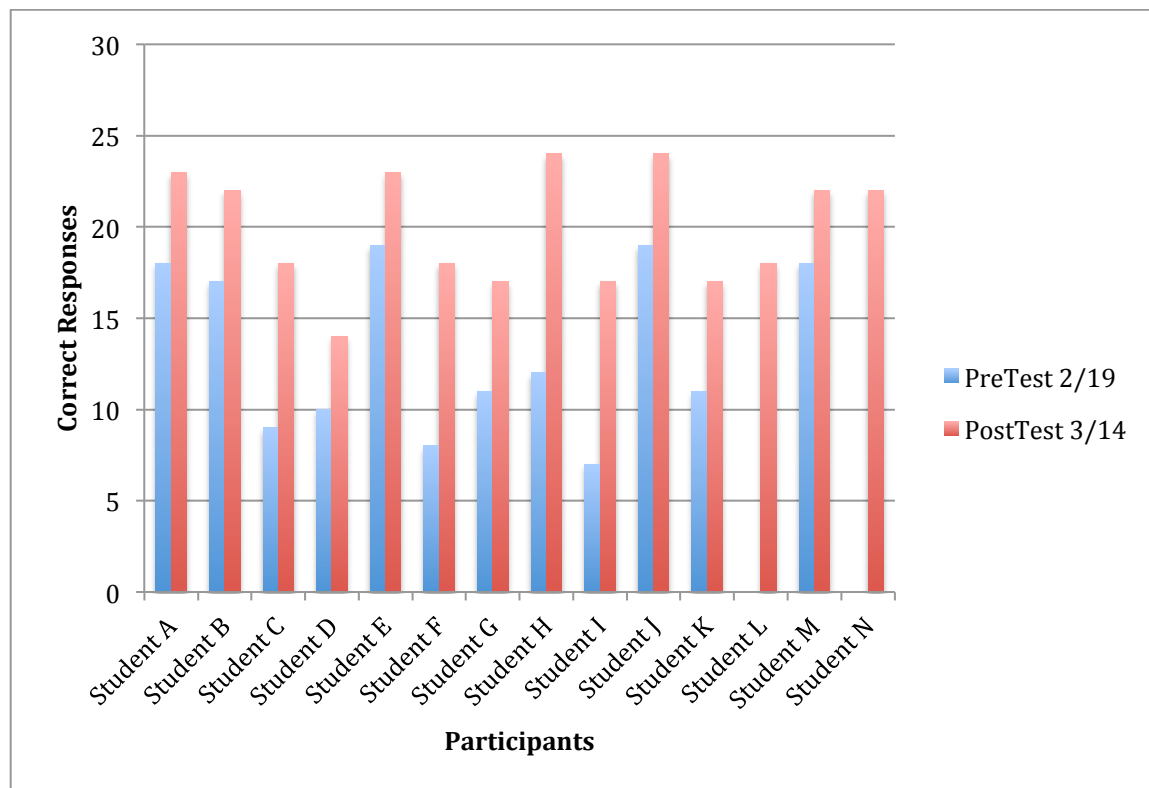


Figure 4.2: Pretest and Posttest Scores and Percentage Increase

<b>Participant</b>	<b>Pretest Score</b>	<b>Posttest Score</b>	<b>Percentage Increase</b>
Student A	75%	96%	21%
Student B	70%	92%	22%
Student C	37%	92%	55%
Student D	42%	58%	16%
Student E	79%	96%	17%
Student F*	33%	75%	42%
Student G	46%	71%	25%
Student H	50%	100%	50%
Student I	29%	71%	42%
Student J	80%	100%	20%
Student K	46%	71%	25%
Student L*	0%	75%	75%
Student M	75%	92%	17%
Student N*	0%	92%	92%

### **Limitations of the Study**

This study was limited by a number of factors. The sample size is small, meaning it has low generalizability. Secondly, during the duration of the study, several students in the class fell ill. Four participants missed one day of instruction, Student N and L missed the pretest due to absences and, due to scheduling difficulties, were not able to take it later. Student F took the pretest late on March 7 because of an absence. One student in the class missed four days of instruction, including the pretest and posttest, so the researcher used her discretion and excluded the student from the study. Further limitations included the abbreviation of several of the vocabulary sessions, in which there were interruptions in the form of announcements from the office, bathroom breaks, and schedule changes.

### **Chapter Five: Discussion**

This research focused on the use of two visual strategies to enhance vocabulary learning in the general education setting. The aim of this study was to find out if semantic

mapping and picture word pairing strategies helped students better understand vocabulary word meanings and synonyms.

### **Interpretation of Results**

The hypothesis of this study was that the use of directly teaching visual vocabulary strategies would allow students to increase their score on a posttest to 80% accuracy. The results indicate that eight students out of the fourteen participants had over an 80% score on the posttest. There was at least some increase in percentage for every student, and all results included had over 15 percent score increase from pretest to posttest. Comparison of mean test grades between pretest and posttest scores indicated a very statistically significant increase in average score accuracy ( $p < 4 \times 10^{-5}$ ).

Some increase was expected for all participants, because the vocabulary words were directly taken from their reading comprehension story for that week. Thus, they received adequate experience with the words used in usual instruction. Usual instruction includes discussion of word meanings, writing word meanings, and using the words in sentences, as well as using the reading series with included words and stories. However, the method of teaching extra vocabulary using visual strategies showed to be beneficial to all students who took part.

### **Limitations to the Study**

One limitation to this study is sample size, as only fourteen conveniently selected students participated. This study was performed just before the spring break of that school, where the timing could have affected the students' ability to stay on task. Another variable that could have caused effects to the outcome include absences due to illnesses, unexpected interruptions and schedule changes, all of which lessened the time available for vocabulary instruction sessions. These limitations could have affected the amount of information gained and retained by

participants, as well as their level of effort towards the posttest. If all participants had been healthy, in class, and lessons had fewer interruptions during sessions, the results may have been more significant. Despite these limitations, the robust statistical analyses indicate that higher power (increase in class size, etc.) may show a greater improvement for aggregate score analyses.

### **Pretest Administration**

The pretest was administered over one day. The instructor did not give any introduction or activation of prior knowledge. The instructor informed the students that she was giving a pretest on words they may or may not know, and to try their very best. She did remind them of the meaning of synonyms and antonyms. The students were also informed that they would not be graded on the pretest. According to the notes of the researcher, some of the students tried to ask questions during the pretest and were told to make their best guess if they did not know. A few students took longer than thirty minutes, and were permitted to complete it in their own time.

### **Vocabulary Sessions**

During the seventeen vocabulary instruction sessions, the instructor would put a word in the center of the board. The students would write the word in the center of their blank papers. One student would look up the word in the student dictionary in the classroom, and the whole class would write the meaning down. Then, the students would give related words, synonyms, antonyms, and the word in a sentence on their own sheets in map form. Finally, the students and teacher discussed a possible picture or diagram to help the students remember the meaning of the word. This was repeated for all of the words throughout the sessions. In one session, the class also participated in a drawing game in which the teacher or student would draw one of the diagrams the class had constructed on the smart board, and the students tried to guess the word.

If the class had difficulty, the teacher encouraged them to look back at their maps. The students also encountered the vocabulary words in their reading series story for March 7-9.

### **Posttest Administration**

The posttest was administered in the same setting as the pretest, and all students completed it in the period allowed. All students who are included in this research completed the test on that date.

### **Questions for Future Research**

This study could be used as a jumping off point for more research in different populations, different content areas and for a longer duration of time. It could have been beneficial to use this method with a control group, to see how much the experimental group gained versus the students who received regular instruction. It would also have been advantageous to use this method for a longer period with multiple groups of vocabulary words and different stories, as well as use of a larger, randomly selected sample size to decrease potential bias, and more reliable, valid measures. Despite lack of control group, the paired nature of the data (aggregate test scores as defined by pretest and posttest) allows for a robust statistical analysis with moderate power. Some further considerations for research would be for use with different subject matter, or special education students for generalization to different populations, especially students with autism. The researcher decided not to pursue an experimental design because it was believed that the strategies would be successful. The researcher did not wish to exclude any students who may benefit, and she did not want to further decrease the sample size. Future researchers may wish to include a control group, to see if this strategy works better than normal vocabulary instruction alone.

## **Conclusion**

As earlier discussed, the practice of teaching vocabulary words paired with visuals helped students to better learn vocabulary words than independent teaching of words (Carpenter & Olson, 2012). The study explored the effectiveness of pictures alongside words to teach a foreign language; the researchers found that it was very effective in adult learners. Semantic mapping is a second visual strategy that has been used to success for vocabulary instruction (St. John & Vance, 2014). The study found that students who used semantic maps had significant improvements on words taught. Both picture word pairing and semantic mapping have displayed benefits for learners when used separately.

In a different study, highly visual programs were used to help students with autism learn vocabulary (Moore & Calvert, 2000). This research, though without computer programs and in a different educational setting, also supports the study Moore and Calvert (2000), because of its success with visual teaching methods. The current study also reflects the results of studies conducted by Carpenter and Olson (2012), and St. John and Vance (2014). The results of the current study suggest that these visual strategies, when used together, positively impact student ability when remembering vocabulary meanings and synonyms. This study opens up the idea that the two visual strategies used in tandem can help learners to be successful at learning and using vocabulary.



**Appendix**

Figure A1: Pretest and Posttest

Draw a line to match the word to its synonym

- |                 |            |
|-----------------|------------|
| 1. tadpole      | restrain   |
| 2. training     | common     |
| 3. suspiciously | relative   |
| 4. sensible     | retake     |
| 5. retrieve     | polliwog   |
| 6. splendid     | scene      |
| 7. cage         | fishy      |
| 8. obedience    | bother     |
| 9. control      | jumbled    |
| 10. nephew      | wise       |
| 11. upset       | practice   |
| 12. confused    | compliance |
| 13. situation   | pen        |
| 14. ordinary    | excellent  |

Circle the correct answer.

15. Someone who is the son of your brother and sister is your \_\_\_\_\_

- a. tadpole
- b. nephew

- c. control
- d. situation

16. When one is bothered or worried, one is \_\_\_\_\_.

- a. control
- b. sensible
- c. splendid
- d. upset

17. If you are unable to think clearly, you must be \_\_\_\_\_.

- a. confused
- b. training
- c. suspicious
- d. ordinary

18. Not yet a full-grown frog is a \_\_\_\_\_.

- a. Nephew
- b. tadpole
- c. cage
- d. training

19. Obedience training teaches a pet how to \_\_\_\_\_.

- a. comply and obey
- b. play
- c. run away
- d. eat

20. That meal was ordinary. This means it was \_\_\_\_\_.

- a. fantastic
- b. crazy
- c. different
- d. normal

Use each word in a sentence correctly OR draw a picture or diagram of the word.

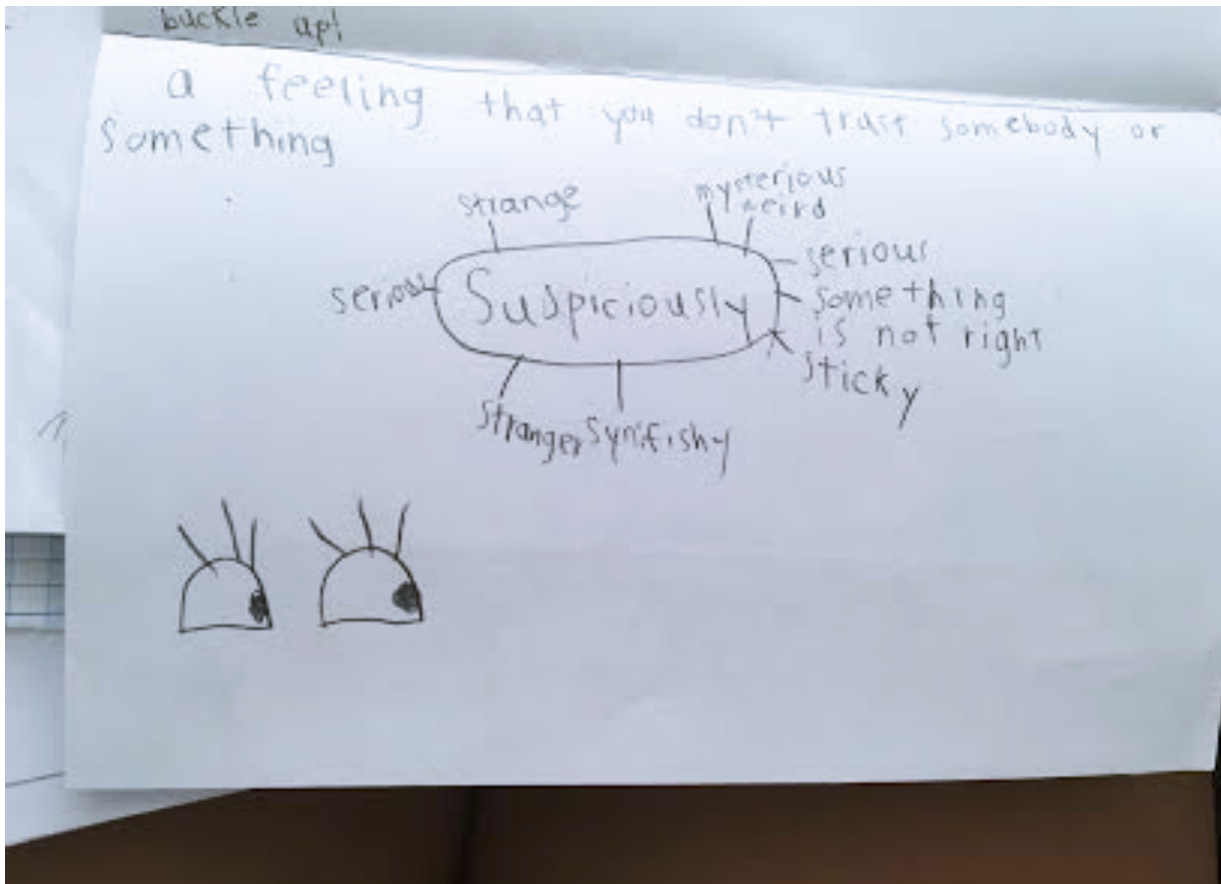
21. cage

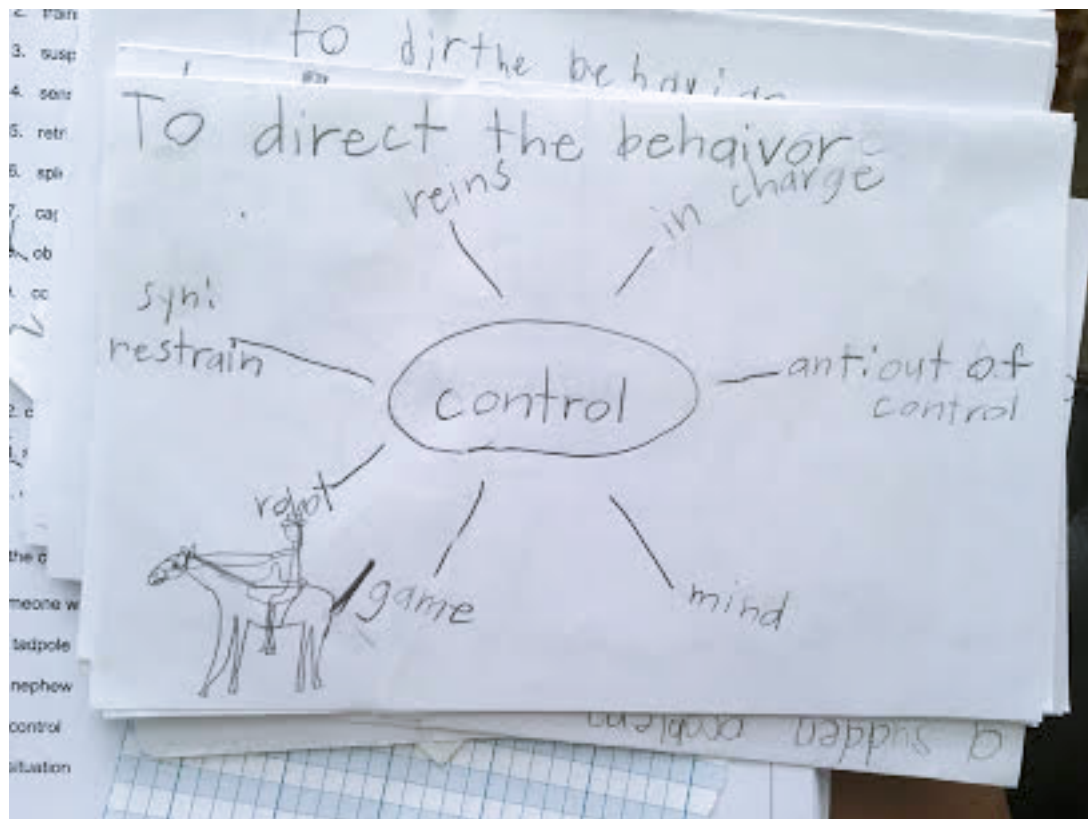
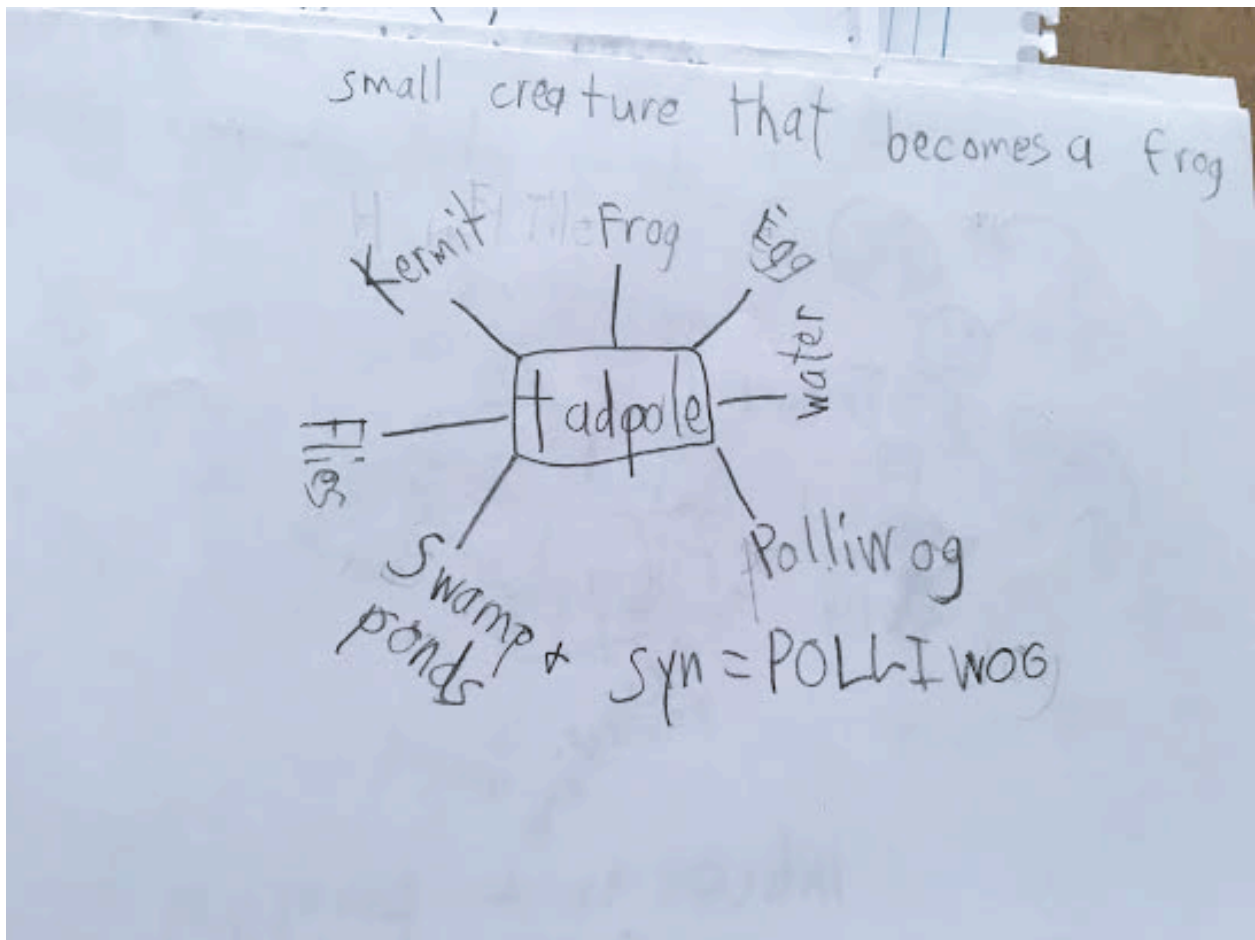
22. retrieve

23. control

24. situation

Figure A2: Examples of Student Made Semantic Map with Picture Pairing





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