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Effects of science vocabulary instruction beyond the curriculum text

Julie M. Kubanek

Effects of Science Vocabulary Instruction Beyond the Curriculum Text

By

Julie M. Kubanek

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Sarah Noerenberg

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Abstract

This action research sought to answer the question: Will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text? The population was 6 first grade students attending an urban public school. Students completed a pretest to determine understanding of target vocabulary words prior to instruction. Explicit instruction was provided for 12 science vocabulary words. A posttest assessed gains in understanding of target science vocabulary words. Results show students made gains in understanding of science vocabulary after explicit instruction.

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Chapter One

Introduction

One of the obstacles I have encountered during my years in the elementary classroom is students' lack of understanding of the words they are reading. I have struggled to find the most effective way to help students build their vocabulary or knowledge of words and their meanings. Also, to help build students' comprehension or gain meaning or understanding of what was read in my classroom.

I have observed students entering my first grade classroom with minimal word knowledge. Those students also struggled with comprehending what they read. I wanted to find a more effective strategy to teach vocabulary and best instruct my students to improve student learning. I chose vocabulary specifically because of the strong connection between vocabulary and comprehension shown in previous research. Stahl and Fairbanks (1986) found that vocabulary instruction can enhance student comprehension when a definition is provided, context information is utilized, students receive multiple encounters with the vocabulary words, and students actively process the word's meaning. I chose science vocabulary, particularly, to determine if strategies presented in previous research could transfer to a content area. These strategies include explicit or focused vocabulary instruction, providing specific instruction on chosen vocabulary words (Kindle, 2009; Beck & McKeown, 2007; Coyne, McCoach, & Kapp, 2007), and relating words to a common topic (Hashemi & Gowdasiaei, 2005). Explicit or focused instruction means to provide specific instruction on pre-selected vocabulary words.

Vocabulary words are related to a common topic if they are related in meaning or belong to the same domain (i.e. doctor, nurse, waiting room are all related to "hospital").

The intervention utilized for this action research study was designed to specifically answer the question; will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text? I chose six first grade students to participate in the intervention. Of these six students, two were considered to be above grade level readers, or reading and comprehending material above their current grade level. Two students were considered on grade level, reading and comprehending material at the grade level that they are currently enrolled, and two students were considered below grade level readers, reading and comprehending material below their current grade level. Students from varying levels were included in this action research to represent all learners present in the classroom. Students were given a pretest (Appendix A) and intervention took place for 6 weeks, twice a week, for 20 minutes each. Explicit, or focused, instruction was provided for twelve target vocabulary words. After the six week intervention, students were given a posttest to determine if gains in understanding of the vocabulary words were made.

Connections to State Content Standards

Wisconsin State Content Standards (http://dpi.wi.gov/standards) that are related to this action research include: Content Standard Science Standard E- Earth and Space Science: Students in Wisconsin will demonstrate an understanding of the structure and systems of earth and other bodies in the universe and of their interactions. The twelve vocabulary words chosen for this action research were part of a unit on space. This intervention sought to deepen students' understanding of these vocabulary words. In addition, Content Standard English Language Arts

Standard F (Research and Inquiry): Students in Wisconsin will locate, use, and communicate information from a variety of print and nonprint materials. This content standard relates to this study because information from a variety of materials was used to determine or clarify meaning of vocabulary words and the information gathered from these materials was communicated on a graphic organizer and verbally during teacher led discussions. In addition, several Common Core State Standards (http://www.corestandards.org/the-standards/english-language-arts-standards) are addressed: Research to Build and Present Knowledge Standard 8 states that with guidance and support from adults, students will recall information from experiences or gather information from provided sources to answer a question. This action research study includes many teacher-led discussions to connect students' background knowledge and new information of target vocabulary words. The Common Core State standard for Craft and Structure Standard 4 states that students will ask and answer questions to help determine or clarify the meaning of words and phrases in a text. This action research includes the use of teacher-led guiding questions to help students develop understanding of target science vocabulary.

Conclusion

Determining if students will gain a deeper understanding of science vocabulary with explicit instruction beyond the science text will be investigated in this action research. Existing research played a primary role in guiding this study's procedures and findings. Previous studies that informed this study will be presented in Chapter Two.

Chapter Two

Review of Literature

Vocabulary instruction has been used by teachers in the classroom for years. Instruction has included many types of strategies. Several of these strategies will be discussed in this chapter. For example, linking student background information to a new word to aid in the understanding of a word's meaning through discussion. The discussion may either be teacher led or student led. Another strategy is pausing during reading to provide a brief definition of an unknown word. This strategy may also include discussion of students' background knowledge but is not always the case. Using the unknown word's letters and sounds to analyze the word's meaning is another strategy used for vocabulary instruction. This strategy may also include background knowledge or a brief definition of the unknown word's meaning. An additional strategy included in vocabulary instruction is using the context of the story to infer a word's meaning. During reading, students use the story structure to gain meaning of a word without additional discussions or analysis of the word's meaning. The goal of these instructional strategies has been for students to gain word knowledge and understanding of an unknown word. Through gaining knowledge of a word's meaning, students can better comprehend what they are reading.

Researchers have examined these different instructional strategies to better understand the role of each method on student comprehension and word learning. Through analysis of a strategy or comparing different instructional strategies, researchers have begun to understand more clearly which strategies are most successful in aiding student comprehension and word learning during reading.

The research studies that will be discussed in this literature review will compare specific types of vocabulary instruction. Also discussed is vocabulary and its effects on comprehension and word learning, and analyzing vocabulary instruction using literature. It will be shown that specific types of vocabulary instruction are more beneficial than others. For example, Juel & Deffes, 2004, will show that the analysis of word meanings is more effective in word learning than relating words to background knowledge and personal experiences. These findings will be supported by the research of Beck & McKeown, 2007. It will also be shown that vocabulary instruction is essential for aiding students in comprehension and word learning (Nelson & Stage, 2007). Finally, it will become clear that vocabulary instruction can increase student learning during storybook reading. The chapter is divided into three sections: Comparing Specific Types of Vocabulary Instruction, Vocabulary and its Effects on Comprehension and Word Learning, and Analyzing Vocabulary Instruction Using Literature.

Types of Vocabulary Instruction

The four articles in this section use comparisons of various vocabulary instructional strategies to determine if there are strategies most beneficial for student learning. The first research study compares three of the most common types of vocabulary instruction: Using student background knowledge to create a link to a word's meaning, analyzing the word itself to guide learning of the word, and providing a definition of the unknown word.

Juel and Deffes (2004) conducted a study to deepen the understanding of the effects of anchored word instruction; this strategy uses background knowledge, word meaning, and letters and sounds to help students create meanings of unknown words, and analytic vocabulary instruction; which uses background knowledge and word meanings to create meaning for

unknown words, in comparison to the effects of context-based vocabulary instruction; which uses only student background knowledge to create meaning for unknown words. The latter of these strategies is most common in early grades. The independent variable was the three types of vocabulary instruction being compared; contextual versus analytic versus anchored vocabulary instruction. The dependent variable was the pre and posttests; a researcher designed vocabulary test to measure the effectiveness of the interventions. The test of Language Development (Newcomer & Hammill, 1997) was used to assess overall vocabulary knowledge. The Dynamic Indicators of Early Literacy Skills (Good & Kaminski, 2002) was used to assess letter-naming fluency.

The subjects of this study were six kindergarten classrooms. The sample included ninety-two students from two schools.

The intervention took place for six weeks. During the six weeks, teachers used scripted curricula according to each of the three conditions for three days a week. One teacher from each school was randomly assigned to each condition. A different book was read each week for a total of six books. The books were read in the same order for each of the conditions. Teachers read-aloud for thirty minutes following a specific curriculum for each of the books read. Each teacher used the same five target words for each book but used different methods to introduce and reinforce them according to condition. The teachers in the contextual condition related word meanings to the background knowledge of students. Teachers in the analytic condition related word meanings to both students' background knowledge and had students analyze word meanings. Teachers in the anchored condition related words to background knowledge of students, had students analyze word meanings, and focused on the words' letters and sounds.

The findings for this study show that the analytic and anchored conditions helped students learn words more effectively than the contextual condition regardless of general vocabulary knowledge, letter-naming fluency, or background knowledge. There was no significant difference between the analytic or anchored conditions; results show equal effects on student learning of new words. Students that were found to be below average in letter-naming fluency learned more vocabulary words in the anchored condition. Researchers hypothesize that the focus of letters and sounds during vocabulary instruction might have benefitted students with low literacy skills.

In summary, the researchers found that the analytic and anchored conditions significantly outperformed the contextual condition. These findings show that only relating words to personal experience and background knowledge are not as effective for student learning as analyzing word meanings.

Juel & Deffes (2004) proved that word meaning analysis was more effective in student learning than using background knowledge alone. In the next study, Silverman & Hines (2009) will also compare types of instruction to determine if one is more effective. This study will use traditional vocabulary instruction compared with instruction enhanced with multimedia.

Silverman and Hines (2009) conducted a study to compare traditional vocabulary instruction with one enhanced with multimedia. The researchers sought to discover the effects of using a multimedia-enhanced read-aloud vocabulary intervention compared with a read-aloud intervention not enhanced with multimedia on target words, vocabulary knowledge, and content knowledge of elementary school-aged students. Researchers also wanted to know if the effects of the intervention were influenced by the student's language background (i.e. ELL or non-ELL).

The independent variable is multimedia and non-multimedia instruction. The dependent variables are the pre- and posttests that included a researcher designed Target Vocabulary Assessment (TVA) based on Beck and McKeown (2007), the Peabody Picture Vocabulary Test-3rd Edition (PPVT-III, Dunn & Dunn, 1997) and a researcher designed Science Assessment (SCI).

The subjects for this study were eighty five students, including fifteen pre-kindergarten, twenty-eight kindergarten, twenty-five first grade, and seventeen second grade students. The students ranged in age from 4 ½ years to 8 ½ years old. Just over half of the sample was male. The ethnicity of the students was: 48% Black, 20% White, 20% Asian, 7% Hispanic, and 5% other. Students were from a semi-urban public school located in northeast United States. Of these students, 55% qualified for free or reduced price lunch. Non-ELL, or students who primarily spoke English at home made up 68% of the sample. ELL, or students who spoke a language other than English at home made up 32% of the sample. The ELL students were identified as 33% Black, 3% White, 52% Asian, and 11% Hispanic.

The researchers used two interventions for this study: multimedia and non-multimedia. For both conditions, teachers used a scripted intervention lesson. Lessons were given for 45 minutes a day, 3 days a week, for 12 weeks. Instruction focused on habitats, which aligned with the district's science standards. Both narrative and informative texts were used for the lessons. The intervention was broken into four 3-week cycles, one for each habitat. Both of the intervention conditions used the same books, in the same order, across the grade levels, and students were introduced to the same target words. Per cycle, teachers read three books that had been chosen by the researchers based on the content, accessibility, and engagement. The books had to meet three criteria, including relevance to the habitats studied, easy for student

comprehension but challenging to increase student knowledge, and interesting enough to hold student attention. Students were introduced to eight target words per book, four of which related to the theme. A total of one hundred words were used. All one hundred words were considered to be Tier-2 and were important to the book's content. In addition, the multimedia condition included four videos. One video was shown for each habitat. Five minute clips from the video for each habitat was shown after six book reading days. The teachers using the multimedia condition read the book on two days then showed video clips for the last three days of the cycle. The teachers used scripted curricula for the read-aloud book and video clips. The teachers using the non-multimedia condition read each book on three days. They also used a scripted curricula for each book. This condition differed from the multimedia condition in the number of days each book was read and that no video clips were shown. Teachers had been paired across grade level and then randomly assigned to a condition. Students, as well, were randomly assigned to a condition across grade levels.

The researchers' found that there was no effect on measures of the Peabody Picture Vocabualry Test (PPVT) and the Target Vocabulary Assessment (TVA). However, student gains were found to occur on Science Assessment (SCI) measures. No grade level or gender effects were found on outcomes, no group effects (ELL/ non-ELL) were found on SCI. Researchers found that there was no effect of the use of multimedia for non-ELL students but there was an effect for ELL students. Non-ELL students scored the same from pretest to posttest on the TVA in both conditions. However, the ELL students in the multimedia condition scored about 6 points higher on the TVA than ELL students in the non-multimedia condition. Results were similar on the PPVT. Non-ELL students showed gains from pretest to posttest in the non-multimedia condition as well as the multimedia condition. ELL students in the multimedia

condition gained twice as many points as the ELL students in the non-multimedia condition. Results showed that for the multimedia enhanced vocabulary intervention the non-ELL and ELL students were equal in knowledge of target words and closer in general vocabulary knowledge.

In summary, researchers found that replacing traditional reinforcement with multimedia in the form of video clips did not have a negative effect on achievement on non-ELL students in vocabulary or learning of science content. The multimedia enhanced intervention was equally effective as the non-multimedia intervention for non-ELL students but was more effective for ELL students in vocabulary learning.

This article by Silverman & Hines (2009) concludes that multimedia enhanced vocabulary instruction is most beneficial for students who are English Language Learners as compared to non-multimedia enhanced vocabulary instruction. The next study by Kindle (2009) doesn't compare instructional strategies as the previous article did. This study looks at different strategies utilized by different teachers during read alouds.

A study by Kindle (2009) was designed to study strategies used by teachers to develop vocabulary during read alouds to their classes (p. 202). The author's purpose for this study was to better understand how teachers identify words for instruction and the strategies they use to teach words without losing the enjoyment of the read-aloud. Data was collected through observations and semi-structured interviews. This was a qualitative study.

Four teachers participated in this study. These included one kindergarten teacher, one first grade teacher, and two second grade teachers. Their experience was twenty years, ten years, three years, and an internship. The study took place in the south central United States in a small

private school. The school was located in an ethnically diverse neighborhood. The neighborhood was a middle-class suburb of a large metropolitan area.

This was a six week study. During the six weeks each teacher was observed four times to identify patterns, within a read-aloud, of student-teacher interactions. Teachers were observed during a read-aloud, scheduled at their convenience, and were aware that vocabulary was the focus of the study but were observed doing what they typically do during a read-aloud. Each observation lasted an hour and was audio taped and transcribed. Researchers also included field notes of gestures, actions, and student work.

The researcher found three different levels of instruction present among the observations of the four teachers. These levels included incidental exposure, embedded instruction, and focused instruction. Incidental exposure, where no direct instruction was provided but meaning was helped with context clues, was used primarily before, during, and after reading discussions. This type of instruction was used most often to expose students to rich vocabulary. Embedded instruction was defined as less than four teacher/student interactions to give attention to a word's meaning (i.e. using a synonym or brief description). An example of embedded instruction would be reading the word stumble and adding 'or fall' as you read to clarify meaning. Embedded instruction was used when the word represented a familiar concept to the students. Focused instruction was used when the word(s) were important to comprehension of the story or if there was trouble communicating a word's meaning. These teacher/student interactions varied from four to 25 in number, and were used before or after reading. Focused instruction differs from embedded instruction in the number of interactions between the teacher and students to clarify meaning of a word thought to be important in comprehension. Teachers had, in some cases

identified words they felt were important for students to know and other times, instruction was in response to student confusion or questions during reading.

The researcher also identified nine categories of instructional strategies observed during teacher observations. The most common of these strategies was questioning, but also included: providing a definition, providing a synonym, providing examples, clarifying or correcting student responses, extending student-generated definitions, labeling, imagery, and morphemic analysis. Questioning usually occurred at the beginning of an exchange when an unknown word was encountered and the teacher would stop and ask about it. Questioning was used to assess word knowledge and if students had gained meaning through context clues. Providing the definition was used more in embedded instruction and was given in simple, child-friendly language. Providing a synonym was used with recasting, or re-reading a sentence replacing the unknown word with a synonym. Providing examples was used to help students create their own connections to words by giving or asking students for examples of the word. Clarification and correction is used when students give an incorrect or partially correct definition of a word and the teacher needs to correct it. Extension is taking a simplistic explanation of a word and extending it by giving more information based on the student's response. Labeling is used most with picture books during a read-aloud and connects the word to a picture. Imagery was when teachers used facial expressions, sounds, or movements to show word meaning. Imagery occurred most often while teachers were reading aloud from chapter books and was used most with embedded instruction. Morphemic analysis is when the teacher calls attention to a word part to help create meaning. Multiple strategies were used during focused instruction. Multiple strategies were increasingly found in kindergarten and first grades, showing the teachers' goal to develop vocabulary as well as story comprehension.

In summary, several similarities were found among teachers. Some of these similarities were that the read-aloud was interactive and engaging and attention was given to word meaning in every read-aloud observed. In addition, a few differences were noted as well. Teachers differed in developing word meaning, uses of incidental exposure, embedded instruction, and focused instruction as well as the instructional strategies each used which impacted word learning. "Teachers should select target words in advance and plan instructional support based on those particular words" (Kindle, 2009, p. 209). The researcher recommends these five steps for increasing word learning: identify words for instruction in advance that are essential for comprehension and vocabulary, consider the type of word learning required (use of incidental, embedded, or focused instruction), identify appropriate strategies that are consistent with instructional goals, have a plan B to provide clarification or correction with a definition, synonym, or example, and infuse the words into the classroom by finding opportunities for new words to be used in other contexts (Kindle, p. 210).

In the previous article, the researcher asserts that by selecting vocabulary words in advance and planning instruction for those words, teachers positively affect student comprehension and vocabulary. The last article in this section confirms the previous article's findings that planned vocabulary instruction benefits student learning. The last study also looks at planned instruction and examines the extent students learn sophisticated words with instruction and without instruction.

Study One. A duel study by Beck and McKeown was conducted to examine "the extent to which children learned a set of sophisticated words that were taught to them in comparison to children who did not receive the instruction" (2007). The independent variable for study one was the students who received instruction compared to the students who did not receive

instruction. The dependent variable used was the pre and posttests. This included an experimenter-designed test developed around a set of 22 kindergarten words and 22 first grade words.

The subjects for this study were 98 students from four kindergarten classes. All of the participants were from one school located in a small urban district. The district showed to have a low socioeconomic status (SES) population and had 82% of its population qualify for free or reduced price lunch. All of the participants of this study were African American. Two classes from each grade were designated as part of the experimental group (52 students total) and the other two classes were designated as the comparison group (46 students total).

The method and procedures for this study was vocabulary instruction as part of Text Talk (Beck & McKeown, 2001; McKeown & Beck, 2003). The words chosen for the intervention were considered Tier 2 words. Tier two words are words that applied to students' daily lives, were easy to explain to students, were different in meaning, and different in phonological/orthographic properties. This means words that students would use in real life and looked and sounded different from each other. Researchers developed Rich Instruction for several of the words for each story. Rich instruction uses student friendly language to explain a word's meaning, giving many examples and contexts for the word, and having students give examples of how to use the word correctly. Instruction of the words occurred after a story had been read, discussed, and concluded which provides rich content to build initial understanding. The researchers' goal was to enhance students' general vocabulary development rather than their comprehension. The teachers reinforced the words for which instruction occurred on subsequent days by charting when students used the word and by using the word in other classroom activities. The study was conducted during the last 10 weeks of school, at the end of the year.

Research staff observed teachers once a week and met with them every 2 weeks to compare the script of the lesson to the implementation. Researchers found a high degree of fidelity. The comparison group did not receive Text Talk stories or vocabulary instruction but participated in daily read alouds as part of the regular school reading curriculum. This differed from the experimental group where the Text Talk story was the daily read aloud.

The measures for this study included the Peabody Picture Vocabulary Test (PPVT) (Dunn & Dunn, 1997) at the beginning of the year to determine if the experimental and non-experimental groups were equal in vocabulary knowledge prior to the study. In addition, experimenter designed pretest and posttests were used on 22 words for both the kindergarten and first grade classes. Vocabulary pretests were administered in February while instruction took place in March and April.

The researchers found that within grade level, students in the experimental group learned significantly more vocabulary words. Also, no differences were shown in the control classes in either kindergarten or first grade.

Study Two. In the second part of this study, the purpose was to show to what extent more instruction enhances student learning. The researchers' hypothesis was that "to learn and develop their understanding of sophisticated words, children need more instruction over time" (2007). The dependent variable was the pre and posttests and the independent variable was the Rich Instruction compared to More Rich Instruction. More Rich Instruction provides additional instruction for a few of the vocabulary words (i.e. 3 of the 6 vocabulary words).

The subjects for Study Two included students from a different school within the same district as Study One. The students were all African American and included 36 students from 3

different kindergarten classes and 40 students from 3 first grade classes. The school had 81% of students eligible for free or reduced price lunch.

The procedure for Study Two again used Text Talk as the read aloud and for each grade six words from each of seven different books were used for instruction. Within each set of six words, words were assigned randomly to one of the two conditions: Rich Instruction or More Rich Instruction. The Rich Instruction was identical to the Rich Instruction used in Study One. The More Rich Instruction was the same as Rich Instruction with the exception that teachers provided additional instruction for several days. Students received instruction on six words per week, Rich Instruction on all six words with More Rich Instruction on three of those words. Two review cycles for More Rich Instruction words were also provided. The total instructional phase lasted nine weeks. Teachers provided twenty minute lessons for each day. On day 1, students read and discussed the story. On day 2 students received Rich Instruction for three words, and on day 3 students received Rich Instruction for the last three words. Days 4 & 5 provided More Rich Instruction for three of the words already given Rich Instruction that week. The review cycles were provided after the first four weeks and after the last three weeks of instruction. The research staff visited each classroom four times over the nine week instructional phase where they observed a lesson in its entirety and gave feedback.

The measures for Study Two were similar to the researcher made pre and posttests in Study One but added an all verbal format to increase reliability. The findings of Study Two showed pre to posttest gains for both kindergarten and first grade for students in the More Rich Instruction group. The gains were significantly higher than the pre to posttest gains in the Rich Instruction group. Overall, these studies showed that more instruction was beneficial and gains were more than double for More Rich Instruction in both kindergarten and first grades.

This article confirms that vocabulary instruction is beneficial, however, more vocabulary instruction is the most beneficial for students in primary grades. This section looked at research on types of vocabulary instruction. The articles in this section confirmed that direct vocabulary instruction, word analysis, and teacher planning are the most beneficial influence on student vocabulary.

Vocabulary and Its Effects on Comprehension and Word Learning

The National Reading Panel (2000) has determined that the development of comprehension cannot be fully understood without first examining the role of vocabulary knowledge. The following section investigates how vocabulary effects varying aspects of reading, including phonemic awareness, word learning, and comprehension. The first article by Yeh and Connell (2008) compares several types of instruction and the development of phonemic awareness.

A study was conducted by Yeh and Connell (2008) for the purpose of "…evaluating the extent to which 4- and 5-year-old children in Head Start were more likely to develop phonemic awareness through: (a) direct instruction in phoneme segmentation and blending, (b) rhyming activities or (c) vocabulary activities" (p. 245). Researchers hypothesized that instruction in either rhyming or vocabulary is adequate to develop phonemic awareness and is more developmentally appropriate than activities in segmenting and blending for students in the Head Start program. The independent variables were the three treatment groups: rhyming, segmenting and blending, and vocabulary. The dependent variables include subtests of the Phonological Awareness Test (Robertson & Salter, 1995), Word Identification subtest of the Woodcock-Johnson Psycho-Educational Battery Test-Revised (WJ-R) (Woodcock & Mather, 1989), and the

word identification subtest of the Peabody Picture Vocabulary Test, Third Edition (PPVT-III; Dunn & Dunn, 1997).

The study included 128 students ranging in age from 4.3 years to 5.2 years. Students were from sixteen Head Start classrooms located in Boston, MA. Of these students, 72% were Black, 18% Hispanic, 6% White, and 4% Asian. Students were all considered to be from low-income families and were non-readers with low phonemic awareness skills.

All the conditions used The Creative Curriculum (Dodge et al., 2002) and the sixteen classrooms were randomly assigned to one of the three conditions. This study did not contain a control group, receiving no treatment. The intervention lasted for fourteen weeks. Instruction was provided to small groups and lasted for 20-25 minutes twice a week. Teachers and students were observed on random instructional days for 30 minutes a week as well as on non-instructional days. The conditions differed in the type of instruction provided. The Phoneme Segmentation Group focused on blending, segmenting, and manipulating phonemes of three-letter words. Teachers used preplanned activities from the Phono-Graphix programme (McGuinness & McGuiness, 1999). Students in this condition participated in activities that focused on spelling and reading actual words. The Rhyming Group focused mainly on rhyming activities and providing initial consonants of words. Rhyming activities were selected from a commercially available program called Phonemic awareness in young children: A classroom curriculum (Adams, Foorman, Lundberg, & Beeler, 1998). The Vocabulary Development Group focused on strategies suggested by the National Reading Panel (NRP) and previous research (Dickinson & Smith, 1994; Leung, 1992; Robbins & Ehri, 1994; Senechal, 1997; Senechal & Cornell, 1993), in addition to the regular Head Start curriculum. Students in this group traced letters, wrote stories using invented spellings, learned new vocabulary, had books

read to them with explanation of new words, words and stories re-read after the meanings of words were discussed, and were asked specific questions to engage students and help teach vocabulary.

Results show that each treatment group had a significant increase from pretest to posttest for their corresponding subtests. The segmenting and blending condition had substantially greater gains than the other two groups in phonemic awareness. Regarding letter-sound knowledge, the segmenting and blending group showed greater gains than the rhyming group but not the vocabulary group. No significant differences were seen for rhyming or vocabulary among any of the three treatment conditions.

Overall, instruction with emphasis on phoneme segmentation and blending was more effective for developing skills in phoneme segmenting and blending than either rhyming or vocabulary instruction. Instruction in segmenting and blending is more likely to improve future reading skills than the other two conditions.

This article concludes that although vocabulary instruction showed student gains in letter-sound knowledge, instruction on segmenting and blending is most beneficial for improving students' phonemic awareness. The previous article focused on aspects of reading skills while the next article compares lexical-set vocabulary to semantically-unrelated vocabulary instruction and English proficiency. Researchers will see if providing a context to learn words within aids in the comprehension of the words' meanings.

A study by Hashemi and Gowdasiaei (2005) was conducted with the purpose "(a) to assess the effectiveness of the lexical-set (LS), or words related in a common category, and the semantically-unrelated (SU), words not related in a common category, vocabulary instruction,

separately and relative to each other, and (b) to assess the differential effects of the two methods for students of lower and upper English proficiency levels" (p. 341). The authors' had two hypotheses. First, they believed English proficiency may affect a student's ability to learn new words. Secondly, they believed that students with different proficiency levels may use different strategies to help them learn new words (Hashemi & Gowdasiaei, 2005, p. 344). The independent variables included the learner's English proficiency level and the treatment group (LS or SU vocabulary instruction). The dependent variables were The Vocabulary Knowledge Scale (VKS) (Wesche and Paribakht, 1996). The Vocabulary Knowledge Scale measures the gains of target words; this includes vocabulary breadth (VB) which is how many words are known. It also includes the measure of vocabulary depth (VD) which is how well an individual word is known. Also, included as a dependent variable, is the Nelson Proficiency Test (NPT) (Fowler & Coe, 1976) to place students at the correct English proficiency level.

The subjects for this study were 60 EFL students from two intermediate classes at the English Institute in Mashhad, Iran. Each class had thirty students and contained about the same male and female population. The students' ages ranged from twenty years to thirty years old. All the participants had had six years of English in high school and were studying a curriculum titled Connections (Hartley and Viney, 1984) at the time of the study. According to the Nelson Proficiency Test (NPT) students were balanced equally between the two classes in terms of English proficiency of students.

The researchers used a quasi-experimental, non-equivalent control-group design (Borg & Gall, 1989) for this study. This means that researchers could not randomly assign participants to treatment groups but relied on an environmental influence to determine the participants of each group. The researchers chose this design because a necessary pretest would need to be given to

account for preexisting differences between treatment groups. Also, the researchers wanted to use real classroom situations to ensure results would be valid. Researchers chose one hundred words from thirteen lexical sets (words that share meaning or form) to be used for instruction. Short stories with vocabulary incorporated within were used to help students make meaning utilizing context and also to activate semantic structures, which is the way words are organized in a sentence to determine meaning (i.e. noun before or after verb changes meaning). Both of the treatment groups were taught the same vocabulary in the same short stories and both received the definition of the words. However, only the Lexical-set method had received the words in lexical sets where the words were all related in meaning or another relationship. In addition, only the Lexical-Set group received the words as part of a topic to help students visualize a concept. The Semantically-unrelated group received the same vocabulary but in random order and not part of the same lexical set. The two classes were randomly assigned to either the Lexical-Set or Semantically-Unrelated treatment. Both of the groups were given the Vocabulary Knowledge Scale as a pretest one week before the start of instruction. The Nelson Proficiency Test was also given to both conditions to form four homogeneous subgroups. These groups included the Upper Lexical-Set, Lower Lexical-Set, Upper Semantically-Unrelated, and Lower Semantically-Unrelated. Each subgroup contained fifteen students and received instruction for 45 minutes two times per week. The Lexical-Set group was introduced to a topic before the vocabulary words were given, after the words were presented, they were used in a sentence. Students tried to guess the meanings using context clues, the topic, and related words. Students were given the definition from an English dictionary with a Persian translation if needed. The Semantically-Unrelated method had the same procedure but the words were not presented together if they were part of the same lexical set. Instead, they were taught in a random order, not as a lexical set.

Students still tried to guess the definition but usually failed. A definition was given to this group as well. One week after the instruction ended, the Vocabulary Knowledge Scale was given a second time as a posttest.

The results showed that the Nelson Proficiency Test scores reported no significant difference between the treatment groups. Both the Lexical-Set and Semantically-Unrelated groups, for the most part, had equal proficiency levels. The pretest scores in the area of Vocabulary Depth (VD) showed no significant difference between the two treatment groups. However, the upper level students in both groups did outperform the lower level students in their treatment group. Results also showed that students gained in vocabulary depth and vocabulary breadth through the Lexical-Set method. Upper level Lexical-Set students showed greater gains in Vocabulary Depth and Vocabulary Breadth than the lower level students. The same was true for the Semantically-Unrelated method. The students in the Lexical-Set treatment group made significantly greater gains in vocabulary depth and vocabulary breadth knowledge than the students in the Semantically-Unrelated treatment group.

In summary, both the Lexical-Set and Semantically-Unrelated groups had significant gains in vocabulary depth and vocabulary knowledge despite varying proficiency levels. The Lexical-Set group did reach a significantly higher level than the Semantically-Unrelated group and the upper level groups in both the Lexical-Set and Semantically-Unrelated treatments consistently showed greater gains than the lower level Lexical-Set and Semanitcally-Unrelated groups (Hashemi & Gowdasiaei, 2005, p. 354-355).

Overall, the results show that both the Lexical-Set and Semantically-Unrelated treatments led to student gains in both Vocabulary Depth and Breadth knowledge. The results also indicate

that by using a conceptual framework and by embedding words into meaningful contexts, student learning can be enhanced.

In the previous article, the authors found that both types of instruction helped English Language Learners' word learning but by relating words to a main topic or concept, students showed greater gains in their word learning. The next article uses an academic vocabulary intervention to discover its impact also on students considered language minority learners and native English speakers.

A study by Lesaux, Kieffer, Faller, and Kelley (2010) was designed to answer three specific research questions: "(1) What is the impact of an academic vocabulary program on the vocabulary and reading comprehension of language minority learners and their native English speaker classmates enrolled in urban middle schools? (2) With what level of fidelity was the program implemented and what do teachers report about ease of implementation? (3) In what ways did the instruction as implemented contrast with standard practice?" (p. 200). Based on previous research, the researchers found confirmation that there are instructional principles of effective vocabulary instruction but need to confirm this research within different instructional contexts and using different materials. The independent variable was the type of instruction: academic vocabulary intervention versus a control. The dependent variables included a teacher survey and interview, weekly teacher logs, classroom observations, and pre- and posttests. The pre- and posttests used were the Gates-MacGinitie Reading Test, Fourth Edition: Reading comprehension, Words-Meanings-in-Context task (Pearson, Hiebert, & Kamil, 2007), Stanford Achievement-10th Edition: Reading Vocabulary subtest (Harcourt Assessment, Inc., 2003), Target Word Mastery (researcher-created) Word Association (Carlo et al, 2004; Schoonen & Verhallen, 1998), and Morphological Awareness (Carlisle, 2000; Carlo et al, 2004).

The sample included 476 sixth grade students. Of the 476, 346 were considered language minority learners and 130 were native English speakers. Nineteen teachers participated in this study from seven different middle schools. The schools were located in an urban district in the southwestern United States. The sample was 53% female and the average age was 11.11 years. The student sample was considered diverse both ethnically and linguistically with three-fourths of the students speaking a language other than English at home.

Twelve teachers taught thirteen sections totaling 296 students in the treatment group. There were about three teachers per school, with two of the teachers using the academic vocabulary intervention and the third not. Seven teachers taught eight sections with 180 students in the control group. The intervention was a text based academic language program, called Academic Language Instruction for All Students (ALIAS) (The Language Diversity and Literacy Development Research Group at Harvard). The intervention lasted for eighteen weeks and included two eight week units and two one week review units. Each unit was an eight day lesson cycle. Lessons were given four days a week for forty-five minutes each. The lessons took place during the 90-120 minute language arts block. All the units were designed around articles from Time For Kids Magazine. The articles were chosen based on the potential for student engagement, a 4-6th grade instructional reading level, length, and an opportunity to teach academic vocabulary. Eight to nine high utility academic words were chosen from the text, these words were also on the Academic Word List (AWL; Coxhead, 2000). A total of seventy-two words were taught. Per unit, students received three to four exposures of each word, two to five words were used per day. Eleven of the target words were used for two of the units so students received more exposure to those words. Each of the lesson cycles was followed by a developmental sequence of activities. These activities were used to build word knowledge in

increments and included; exposure through text, activation of prior knowledge of a word, word meaning in text context, introduction of additional word meanings, and use of the word in student writing. The first review unit used words from only the first half of the program while the second review unit used words from the whole program.

The study took place during the 2007-2008 school year with observations beginning in fall. The pretest was given in December and the posttest was given two weeks after the program completion, this was at the end of May for the traditional school year calendar and mid-July for the year-round school calendar.

The findings for this study show that at pretest, there were no statistically significant differences on any of the measures at pretest. At posttest, there was a positive statistically significant effect, meaning a large measurable effect, of the treatment on the Target Word Mastery, Morphological Decomposition, and Word-Meanings-in-Context. The effect was greatest for the Target Word Mastery and smaller for the Morphological Decomposition and Word-Meanings-in-Context tasks. Results also show a positive marginally significant effect, or a measurable effect, on the Gates-MacGinitie Reading Comprehension and Target Word Association. The language minority learners in each condition performed lower on both the pre- and posttests in all measures than the native English speaking students.

In summary, researchers found promise in developing effective word vocabulary instruction for successful implementation by ELA teachers in middle schools with many language minority learners. Results were consistent with previous research and reinforce the efforts of increasing vocabulary and reading comprehension skills for students below grade level.

The previous study shows the importance of effective vocabulary instruction for increasing vocabulary and comprehension skills, especially for English Language Learners. The final study in this section will look at contextually-based multiple meaning vocabulary instruction and its effects on vocabulary and comprehension of students.

Nelson and Stage (2007) conducted a study "…to assess the effects of contextually-based multiple meaning vocabulary instruction on the vocabulary knowledge and reading comprehension of students" (p. 4). They were examining if teaching several meanings for a word would aid in student comprehension. The researchers believed that teaching students that most words have multiple meanings, and may fall into semantic categories according to context, would have a positive effect on reading comprehension. The independent variable was contextually-based multiple meaning vocabulary instruction embedded in the standard language arts instruction or the standard language arts instruction alone. The dependent variables were the pre- and posttests using standardized assessments of vocabulary and reading comprehension. These assessments included the Gates-MacGinitie Reading Tests (GMRT; 4th Edition)(MacGinitie, Maria, & Dreyer, 2000). Level 3 of the GMRT was used for third grade students and level 5 was used for fifth grade students. Form S was used for the pretest and form T for posttest.

The subjects for this study consisted of 283 third and fifth grade students. Students were from four classes in a small Midwest public school district. 32% of students received free or reduced price lunch. Sixteen teachers took part in the study.

Students were placed into two groups based on their initial scores on the vocabulary and comprehension subtest of the GMRT. Vocabulary words chosen for this study were identified as

either level 1 (having two meanings) or level 2 (having three or four meanings) using the four "stages of vocabulary knowledge" (Dale & O'Rourke, 1986) to help identify multiple meaning words. All of the participating teachers used the district's core curriculum, Scott Foresman Basal Reading Program (Scott Foresman, 2001). The experimental group received instruction on contextually-based multiple meaning vocabulary on thirty –six target words and three related words per meaning. Instruction was embedded into the core curriculum. The third grade students used level 1 words and the fifth graders used level 2 words. Each target word and related words were taught over a period of two days for about 20-30 minutes a day. Day one focused in introducing the meanings of target words using related words to help activate students' prior knowledge. Day two consisted of vocabulary activities led by the teacher and completed in student notebooks.

The researchers found that students with low initial vocabulary and comprehension skills participating in the experimental condition, showed a small improvement compared to the control, or non-specific treatment condition. Students who were considered average to high in both groups showed minor changes. Results show that all students showed improvements in skills from pretest to posttest and students in the low achieving group were more likely to show improvement than average to high students. The third grade students with low initial vocabulary and comprehension skills were more likely to show improvement than the fifth grade students. Students in the experimental condition showed moderate to large improvements in comprehension skills compared to students in the control condition. In addition, third and fifth grade students with low initial vocabulary and comprehension skills in the experimental condition were more likely to show improvement in reading comprehension skills than average to high achieving students.

The authors of this study show that vocabulary instruction is crucial for students with low vocabulary and comprehension skills. This section investigated vocabulary and its effects on word learning and comprehension. Research confirms that vocabulary instruction aids in student comprehension skills and word learning.

Vocabulary Instruction Using Literature

This section discusses research using storybooks, read alouds, and multi-cultural texts. These articles examine the use of literature in the classroom to effectively teach vocabulary.

In a study by Lovelace and Stewart (2009) the authors wanted "to examine the effect of a systematic vocabulary instructional technique in African American second grade children with below average vocabulary skills. An additional goal was to examine the role of book type in the retention of novel vocabulary words" (p. 168). The researchers hypothesized that in using a sound method of vocabulary instruction, African American students with below average vocabulary skills would learn novel vocabulary words and would retain more vocabulary from books that use images and experiences similar to the students' own cultural background. The independent variable in this study was the use of robust vocabulary instruction. The dependent variable was word knowledge, measured by E. Dale's (1965) classifications. Researchers used an alternating treatments design. This means that for this study instructional sets of words from two storybooks (one Caucasian and one African American) were alternated as the treatment.

The sample for this study included five students; three boys and two girls. All the students were African American and were in the second grade. They ranged in age between seven and eight years old. Criteria for inclusion in this study were: students were able to attend to a task for thirty minutes; students had normal hearing and vision; students were in the normal

cognitive range; students were one standard deviation or more below the mean on vocabulary standardized tests; and students had none to general knowledge of the target words used in the study. Students in this study were from four different public elementary schools and were identified as coming from low socio-economic status homes.

The method used by the researchers was small group instruction for thirty minute sessions two times a week. Sessions took place for four weeks for a total of eight sessions. Within each session, a single book was read: Book A-Miss Viola and Uncle Ed Lee (Duncan, 1999) or Book B-Sophie's Knapsack (Stock, 1988). Book A featured an African American cultural theme and Book B featured a Caucasian theme. Then a vocabulary lesson was given on the instructional word set for that book. Instruction included oral and experimental activities completed in a sequenced order based on Beck and McKeown's (2001) Text Talk and Beck et al.'s (2002) Robust Vocabulary Program. For example, each word would be found in the text and a child friendly definition was given. Students then repeated the word, answered questions related to the word, and related the words to known concepts. Then each word was placed in a context other than the story. Students had been given a pretest on the instructional and control words from each book to set a baseline. Weekly probes were given on eighteen words. The eighteen words were made up of six instructional words, six commonly known words, and six control words. Two weeks after the intervention, a follow up test was given.

The researchers found that all five students had knowledge of common words from the books read. Students demonstrated contextual knowledge of words on all six probes. Pretest scores indicated that knowledge for the instructional set was low but was higher than the control word set. In addition, by probe four, all five students changed level, showing increases in word knowledge for one or more of the words in the control word set. Students could use the control

words correctly in a sentence as well. Results showed no significant difference in the acquisition of novel vocabulary words based on the type of book used. Interestingly, at the posttest, student word knowledge declined for the African American book used and remained the same or increased for the Caucasian book.

In summary, robust vocabulary instruction is effective in developing and maintaining knowledge of novel words in students with below average vocabulary skills. The use of an African American book with African American students did not influence their retention of novel words.

This study shows that regardless of the type of book used, culturally-relevant or not, students learned vocabulary words when given robust vocabulary instruction. The previous article investigated specific literature and vocabulary, the next article uses many types of literature to investigate the use of Graves's four components on vocabulary of fifth grade students.

Baumann, Ware, and Edwards (2007) conducted a study to determine the impact of an instructional program incorporating Graves's (2000, 2006) four components on the vocabulary development and appreciation of fifth-grade students over an academic school year. The authors' reason for conducting this study was that previous research showed that students could be taught vocabulary strategies but no other studies used multi-faceted instruction. The independent variables for this study were student word knowledge (i.e. expressive vocabulary and receptive vocabulary) and student interest in reading, writing, and vocabulary. The dependent variables for this study were pre- and posttest results of the Expressive Vocabulary

Test (Williams, 1997), Peabody Picture Vocabulary Test (Dunn & Dunn, 1997), writing samples, written parent questionnaires, and student questionnaires from fall to spring.

The subjects for this study were 20 fifth-grade students from a low income elementary school. The school was located in a medium sized community. 65% of students received free or reduced price lunch. The sample included 56% African American students, 25% European Americans, 14% Latino/a, and 5% were considered "other".

Students were given a pretest in August and received integrated vocabulary lessons and activities throughout the curriculum from September to April. Students were given a posttest in May. Data was collected using reading and vocabulary tests, writing samples, student and parent questionnaires, student interviews, lesson plans, work samples, student logs, and researcher journals.

Researchers used techniques and strategies that were compatible with Graves's (2006) framework. To expose students to a vocabulary-rich environment, students were read to regularly out of chapter books that aligned with the social studies curriculum, poetry, and books using word play, students participated in self-selected independent reading, discussion groups, and writing activities to explore word choice and word usage. Vocabulary work was infused into the daily read aloud.

Students kept a log of interesting words they found as they read. These logs provided words for students to discuss and use in their own writing. Students also kept a dialogue journal with the teacher to share ideas about the independent reading the student completed. The dialogue journals usually focused on word usage and word craft. Additionally, the class had several word walls displaying interesting vocabulary, content vocabulary, and words with affixes

(Cunningham & Hall, 1998). Other vocabulary strategies were utilized as well, including, Word Wizards (Beck et al., 2002), acting out word meanings, Predict-O-Gram (Nickelsen, 1998), graphic organizers, semantic maps, and linear arrays (Allen, 1999, pp. 52-53).

Researchers taught prefixes and suffixes as "families" or clusters and organized them as such on the wall. Five context clues were taught; definition, synonym, antonym, example, and general (Dale & O'Rourke, 1986; Johnson & Pearson, 1978) and examples of each were presented to students. Students were then given independent practice to predict the meaning of several words, read to identify the context clues for each word, and write the meaning from the context clues. Overall, researchers provided students with explicit instruction and practice on how to figure out the meaning of novel words using context clues and word-parts. Informal lessons were also given based on the class Our Learning About Words and Language (Johnson, 1999 and Johnson, 2001) chart which gave definitions and examples for 13 words. Students then created their own alliterative sentences, which are sentences constructed with a repeated initial consonant sound for each word in the sentence, and searched for examples in books and used alliterative sentences in their own writing.

Researchers found that students had shown growth in word choice and word knowledge based on quantitative results, such as pre and posttest results on various measures. In addition, expressive vocabulary grew more than had been expected on the pretest to posttest comparison of the Expressive Vocabulary Test (Williams, 1997). Results based on the Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) show students below average in receptive language had gained more benefits than above average students. Students used 36% more words in their writing sample and 42% of students used more low frequency words. Researchers found three themes: students used more sophisticated and challenging words; students' interest and attitudes

toward vocabulary instruction increased; and students independently demonstrated use of word-learning tools and strategies and participated in word play. Parent and student surveys showed that vocabulary and interest had grown, as well.

In summary, researchers "found by immersing students in a vocabulary-rich environment and providing them instruction in words and word-learning strategies, they developed greater breadth and depth of vocabulary knowledge" (p.120). This means that by teaching students strategies to figure out meanings of unknown words and providing many opportunities to practice those strategies, students gain deeper word knowledge and a more expansive word knowledge.

This research discovered that student immersion in a vocabulary-rich environment and instruction in words and strategies to learn words, helped students improve in vocabulary knowledge. The next article continues to look at a vocabulary-rich environment by comparing types of instruction on vocabulary learning through storybook reading.

A duel study by Silverman (2007) was conducted with the purpose to answer three questions: "1. Which of the following three methods is more effective at promoting children's word learning through storybook reading: (a) contextualized instruction, (b) contextualized instruction augmented by analytical instruction, or (c) contextualized instruction augmented by analytical instruction and anchored instruction (i.e., phonological and orthographic analysis)? 2. Are the effects of the methods consistent across receptive and expressive vocabulary knowledge tasks? 3. Are the effects of the methods consistent after 6 months without planned instruction?" (p. 100). The dependent variable in this study was the researcher developed receptive and expressive vocabulary measures (RVA subtest). The receptive measure asked students to

choose one of four pictures to represent the meaning of the target word. The expressive measure asked students to give a definition orally for each target word. The independent variable was the comparison of the three conditions; contextual, analytical, and anchored. The contextual condition used students' background knowledge to discuss vocabulary, or target words. The analytical condition asked students to analyze vocabulary words out of context of the book in addition to using student background knowledge for discussion. The anchored condition focused on the letters and sounds of the vocabulary words.

The subjects participating in the first study were from six classrooms, three from each of two schools. Both were public schools, were considered demographically diverse and were located in a major metropolitan area in the northeast. The participants were 94 kindergarten students in their spring semester and made up 86% of students enrolled in the participating classrooms.

The procedures for this study were as follows. Teachers implemented the assigned condition in their own classrooms using a researcher designed curricula for each of the three methods. The curricula were created from teacher recommended titles. One class from each school was randomly assigned to each condition. The words used were chosen from books based on Beck, McKeown, and Kucan (2002) Tier 2 words, or "sophisticated" words for instruction. A total of thirty words were chosen, five from each of six books. All three conditions followed the same 3-day lesson format. On day one, the teacher read the book and stopped at pages noted in the curriculum to target instruction on chosen words. The teacher then asked follow-up questions after reading the story. On day two, the teacher reread the book without stopping. After the reread, the teacher asked questions about the target words in the book. The teacher referred to the pages in the book where the word appeared and asked follow-up questions. On

day three, the teacher did not read the book but the students were asked to retell the story. The teacher then asked follow-up questions about the target words in the story. In each condition, the teacher provided an explicit definition of each target word.

Instruction in the three conditions differed in several ways. The first difference is the level of discussions about the words in the book, and the students' personal experiences. The second difference is the analysis of the target words out of context of the book and the students' personal lives. The third difference, is the focus on the sounds and letters in target words. For example, in the contextual condition, the discussions about the storybook highlighted new words, and students were asked leading questions about the target words to connect the words to their background knowledge. In this condition, all of the instructional time was devoted to discussions of target words in the story context, and the students' background knowledge of the words. In the analytical condition, the teacher guided the students to relate the target words to their personal experiences. In addition, teachers asked students to use the new words in different contexts outside of their personal experiences. Students were asked to compare and contrast the target words. Instructional time was split. First, students engaged in discussions of the target words using the storybook context and personal experiences. Also, students were encouraged to analyze the new words by comparing and contrasting and applying the words to different contexts. The anchored instruction also engaged students in discussions of the target words in the storybook context and their personal experiences, comparing and contrasting words to analyze them deeper, but also included attention to phonological (sounds) and orthographic (letters) aspects of the target words.

The researcher observed and videotaped instruction in each classroom each week. She also examined instruction on two of the tapes chosen at random. Using a four point scale, two

raters coded each videotape and found teacher fidelity to be high with a mean score of 3.11 out of 4.

The findings for this study show that students in the analytical and anchored conditions learned more words on the receptive, or picture, and expressive, or oral, vocabulary subtests than students in the contextual condition. Students learned an average of about six words out of thirty in the anchored and analytical conditions while students in the contextual condition learned three words on the receptive measure. On the expressive measure, students in the anchored and analytical condition learned an average of about seven words out of thirty while the contextual condition learned about two words.

Study Two. In the follow-up study, 50 of the original 94 students who participated as kindergartners, were still enrolled in the school for first grade. Of the 50 remaining students, 20 had participated in the contextual condition, 13 had participated in the analytical condition, and 17 had participated in the anchored condition.

The measures for Study Two were the researcher developed receptive and expressive vocabulary measures (RVA subtests, also given in Study One) given to students a third time. The results showed that the students that were originally in the analytical and anchored conditions scored higher than those in the contextual condition for both the picture and oral vocabulary tests.

In summary, the researcher found that "engaging children in active analysis of word meanings is more effective at promoting their learning of new words than instruction that merely has children relate words to the context of a story and to personal experiences in a less analytical, more context-bound way"(Silverman, 2007). This corroborates the findings of Beck and

McKeown (2001) and Dickinson and Smith (1994). In addition, findings support research showing that adding focus to phonological and orthographic properties of words is effective. In other words, having students relate words to their own backgrounds, the context of a story, and analyzing that word out of the story context is most beneficial.

Silverman found that teachers should help students relate to a story through their own backgrounds, the story context, and using word analysis. The previous article compared types of vocabulary instruction through storybook reading. The final article in this section continues to explore vocabulary instruction during storybook reading with students in small groups.

Coyne, McCoach, and Kapp (2007) conducted a duel study for the purpose of evaluating "the effectiveness of extended vocabulary instruction during storybook reading with kindergarten students within a small-group intervention study" (P.74). Extended vocabulary instruction is explicit teaching including both contextual and definitions of words, exposing students multiple times to target words in different contexts, and sharing experiences that promote a deeper processing of the word meanings.

Study One. The researchers in Study One compared extended instruction of targeted vocabulary words to incidental exposure of vocabulary words during storybook readings. The researchers sought to answer these specific questions; "(a) Does extended vocabulary instruction result in greater word learning than incidental exposure? And (b) Do students maintain their knowledge of word meanings without planned review of instruction?" (Coyne, McCoach, & Kapp, 2007, p. 76). The dependent variables include the Expressive Measure of Story Word Definitions (expressive definitions). This is a researcher-developed assessment to measure knowledge of six target word definitions with the researcher asking what a word means and the

student's answers being recorded verbatim. The second measure used is the Receptive Measure of Story Word Definitions (receptive definition). This is also researcher-developed and measures the six target word definitions using questions requiring a yes or no answer to show understanding of the correct definition. The third researcher-developed measure used is the Receptive Measure of Understanding Story Words in Context (context). This measures understanding of target words used in novel contexts, and again requiring a yes or no answer to words used correctly or incorrectly. In addition to the researcher-developed measures, the Peabody Picture Vocabulary Test-III (PPVT; Dunn & Dunn, 1999) was used to measure receptive language and vocabulary. The independent variable is extended instruction, which is directly teaching the meanings of three target vocabulary words within the context of the story reading. Extended instruction is designed to extend the understanding of the target words by providing students with an interactive opportunity to process meanings of words on a deeper level, and to increase exposure to target words by giving students opportunities to interact with, and also discuss, the target words in various contexts beyond the original story.

The subjects in this study were kindergarten students in a K-4 elementary school located in a small Northeast town. There were a total of 55% of students qualifying for free/reduced price lunch. The school was comprised of 55% Hispanic and 40% Caucasian students. Thirty-one students participated in this study: fifteen males and sixteen females. Of this population of students, twenty were Caucasian and eleven were Hispanic. The average age of students was five years, ten months with a range from five years three months to six years six months.

All the students participated in listening to three readings of The Three Little Pigs by James Marshall (1989). Six target words were chosen by the researchers because they were considered important for comprehension of the story and were unlikely to be known by the

students. The target words included two nouns, two verbs, and two adjectives. Researchers felt that the story context was sufficient enough to infer the meanings of the target words. In addition, the story was modified so that each word only appeared once. Two versions of the intervention were used, both included three target words that were taught using extended instruction and three words that were not taught but were encountered incidentally (incidental exposure). Both of the versions used had identical procedures for instruction and students were randomly assigned to either version A or B. The intervention was given to groups of three to four students for three 20-30 minute sessions during a one week time span.

Extended instruction used the following procedure: before each story reading, students were prompted to pronounce each of the three target words, then students were asked to listen for each target word within the story and raise their hand when they heard the word. As each target word was heard in the story, students were asked to identify the word and then the sentence was reread from the story that contained that word. A simple definition was given and the sentence was reread again. The second time the target word was replaced with the definition. Students were again asked to pronounce the target word to reinforce the phonological aspects. The purpose of this procedure was to offer students a simple definition for each target word and also to provide contextual support for words in the story (Stahl & Fairbanks, 1986). Each story reading lasted approximately 10-20 minutes.

After the story reading, students participated in activities to interact with and discuss target words in "rich and varied contexts beyond the story" (i.e. recognizing examples of target words, answering questions about the target words, formulating sentences with the target words, and responding to sentences containing several target words) (Coyne, McCoach, & Kapp, 2007, p. 78). In addition, students were given open-ended questions to extend and elaborate their

original responses. The incidental exposure intervention used the following procedure: the three target words appeared in the story but were not directly taught to students or discussed. Each target word was heard three times within the context of the story (once per reading). Researchers did not control for frequency of exposure to target words between the two conditions.

Researchers developed the following three measures for this study; Expressive Measure of Story Word Definitions (expressive definitions) which measures the knowledge of the six target words by recording student's answers to what a word means. Also, the Receptive Measure of Story Word Definitions (receptive definitions) which also measures the knowledge of the six target words by asking students yes or no questions about correct and incorrect definitions. The Receptive measure of Understanding Story Words in Context (context) measures the understanding of the target words used in novel contexts and the Peabody Picture Vocabulary Test-III (PPVT) (Dunn & Dunn, 1999) to test for receptive language and vocabulary. The pretest was given one week before the start of the intervention, the posttest was given between one to five days after the completion of the third storybook reading, and the delayed posttest was given eight weeks after the posttest.

The researchers found the following upon completion of Study One: the pretest indicated that participants had no knowledge of target word meanings prior to the intervention, and there was no significant difference across conditions in word knowledge. On all three of the measures, students scored significantly higher on extended instruction words than incidental exposure words. However, there was a decrease from the posttest scores to the delayed posttest scores. Students continued to show little knowledge of the words that were not taught. On the receptive and context measures, no significant interaction between time and type of instruction was shown.

Study Two. Study Two compared extended instruction of targeted vocabulary words with embedded instruction of vocabulary words during storybook readings. The specific research questions addressed during this study were "(a) Does extended vocabulary instruction result in greater word learning than embedded instruction? And (b) Do students maintain their knowledge of word meanings without planned review or instruction?" (Coyne, McCoach, & Kapp, 2007, p. 81). The dependent variable was expressive definitions, receptive definitions, and context measures in addition to the Peabody Picture Vocabulary Test-III (PPVT) (Dunn & Dunn, 1999). These measures were given at posttest and delayed posttest (six weeks after posttest). The independent variable was extended instruction versus embedded instruction.

The subjects for Study Two were kindergarten students from a K-8 school with a total enrollment of 575 students. The school was located in a large city in the Northeast. Of the school population, 57% of the students qualified for free or reduced price lunch, 17% of the fourth grade students met the state goal in reading versus 58% statewide. The school population consisted of 67% Hispanic, 25% African American, and 6% Caucasian. Thirty two students were randomly selected from three kindergarten classrooms to participate in the study. This included 22 males and 10 females. There were 23 Hispanic, 5 African American, 2 Asian, and 2 Caucasian students. The students' ages ranged from 5 years 4 months to 7 years 0 months.

The procedures for Study Two were identical to Study One. Students listened to three readings of The Three Little Pigs (Marshall, 1989) in small groups during week one. Students were assigned randomly to one of the two interventions. Study Two differed from Study One because three target words received extended instruction and three received embedded instruction. The extended instruction was the same as in Study One. In the embedded instruction condition, students were given simple definitions of the target words when they were

encountered in the story. The sentence was reread and the target word was replaced with the definition, similar to the procedure used in the extended instruction. However, explanations of all six target words were given within the context of the story but only three of the words received extended instruction in activities after the reading.

Upon completion of the second study, the researchers found that on the expressive measure, students scored significantly higher on words that received extended instruction than words that received embedded instruction. There was no significant difference between posttest and delayed posttest. On the receptive measure and the context measure, students also scored significantly higher on words that received extended instruction than embedded instruction. However, the context scores on words introduced using the extended instruction approach decreased slightly from posttest to delayed posttest, and words introduced using embedded instruction increased slightly from posttest to delayed posttest.

Overall, the findings show that extended instruction resulted in greater word learning than incidental exposure, or embedded instruction on all measures. The researchers emphasize that direct vocabulary instruction helps students gain word meanings and can help students who may become struggling readers.

The authors found that explicit vocabulary instruction aids in word learning and may help struggling readers. This section investigated vocabulary instruction using literature. Research showed that through the use of storybooks, read-alouds, and explicit vocabulary instruction students showed gains in vocabulary skills.

Conclusion

In summary, through this literature review, Section One concludes that Rich Vocabulary Instruction benefits student learning of words and more Rich Instruction shows double the benefits (Beck and McKeown, 2007). Section Two showed that instruction in vocabulary improved students' comprehension skills (Nelson and Stage, 2007). Finally, Section Three concluded that through the use of storybooks, direct instruction in vocabulary leads to greater word learning (Coyne, McCoach, and Kapp, 2007).

Through this literature review, it has become apparent that explicit vocabulary instruction must be included to ensure student growth in vocabulary knowledge. Therefore, I will include explicit vocabulary instruction into my research. Another implication for my research is to provide students with many opportunities to explore words in different contexts using the specific strategies they have been taught to identify unknown words.

Chapter Three

Procedures

Students enter the classroom with varying backgrounds and encounter words that are unknown to them. The teacher's job is to help build background knowledge and understanding for those unknown words. Vocabulary instruction becomes essential to build word knowledge, but is there one specific method that is most effective? This study investigated the question: Will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text?

Sample Population

The sample population used for this study was six first grade students, four boys and two girls. The students ranged in age from six years seven months to seven years six months. All six students are African American and of low-middle socioeconomic status. The students attend an urban public school in the mid-west. These six students were selected to participate in this study because they did not receive special education services and had a reliable attendance rate according to the school's computerized attendance program. In addition, students chosen represented either a below grade level reader, on grade level reader, or above grade level reader. Students were identified by teachers and previous district assessments as above grade level readers, on grade level readers, or below grade level readers. The sample population consisted of two students identified at each level. A student is considered to be an above grade level reader if he/she is reading and comprehending material at least one year ahead of the current grade level. An on grade level reader is reading and comprehending material assigned to the student's current

grade level. Reading below grade level is when a student is reading at least one year below their current grade.

Procedures

Past research has shown that vocabulary knowledge correlates with reading comprehension, both of which are necessary for showing academic success (NICHD, 2000; Snow et al., 1998). Previous instruction of science vocabulary in my classroom consisted of embedded vocabulary instruction. Embedded vocabulary instruction consists of the teacher reading the text aloud, pausing at an unknown word to provide a student friendly definition and/or example, and then the teacher continues reading. The intervention for this action research study would instead be focused or explicit vocabulary instruction for twelve science vocabulary words relating to a unit on space.

The twelve words chosen by the researcher for explicit, or focused, instruction were related to a science unit on space and were found by reading through the material and selecting vocabulary words found in the chapter of the science text. The words were chosen by the researcher if they were believed to be unfamiliar to the students or if the word was known on a very basic level to students.

Students were given a researcher-created pretest (Appendix A) for each of the twelve researcher-selected vocabulary words. The pretest asked students to draw and/or write everything they knew about the vocabulary word. The pretest for the selected vocabulary word was given to all six students in a small group at the same time. Pretests were completed for two words per session, one right after the other, for a total of six sessions. Over the course of six sessions that lasted between fifteen and thirty minutes individual students were given the

opportunity to work at their own pace until both pretests were complete for that session. A total of six sessions were conducted to complete student pretests.

Once the pretests were complete, student responses were then scored using a researcher-created rubric (Appendix B). Students scored a 3, 2, or 1 for each word. A score of 3 indicated that the student showed a detailed understanding of the word. This means that the student drew an accurate picture and/or used words to describe the term and clarify meaning and/or gave an accurate oral definition and could clarify and/or give examples. A score of 2 indicated that the student showed a partial understanding of the term. This means that the picture drawn was partially accurate, the student's words were partially accurate, and/or the student gave a brief definition but could not clarify or give examples. A score of 1 indicated that the student had a minimal or no understanding of the term. Minimal to no understanding was demonstrated by the student drawing a basic picture of the term or not drawing a clear picture, the student not using written words to describe or clarify the term, and/or the student not giving an accurate oral definition.

Following the pretest, students received instruction that focused on two vocabulary words per week. Explicit or focused instruction, meaning specific instruction regarding researcher-selected vocabulary words, was given to the six students in a small group twice per week for twenty minutes. Instruction lasted a total of six weeks and consisted of strategies found to be successful in previous research and included guiding questions, discussions, providing examples, and use of a graphic organizer (Kindle, 2009). During instruction, guiding questions asked by the teacher helped students engage in discussion of their background knowledge of a word (i.e. Can you tell what you know about astronauts?). Ideas from those discussions were placed on a concept web graphic organizer (Vocabulary A-Z, Appendix C). Students also were able to draw

or write to show their meaning of the term. The researcher then read a book aloud from various sources to give a clear explanation of the target vocabulary word and provide examples and/or pictures of the vocabulary word. The chosen vocabulary word and new information was discussed in a teacher-led small group discussion. If applicable, pictures from the readings were shown and also discussed. The discussion was teacher-led and guiding questions (i.e. What is one new thing that we learned about the moon?) were again used to help students find new information from the book or article about the selected vocabulary word. New information was added to the student's individual graphic organizer and a large group graphic organizer matching the individual organizers (Appendix C). Graphic organizers were kept by the researcher after instruction.

When the target vocabulary word was encountered during class instruction of the science text, the students in the intervention group became class "experts". The "experts" explained the words to the other students and gave examples. The purpose of using the class "experts" was to help the students in the intervention verbalize their understanding of the target vocabulary word in their own words and to help students that were not in the intervention group hear a definition of the word from their peers to help student understanding. The procedure used was similar to embedded instruction with the only difference being that the student "expert" provided the definition, not the teacher. When instruction for all twelve words was complete, a posttest identical to the pretest was administered using the same procedures and time frame for each session. Again, work was scored using the same researcher-made rubric.

Conclusion

Six first grade students from an urban public school participated in this study designed to answer the question: Will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text? Students were given a pretest prior to the six week intervention. At the close of the intervention, students were given a posttest. Pre- and posttest scores were compared and results will be discussed in the following chapter.

Chapter Four

Results

The purpose of this action research was to investigate the question; Will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text? The findings that will be discussed will include individual student results and composite scores for individual students.

Results

Prior to beginning a unit on space within the science text at the start of the second semester of the students' first grade year, students were given a researcher-created test (Appendix A) to determine their knowledge of researcher-selected target vocabulary words. The students were asked to draw and/or write anything that showed their understanding of the word's meaning. A total of twelve words were tested: astronaut, constellation, Earth, meteor, moon, orbit, planet, sun, axis, revolve, star, and gravity.

Pretests (Appendix A) were scored using a researcher-created rubric (Table 1). At the conclusion of the space unit in the science text, and after instruction regarding all twelve vocabulary words was complete, students were given a posttest using the same researcher-created test that was used for the pretest. Students were again asked to draw and/or write their understanding of the meaning of the twelve selected words. Posttests were scored using the same researcher-created rubric that was used to score the pretests.

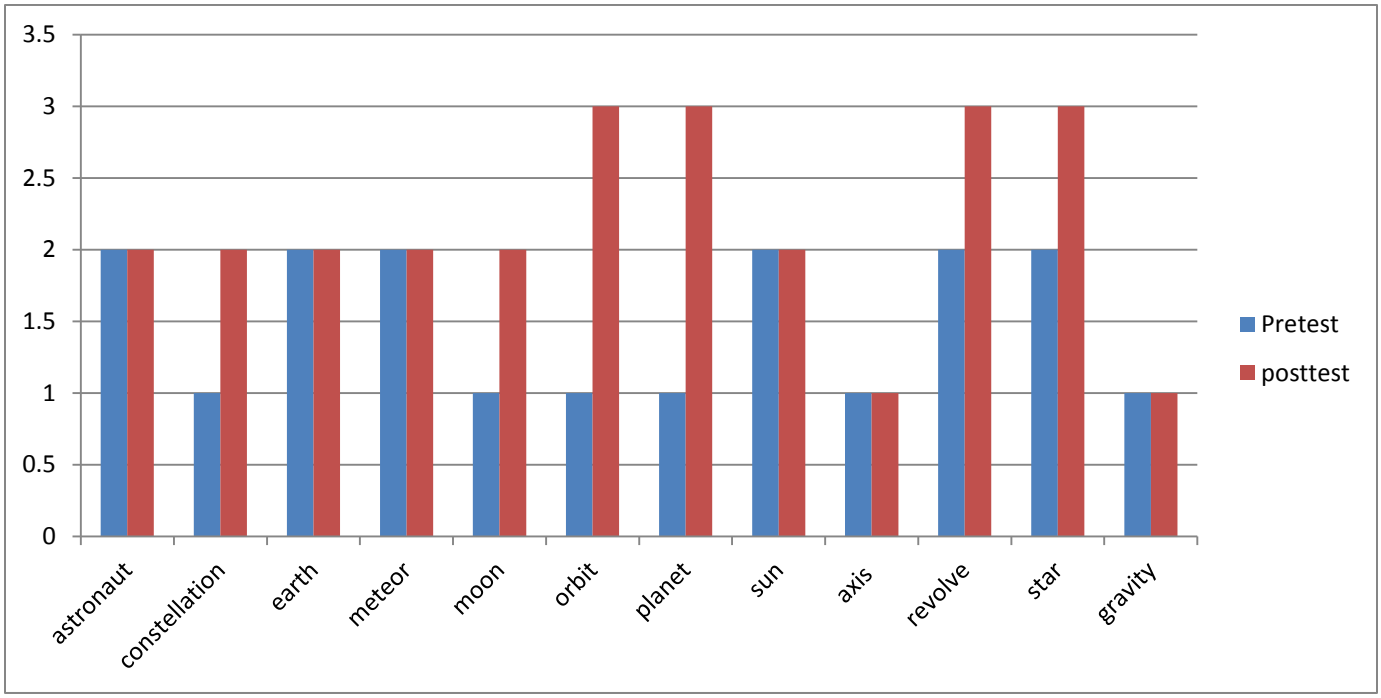
Table 1

Understanding of Target Vocabulary

3 points Detailed understanding	2 points Partial Understanding	1 point Minimal or No Understanding
-student drew an accurate picture to show their understanding of the concept -student used words to describe the term and clarify meaning -student gave an accurate oral definition and could clarify and/or give examples	-student drew a partially accurate picture to show their understanding of the concept -student wrote the term or attempted other words but meaning was not clear -student gave a brief definition of the term but could not clarify or give examples	-student drew a basic picture to show their understanding or no clear picture was drawn -student did not use written words to describe or clarify the concept -student did not give an accurate oral definition

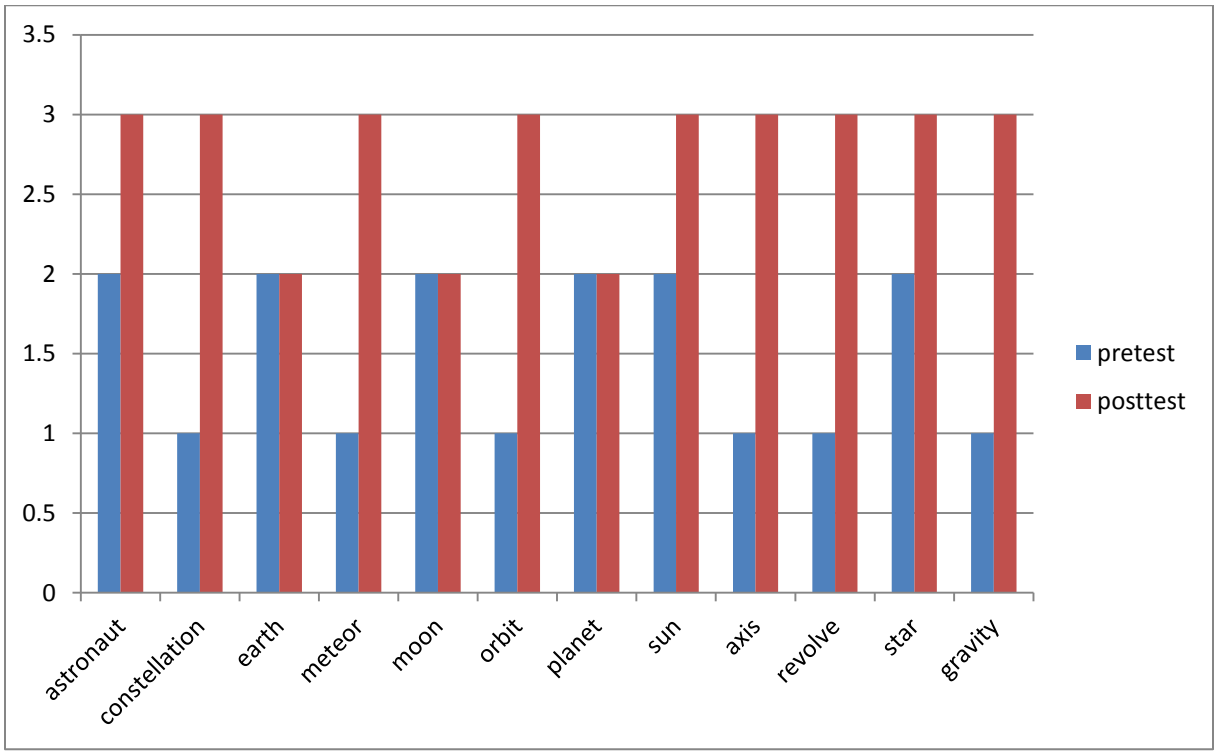
Pretest (Appendix A) scores showed that almost all six students had minimal or no understanding to partial understanding of the twelve target words. None of the students demonstrated a detailed understanding of any of the target vocabulary words on the pretest. Posttest scores showed that student understanding increased for most words. Although students did not draw pictures that were much more detailed than those drawn for the pretest, many were more accurate. Additionally, students gave more accurate oral definitions when asked to clarify or explain their drawing or written words. Pre and posttest scores for each student are illustrated and explained using the following figures 1-6.

Figure 1. Damontae Pretest and Posttest Scores



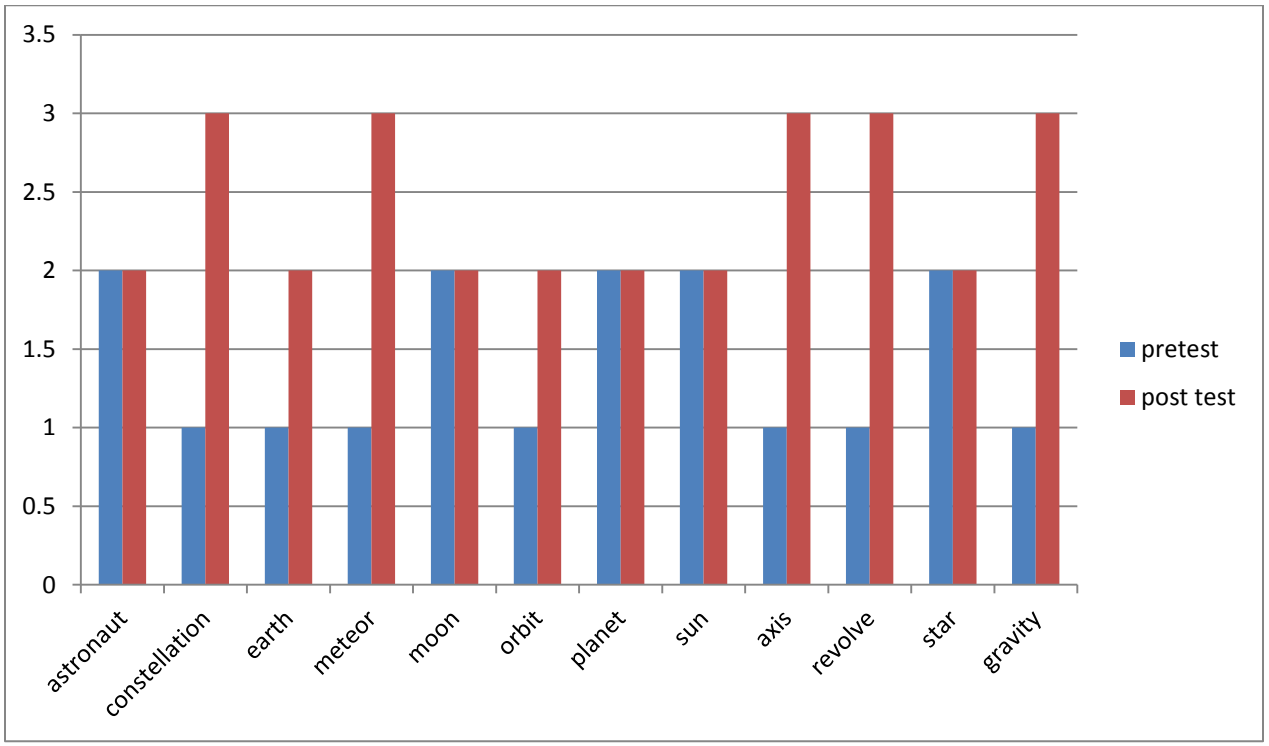
Damontae is a student identified as a below grade level reader by the universal screening test used by the school district (Measurement of Academic Progress) and classroom data. Damontae is reading and comprehending at least one academic year below grade level. Damontae scored either a 1 or 2 on all pretest (Appendix A) items, which means he showed minimal to partial understanding on the target vocabulary words. On the posttest, Damontae earned a score of 2 or 3 on most target vocabulary words. The exceptions were the words axis and gravity, on which his posttest score of 1 matched his pretest score. This graph also shows that on four other target vocabulary words, Damontae's score of 2 remained the same from pre to post test. Damontae showed a more detailed response for 6 of the 12 words.

Figure 2. Cashuel Pretest and Posttest Scores



Cashuel is a student who is identified as an above grade level reader by the universal screening test used by the district (Measurement of Academic Progress) and classroom data, which means that he is reading and comprehending at least one academic grade level above his current grade level. Cashuel earned a score of 1 on the pretest (Appendix A) for six of the twelve target vocabulary words. Cashuel demonstrated minimal to no understanding for those words. Cashuel earned a score of a 2 on the other six target vocabulary words which demonstrated a partial understanding of those words. On the posttest, Cashuel demonstrated growth in nine of the twelve target vocabulary words. On the three remaining words, the posttest score remained the same as the pretest score, a 2. This indicates that he did not demonstrate growth in understanding of these three vocabulary words.

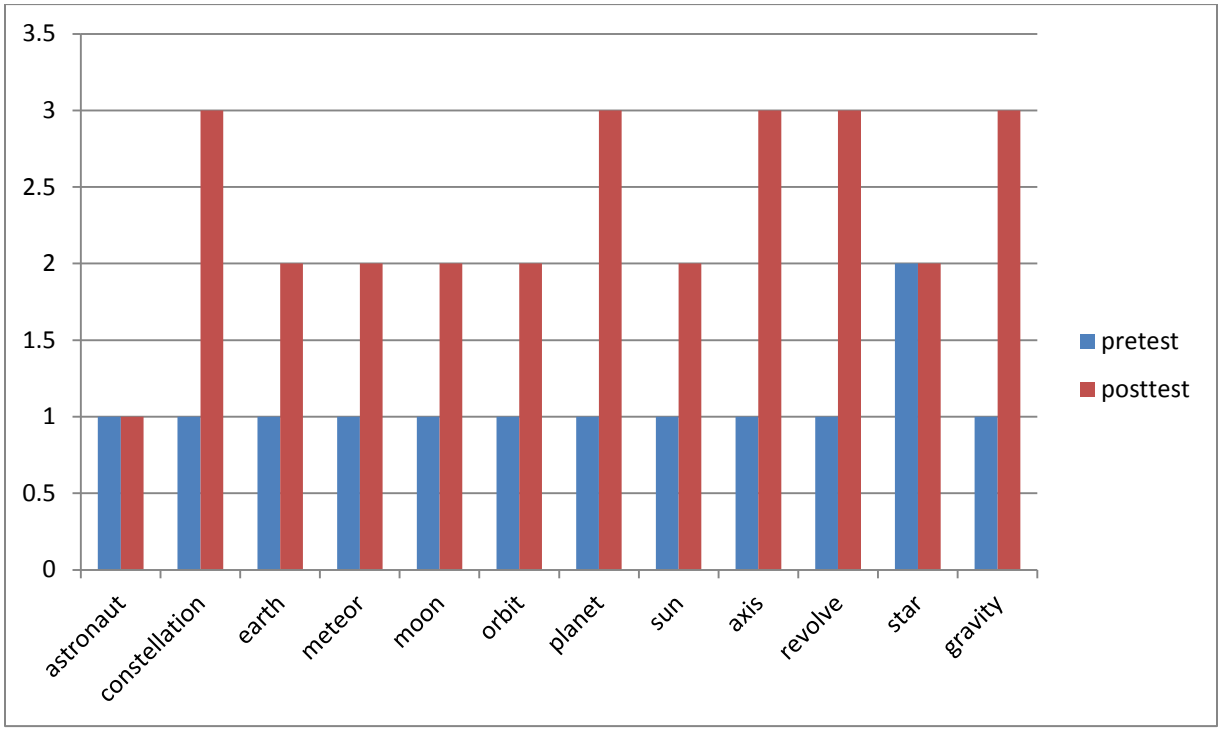
Figure 3. Zhanobia Pretest and Posttest Scores



Zhanobia is a student identified as an on level reader by the universal screening test used by the district (Measurement of Academic Progress) and classroom data, which means she is reading and comprehending at her current grade level. Zhanobia earned a score of a 1 on the pretest (Appendix A) for seven of the target vocabulary words meaning she demonstrated no to minimal understanding of those words. She earned a score of 2 on the pretest for the remaining five target vocabulary words which indicated a partial understanding of those words. On the posttest, Zhanobia increased her score from a 1 to a 3 for five of the vocabulary words indicating growth from minimal to detailed understanding of the vocabulary words and from a 1 to a 2 on two of the vocabulary words indicating growth from minimal to partial understanding for those words. Zhanobia earned a score of 2 on the posttest as well as the pretest for the remaining five vocabulary words, which indicated that there was no growth in understanding of the meaning of

those words. Zhanobia showed growth in understanding for seven of the twelve target vocabulary words.

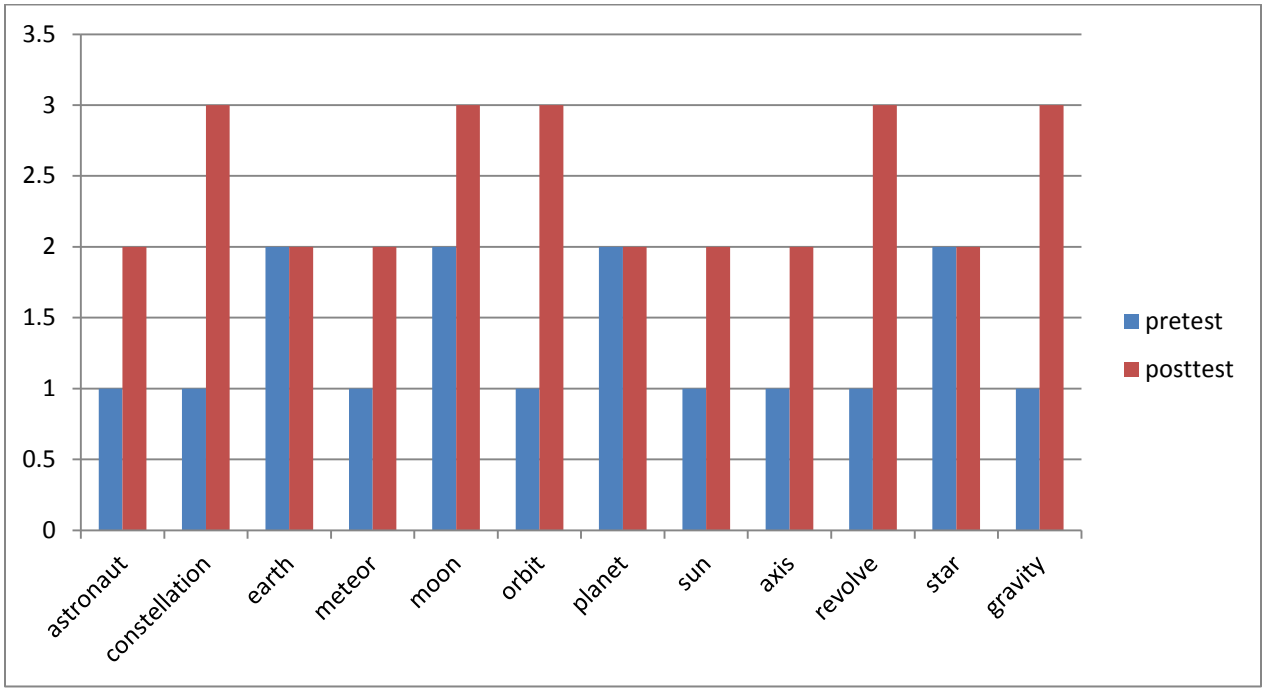
Figure 4. Damontay Pretest and Posttest Scores



Damontay has been identified as a below grade level reader by the universal screening test used by the district (Measurement of Academic Progress) and classroom data. On the pretest (Appendix A), Damontay earned a score of 1 on all of the target vocabulary words except for one, star, which he earned a score of 2. This indicates that Damontay had no to minimal knowledge of most of the target vocabulary words. On the posttest, Damontay increased his score from a 1 to 2 for five of the vocabulary words indicating that he demonstrated growth in knowledge of the chosen vocabulary from minimal to partial understanding. His score increased from a 1 to 3 for five of the vocabulary words, showing growth from minimal to detailed

understanding of those words. For one word, Damontay's posttest score remained the same as his pretest score of 1. This indicates that Damontay did not demonstrate growth in knowledge for that word. For the last vocabulary word, his posttest score of 2 remained the same as the pretest score. Again, this indicates that no growth in knowledge for the word was demonstrated. Damontay showed growth in understanding for a total of ten of the twelve target vocabulary words.

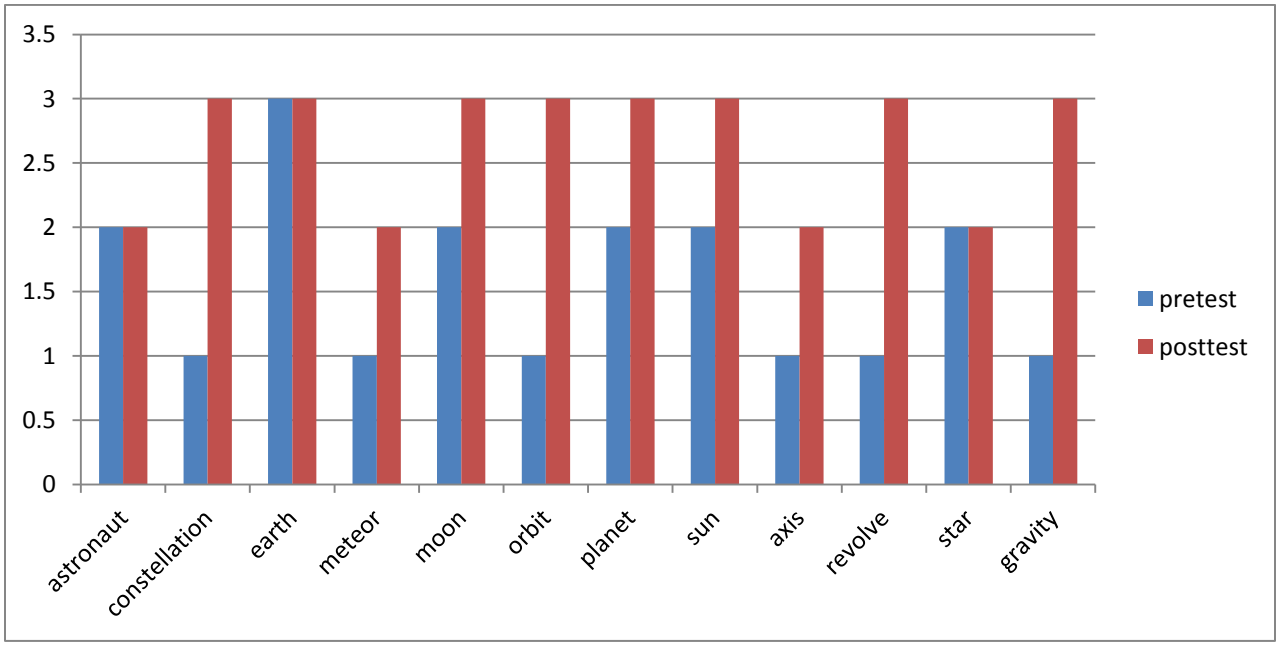
Figure 5. Ahnya Pretest and Posttest Scores



Ahnya is identified as an on level reader by the universal screening test used by the district (Measurement of Academic Progress) and classroom data, reading and comprehending material at her current grade level. On the pretest (Appendix A), Ahnya earned a score of 1 on eight of the target vocabulary words, demonstrating minimal knowledge of those words. She

earned a score of 2 on the remaining four words, indicating partial understanding of the vocabulary words. On the posttest, Ahnya's score increased from a 1 to 2 on four of the vocabulary words. This indicates that her understanding of the vocabulary words increased from minimal to partial understanding. Her score increased from a 1 to 3 on the posttest for four of the target vocabulary words, showing growth in knowledge from minimal to detailed understanding. The posttest showed Ahnya increased her score from a 2 to 3 for one of the vocabulary words, indicating word knowledge growth from partial to detailed understanding. The remaining three words received a score of 2 on both the pretest and the posttest, indicating no growth in knowledge for those words. Ahnya showed growth in understanding for nine of twelve vocabulary words.

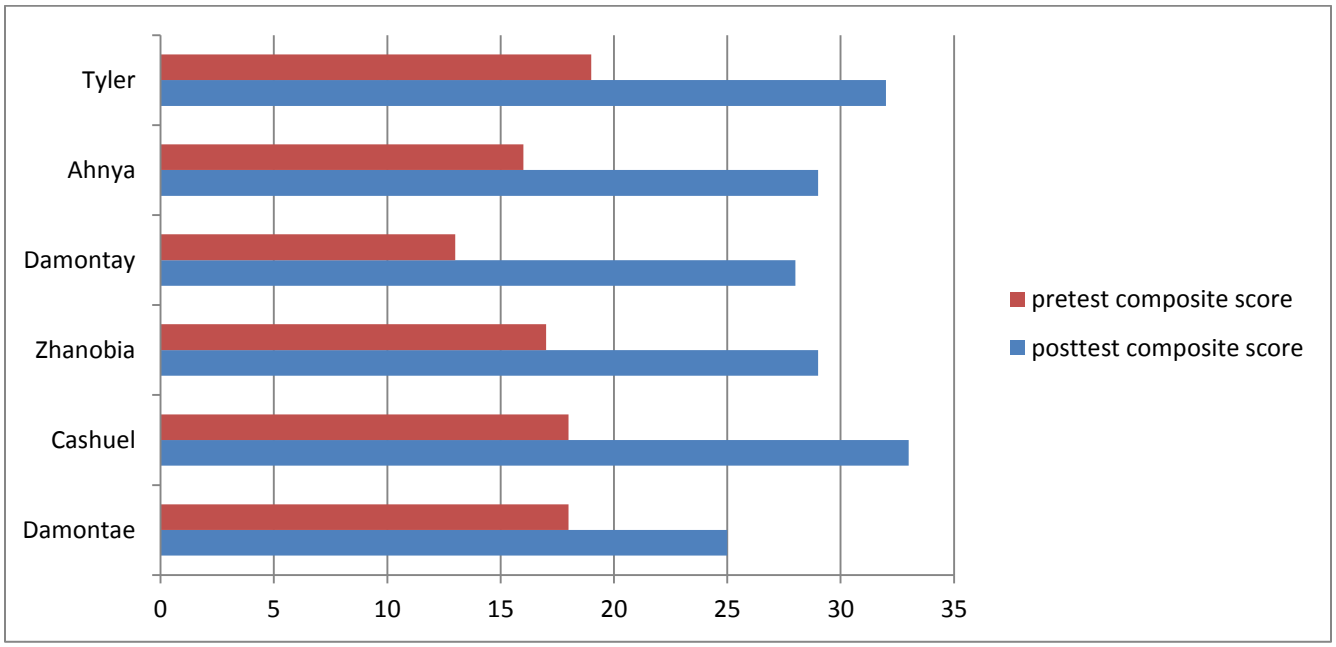
Figure 6. Tyler Pretest and Posttest Scores



Tyler is identified as an above grade level reader by the universal screening test used by the district (Measurement of Academic Progress) and classroom data, reading and comprehending material at least one academic year above his current grade level. On the pretest (Appendix A), Tyler earned a score of 1 on six of the target vocabulary words. This means that he showed minimal understanding of those words. Tyler earned a score of 2 for five of the vocabulary words, meaning he showed partial understanding of those words. For the remaining word, he received a score of 3 on the pretest showing a detailed understanding of that word. On the posttest, Tyler's score increased from 1 to 2 for two of the vocabulary words. This indicates growth in word knowledge from minimal to partial understanding of those words. His score increased from a 1 to 3 for four of the target vocabulary words, indicating growth in word knowledge from minimal to detailed understanding. Tyler's score improved from a 2 to 3 for three of the target vocabulary words, indicating growth in word knowledge from partial to detailed understanding. Tyler's posttest score remained the same for the remaining three words, indicating no growth in word knowledge for those words. Tyler showed growth in word knowledge for a total of nine of the twelve selected vocabulary words.

To summarize overall outcomes for each student, a composite score was calculated based on total pretest and posttest (Appendix A) scores. A total of 36 points could have been earned on both the pretest and the posttest. The comparison of these composite scores of the pre and posttests are shown in Figure 7.

Figure 7. Composite Scores Student Pretests and Posttests



Each item on both the pre and posttests was assessed using a rubric (Table 1). The student could earn up to 3 points for each item based on the level of understanding that he/she demonstrated about the vocabulary word. A total of 36 points could have been earned on both the pretest and posttest. Each student's scores for both the pre and posttest were combined to create a composite score for each assessment. Pretests and posttests were compared to determine total point increase between pretest and posttest. Damontae scored a composite pretest score of 18 and a composite posttest score of 25. The increase from pretest to posttest is 7 points. Cashuel's pretest composite score is 18 and his posttest composite score is 33. Total increase from pretest to posttest is 15 points. Zhanobia's composite pretest score is 17 and posttest composite score is 29. This indicates a point increase of 12 from pretest to posttest. Damontay has a pretest composite score of 13. His posttest composite score is 28 indicating a point

increase of 15 from pretest to posttest. Ahnya's pretest composite score is 16. The posttest composite score is 29, indicating an increase of 16 points. Tyler has a pretest composite score of 19 and a posttest composite score of 32. A point increase of 13 points was shown for Tyler.

Students showed an increase from pretest to posttest (Appendix A) in all cases. Composite score increases ranged from a 7 point increase to a 15 point increase. There are no students that decreased composite scores or that did not make an increase of points from pretest to posttest.

In conclusion, all six students showed growth for at least six of the twelve selected vocabulary words. There did not seem to be a pattern or common result across all six students. Students differed on which words showed evidence of growth and which words maintained a level of understanding. Reading levels of the students did not affect results. Results did not indicate that students of a particular reading level benefitted more or less from the intervention. These results and the possible reasons for the outcome of this action research will be discussed in the next chapter.

Chapter Five

Conclusions

This study sought to answer the question; will students develop a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text? The researcher provided explicit, focused instruction of target science vocabulary. The findings of this study led me to conclude that students gained in understanding of the target vocabulary as a result of this intervention. My findings support those of existing research by researchers including Kindle (2009), Beck and McKeown (2007), and Coyne, McCoach, and Kapp (2007) that when focused vocabulary instruction is provided, students' word learning increases.

Connections to Existing Research

Research regarding vocabulary instruction is ongoing. Juel and Deffes (2004) conducted a study on several types of vocabulary instruction; anchored word instruction, analytic vocabulary instruction, and context-based vocabulary instruction. Their research found that context-based vocabulary instruction was not the most effective type of instruction. Rather anchored and analytic vocabulary instruction were found to be more effective methods. Their findings informed my decision to include instruction in multiple contexts and connect each vocabulary word to the students' own experiences. Also guiding questions were used to discuss student knowledge of the vocabulary words beyond the context of which the target word had originally appeared. I provided repeated opportunities for students to hear the target words in varied contexts and helped students relate the target vocabulary words to both their own experiences and new knowledge of the words. Kindle (2009) examined and determined effective strategies for teachers to use during a read aloud to aid in vocabulary development. Kindle's

research found that focused instruction was used to teach vocabulary when word(s) were important to comprehension. Kindle also found that the most commonly used instructional strategy used by teachers to teach vocabulary during a read aloud is questioning. Other strategies Kindle found that were utilized by teachers were: providing a definition, providing examples, clarifying or correcting student responses, extending student definitions, and imagery. I used these same strategies identified by Kindle (2009) during the intervention designed for this study. I used questioning as a main strategy to aid in student learning of target vocabulary words and used many of the other strategies identified by Kindle (2009) to help students complete the graphic organizer used in the intervention (Appendix C).

The use of these strategies was reinforced by Beck and McKeown's (2007) research. Beck and McKeown conducted research that compared the effect of instruction of sophisticated words to no instruction of the words. Beck and McKeown's (2007) findings supported Kindle's (2009) findings that students learn words when instruction that focuses on vocabulary words is provided. Research by Coyne, McCoach, and Kapp (2007) also supports extended or focused instruction of target vocabulary words in comparison with incidental exposure to words that occur while reading. Their research found that students experienced greater word learning through focused instruction of target vocabulary words than with words encountered incidentally while reading. In a study conducted by Hashemi and Gowdasiaei (2005), the researchers compared instruction on vocabulary words related to a topic to instruction regarding vocabulary words not related to a common topic. They found that students were able to learn more words when those words were all related to a common theme or topic. Based on these findings, for the purpose of this action research study, I chose twelve words all related to the common theme, space, to focus the vocabulary instruction on.

Connections to Common Core Standards

As educators, our lessons are guided by the Common Core State Standards. The lessons presented in class need to connect to these common core standards to ensure students are receiving the skills they need to be successful in school and beyond school years. My action research aligns with the standards for Vocabulary Acquisition and Use L.1.4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 1 reading and content, choosing flexibility from an array of strategies; Use sentence-level context as a clue to the meaning of a word or phrase. Through focused vocabulary instruction given in this intervention, students determined meanings of unknown words or clarified meanings of target vocabulary words. Varied contexts were used to enhance student understanding of each vocabulary word and students were given opportunities to determine or clarify the meaning of the target vocabulary word using sentences containing the vocabulary word within each context. Vocabulary Acquisition and Use L.1.5. With guidance and support from adults, demonstrate understanding of figurative language, word relationships and nuances in word meanings; Identify real-life connections between words and their use. Through teacher-led discussions, students were able to connect each vocabulary word with a real life example. For example, an astronaut travels through and explores space. Vocabulary Acquisition and Use L.1.6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g. because). Students were able to use target vocabulary in teacher-led discussions and read-alouds and were able to verbalize the relationship of each vocabulary word and its meaning.

Explanation of Results

Based on the results of my research I found that students' understanding of the vocabulary words had increased overall. Students demonstrated a greater understanding of the target vocabulary words as a result of focused instruction on the words chosen for instruction. Students made greatest gains in understanding for vocabulary words that they had the least initial knowledge about before instruction. Student understanding went from no understanding to partial or detailed understanding after instruction. This could be because students had never been exposed to those particular vocabulary words before and gained understanding of the word through examples and discussions of the word. Students made the least gains in understanding with words they had partial understanding of before instruction. This could be due to the fact that the instruction provided, including the examples and discussions during the intervention did not provide the students with new information to deepen their understanding of the target vocabulary words.

Strengths

An important strength of this action research is that teachers can implement this strategy immediately in their classrooms, without additional training, with measurable results. By implementing strategies such as guiding questions, discussion, examples, and graphic organizers teachers can adapt this strategy in their classrooms to provide target vocabulary instruction in science. Another strength to this action research is that it follows prior research that used focused instruction with trade books during reading class, and altered it to focus on another content area, science, and still showed gains. A third strength is that previous research has shown that vocabulary knowledge correlates closely with reading comprehension and that these

skills are necessary for showing academic success in school (NICHD, 2000; Snow et al., 1998). Therefore, this study deepens vocabulary understanding in science which will aid students in their academic success. A fourth strength for this study is how efficient and effective the strategy is. Gains were made in a short time span of 6 weeks, twice weekly, for 20 minutes. A final strength of this action research is that the findings reported in this study indicate that this strategy is appropriate and effective for students regardless of reading level. Students identified at each reading level (below, on, and above) made gains in vocabulary understanding as a result of this intervention.

Limitations

One limitation to the study is that the format of the pre/posttest used was subjective. Including a detailed rubric did limit this; however, it did not eliminate it. Using a standardized test would eliminate this problem. A second limitation to this study was the amount of words chosen for instruction. Twelve words chosen for explicit instruction may have been too many to focus on in the six week time limit used for this action research. With more time, or a fewer amount of vocabulary words, more in-depth instruction could have been provided. A third limitation of this study is that students' understanding of target vocabulary was not assessed long term. Students were assessed on their understanding at the end of the six week instruction, but understanding was not assessed again to determine if students retained their understanding of the vocabulary words.

Recommendations for Future Research

To guide future research, I would suggest using the target vocabulary words across content areas to help student make connections outside of the original content area. By creating

these connections between content areas, students can develop a deeper level of understanding for not only the vocabulary word, but within the contexts it is used. I would also guide future research to expand and include other content areas to show that focused vocabulary instruction is beneficial for vocabulary words in any content area. I would also suggest investigating the results of letting the students choose their own vocabulary words for instruction, would students make greater gains by identifying words themselves intended for focused instruction? Additionally, I would suggest investigating the results of this study on a larger scale, perhaps whole class. Would students make similar gains without small group attention? Finally, I would suggest investigating students' long-term success of word learning. Do students become more independent word learners in higher grades with focused instruction in primary grades?

Conclusions

Vocabulary instruction aids in building background knowledge and comprehension (Stahl and Fairbanks, 1986). Finding ways to build effective vocabulary instruction is a necessity for educators. Previous researchers have shown that focused instruction in vocabulary is beneficial for students (Kindle, 2009; Beck and McKeown, 2007; Coyne, McCoach, and Kapp, 2007). I have shown through my action research that students developed a deeper understanding of science vocabulary with instruction in content vocabulary beyond the curriculum text. By providing explicit focused instruction in twelve science vocabulary words related to a unit on space, students gained in understanding of these words. The findings of this action research show that explicit, or focused, instruction of content vocabulary is beneficial for students' understanding of target vocabulary words. Based on the results of this action research, I will include focused vocabulary instruction in content areas beyond the curriculum text to improve students' learning and academic success.

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Appendix A

Pretest/Posttest

_____

Vocabulary Word

Use pictures and/or words to show what this word means.

Appendix B

Rubric

Table 1. *Understanding of Target Vocabulary*

3 points Detailed understanding	2 points Partial Understanding	1 point Minimal or No Understanding
-student drew an accurate picture to show their understanding of the concept -student used words to describe the term and clarify meaning -student gave an accurate oral definition and could clarify and/or give examples	-student drew a partially accurate picture to show their understanding of the concept -student wrote the term or attempted other words but meaning was not clear -student gave a brief definition of the term but could not clarify or give examples	-student drew a basic picture to show their understanding or no clear picture was drawn -student did not use written words to describe or clarify the concept -student did not give an accurate oral definition

Appendix C

Graphic Organizer

Vocabulary A-Z .com

CONCEPT WEB
DAY 1

(Page 1 of 1)

Name: _____

INSTRUCTIONS: Have students write a topic or word in the rectangle. Then have them write or draw details about the topic or word in the surrounding circles.