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THE IMPACT OF ACADEMIC VOCABULARY INSTRUCTION ON
READING PERFORMANCE OF SOPHOMORE STUDENTS ON
THE FLORIDA COMPREHENSIVE ASSESSMENT TEST FROM 2008 AND 2009

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the Department of Educational Research, Technology and Leadership
in the College of Education
at the University of Central Florida
Orlando, Florida

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ABSTRACT

This study investigated the change in sophomore reading scores on the Florida Comprehensive Assessment Test after the implementation of an academic vocabulary program and the change in teacher knowledge and professional practice after a program of staff development in academic vocabulary. The purpose was to determine if the impact of the professional development on student reading performance.

The study analyzed student data from 2008 and 2009 gathered from the Florida Department of Education, and teacher data collected from a survey used as a pretest/posttest. Variables used in the analysis of student data included demographic subgroups of white, African-American, Hispanic and students with disabilities, English language learners, and economically disadvantaged students. Teacher variables used were years of teaching experience and curriculum area.

Both an ANCOVA and a multiple logistical regression were used to analyze change in student reading performance. Student reading score performance dropped for subgroups and overall. Several intervening variables could explain this downward change: budget cuts resulting a change in instructional day from six to seven-period day with loss of instructional time,

reduction in number of teachers, increase in student population, and change in start time for school day (from 7:15 a.m. to 2:30 p.m. to 9:30 a.m. to 4 p.m.).

An ANOVA and independent t-test were used to analyze teacher pretest/posttest data. The data indicated a positive change in teacher knowledge and instructional practice, though not statistically significant.

It should not be concluded from the reading scores that the program of academic vocabulary was not successful, but rather that vocabulary instruction is only one of the essential components of any plan to improve secondary student reading performance.

Further research should be conducted to replicate this study during a time period without intervening variables experienced during the span of this study. Additionally, students should be matched to their teachers to examine the relationship between individual teacher and student performance. This study should be replicated in a high school with different demographics and different level of student achievement.

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During my career, I have learned so much from my students and colleagues. They provided the impetus for me to continue learning. My friends, faculty, study group, and family provided encouragement and support throughout my journey, and I am grateful to them for their confidence in me.

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CHAPTER ONE: INTRODUCTION

In the era of high-stakes testing and accountability, improving student achievement for all learners is a focus for educators. Effective school leadership is documented as having a significant impact on student learning. Marzano, Waters, & McNulty, (2005), conducted a meta-analysis that reviewed 30 years of research and found a correlation of .25 between principal leadership and student achievement. Improving student achievement in reading as measured by the Florida Comprehensive Assessment Test (FCAT) has been a challenge since the inception of this assessment in 1998. By the time a student reaches high school, most students are able to recognize words and decode text. The bigger challenge is the comprehension of text that becomes increasingly more complex in high school as the gap in background knowledge widens (Marzano, 2004). Commercial reading programs asserting research-based results are readily available for schools to purchase, but they vary in price and success.

Additionally, in light the school funding crises, spending money to purchase a program may not be prudent from either a financial or educational viewpoint when a method exists that is both relatively free and effective. Improvement of student vocabulary within academic disciplines is an area of study that shows promise not only for reading improvement, but also for mastery of content area knowledge.

In his work on school effectiveness, Marzano (2003) identified “a guaranteed and viable curriculum” as a critical factor in student achievement (p. 22). In addition to the Sunshine State Standards written by the Florida Department of Education (FLDOE) and benchmarks established by the local school district, the development and implementation of an academic vocabulary program could provide a guaranteed curriculum at the school level. These guaranteed terms that students explain and describe more than define, provide students with academic language. Much of the theoretical basis and instructional design for academic vocabulary is the work of Marzano and Pickering (2005).

Literature Review

Vocabulary Instruction

Kenny (2004) found that student vocabularies expanded through the use of recognition exercises more than when students used paper and pencil practice. Lesley Marwood’s Classroom Performance System, as cited in Kenny, enhanced group performance and improved educational achievement in vocabulary using the prescribed vocabulary recognition strategies (Kenny).

Direct vocabulary instruction has a strong impact on student achievement. Marzano (2004) found that students who had no vocabulary instruction scored

lower than those who had direct vocabulary instruction. Students with no instruction scored at the 50th percentile, but students with instruction scored at the 62nd percentile (effect size = .32). The direct method described involved students learning 10 to 12 new words a week from a high-frequency list. When students received vocabulary instruction on specific words essential to the content, however, their scores increased by 33 percentile points. Clearly, “direct vocabulary instruction has an impressive track record of improving students’ background knowledge and the comprehension of academic content “(p. 69).

Silverman (2005) knew that vocabulary is an important prerequisite to literacy and investigated the efficacy of storybook reading in improving vocabulary in young children. Her work found that analytical and multidimensional vocabulary practice tied to literature was a more effective practice than standard pedagogy of memorizing definitions. Relating essential terms to literature enhanced both short and long-term knowledge of words. This practice especially served English language learners (ELL) in catching up with their non-ELL peers.

Marzano and Pickering (2005) developed a six-step method of vocabulary instruction designed to develop students’ academic language. This language, or academic vocabulary, originated with terms identified by subject-area teachers as essential to the understanding of a course or class, improved background knowledge and enhanced students’ capacity to learn when the six-step process

was used. Rather than memorize definitions of lists of terms, students described and explained new terms in their own words, reviewed them frequently in activities and games, and focused on terms important to the course content.

In Ward's study (2006), Bethan Marshall of King's College in London opined that there is no substitute for what books do in terms of helping students expand their world and extend their vocabularies. The effectiveness of information and communication technologies to increase student achievement was compared to books. Ward's research showed that 100 English pounds spent on books per upper grades pupil had a greater impact on average test scores in English, mathematics, and science when compared to the same amount spent on technology. The average score rose from 27.5 to 27.9 or a 15% increase per student.

In seven Title I schools, 15 third grade teachers were randomly assigned a vocabulary intervention method or to a control group in a study by Helen Apthorp (2006). Trained examiners conducted pretests and posttests of oral and sight vocabulary. At one school, students in the treatment group compared to the control group showed improvement. Contextual factors and student characteristics appeared to affect the results more than the methodology.

How teachers use instructional time and its influence on student achievement was examined by Miller (2006). Using direct classroom instruction, trained examiners tabulated best practice methodology in vocabulary, reading

comprehension, and word study. Arizona state reading tests were used to measure student performance. Teaching students how and when to use comprehension strategies and the allocation of time had a positive effect on student achievement.

The unexpected, and large, gains in average intelligence quotient (IQ) gains in the last ten years presented a paradox according to Flynn (2007). The Wechsler Intelligence Scale for Children (WISC) is a collection of subtests measuring, among other items, vocabulary, arithmetic, and subjects who score above average on one subtest tend to excel in all categories. The vocabulary portion measures the words people have accumulated in everyday life. The unexpected score gains in thirty countries are the source of speculation. Flynn posited that either the tests are no longer a valid measure of IQ, or kids are getting smarter. He believed the explanation is more complex than just kids getting smarter. Students and teachers intentionally studied vocabulary which had a direct impact on performance on the WISC or other methods of assessing ability.

Doherty and Hilberg (2007) examined the relationship between pedagogy and student achievement. Twenty-three teachers and their 344 students participated in the year-long study which began with pretests and concluded with posttests. Teachers reliably predicted performance on year-end assessments in reading comprehension, vocabulary, and spelling using the standards for

effective pedagogy. The greatest gains occurred in classrooms in which the standards for vocabulary were practiced in diversified activity settings.

Two college students wondered why they could so easily learn all the words to rap songs, but struggled with challenging vocabulary words found on standardized tests. They began an academic rap company named Flocabulary which produced a CD entitled, *A Dictionary and a Microphone*. Menchville High School in Newport News, Virginia used the Flocabulary CD with juniors, and the students' average Scholastic Aptitude Test writing score rose from 420 to 477 after using the method of learning vocabulary words rap style for one year (Harrison & Rappaport, 2007).

Tredwell (2007) investigated the impact of peer tutoring on vocabulary growth. The study measured vocabulary growth over a six-week period and used a pre- and posttest to gather data. Students were assigned a peer tutor who had been trained to model the correct use of specific target vocabulary words.

Professional Development

The effects of professional development for experienced teachers in vocabulary instruction in a critical content area were studied by Armstrong (2000). Secondary science teachers participated in ten hours of professional development in specific vocabulary instruction and then their practices were observed. Students in both the control and the experimental group took

vocabulary pretests before the ten-week regimen of prescribed activities began. Students in the experimental group performed better on the posttest. Both teachers and students were interviewed at the culmination of the project and both groups responded favorably to the activities and the results.

Teacher participation in professional development activities explained significant amounts of variation in mathematics and science achievement (Weglinsky, 2000). His research with 7,500 eighth graders found that teacher involvement in professional development had as much influence on the variance in student achievement as did student background.

In an extensive research on the effects of professional development, Garet, Porter, Desmone, Birman, and Yoon (2001) surveyed over 1000 teachers. Their findings show that if professional development is to change teacher behavior, then it should focus on content knowledge in an atmosphere of active learning.

The research on effective schools points directly to the principal being recognized as an instructional leader in schools that succeed (Terry, 1996). Marzano, Waters, and McNulty (2005) asserted that the successful school is one that is lead by a principal who has knowledge of curriculum, instruction, and assessment. That knowledge provides the “guaranteed and viable curriculum” to ensure that teachers address the essential content (p. 110).

Statement of the Problem

This study sought to determine if there was a relationship in the changes in available data (FCAT reading developmental scale scores) and teacher knowledge and skill in vocabulary instruction. The hypothesis used in this study was that if teachers participated in professional development provided by the principal (also the researcher) that there would be an improvement in student achievement as measured FCAT reading scores.

Purpose of the Study

The work of an instructional leader is to help teachers help students learn. How to help high school teachers help their students improve reading achievement is a complex issue. Working with teachers to develop a guaranteed curriculum, such as a program of academic vocabulary, was the impetus of this study. The goal was to guide teachers to implement such a program which could result in significant improvement in student reading. The researcher was the principal of the study school. In 2008 and 2009, the researcher conducted a pre-test and posttest assessment as well as personally provided the professional development in academic vocabulary.

Significance of the Study

The importance of academic vocabulary is reflected in the following statement by Marzano (2004):

Enhancing students' academic knowledge...is a worthy goal of public education from a number of perspectives. In fact, given the relationship between academic background knowledge and academic achievement, one can make the case that it should be at the top of any list of interventions intended to enhance student achievement. (p. 4)

Research Questions

The study was guided by the following Research Questions:

1. What relationship, if any, existed between the Florida Comprehensive Assessment Test reading scores of sophomore students from 2008 to 2009 after teachers implemented the academic vocabulary program?
2. To what extent, if any, did different demographic student sub-groups (white, African-American, Hispanic, economically disadvantaged, English language learners, and students with disabilities) benefit from teacher participation in the academic vocabulary professional development program according to change in FCAT reading scores?

3. To what extent did teachers report changes in their knowledge and implementation of research-based vocabulary instruction as a result of participation in professional development?
4. What relationship, if any, existed between FCAT reading change and change in knowledge and skill in vocabulary teaching reported by teachers?

Methodology

Population

The population used for this study was the 1600 sophomore students and the 175 teachers of a high school located in Central Florida over the course of the 2008 and 2009 school years.

The student population of the study school was disaggregated into subgroups of students on this school campus identified as white (59%), African-American (12%), Hispanic (26%), economically disadvantaged (28%), English language learners (ELL) (14%), and students with disabilities (SWD)(22%) for an analysis of learning gains. All classroom teachers in the school participated in a program of professional development for academic vocabulary, but the possible impact of academic vocabulary on student learning for the purposes of this study was measured by FCAT reading scores of sophomore students in 2008 and 2009.

The entire classroom teacher population participated in the pretests and posttests (Appendix A) for the purposes of data collection.

Procedures

A program of professional development for teachers was designed and conducted to present the theoretical framework for an academic vocabulary program, the process of creating academic vocabulary lists, and the instructional strategies required for the implementation of an academic vocabulary program within each content area. A pretest was administered to all teachers as the first segment of the professional development activities to determine faculty baseline knowledge and opinions.

Training the teachers to develop the lists of academic vocabulary terms was the necessary first step for the implementation of an academic vocabulary program. Teachers worked within their content areas (English, mathematics, science, social studies, fine arts, business and computer education, physical education, performing arts, and foreign language) to identify the academic vocabulary of their courses; i.e., the terms, dates, names, places, processes, concepts, and phrases critical to the understanding of each content area course. These terms were gleaned from national and state standards as well as local benchmarks and goals. The lists of academic vocabulary terms were first developed horizontally by teachers for each specific course within each subject

area (e.g., world history academic vocabulary within the social studies department; algebra II academic vocabulary within the mathematics department). The number of academic vocabulary terms selected for each course was managed by determining if a term in question was critical to the understanding of the content, useful to the understanding of the content, or an interesting additional term in the content (Marzano & Pickering, 2005). In order for students to learn the academic vocabulary identified as critical, teachers controlled the number of terms introduced over time by considering both the number of terms deemed critical as well as the length of the school term in which students had to master them.

The second phase in the development of course-specific academic vocabulary terms was the vertical alignment of the terms by teachers to ensure that the sequence of the terms was appropriate and logical within the scope and sequence of each curricular area. The overlapping of key terms, people, events, processes, concepts, and dates was both acceptable and unavoidable, though not ideal. The target number of terms for each course was thirty; however, that number was a recommendation and not binding.

After the teachers completed and agreed upon their academic vocabulary lists for their courses within each curriculum area (Appendix B), the implementation began in the classroom. The process of teaching the academic vocabulary terms was not what was previously expected in terms of vocabulary

instruction. Implementation of academic vocabulary required student mastery of identified key academic vocabulary terms over time. It did not necessitate the rote memorization of lists of words with specific definitions assigned in long lists, but rather a six-step teaching process designed by Marzano and Pickering (2005).

Step 1: Provide a description, explanation, or example of the new term.

Step 2: Ask students to restate the description, explanation, or example in their own words.

Step 3: Ask students to construct a picture, symbol, or graphic representing the term.

Step 4: Engage students periodically in activities that help them add to their knowledge of the terms in their notebooks.

Step 5: Periodically ask students to discuss the terms with one another.

Step 6: Involve students periodically in games that allow them to play with terms. (pp. 14-5)

The first teaching step in the process was for an academic vocabulary term to be introduced to the students through explanation, with examples and non-examples presented and discussed. At this point teachers were able to determine prior knowledge, provide an example, or share an historical event. The second step required the students to write and maintain a list of academic vocabulary terms – similar to a glossary – in which they wrote definitions or explanations in

their own words throughout their course of study. Students often resisted this step and requested instead that teachers provide a definition, but it was important that students construct their own meaning for the critical terms. It was essential at this point that teachers check for understanding and monitor the accuracy of student work to ensure that students were learning correct information. It was also important for these lists of words/notebooks/glossaries belong to the students so that they were portable and able to be updated. For step three, students made graphic or non-linguistic representations of each term to reinforce their understanding and provide another method of reinforcing the term's meaning or significance. Modeling this step for students was important, and allowing students to work together on this step was also encouraged. The fourth step in the process of teaching academic vocabulary required teachers to provide opportunities for students to use their academic vocabulary terms regularly to deepen their understanding. The fifth and sixth steps both involved the purposeful and frequent referencing and reviewing of the essential academic vocabulary terms determined for each specific course. Using games, graphs, charts, and inconsequential competition to review the terms as well as provide opportunities for students to discuss and use the terms allowed the words to become part of students' long-term memories through the numerous and frequent use. These activities used to reinforce and expand on students' understanding of academic vocabulary terms occurred throughout each course

of study until the completion of the semester or school year. Rather than asking students to memorize a dictionary definition and/or use words in a sentence, the academic vocabulary terms identified by teachers as being critical and essential to the understanding of a subject area were learned and reviewed over time to improve student understanding and retention (Marzano, 2003).

Data Collection

In the spring of 2008 and 2009, ninth and tenth grade students took the Florida Comprehensive Assessment Test (FCAT) and data from this assessment were collected. Student performance on FCAT Reading was compared to previous year's scores with a focus on learning gains. Appropriate statistical procedures were used to calculate the difference in mean scores and to determine if the results were statistically significant. For Research Question One which was determine the relationship, if any, between FCAT reading scores of sophomore students from 2008 to 2009 after teachers implemented the academic vocabulary program, the researcher conducted a linear regression with the dependent variable (y) was grade 10 reading mean scale score, and the independent variable was the year. In determining if year was a statistically significant predictor of mean scale score, the relationship, if any, between the two variables was determined. Additionally, a one-way analysis of covariance (ANCOVA) was performed to examine performance of cohort group scale scores. To look at the

performance of student subgroups (Research Question Two), a multiple logistic regression was performed which yielded the likelihood of a student making a learning gain in reading based on a variety of predictors including the year and the subgroup. To further examine the performance of the different student subgroups, a one-way analysis of covariance (ANCOVA) was conducted to focus on the different levels of performance.

Instrumentation

A survey entitled Teacher Perceptions of Vocabulary Instruction (Appendix A) was conducted both prior to and at the conclusion of the treatment to assess teacher knowledge of vocabulary instruction, reading comprehension, and academic vocabulary. The instrument designed by the researcher collected data through a Likert-type survey distributed to teachers of the study school. The items represented a variety of 5-point Likert scale statements with a range of responses including the following: (1) strongly agree, (2) agree, (3) neither agree or disagree, (4) disagree, (5) strongly disagree, and (6) not applicable.

Demographic questions were included to identify teachers' areas of content specialization, years of the teaching experience, and highest degree of education earned. To answer Research Question Three which sought to determine the extent to which teachers reported changes in their knowledge and implementation of research-based vocabulary instruction as a result of

participation in professional development, a factor analysis was performed on the survey items, and independent T-tests were conducted to determine the differences in pretest and posttest surveys. Two-way factorial analyses were run to examine the results of teacher responses based on years of teaching experience and subject area taught.

The fourth question addressed the relationship between FCAT reading score change and change in knowledge and skill in vocabulary teaching reported by teachers. This question was answered by determining the change, if any, between the change in FCAT reading scores and change in teacher survey scores. Since no common measure was used, only inferential and anecdotal data was obtained.

Delimitations of the Study

The factors which delimited of this study included the following:

1. The study included the sophomore populations of one high school.
2. The effectiveness of the academic vocabulary program was only evaluated in terms of student success in FCAT Reading.

Limitations of the Study

The factors which limited the validity of this research included the following:

1. Unidentified factors including student motivation to perform, development growth, and impact of reading instruction may have influenced student scores on FCAT reading.
2. The implementation of the academic vocabulary program was dependent on individual teacher participation, cooperation and/or self-reporting.
3. Although the use of FCAT results was appropriate for the purposes of this study, the use of this assessment and its scaling procedures makes the information Florida specific.

Definitions of Terms

The following definitions are provided for terms that will be referenced throughout this study.

Academic vocabulary: Terms, names, dates, concepts, dates, and processes identified as essential to the mastery of individual academic subjects (Marzano & Pickering, 2005).

Developmental Scale Scores: These FCAT scores allow student progress within a subject area (reading and mathematics) to be tracked over time and across grade levels. They indicate growth and provide the scores to determine learning gains (FLDOE).

Florida Comprehensive Assessment Test: The Florida Comprehensive Assessment Test (FCAT) is administered annually to public school students in grades 3 through 11 by the Florida Department of Education. The FCAT sought to measure student achievement on the Sunshine State Standards in the areas of reading, writing, mathematics, and science. Student scale scores ranged from 100 to 500 and were reported in achievement levels: level 5 was the highest score, level 3 indicated on grade level and high performing, and levels 1 and 2 indicate poor performance and the need for remediation. Student achievement was also reported in developmental scale scores which range from 0 to 3000. Individual student progress in reading and mathematics was also reported as learning gains each year (Florida Department of Education).

Learning gains: Students can demonstrate a learning gain in one of three different ways: (1) improve by achievement level from 1 to 2, 2 to 3, 3 to 4, or 4 to 5; (2) maintain a high performing level of 3, 4, or 5; or (3) demonstrate at least one year's growth in developmental scale scores within levels 1 or 2 (Florida Department of Education).

Student subgroups: Student performance on FCAT is disaggregated and analyzed by subgroups. These subgroups of students have been determined by the federal No Child Left Behind Act of 2001 and include white, African-American, Hispanic, economically disadvantaged (ED) as determined by participation in the federal free and/or reduced lunch program, English Language Learners (ELL), and students with disabilities (SWD) (United States Department of Education).

Summary

This first chapter of five contained a literature review, the statement of the problem, and the purpose and significance of the study. The research questions, methodology, delimitations, limitations, and definitions of terms were included.

The second chapter will focus on the Review of Literature. In addition to an introduction and summary, reviews of the following topics are included: instructional leadership, vocabulary instruction, English language learners, and professional development.

The third chapter contains the research questions, the population, an explanation of the professional development treatment, and instrumentation. The data collection process is explained, and the statistical procedures used in the study related to student FCAT performance in reading, the results of the

teacher survey, and the relationship that can be inferred between the student scores and the teacher results are presented.

Chapter Four will include a discussion of the Analysis of Data, and Chapter Five will focus on the Summary, Conclusions, and Recommendations.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

This researcher's study centered on professional development provided by an instructional leader, the change in teacher knowledge and practice, and the effect of professional development on student achievement in reading. The hypothesis used in this study was that if teachers participated in professional development provided by the principal (also the researcher) that there would be an improvement in student achievement as measured by Florida Comprehensive Assessment Test (FCAT) reading scores. This chapter is divided into the following sections: (1) instructional leadership, (2) vocabulary instruction, and (3) professional development and concludes with a summary.

Instructional Leadership

Cawelti's (1987) research identified patterns of behavior among effective principals including vision, organization, instructional support, and the monitoring of student learning. He found that many principals spent a majority of their time in administrative and operational tasks. His explanation of instructional support required that a school leader have knowledge and expertise in designing staff development programs.

In his work on the relationship between leadership and student achievement, Williamson (1995) examined how principals function in different roles to promote community engagement and student learning. He found that successful principal characteristics included the ability to inspire, to develop people, and to lead change focused student achievement.

Hallinger and Heck (1996) looked for a direct effect between student learning educational leadership by reviewing numerous studies. Their findings suggest that the broader category of effective schools research ties back to instructional leaders. Principals, in their roles as instructional leaders, can shape the environment of the school to create a culture of teaching and learning. The sharing of vision and responsibility for student learning are important in establishing this culture. When this occurs, the conditions and processes in a school building, has an effect on student achievement (Hallinger & Heck).

The research on effective schools points directly to the principal being recognized as an instructional leader in schools that succeed (Terry, 1996). Marzano, Waters, and McNulty (2005) asserted that the successful school was one that was lead by a principal who had knowledge of curriculum, instruction, and assessment. That knowledge provides the “guaranteed and viable curriculum” to ensure that teachers address the essential content (p. 110).

Leithwood, Louis, Anderson, and Wahlstrom (2004) found in their work with the Wallace Foundation that “leadership is second only to classroom

instruction among all school-related factors that contribute to what students learn at school” (p.5). The total effects of instructional leadership on student achievement can account for approximately 25% of the total school effects (Hallinger & Heck, 1996; Leithwood, & Jantzi, 2000).

Fullan (2004) described of the role of the principal as a staff developer in the context of a moral imperative. The function of the principal as instructional leader rather than a manager as being important in breaking barriers to effective school reform. He identified the ability to facilitate and lead staff development as playing a crucial role in the changing framework of school leadership.

In a meta-analysis of 27 studies of instructional leadership, Robinson, Lloyd, and Rowe (2008) concluded that the impact of instructional leadership was almost four times that of transformational leadership. Their five sets of leadership practices that comprise instructional leadership included establishing goals and expectations, resourcing strategically, evaluating teaching and curriculum, promoting and participating in teacher learning, and the establishment of an orderly and supportive environment. They concluded that “a school’s leadership is likely to have more positive impacts on student achievement and well-being when it is focused on the quality of learning, teaching, and the teacher learning” (p.668).

If the goal in education is student achievement, then teachers and principals must be able to set high expectations for all students. Essential to the

achievement of those expectations is that teachers have the skills, knowledge, strategies to help students achieve them (Cross, 2008). Principals must be able to provide training for teachers that includes making expectations clear, spending time with students of all performance levels, and making sure students understand the relationship between effort and achievement.

The knowledge of content area standards is essential for principals in their roles as instructional leaders (Church, 2009). This knowledge is required to place teachers in appropriate schedules, assign mentors, and selecting instructional materials. Evidence supports a strong relationship between a strong library program and student achievement. Principals who know curriculum and standards are best equipped to support a strong library media programs that in turn support the needs of students and teachers with adequate and appropriate resources and services.

Based on data from interviews and surveys, Graczewski, Knudson, and Holtzman (2009) found a connection principals' involvement in instructional improvement and effective staff development focused on content and curriculum. This study supports the idea that for school reform to occur, principals must expand their roles beyond that of administering and managing schools to that of instructional leadership.

Frey and Fisher (2009) asserted that what teachers do in their classrooms was important in terms of student learning, but that it was the principals who

play a most important part in improving student performance from year to year. Classroom lessons must be designed to include focused lessons, guided instruction, and collaborative projects to independent learning. Principals must be able to observe classrooms and notice the presence or absence of quality instruction. The role of the principal then becomes that of guiding and training teachers to grow in their professional practice.

Vocabulary Instruction

The work of Youngs (1980) examined the effects of special vocabulary teaching and learning techniques on students of diverse academic abilities and their occupational interests. Using a vocabulary program entitled Exciting Words for Active Minds and Building Blocks for the Future (EWAM), teachers introduced a 1000-word list of terms identified as useful and frequently used in business that had been validated by managers and executives. Two experimental and two control groups of students who were of equal scholastic ability were created. The experimental group received EWAM lessons, and the control group received no special vocabulary instruction. Youngs found that the mean achievement difference between the two groups on vocabulary tests was insignificant, but that the experimental group maintained superior performance on achievement tests and earned higher grade point averages (GPAs). Higher

and lower ability students made similar gains with a correlation between GPA and vocabulary knowledge of .64.

In a study of 55 seventh graders from an urban school, Clark (1984) examined the effect of three different vocabulary instruction methodologies: (1) students studied a list of words with definitions, (2) students studied the identical words in context, and (3) students studied the same list of words with definitions and contextual sentence examples. Using the results of t-tests, Clark found that all three methods improved vocabulary knowledge and that there was not a preferred method.

Graham (1985) found that vocabulary instruction facilitated reading comprehension. In a study of 161 sixth graders, the significance of vocabulary knowledge on students' ability to understand inference in reading passages was explored. The students participated in pretests and posttests. The test group (TG) had twenty minutes of vocabulary instruction, and the control group had no vocabulary instruction. The TG scores showed a significant mean effect on inference questions.

Cregan (1989) investigated the importance of depth of word meaning for content area reading. An examination of 10 upper elementary history texts revealed that a substantial portion of content consisted of multiple-meaning words. Students were tested on those words, and the most frequently missed incorrect answers were the most familiar meanings. His findings supported his position that depth of

vocabulary knowledge was essential for students to have access to their content area reading.

Marmolejo (1990) investigated the relationship between vocabulary acquisition and reading experiences from a variety of sources. The study examined evidence that poor readers had difficulty learning from context since they did not have the vocabulary to understand the reading. The findings supported the position that different students had different needs for vocabulary instruction. The students who learned through direct instruction in vocabulary yielded a significant mean effect size. The tests of those students who learned through an incidental vocabulary approach did not yield significant results.

In a study that looked at the influence of vocabulary study on reading proficiency, Grimason-Lowewenthal (1990) worked with nine undergraduate students at an inner city community college. These students had been identified as not meeting minimum reading comprehension and projected to face extreme academic challenges in their college classes. Students were divided into four groups - three vocabulary groups and one control group. They were pre and post tested in vocabulary knowledge and reading comprehension. An analysis of the results showed strong gains in both vocabulary knowledge and reading comprehension in all three groups. Though the three vocabulary groups each used a different approach to vocabulary instruction, the findings showed similar gains with each of the three methods.

Vocabulary was presented as a major determinant of reading success for students in grades K-12 by Biemiller (2003). He cited the need for direct instruction for vocabulary growth rather than incidental acquisition. The methods for promoting vocabulary instruction were not as important as the actual teaching of vocabulary. The amount of vocabulary needed for successful learning was viewed as too large to rely on chance exposures with essential terms.

Time and access to a wide variety of reading materials was the most effective tool to improving reading (Shin, 2004). His study was to determine the role played by books in increasing vocabulary. He found that student vocabulary acquisition rates increased faster through reading than through direct instruction.

Two methods of systematic word study (workbook and words learned through context) were the basis for work done by Taliaferro (2004). Forty-eight students in grades 6-9 participated and took pretests and posttests. Taliaferro found that both methods of vocabulary instruction worked equally well as indicated by student performance on posttests.

Kenny (2004) found that student vocabularies expanded through the use of recognition exercises more than when students used paper and pencil practice. Lesley Marwood's Classroom Performance System, as cited in Kenny, enhanced group performance and improved educational achievement in vocabulary using the prescribed vocabulary recognition strategies (Kenny).

Moseley (2004) examined the quality of writing among 87 eighth grade students. Half the students had intensive vocabulary and writing instruction, and the other half had intensive vocabulary but no writing instruction. All students took the Test of Written Language 3rd edition (TOWL: 3) at the end of the instructional period. Moseley found no significant difference in scores of students in the vocabulary only group or the writing group. Students in the vocabulary with writing instruction group used the target vocabulary words in their writings three times more than the students who had only vocabulary instruction.

Direct vocabulary instruction has a strong impact on student achievement. Marzano (2004) found that students who had no vocabulary instruction score lower than those who had direct vocabulary instruction. Students with no instruction scored at the 50th percentile, but students with instruction scored at the 62nd percentile (effect size = .32). The direct method described involved students learning 10 to 12 new words a week from a high-frequency list. When students received vocabulary instruction on specific words essential to the content, however, their scores increased by 33 percentile points. Clearly, “direct vocabulary instruction has an impressive track record of improving students’ background knowledge and the comprehension of academic content” (p. 69).

Marzano and Pickering (2005) developed a six-step method of vocabulary instruction designed to develop students’ academic language. This language, or academic vocabulary, originated with terms identified by subject-area teachers as

essential to the understanding of a course or class, improved background knowledge and enhanced students' capacity to learn when the six-step process was used. Instruction should focus on words that have a high probability of making an impact on student achievement, and that those words should be treated differently (Marzano, 2003). Rather than memorize definitions of lists of terms, students described and explained new terms in their own words, reviewed them frequently in activities and games, and focused on terms important to the course content.

In a study of two vocabulary instruction methods, Postell (2006) found no major difference in the performance of the participants. The test group had a variety of intensive daily vocabulary instruction. The students in the control group completed exercise in a traditional vocabulary workbook one day a week. All students showed improvement in vocabulary knowledge, but neither group outperformed the other.

Rountree (2006) sought to confirm the significant and direct relationship between reading vocabulary and reading comprehension. He found a correlation between four standardized tests with statistical significance between reading level and vocabulary scores, vocabulary scores and overall comprehension, and between reading level and comprehension scores. His findings reinforced the need for growing students' vocabularies, and emphasized the need for effective vocabulary instruction.

In seven Title I schools, 15 third-grade teachers were randomly assigned a vocabulary intervention method or to a control group (CG) in a study by Helen Apthorp (2006). Trained examiners conducted pretests and posttests of oral and sight vocabulary. At one site, students in the treatment group compared to the control group showed improvement. Contextual factors and student characteristics appeared to affect the results more than the methodology.

How teachers use instructional time and its influence on student achievement was examined by Miller (2006). Using direct classroom instruction, trained examiners tabulated best practice methodology in vocabulary, reading comprehension, and word study. Arizona state reading tests were used to measure student performance. Teaching students how and when to use comprehension strategies and the allocation of time had a positive effect on student achievement.

In Ward's study (2006), Bethan Marshall of King's College in London opined that there was no substitute for what books do in terms of helping students expand their world and extend their vocabularies. The effectiveness of information and communication technologies to increase student achievement was compared to books. Ward's research showed that 100 English pounds spent on books per upper grades pupil had a greater impact on average test scores in English, mathematics, and science when compared to the same amount spent on

technology. The average score rose from 27.5 to 27.9 or a 15% increase per student.

Contemporary education author and critic Edward Hirsch (2006) posited that more exposure to a broad range of knowledge was the defining factor in student achievement. He suggested that there is too much emphasis on reading skills rather than on reading itself. For students to acquire the exposure to essential knowledge in the classroom, the recommendation was for reading from a broad variety of sources and more intentional vocabulary instruction.

Teaching fewer words well, but better, was the recommendation of Bromley (2007). He believed that having a sufficient content vocabulary was essential to reading comprehension. Direct instruction of key terms, word associations, multiple meanings, and multi-syllabic word parts were essential elements of vocabulary teaching. Bromley recognized the importance of the vocabulary teacher as salesperson of new words and language.

Doherty and Hilberg (2007) examined the relationship between pedagogical instructional practices and student achievement. Twenty-three teachers and their 344 students participated in the year-long study which began with pretests and concluded with posttests. Teachers reliably predicted performance on year-end assessments in reading comprehension, vocabulary, and spelling using the standards for effective pedagogy. The greatest gains

occurred in classrooms in which the standards for vocabulary were practiced in diversified activity settings.

Harrison and Rappaport (2007), two college students, wondered why they could so easily learn all the words to rap songs, but struggled with challenging vocabulary words found on standardized tests. They began an academic rap company named Flocabulary which produced a compact disc entitled, *A Dictionary and a Microphone*. Menchville High School in Newport News, Virginia used the Flocabulary CD with juniors, and the students' average Scholastic Aptitude Test writing score improved from 420 to 477 after using the method of learning vocabulary words rap style for one year.

The unexpected, and large, gains in average intelligence quotient (IQ) gains in the last ten years presented a paradox according to Flynn (2007). The Wechsler Intelligence Scale for Children (WISC) is a collection of subtests measuring, among other items, vocabulary, arithmetic, and subjects who score above average on one subtest tend to excel in all categories. The vocabulary portion measures the words people have accumulated in normal life experiences. The unexpected score gains in thirty countries are the source of speculation. Flynn posited that either the tests are no longer a valid measure of IQ, or kids are getting smarter. He believed the explanation is more complex than just students getting smarter. Students and teachers intentionally studied vocabulary which

had a direct impact on performance on the WISC or other methods of assessing ability.

Tredwell (2007) investigated the impact of peer tutoring on vocabulary growth. The study measured vocabulary growth over a six-week period and used a pre- and posttest to gather data. Students were assigned a peer tutor who had been trained to model the correct use of specific target vocabulary words.

In a study on the impact of the use of a graphic organizer (Frayer Model), LaBrosse (2007) supported the learning of vocabulary in other than the traditional memorization of definitions approach. Four chemistry classes were divided into a treatment group (TG) and a control group (CG). Two TGs studied chemistry vocabulary with meaningful definitions in context using the Frayer Model. The two CGs studied the same vocabulary words without using a graphic organizer. Both the TGs and the CGs took multiple pre and posttests. A Chi square analysis showed students in the TGs had learned more chemistry content.

Researchers Taylor, Mraz, Nichols, Rickelman, and Wood (2009) asserted that research supports direct vocabulary instruction across content areas and grade levels to support reading comprehension of varied texts. In light of the emphasis on comprehension and decoding, vocabulary instruction has been reduced. Direct vocabulary instruction strategies enhance reading comprehension and should be a main focus of any reading program.

A leading factor contributing to the achievement gap was limited background and vocabulary knowledge (Winter, 2009). This was true particularly for students in the subgroups recognized by NCLB: African-American, Hispanic, English language learners (ELL), and students with disabilities (SWD). Winter supports vocabulary instruction that approaches language in each classroom as essential knowledge for word consciousness.

In Marzano (2009) on the subject of vocabulary instruction , he advised that simply using a strategy that some have found effective would not guarantee a positive result. Rather, it was how a strategy was used that determined the extent of student achievement. In a review of one district with 24 elementary teachers using his six-step vocabulary instruction process with one group of students but not the other, he found that teachers who substituted their own definitions rather than directing students to develop their own descriptions of words did not get strong results (p. 84). The use of games and engaging students at a high level in activities that reviewed words in a non-threatening way produced a strong effect. The third step, which asks students to produce their own symbolic or nonlinguistic representations of the terms, produced soaring results, but was the step he found most often skipped.

English Language Learners

Mansaray (1997) examined the effect of vocabulary methodology for English language learners. The TG had thirty-three students and the CG had 36. Both groups took pre and posttests. The TG had teacher-directed lessons on vocabulary strategies, and the CG had no formal vocabulary instruction. The TG showed significant gains in vocabulary on teacher-made tests. There was no significant difference between the scores of the two groups on the Metropolitan Achievement Test (MAT) vocabulary subtest. Mansaray found that direct instruction in vocabulary for second language learners did improve student performance on the reading subtest of the MAT and recommended direct instruction as part of the overall reading program for second language learners.

In a longitudinal study to determine if vocabulary instruction helped English language learners acquire language faster than students left on their own, La Piana (2001) made no significant finding in student achievement in language. The number of participants was small; therefore, La Piana recommended further study with a larger number of participants.

In a study of English language learners, Martin (2004) conducted both a quantitative and a qualitative study of standardized test scores and of GPAs. He placed 50% of the English language learner population in an intensive academic vocabulary program for their freshmen and sophomore years. Though all the students were considered unprepared for college level work, the standardized test

scores for the experimental groups improved. He further noted that the improvement was observed in test scores more than in student GPAs. A follow-up questionnaire given during the junior or senior year found that the students approved of the vocabulary experience. Because the grade improvement did not match test score improvement, Martin suggested further study of vocabulary used in content area classrooms.

Wang (2005) also researched vocabulary instruction for English language learners. In his study, 99 Chinese university ELL learners joined two groups. The first group studied vocabulary before reading, and the second groups studied vocabulary instruction after reading. Both groups took pretests and posttests. Wang found that the group with focused vocabulary instruction before reading made greater gains in the number of words learned and in depth of understanding.

Silverman (2005) knew that vocabulary is an important prerequisite to literacy and investigated the efficacy of storybook reading in improving vocabulary in young children. Her work found that analytical and multidimensional vocabulary practice tied to literature was a more effective practice than standard pedagogy of memorizing definitions. Relating essential terms to literature enhanced both short and long-term knowledge of words. This practice especially served English language learners (ELL) in catching up with their non-ELL peers.

Professional Development

The effects of professional development for experienced teachers in vocabulary instruction in a critical content area were studied by Armstrong (2000). Secondary science teachers participated in ten hours of professional development in specific vocabulary instruction and then their practices were observed. Students in both the control and the experimental group took vocabulary pretests before the ten-week regimen of prescribed activities began. Students in the experimental group performed better on the posttest. Both teachers and students were interviewed at the culmination of the project and both groups responded favorably to the activities and the results.

Teacher participation in professional development activities explained significant amounts of variation in mathematics, and science achievement (Weglinsky, 2000). His research with 7,500 eighth graders found that teacher involvement in professional development had as much influence on the variance in student achievement as did student background.

In an extensive research on the effects of professional development, Garet, Porter, Desmone, Birman, and Yoon (2001) surveyed over 1000 teachers. Their findings show that if professional development is to change teacher behavior, then it should focus on content knowledge in an atmosphere of active learning.

DuFour (2001) recognized the importance of the principal as instructional leader and staff developer. He supported the idea of professional development

be embedded at the worksite and stressed that “the primary arena for professional development moves from workshops to the workplace” (p. 14). Professional development should be selected by the context of the school setting and be tailored to match the needs of the adult learners. DuFour also asserted that the role of the principal is that of being the primary staff developer, and ensuring that professional growth becomes part of the school culture (1995).

In research funded by the Wallace Foundation, Leithwood, Louis, Anderson, and Wahlstrom (2004) found that school leaders had an impact on student learning in three ways: by creating a vision and monitoring progress toward that end, by developing teachers through training and support, and by creating conditions that support teaching and learning. Developing people requires the instructional leadership to focus on the improvement of classroom practices as the focus of the school (p. 6).

Jenkins (2009) found that since 1980, the role of the school principal has been influenced by the research on effective schools and the principals who led them. Instructional leadership was described as both the actions and behaviors of the principal that promote student learning. Making student achievement a top priority also demands that instructional quality be the main concern to realize the vision of student achievement. The challenge for principals would then be to make certain that teachers receive both the training and support to challenge all students to learn to their highest potential.

Summary

This chapter presented a review of literature that addressed the role of the instructional leader in terms of impact on student achievement. The findings suggest that the presence of an instructional leader has a positive impact on student achievement. The effectiveness of different methods of vocabulary instruction was described, and studies supported that direct vocabulary instruction and reading from a wide range of material were the best way to improve learning and academic language. Several studies of English language learners (ELL) and vocabulary instruction were reviewed which found that vocabulary instruction helped ELL students catch up to their peers. The third section of this chapter explored the role of an instructional leader as a professional developer, and supported the idea that school-based professional development focused on curriculum and instruction and presented by a school leader had a positive impact on student achievement.

CHAPTER THREE: METHODOLOGY

Introduction

This chapter contains a description of the methodology used in the study. The problem studied was whether sophomore student reading scores on the Florida Comprehensive Assessment Test (FCAT) would improve after a specific program of professional development was provided by the researcher. The hypothesis of this research was that if teachers participated in professional development provided by the principal there would be an improvement in student achievement as measured by FCAT reading scores.

Research Questions

The study was guided by the following Research Questions:

1. What relationship, if any, existed between the Florida Comprehensive Assessment Test reading scores of sophomore students from 2008 to 2009 after teachers implemented the academic vocabulary program?
2. To what extent, if any, did different demographic sub-groups (white, African-American, Hispanic, economically disadvantaged, English language learners, and students with disabilities) of students benefit

- from teacher participation in the academic vocabulary professional development program according to change in FCAT reading scores?
3. To what extent did teachers report changes in their knowledge and implementation of research-based vocabulary instruction as a result of participation in professional development?
 4. What relationship, if any, existed between FCAT reading change and change in knowledge and skill in vocabulary teaching reported by teachers?

Population

The population used for this study was the 1600 sophomore students and the 175 teachers of a high school located in Central Florida over the course of the 2008 and 2009 school years. Institutional Review Board approval was obtained (Appendix C) to conduct the study.

The student population was disaggregated into sub-groups of students on this school campus identified as white, African-American, Hispanic, economically disadvantaged, English language learners (ELL), and students with disabilities (SWD) for an analysis of learning gains. A student learning gain was defined as (1) improvement in achievement level, (2) the maintenance of a high level of performance, or (3) the demonstration of at one year's growth in developmental scale scores within low-performing scores. All classroom teachers

in the school participated in professional development for academic vocabulary, but the possible impact of academic vocabulary on student learning for the purposes of this study was only measured by FCAT reading scores of sophomores in 2008 and 2009. The entire teacher population participated in the pretest and posttest (Appendix A) for the purposes of data collection.

Professional Development Treatment and Procedures

A program of professional development for teachers was designed and conducted to present the theoretical framework for an academic vocabulary program, the process of creating academic vocabulary lists, and the instructional strategies required for the implementation of an academic vocabulary program within each content area. Marzano asserted that when teachers focused on the same academic language and that language was presented in the same way, that the school had a consistent and powerful approach (2004). The pretest, "Teacher Perceptions of Vocabulary Instruction," (Appendix A) was administered to all teachers as the first segment of the professional development activities to determine a baseline of faculty knowledge, opinions, and vocabulary instruction professional practice.

Training the teachers to develop the lists of academic vocabulary terms was the necessary first step to the implementation of an academic vocabulary program. As academic language is the key to all content areas (Marzano, 2004),

teachers worked within their content areas (English, mathematics, science, social studies, fine arts, business and computer education, physical education, performing arts, and foreign language) to identify the academic vocabulary of their courses; i.e., the terms, dates, names, places, processes, concepts, and phrases that are critical to the understanding of each content area course. These terms were gleaned from national and state standards as well as local benchmarks and goal. The lists of academic vocabulary terms were developed horizontally by teachers for each specific course within each subject area (e.g., world history academic vocabulary within the social studies department; algebra II academic vocabulary within the mathematics department). The number of academic vocabulary terms selected for each course was determined by deciding if a term in question was critical to understanding of the content, useful to the understanding of the content, or an interesting additional term in the content (Marzano & Pickering, 2005). In order for students to learn the academic vocabulary identified as critical, teachers managed the number of terms introduced over time by considering both the number of terms deemed critical as well as the length of the school term in which students must master them.

The second phase in the development of course-specific academic vocabulary terms was the vertical alignment of the terms by teachers to ensure that the sequence of the terms is appropriate and logical within the scope and sequence of each curricular area. The overlapping of key terms, people, events,

processes, concepts, and dates was both acceptable and unavoidable, though not ideal. The target number of terms for each course was set at thirty; however, that number was a recommendation and not binding.

After the teachers completed and agreed upon their academic vocabulary lists for their courses within each curriculum area (Appendix B), the implementation began in the classroom. The process of teaching the academic vocabulary terms was not what may be commonly expected in terms of vocabulary instruction. Effective teaching of academic vocabulary required student mastery of identified key academic vocabulary terms over time. It did not necessitate the rote memorization of lists of words with specific definitions assigned in long lists, but rather a six-step teaching process designed by Marzano and Pickering (2005).

Step 1: Provide a description, explanation, or example of the new term.

Step 2: Ask students to restate the description, explanation, or example in their own words.

Step 3: Ask students to construct a picture, symbol, or graphic representing the term.

Step 4: Engage students periodically in activities that help them add to their knowledge of the terms in their notebooks.

Step 5: Periodically ask students to discuss the terms with one another.

Step 6: Involve students periodically in games that allow them to play with terms. (pp. 14-15)

The first teaching step in the process was for an academic vocabulary term to be introduced to the students through explanation, with examples and non-examples presented and discussed. At this point, classroom teachers determined prior knowledge, gave an example, or shared an historical event. The second step required that students write and maintain a list of academic vocabulary terms – similar to a glossary – in which they wrote definitions or explanations in their own words throughout their course of study. Some resisted this step and requested instead that teachers provide a definition, but it was important that students construct their own meaning for the critical terms. It was essential at this point in the process that teachers checked for understanding and monitored the accuracy of student work to ensure that students were learning correct information. It was also essential for these lists of words/notebooks/glossaries belong to the students so that they were portable and able to be updated. For step three, students made graphic or non-linguistic representations of each term to reinforce their understanding and provide another method of reinforcing the term’s meaning or significance. Modeling this step for students was important, and allowing students to work together on this step was also encouraged. Powell (1980) conducted a meta-analysis on the use of nonlinguistic strategies and

reported that these strategies produced a vocabulary learning gain of 34 percentile points with an average effect size of 1.00.

The fourth step in the process of teaching academic vocabulary required teachers to provide opportunities for students to use their academic vocabulary terms regularly to deepen their understanding. The fifth and sixth steps both involved the purposeful and frequent referencing and reviewing of the essential academic vocabulary terms determined for each specific course. The use of games, graphs, charts, and inconsequential competition to review the terms as well as provide opportunities for students to discuss and use the terms provided sufficient practice of the terms to allow them to become part of students' long-term memories through the numerous and frequent use of the terms. These activities to reinforce and expand on students' understanding of academic vocabulary terms occurred throughout each course of study until the completion of the semester or school year. Rather than requiring students to memorize a dictionary definition and/or use words in a sentence, the academic vocabulary terms identified by teachers as being critical and essential to the understanding of a subject area were learned and reviewed over time to improve student understanding and retention (Marzano, 2003).

Instrumentation

The survey used for the teacher pretest and posttest was developed by the researcher with guidance from the researcher's program advisor. "Teacher Perceptions of Vocabulary Instruction" (Appendix A) was reviewed for reliability using Cronbach's alpha. The test was run in several iterations on the pilot run of the survey, removing items one by one to increase the Cronbach's Alpha value to its maximum. The final scale included seven questions with a Cronbach's Alpha value of $\alpha = 0.87$.

Furthermore, a confirmatory factor analysis was run to ensure that this scale indeed reflected a series of questions that belong together. The factor analysis was used via Maximum Likelihood extraction with a Promax rotation and a minimum eigenvalue of 1.

The Florida Comprehensive Assessment Test is given to all Florida public school students each spring. The sections on the test assess student performance on the Florida Sunshine State Standards in reading, mathematics, writing, and science in grades three through eleven. The results of this statewide test provides the basis not only for school and districts grades, but also for adequate yearly progress (AYP) data required by the federal Department of Education. Each item on the Florida Comprehensive Assessment Test was included on the test based on its connection to a specific Sunshine State Standard benchmark (Florida Department of Education, 2005). Test items were reviewed not only by

item writers, but also by a review committee and the Florida Department of Education (FDOE). In terms of test reliability, the FDOE evaluated statistical characteristics based on three indicators of reliability: conditional standard error of measurement, marginal reliability, and Cronbach's alpha (p. 106). For the purpose of this study, results of sophomore FCAT reading scores from 2008 and 2009 were used.

Data Collection

In the spring of 2008 and 2009, tenth grade students took the Florida Comprehensive Assessment Test (FCAT) and data from this assessment were collected. Orange County Public Schools approved the use of the student data (Appendix D). Student performance on 2009 FCAT reading in the tenth grade was compared to 2008 tenth grade scores with a focus on learning gains. Appropriate statistical procedures were used to calculate the difference in mean scores and to determine if the results were significant.

For Research Question One, what relationship, if any existed between the Florida Comprehensive Assessment Test reading scores of sophomore students from 2008 to 2009 after teachers implemented the academic vocabulary program, the researcher conducted a linear regression with the dependent variable (y) being the grade 10 reading mean scale score, and the independent variable was the year. In determining if year was a statistically significant predictor of mean

scale score, the relationship, if any, between the two variables was determined. Additionally, a one-way analysis of covariance (ANCOVA) was performed to further examine student performance.

To look at the performance of student subgroups (Research Question Two) which examined student reading proficiency by subgroups after teacher participation in academic vocabulary professional development), a multiple logistic regression was conducted which yielded the likelihood of a student making a learning gain in reading based on a variety of predictors including the year and the subgroup. A one-way analysis of covariance (ANCOVA) was performed to focus on different levels of student performance.

A survey for teachers entitled “Teacher Perceptions of Vocabulary Instruction” (Appendix A) was administered both prior to and at the conclusion of the treatment to assess their knowledge of vocabulary instruction, reading comprehension, and academic vocabulary. The instrument designed by the researcher collected data through a Likert-type survey distributed to teachers of the study school. The items represented a variety of 5-point Likert scale statements with a range of responses including the following:

(1) strongly agree, (2) agree, (3) neither agree or disagree, (4) disagree, (5) strongly disagree, and (6) not applicable. Demographic questions were included to identify teachers’ areas of content specialization, years of the teaching experience, and highest degree of education earned. To answer Research

Question Three, a factor analysis was performed on the survey items for content validity. Cronbach's alpha was used to establish reliability. Independent T-tests were conducted to determine the change in teacher scores on the pretest and posttest survey "Teacher Perceptions of Vocabulary Instruction" (Appendix A). A two-way factorial analysis (ANOVA) was conducted to examine teacher responses based on years of teaching experience and subject area taught.

Because there was no common measure, no statistical measure could be used for Research Question Four to analyze the change in FCAT performance and change in teacher scores. In addition to anecdotal evidence, inferences were drawn from Research Question One through Research Question three to address the educational significance of Research Question Four which looked at the relationship between FCAT reading score change and change in knowledge and skill in vocabulary teaching reported by teachers.

Summary

This chapter presented the methodology used in the program of professional development focused on academic vocabulary. The parameters of both the student and teacher population in the sample were provided. The procedures used to determine statistical significance in reading score change were described, and the procedures used to measure change in the teacher pretest and posttest were presented.

CHAPTER FOUR: ANALYSIS OF DATA

Introduction

The purpose of this study was to determine if there was a statistically significant relationship between a professional development program in academic vocabulary and sophomore reading performance on the Florida Comprehensive Assessment Test (FCAT) from 2008 to 2009. Additionally, the knowledge and professional practice in vocabulary instruction of the teachers in the study school was studied. Four research questions were introduced in Chapter One: (1) What relationship, if any, exists between the Florida Comprehensive Assessment Test reading scores of sophomores from 2008 to 2009, after teachers implemented the academic vocabulary program? (2) To what extent, if any, do demographic subgroups of students benefit from teacher participation in the academic vocabulary professional development program according to change in FCAT reading scores? (3) To what extent do teachers report changes in their knowledge and implementation of research-based instruction as a result of participation in professional development? and (4) What relationship, if any, exists between FCAT reading scale score change and change in knowledge and skill in vocabulary teaching reported by teachers? Chapter Four will present the findings associated with the research questions.

The data sources were the 2008 and 2009 sophomore reading scores on FCAT provided by the Florida Department of Education and the survey instrument “Teacher Perceptions of Vocabulary Instruction” (Appendix A) developed by the researcher to determine teacher knowledge and professional practice in vocabulary instruction. The survey was completed by all teachers in the school at the time of the pretest and the posttest. Because of funding cuts, fewer teachers were still employed by the school and present to complete the posttest.

Research Question One

What relationship, if any, exists between the Florida Comprehensive Assessment Test reading scores of sophomores from 2008 to 2009 after teachers implemented the academic vocabulary program?

A simple linear regression was utilized to analyze the relationship between these two variables. The dependent variable was represented by FCAT Scale Scores. This continuous value ranges from 100 to 500. The independent variable was a binary indicator of year, 2008 or 2009. Since the first full year of implementation of the academic vocabulary program among teachers was 2008-2009, the March 2008 tenth graders represented a class of students who were not instructed under the academic vocabulary teachers, while the March 2009 tenth graders were instructed under the fully-trained teachers for the whole year.

Demographic variables showing similarities in the two tenth grade populations are presented in Table 1.

Table 1

Demographic Variables by Academic Year for 10th Grade FCAT Reading Scale Scores

Demographic	Tenth Grade 2007-2008 (n = 631)		Tenth Grade 2008-2009 (n = 715)	
	<i>n</i>	%	<i>n</i>	%
Economically Disadvantaged	147	23.3%	201	28.1%
Students with Disabilities	63	10.0%	77	10.8%
English Language Learners	38	6.0%	54	7.6%
White	291	62.0%	445	62.2%
African-American	80	12.7%	81	11.3%
Hispanic	135	21.4%	166	23.2%
Total	754		1024	

Note: Students may count in more than one subgroup. Number of economically disadvantaged students increased in 2008-2009.

Descriptive statistics for the dependent variable for each academic year are presented in Table 2.

Table 2

Descriptive Statistics for 10th Grade FCAT Reading Scale Scores

Year	<i>n</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
2007-08	631	100	500	332.98	53.462
2008-09	715	100	500	320.08	55.261

Note: Increase in 10th Grade population in 2008-2009.

The simple linear regression was performed. The model, $F(1, 1344) = 18.83, p < 0.001$, was indicated as significant at $\alpha = 0.05$. However, the R-square value of 0.013 indicated that academic year only explained 1.4% of the variability in FCAT score. This result regarding variability was not surprising, as differences in FCAT performance in any group of students can often be attributed to demographic factors. It was worth noting that Table 1 displayed a portrait of two demographically similar classes between years, though.

As the mean scores are reflected in Table 2, tenth grade students in 2007-2008 ($M = 332.98, s = 53.46$) significantly out-performed their successors in terms of growth in 2008-2009 ($M = 320.08, s = 55.26$). This result does not weigh in the hypothesized direction, as it would be expected to have students in the 2008-2009 year out-perform their predecessors. The significant model can be written as Reading Scale Score = $332.98 - 12.90*(Year)$, where 2008 is coded as 0 and 2009 is coded as 1. The statistic indicated that the relationship was significant, but not in the expected direction. Therefore, the hypothesis that student reading scores

would go up after the teachers participated in academic vocabulary professional development was rejected.

Additionally, to measure whether the vocabulary instruction program had a positive influence on student achievement in the form of increased FCAT Reading scores, a one-way Analysis of Covariance (ANCOVA) analysis was employed. The dependent variable was the Grade 10 Mean Scale Score, while the independent variable was the membership in either the 2007-08 or 2008-09 10th grade cohorts. Students must have had two complete years' worth of scores to have been included in this analysis.

The covariate, Grade 9 Mean Scale Score, was employed as a way to control for prior year (ninth grade) FCAT performance among all participants in the analysis. A one-way ANOVA measuring the arithmetic difference between the average scale scores in ninth and tenth grades was not utilized since the scales for this variable, despite having the same ranges (100-500) for each grade level, are not equivalent from year to year. Instead, the analysis of covariance was utilized to control for the starting point. Theoretically, if students in each cohort showed similar tenth grade scores, while accounting for ninth grade scores, it can be said with more certainty that there was no difference in performance by either cohort.

The ANCOVA was first run with ninth grade scale score as a covariate. In order for a variable to be considered a good covariate, it should not have a

significant interaction effect with the independent variable. In this case, ninth grade scale score did interact significantly, so an alternative was sought.

Covariates, if not continuous, should be either binary or dummy-coded. The next measure of prior performance with a reasonable degree of specificity was achievement level (1-5) in ninth grade. This categorical variable was dummy-coded (Level 5 was the reference group). Interactions were not significant, so they were removed. The final ANCOVA analysis, located in Table 3, included the independent variable of year and the covariate consisting of the dummy variables that comprise ninth grade achievement level. It should be noted that this ANCOVA did meet requirements for equality of variances in group, as indicated by Levene's test.

The covariate was highly significant with large eta values, collectively. Year, which represents the cohort, was also highly significant – $F(1, 1229) = 50.24, p < .001$ – but had a much smaller eta value. When this value is squared, it represents the variability of the dependent value (tenth grade scale score) described by the independent variable. In this case, when prior performance is accounted for, year only describes 4% of the variability in scores. Collectively, when the covariate is included, 61% of the variability in 10th grade score is described by the model.

Table 3

Analysis of Covariance for 10th Grade Mean Scale Score Analysis

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Year	1	50.24	0.04	< .001**
Gr9 L1	1	1391.07	0.53	< .001**
Gr9 L2	1	736.45	0.38	< .001**
Gr9 L3	1	355.39	0.22	< .001**
Gr9 L4	1	98.6	0.07	< .001**
S within-group error	1229	(1101.52)		

Note. Value enclosed in parentheses represent mean square error. S = subjects. Prior year achievement level was covariate. R-squared value = .61. * $p < .05$. ** $p < .01$.

Since there was a significant result, it was important to determine the direction in which the results were significant. Table 4 presents the covariate-adjusted and the unadjusted means. These two sets of means were somewhat close to each other, but showed that the 2007-2008 cohort clearly outperformed the 2008-2009 cohort, even when controlling for prior test performance.

Table 4

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis

Cohort	Covariate- Adjusted		Unadjusted	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
2007-08 (n = 576)	335.6	1.38	336	2.18
2008-09 (n = 659)	322.1	1.29	321.8	2.04

Note. Covariates evaluated at Gr9 L1 = .12; Gr9 = .27; Gr9 L3 = .31; Gr9 L4 = .19

Research Question Two

To what extent, if any, do demographic subgroups of students benefit from teacher participation in the academic vocabulary professional development program according to change in FCAT reading scores?

To determine if teachers were better able to assist their students in raising their reading performance during the school year when the teachers were equipped with the full academic vocabulary knowledge than in the year before a multiple logistic regression was performed. This regression was most appropriate when the dependent variable (in this case, whether or not the students made learning gains in reading) was binary and there were multiple independent variables. The variables and their coding are as follows: (1) Learning Gains (Dependent): 0 = No Learning Gain Made, 1 = Learning Gain

Made, (2) Economically Disadvantaged Status: 0 = Not ED, 1 = ED, (3) Student with Disabilities Status = 0 = No Disability, 1 = Disability, (4) English-Language Learner Status: 0 = Not ELL, 1 = ELL, and (5) Ethnicity (White: 0 = Not White, 1 = White; African-American: 0 = Not African-American, 1 = African-American; Hispanic: 0 = Not Hispanic, 1 = Hispanic; Other: no variable). When the other three variables have a value of 0, it means student is classified as "Other."

Descriptive statistics regarding the population are located in Table 5. Note that some of the population percentages (e.g., percentage of students classified as economically disadvantaged) may not match the percentages in Table 3. In Research Question 1, the population consisted of all students who took the test in tenth grade in the given year. In this research question, a student must have had two years' worth of scores to demonstrate a measured learning gain.

Learning gains could be made in the following ways: (1) raising an achievement level (Levels 1 through 5) from Grade 9 to Grade 10, (2) maintaining the same reading level for students who were levels 3-5 in Grade 9, or (3) having a developmental scale score gain greater than 77 points between Grade 9 and Grade 10 for students who were considered Level 1 and 2 readers in the previous year (ninth grade).

Students identified as students with disabilities (SWD) are those with any disability code listed other than gifted. Students identified as English language

learners (ELL) are all students coded as LY (currently receiving ELL services) or LF (currently in follow-up from the ELL program).

Table 5

Learning Gains by Demographic Type for 2007-2008 and 2008-2009 10th Grade Cohorts

Demographic		Total Population		Made Learning Gains	
		2007-08	2008-09	2007-08	2008-09
Total School	n	576	677	393	342
	%			68.2%	50.5%
Economically Disadvantaged	n	122	183	76	72
	%	21.2%	27.0%	62.3%	39.3%
Students with Disabilities	n	58	72	26	19
	%	10.1%	10.6%	44.8%	26.4%
English-Language Learners	n	33	48	21	24
	%	5.7%	7.1%	63.6%	50.0%
White Students	n	374	427	269	230
	%	64.9%	63.1%	71.9%	53.9%
African-American Students	n	68	79	34	30
	%	11.8%	11.7%	50.0%	38.0%
Hispanic Students	n	113	150	76	75
	%	19.6%	22.2%	67.3%	50.0%

Note: Students may count in more than one cell. Percentages reflect portion of total population.

Five successive models were run. In each, the dependent variable was whether a student made or did not make a learning gain on the tenth grade Reading FCAT over their ninth grade score. The models consisted of the following independent variables: (1) Model 1: Year, (2) Model 2: Year, ED, (3) Model 3: Year, ED, SWD, (4) Model 4: Year, ED, SWD, ELL, and (5) Model 5: Year, ED, SWD, ELL, Ethnicity.

Table 6 presents a summary of the various test statistics for each model to illustrate the degree to which each additional factor helped better explain the likelihood of a student making a learning gain.

Table 6

Summary Information for Logistic Regression Models

	Model 1	Model 2	Model 3	Model 4	Model 5
New Variable	Year	ED	SWD	ELL	Ethnicity
Total Model χ^2	40.66**	54.66**	86.05**	86.53**	99.80**
$\Delta \chi^2$		14.00**	31.40**	0.48	13.27**
-2 Log Likelihood	1658.6	1644.6	1613.2	1612.7	1599.5
Nagelkerke R ²	0.043	0.057	0.089	0.09	0.103
Classification % Correct	58.7%	61.8%	63.4%	63.4%	63.8%
Hosmer- Lemeshow Test		1.048	0.552	0.468	0.789

Note: ED - economically disadvantaged, SWD - students with disabilities, ELL - English Language Learners.

The first variable presented in Table 6 is a Total Model χ^2 which was an overall indicator of whether the model was significant. This was comparable to the F-test in a linear regression. Each full model in its entirety was significant. Double asterisks indicate that the model was highly significant at $p < 0.01$. A single asterisk would indicate the model was significant at $p < 0.05$. No asterisk would indicate the absence of statistical significance.

$\Delta \chi^2$ (delta chi-square or change in chi-square) shows the difference in chi-square values between each successive model when each new independent variable was added. Each new variable was a highly significant addition, with the exception of the new Model 4 variable, ELL status. In the interest of controlling for these demographics, it still remained in the model for Model 5.

The -2 Log Likelihood statistic measures how poorly a model predicts the dependent variable. The smaller this variable is the better. The difference between each of these values from model to model is essentially equivalent to the $\Delta \chi^2$. This value steadily shrinks, with, of course, the exception of Model 4.

Nagelkerke R^2 has the same interpretation as the R^2 value in a linear regression, which represents the percentage of variability in the dependent variable that can be explained by the independent variable(s). The higher this value, the better the model is in explaining unexplained sources of variability. As expected, Model 4 has the smallest amount of change (8.9% in Model 3 to 9.0% in Model 4), but between Model 1 and Model 5, there is an overall increase in variability explained of 6% (from 4.3% to 10.3%).

Classification % Correct shows the accuracy of the model in predicting the value of the dependent variable. By default, trying to predict a binary variable with no model at all would yield a 50% probability of being correct. The goal is to move this percentage up above 50% as much as possible to warrant even having a model at all. In this case, Model 1 provides a baseline of 58.7% as it is

important to specify the year in which students were in tenth grade, 2008 or 2009. The percentage slowly moves up and by Model 5, the classification percentage is raised 5.1% to 63.8%. These results are informational rather than evaluative as the $\Delta \chi^2$ provides a better indication if the variable made a difference.

The Hosmer-Lemeshow statistic tests for overall fit of the model. It is not present unless there are more than two independent variables, which is why there is no value for Model 1. A chi-square statistic is technically used for this one, and an insignificant p-value indicates that the data fit the model well. In other words, an insignificant result is desired, and each model indicates an insignificant value for this test.

The results of Model 5 contain the predictor variables of year, economically disadvantaged status, disability status, English-language learner status, and ethnicity. As shown in Table 6, this full model as opposed to no model at all was shown to be statistically significant - $\chi^2_7 = 99.799$, $p < 0.001$. The model correctly classified 63.8% of the student as having made or not made a learning gain.

Table 7 indicates the regression coefficient, Wald test, and odds ratio for each of the predictors. Regression Coefficient is comparable to linear regression in that there is an equation containing numbers and variable names.

The Wald Test (with p-value) is similar to an individual Chi-Square for each variable in the model. In other words, when included in the model with all

of the other independent variables, does it show significance? In this case, year, ED, and SWD were all significant, while ELL and the dummy variables for ethnicity are not. These variables were kept in the model, however, due to their particular interest in the research question.

Holding all of the other variables constant, the Odds Ratios shows how much more likely it is for students to make a learning gain if they fall into the category of this variable. For example, the odds ratio of ED is 0.715. Therefore, holding all other independent variables constant, students who were on free or reduced lunch, the factor that labels students as ED, were about 29% less likely to make a learning gain as students who are not ED.

Holding ED, SWD, ELL, and ethnicity constant, tenth grade students in 2009 were 53% less likely to make learning gains than tenth grade students in 2008. Holding academic year, SWD, ELL, and ethnicity constant, ED students were 29% less likely to make learning gains than students not classified as ED. Holding academic year, ED, ELL, and ethnicity constant, students with disabilities were 67% less likely to make learning gains than students without disabilities. When holding academic year, ED, SWD, and ethnicity constant, English-language learners were 13% more likely to make learning gains than students who were English-proficient based upon the odds ratio.

Ethnicity was coded with "Other" as the reference group, so the odds are all in comparison to this group. Holding academic year, ED, SWD, and ELL

status constant white students were 61% more likely to make learning gains than students of “Other” ethnicities. African-American students were 18% less likely to make learning gains than students of “Other” ethnicities. Hispanic students were 50% more likely to make learning gains than students of “Other” ethnicities.

Table 7

Logistic Regression Coefficients and Significance Tests

	<i>B</i>	Wald χ^2	<i>p</i>	Odds Ratio
Constant	0.598	3.244	0.072	1.818
Year	-0.759	39.109	< 0.001	0.468
ED	-0.336	4.487	0.034	0.715
SWD	-1.107	30.537	< 0.001	0.33
ELL	0.12	0.205	0.651	1.128
Ethnicity				
White	0.48	2.074	0.15	1.616
African American	-0.192	0.275	0.6	0.825
Hispanic	-0.408	1.356	-0.244	1.504

Note. The model can be written as the following: $P(\text{Learning gain} = 1) = \frac{\exp(0.598 - 0.759 \cdot \text{Year} - 0.336 \cdot \text{ED} - 1.107 \cdot \text{SWD} + 0.120 \cdot \text{ELL} + 0.480 \cdot \text{White} - 0.192 \cdot \text{African-American} - 0.408 \cdot \text{Hispanic})}{1 + \exp(0.598 - 0.759 \cdot \text{Year} - 0.336 \cdot \text{ED} - 1.107 \cdot \text{SWD} + 0.120 \cdot \text{ELL} + 0.480 \cdot \text{White} - 0.192 \cdot \text{African-American} - 0.408 \cdot \text{Hispanic})}$ where p = the probability of a learning gain occurring. Exp represents the number e , the inverse of the natural log.

Additional analyses for this research question followed the same format as those described above for Research Question One, but for specific subgroups. Each population of adequate yearly progress (AYP) subgroups had a different record of performance on which to focus. Therefore, several one-way ANCOVA models were performed where, once again, tenth grade mean scale score was the dependent and cohort year was the independent variable, with some measure of prior year performance as the covariate. As with Research Question One, the first choice of covariate was ninth grade mean scale score, but if that variable was inappropriate among any subgroup due to interaction with the independent variable, ninth grade achievement level was used instead.

In examining the performance of economically disadvantaged (ED) students, there was interaction between cohort and ninth grade mean scale score, so ninth grade achievement level was used (Table 6). The covariate was significant, which justifies it remaining in the model. The independent variable of cohort year was also significant - $F(1, 291) = 17.35, p < .001$. However, it only described 6% of the variability in scores. The covariate described much more of the variability, because the overall R-squared value was .51 (51% of the variability in tenth grade scale score was described by a combination of the independent variable and the covariate).

Table 8

Analysis of Covariance for 10th Grade Mean Scale Score Analysis - Economically Disadvantaged

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Year	1	17.35	0.06	< .001**
Gr9 L1	1	111.28	0.28	< .001**
Gr9 L2	1	56.76	0.16	< .001**
Gr9 L3	1	25.36	0.08	< .001**
Gr9 L4	1	8.17	0.03	0.01**
S within-group error	291	(1324.99)		

Note. Value enclosed in parentheses represent mean square error. S = subjects.

Prior year achievement level was covariate. R-squared value = .51.

* $p < .05$. ** $p < .01$.

The means were significantly different, and show that among economically disadvantaged students, the 2007-2008 cohort outperformed the 2008-2009 cohort (Table 9).

Table 9

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis - Economically Disadvantaged

Cohort	Covariate-Adjusted		Unadjusted	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
2007-08 (n = 122)	314.4	3.32	313.93	4.6
2008-09 (n = 175)	296.3	2.77	296.65	3.84

Note. Covariates evaluated at Gr 9 L1 = .24; Gr 9 L2 = .35; Gr 9 L3 = .31; Gr 9 L4 = .08

The results of the analysis for students with disabilities (SWD) shows that there was no significant interaction between cohort and ninth grade mean scale score, so ninth grade mean scale score was usable as a covariate. The covariate was significant, which justified it remaining in the model. The independent variable of cohort year was also significant – $F(1, 126) = 4.28, p = .04$. However, it only described 3% of the variability in scores. The covariate described much more of the variability, because the overall R-squared value was .59 (59% of the variability in 10th grade scale score was described by a combination of the independent variable and the covariate) in Table 10.

Table 10

Analysis of Covariance for 10th Grade Mean Scale Score Analysis - Students with Disabilities

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Year	1	4.28	0.03	.04*
Gr 9 Scale	1	176.58	0.58	< .001**
S within-group error	126	(1846.18)		

Note. Value enclosed in parentheses represent mean square error. S = subjects.

Prior year achievement level was covariate. R-squared value = .59.

* $p < .05$. ** $p < .01$.

The mean scores for students with disabilities are significantly different (Table 11), and show that among students with disabilities, the 2007-2008 cohort outperformed the 2008-2009 cohort.

Table 11

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis - Students with Disabilities

Cohort	Covariate-Adjusted		Unadjusted	
	M	SE	M	SE
2007-08 (n = 58)	275.5	5.64	273.67	8.71
2008-09 (n = 71)	259.7	5.1	261.2	7.87

Note: Covariate evaluated at Prior Scale = 282.62.

There was no significant interaction between cohort and ninth grade mean scale score of English language learners, so ninth grade mean scale score was usable as a covariate (Table 12). The covariate was significant, which justifies it remaining in the model. The independent variable of cohort year was also significant - $F(1, 78) = 26.65, p = .001$. This was a somewhat reasonable variable in terms of descriptive value, as it described 13% of the variability in the dependent variable. The covariate described much more of the variability, because the overall R-squared value was .39 (39% of the variability in 10th grade scale score was described by a combination of the independent variable and the covariate).

Table 12

Analysis of Covariance for 10th Grade Mean Scale Score Analysis – English Language Learners

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Year	1	26.65	0.13	.001**
Gr 9 Scale	1	40.41	0.34	< .001**
S within-group error	78	(1511.68)		

Note. Value enclosed in parentheses represent mean square error. S = subjects.

Prior year achievement level was covariate. R-squared value = .39.

**p* < .05. ** *p* < .01.

The means for this subgroup of students are significantly different (Table 13), and showed that among English Language Learners (ELL), the 2007-2008 cohort outperformed the 2008-2009 cohort.

Table 13

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis – English Language Learners (ELL)

Cohort	Covariate-Adjusted		Unadjusted	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
2007-08 (n = 33)	301.6	6.78	299.39	8.29
2008-09 (n = 48)	271.4	5.62	272.92	6.88

Note. Covariate evaluated at Prior Scale = 281.43.

The data analysis for African-American students showed that there was no significant interaction between cohort and ninth grade mean scale score, so ninth

grade mean scale score was usable as a covariate. The covariate was significant, which justified it remaining in the model. The independent variable of cohort year was not significant - $F(1, 144) = 0.24, p > .05$. The variable of cohort year described less than 1% of the variability in tenth grade score. The covariate described much more of the variability, because the overall R-squared value was .67 (67% of the variability in 10th grade scale score was described by a combination of the independent variable and the covariate) shown in Table 14.

Table 14

Analysis of Covariance for 10th Grade Mean Scale Score Analysis – African-American Students

Source	<i>df</i>	<i>F</i>	η^2	<i>p</i>
Year	1	0.24	0.002	.59
Gr 9 Scale	1	286.15	0.67	< .001**
S within-group error	144	(878.65)		

Note. Value enclosed in parentheses represent mean square error. S = subjects.

Prior year achievement level was covariate. R-squared value = .67.

* $p < .05$. ** $p < .01$.

As with previous subgroups of students, the means are not significantly different and show that among African-American students, neither cohort outperformed one another. It was also apparent in Table 15 that the use of the covariate certainly adjusted the means.

Table 15

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis – African-American Students

Cohort	Covariate-Adjusted		Unadjusted	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
2007-08 (n = 68)	308.5	3.60	312.54	6.19
2008-09 (n = 79)	305.9	3.34	302.42	5.74

Note. Covariate evaluated at Prior Scale = 315.46.

There was interaction between the Hispanic cohort and ninth grade mean scale score, so ninth grade achievement level was used. The covariate was significant among almost all dummy variable values, which justified it remaining in the model. The independent variable of cohort year was also significant – $F(1, 253) = 7.98, p < .001$. However, it only described 3% (Table 16) of the variability in scores. The covariate described much more of the variability, because the overall R-squared value was .59 (59% of the variability in 10th grade scale score was described by a combination of the independent variable and the covariate)

Table 16

Analysis of Covariance for 10th Grade Mean Scale Score Analysis – Hispanic Students

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Year	1	7.98	0.03	< .001**
Gr9 L1	1	118.52	0.32	< .001**
Gr9 L2	1	49.03	0.16	< .001**
Gr9 L3	1	18.82	0.07	< .001**
Gr9 L4	1	1.20	0.27	0.27
S within-group error	253	(1076.77)		

Note. Value enclosed in parentheses represent mean square error. S = subjects.

Prior year achievement level was covariate. R-squared value = .59.

**p* < .05. ** *p* < .01.

The means again were significantly different (Table 17), and showed that among Hispanic students, the 2007-2008 cohort outperformed the 2008-09 cohort.

Table 17

Estimated Marginal Means for 10th Grade Mean Scale Score Analysis – Hispanic Students

Cohort	Covariate-Adjusted		Unadjusted	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
2007-08 (n = 113)	319.6	3.09	319.27	4.61
2008-09 (n = 146)	308.0	2.72	308.31	4.06

Note. Covariates evaluated at Gr9 L1 = .22; Gr9 L2 = .29; Gr9 L3 = .29; Gr9 L4 = .15

Research Question Three

To what extent do teachers report changes in their knowledge and implementation of research-based instruction as a result of participation in professional development?

This question was addressed using a survey “Teacher Perceptions of Vocabulary Instruction” (Appendix A) designed to gather teachers’ opinions on this topic. A 12-question survey was delivered before and after instruction in the vocabulary teaching method. All 12 non-demographic questions were positively worded and measured via Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with 3 representing neutral. It was intended to have all 12 questions combined to form a scale addressing the same construct, so Cronbach’s Alpha was run first to address the reliability of this proposed scale. The test was run in several iterations on the pilot run of the survey, removing items one by one to increase the Cronbach’s Alpha value to its maximum. The final scale included seven questions with a Cronbach’s Alpha value of $\alpha = 0.87$.

Furthermore, a confirmatory factor analysis was run to ensure that this scale indeed reflected a series of questions that belong together. The factor analysis was used via Maximum Likelihood extraction with a Promax rotation and a minimum eigenvalue of 1. Table 18 presents the factor loading.

Table 18

Factor Loading for Academic Vocabulary Survey Scale

Question	Factor Loading
I know what the research says about teaching vocabulary to students.	0.719
Vocabulary instruction is an essential part of my curriculum.	0.769
Knowledge of vocabulary enables students to understand my textbook.	0.722
Students learn vocabulary best in context.	0.799
Before planning a lesson, I identify essential subject-specific terms.	0.783
I review essential vocabulary terms with students throughout the school year.	0.589
Students in my classes create symbols or graphic representations of words.	0.774

These seven questions, combined into a scale, had a minimum score of 7 (respondent answered all 1's) and a maximum score of 35 (respondent answered all 5's). The higher the score on this dependent variable, the greater the skill and utilization held by the teachers in the area of vocabulary instruction. Prior to running the t-test, demographics were summarized for the respondents in the pretest and posttest. The results of this summarization are provided in Tables 19 through 23 and indicate the number and percentage of responses.

Table 19

Teacher Demographics - Gender

Demographic	Pretest (n = 153)		Posttest (n = 98)	
	<i>n</i>	%	<i>n</i>	%
Male	44	28.8%	25	25.5%
Female	109	71.2%	73	74.5%

Note: The change in number from 2008-2009 reflects a reduction in teaching positions due to budget cuts.

Table 20

Teacher Demographics - Ethnicity

Demographic	Pretest (n = 151)		Posttest (n = 96)	
	<i>n</i>	%	<i>n</i>	%
African-American	11	7.3%	6	6.2%
Caucasian	124	82.1%	80	83.3%
Hispanic	8	5.3%	4	4.2%
Asian	1	0.7%	0	0.0%
Native American	1	0.7%	0	0.0%
Other	6	4.0%	6	6.2%

Note: Some teachers chose not to respond. Number of 0-5 year experienced teachers from pretest to posttest reflected budget-related reduction in teaching positions.

Table 21

Teacher Demographics – Years of Experience

Experience	Pretest (n = 151)		Posttest (n = 99)	
	<i>n</i>	%	<i>n</i>	%
0-5 Years	40	26.5%	17	17.2%
6-10 Years	23	15.2%	23	23.2%
11-15 Years	21	13.9%	13	13.1%
16-20 Years	21	13.9%	12	12.1%
21-25 Years	13	8.6%	10	10.1%
25+ Years	33	21.9%	24	24.2%

Note: Number of teachers with 0-5 years experience reflected budget-related loss of teaching positions.

Table 22

Teacher Demographics – Highest Degree Earned

Degree	Pretest (n = 148)		Posttest (n = 96)	
	<i>n</i>	%	<i>n</i>	%
Bachelor's	78	52.7%	52	54.2%
Master's	62	41.9%	39	40.6%
Specialist's	4	2.7%	2	2.1%
Doctorate	4	2.7%	3	3.1%

Since the dependent variable was confirmed via factor analysis, the independent t-test could be run. While the researcher would have opted to conduct a matched-pairs t-test to receive the greatest benefit from the pretest/posttest design, matching of teachers was unfortunately not an option, and therefore an independent t-test was the only available alternative.

The variances were checked for homogeneity prior to running the t-test using Levene's test. Since the results were not significant, equal variances could be assumed. The test, $t_{230} = -1.891$, $p > 0.05$, indicated that there was no statistically significant difference in skill and utilization of vocabulary instruction by teachers before and after they were educated in vocabulary instruction practices. Although the mean score for the 89 teachers who took the posttest survey ($M = 29.27$, $s = 3.19$) was slightly higher than the mean score for the 143 teachers who took the pretest survey ($M = 28.40$, $s = 3.54$), the difference was not large enough to be considered within the range of statistical significance.

Although a t-test indicated that there was no significant difference in perceived knowledge of vocabulary instruction between the pretest and posttest groups, the researcher wanted to determine if teacher type served as a significant independent factor. To make this determination, two separate two-way factorial ANOVA analyses were performed. Both used the pretest/posttest variable, but added *time* (years of experience) as a factor and the other added *curriculum* (academic subject area) as a factor.

A two-way factorial ANOVA was run to determine if pretest/posttest status and/or curricular area taught yielded significant differences in mean score on the survey used to measure perceived vocabulary knowledge. Levene’s Test for Equality of Variances was run to determine if this test was appropriate, and the insignificant result indicated that the equality of variances assumption was met. In Table 24, the means and standard deviations for the survey was separated by pretest and posttest status as well as whether the teacher is responsible for academic core courses (Language Arts, Mathematics, Reading, Science, Social Studies, Foreign Language) or an elective course (Technology, Performing/Visual Arts, Physical Education/Health, or Other).

Table 23

Descriptive Statistics for Time x Curriculum Analysis

	Pretest			Posttest		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Core	108	28.76	3.57	76	29.37	3.17
Elective	33	27.18	3.07	13	28.69	3.43
Total	141	28.39	3.52	89	29.27	3.19

The Analysis of Variance results indicate that pretest/posttest status of *Time* (experience) was not a significant predictor in survey score – $F(1, 226) = 3.06, p > .05$. Mean results did not significantly change between the pretest and

posttest. Only 1% of the variability in score could be described by this variable. Additionally, curricular area did not yield significant results, either - $F(1, 226) = 3.46, p > .05$. Only 2% of the variability in score could be described by this variable. Finally, there was no significant interaction effect between time and curriculum - $F(1, 226) = 0.55, p > .05$. Less than 1% in the variability in score could be described by the interaction between these two variables. The overall R^2 value of 0.04 indicates that only 4% of the variability in score could be described by the entire model.

Referring to Table 25, it can be noted that the elective teachers scored slightly lower than the core teachers on both the pretest and posttest (lower levels of knowledge), but each group did increase slightly from pretest to posttest. These differences were not found to be statistically significant.

Table 24

Analysis of Variance for Time x Curriculum Analysis

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Time (T)	1	3.06	0.01	0.08
Curriculum (C)	1	3.46	0.02	0.06
T x C	1	0.55	< .01	0.46
S within-group error	226	(2559.10)		

Note. Value enclosed in parentheses represents mean square error. S = subjects. $R^2 = .04$. * $p < .05$. ** $p < .01$.

A two-way factorial ANOVA was run to determine if pretest/posttest status and/or teaching experience yielded significant differences in mean score on the survey used to measure perceived vocabulary knowledge. Levene's Test for Equality of Variances was run to determine if this test was appropriate, and the insignificant result indicated that the equality of variances assumption was met. Table 26 presents means and standard deviations for the survey separated by pretest and posttest status as well as a teacher's years of experience (0-10 years, 11-20 years, or 20+ years).

Table 25

Descriptive Statistics for Time x Experience Analysis

	Pre-Test			Post-Test		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
0-10 Yrs	57	28.18	3.08	38	29.5	2.43
11-20 Yrs	40	28.72	4.26	23	29.91	3.32
21+ Yrs	44	28.39	3.32	28	28.43	3.88
Total	141	28.4	3.51	89	29.27	3.19

The Analysis of Variance results indicate that pretest/posttest status (time) was not a significant predictor in survey score - $F(1, 224) = 3.32, p > .05$. Mean results did not significantly change between the pretest and posttest. Only 2% of the variability in score could be described by this variable. Additionally,

years of experience did not yield significant results, either – $F(2, 224) = 1.14, p > .05$. Only 1% of the variability in score could be described by this variable. Finally, there was no significant interaction effect between time and years of experience – $F(2, 224) = 0.78, p > .05$. Only 1% in the variability in score could be described by the interaction between these two variables. The overall R^2 value of 0.03 indicates that only 3% of the variability in score could be described by the entire model.

Referring to Table 27, it is shown that the 11-20 years of experience group scored the highest in both the pretest and posttest compared to the other groups, and the 21+ year experience group changed extremely little from pretest to posttest. Each group did increase slightly from pretest to posttest, but these differences were not statistically significant.

Table 26

Analysis of Variance for Time x Experience Analysis

Source	<i>df</i>	<i>F</i>	η	<i>p</i>
Time (T)	1	3.32	0.02	0.07
Experience (E)	2	1.14	0.01	0.32
T x E	2	0.78	0.01	0.46
S within-group error	224	(11.51)		

Note. Value enclosed in parentheses represent mean square error. S = subjects. $R^2 = .03$. * $p < .05$. ** $p < .01$.

Research Question Four

What relationship, if any, exists between FCAT reading score change and change in knowledge and skill in vocabulary teaching reported by teachers?

Because no procedure could be identified which would provide a statistical measurement between these two factors, inferences of the findings are presented. The hypothesis of FCAT reading performance improvement after the professional development treatment has been rejected. Other factors which may have contributed to the drop in student performance in reading in spite of the academic vocabulary program will be discussed in Chapter Five. The mean score on the teacher posttest does reflect a gain, but not one of statistical significance.

Teachers provided anecdotal evidence of a shift in instructional practice by adding comments about their vocabulary instruction strategies on their posttest surveys which include the following: vocabulary games, word mapping, academic vocabulary sections in student notebooks, pictures and diagrams of words, graphic organizers, students rating their understanding of words, word walls, word games, and flash cards.

Additionally, observations of research-based vocabulary instruction was observed and reported by administrators during informal classroom walkthroughs. During the 2008-2009 school year, twenty-five groups of teachers met together to discuss and develop their lists of essential academic vocabulary.

The educational significance of the professional development treatment will be presented in Chapter Five.

Summary

Chapter Four presented the analyses of data used to address the four research questions and included twenty-seven tables. The data indicate that there was not a statistically significant improvement in student reading performance after the professional development treatment in academic vocabulary. Additionally, change in teacher knowledge and performance was found, but not at a statistically significant level. Much of the lack of change could be attributed to a larger number of students than in the previous year coupled with a smaller number of teachers working under different conditions.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine if sophomore reading scores on the Florida Comprehensive Assessment Test (FCAT) would improve after implementation of a professional development program in academic vocabulary. Additionally, teacher knowledge and practice in vocabulary instruction was surveyed.

FCAT data were collected from the Florida Department of Education to analyze student reading performance from 2008 to 2009. The researcher developed a survey that was completed by all teachers at the study school. This survey was given before and after the professional development treatment in academic vocabulary.

Four research questions directed the focus of this study. Each research question and results will be discussed along with conclusions and recommendations for further study. Educational significance will be addressed in addition to the statistical significance found.

Summary and Discussion of Findings

Research Question One: What relationship, if any, exists between the Florida Comprehensive Assessment Test reading scores of sophomores from 2008 to 2009 after teachers implemented the academic vocabulary program?

The relationship between reading scores of sophomores on the Florida Comprehensive Assessment Test (FCAT) after teachers implemented a program of academic vocabulary was found to be statistically significant. The significance, however, was not in the expected direction. Mean FCAT reading scores of sophomores went down from 2008 to 2009. This drop could be attributed to intervening variables.

The first variable was related to a reduction in school funding which resulted in the study school moving from a six-period school day to a seven-period school day to adjust for the reduction in the number of teachers. During the 2008 school year, students received 10,080 minutes of instruction in each class. In the 2009 school year when the seven-period day was instituted, students received 8,820 minutes of instruction per class. The net loss of instructional time was 1,260 minutes or the equivalent of twenty-two days of instruction per class when compared to the instructional time in the previous school year. This loss of time could have been a factor in the drop in student FCAT scores.

The reduction in instructional personnel coupled with an increase in student population resulted in an increase in the student/teacher ratio. As shown in Table 22, those teachers just beginning their careers suffered the largest reduction in staff. Because of contractual protocol, teachers with tenure retained their positions. Teachers who were newer to the school district and on annual contract were not reappointed. Many of these teachers were the ones who had been hired by the researcher and had been implementing the academic vocabulary program with fidelity and enthusiasm.

Another contributing factor was a substantial change in school hours. As another cost-saving measure, the high school day moved from 7:20 a.m. to 2:20 p.m. in 2008 to 9:30 a.m. to 4:30 p.m. in 2009. This controversial shift in time was a source of frustration to students, teachers, and parents who tried to manage the busy academic and extra-curricular schedule of a large comprehensive high school with fewer daylight hours at the end of the school day.

Research Question Two: To what extent, if any, do demographic subgroups of students benefit from teacher participation in the academic vocabulary professional development program according to change in FCAT reading scores?

The reading performance of all identified subgroups of sophomore students (white, African-American, Hispanic, economically disadvantaged, English language learners, and students with disabilities) dropped as measured

by FCAT reading scores from 2008 to 2009. This drop in scores could be explained by other outside factors which include the loss of instructional minutes due to a move to a seven-period day, a change in the student/teacher ratio, and the change in the hours of the school day.

Each subgroup of sophomore student scores for 2009 was lower than in year 2008. The population of students considered economically disadvantaged (ED) grew in 2009 from 21% of the total enrollment of the school to 27%. Students from every other subgroup were represented in this growing category which typically struggles with achievement. Two subgroups of students often considered to be populations “at risk” presented interesting results.

The first subgroup of note was the performance of English language learners (ELL) as indicated by the Odds Ratio in Model 4. This statistic showed that this subgroup was 13% more likely to make a learning gain than the other groups. This factor could also be attributed to the fact that these students began at a low level, and the growth was not necessarily an indication of proficiency.

The FCAT reading scores of African-American students also were lower in 2009 than 2008. Although these scores were lower than the previous year, they were not significantly different as shown in Table 14. This finding could be an indication that the program of academic vocabulary helped these students maintain their level of performance in the face of intervening variables that negatively impacted student performance in the other subgroups.

Research Question Three: To what extent do teachers report changes in their knowledge and implementation of research-based instruction as a result of participation in professional development?

There was an obvious difference in the number of teachers who completed the pretest (153) and the number who completed the posttest (98). The difference is attributed to two factors: (1) a reduction in the number of teachers (thirty-five) because of budget cuts, and (2) a number of teachers who returned their surveys after the requested submission date and too late to be included in the data tabulation, and (3) fewer inexperienced teachers with more to learn.

Though the change from pretest to posttest was not statistically significant, there was a change in the expected direction in teacher knowledge and instructional performance as reported on their surveys. Anecdotal evidence provided by teacher comments on their surveys support that teacher instructional practice in terms of vocabulary instruction changed toward research-based methods. Teacher comments on the pretest survey indicated wide use of the practice of having students memorize dictionary definitions of words chosen on the basis of their appearance in text.

Comments on the posttest surveys supported the use of the research-based method in the classrooms of the study school. Although not quantified, administrative team members reported observations of teacher use of the

academic vocabulary terms and the utilization of the research-based instructional method of vocabulary instruction.

Research Question Four: What relationship, if any, exists between FCAT reading score change and change in knowledge and skill in vocabulary teaching reported by teachers?

Though the answer to this question was not quantifiable, anecdotal evidence supported a change in teacher knowledge and practice that was educationally significant. Through observation of teacher instructional practice and from the inclusion of comments on the posttest survey, the research-based method of vocabulary instruction continued to be utilized in the study school. During the 2008-2009 school year, twenty-five teacher groups met to develop their lists of essential academic vocabulary terms to use in their curriculum areas. The process of collaboration among these teacher groups influenced the professional relationships within the study school that continues and applies to other professional issues.

Conclusions

Though the academic vocabulary program presented at the study school did not produce the expected results in student FCAT scores, several outside factors which could have negatively impacted student performance in the 2009

school year were presented. The reading performance of sophomore students as measured by FCAT in 2008 to 2009 after the professional development program in academic vocabulary indicates a drop in reading proficiency between the two groups of sophomore students. The demographics of the two groups of sophomores whose scores were compared were well matched by subgroup category; however, no consideration was given to matching the incoming reading proficiency of the two groups of sophomore students.

Furthermore, the study school tenth grade students in 2008 had a high level of reading proficiency. Therefore, the reduction may be attributed to regression toward the mean. Even with this regression, the students were high performing as an overall group. It is more difficult to show improvement with students who are already high performing than with low performing students. The school's population may have made it more difficult to show positive change.

All members of the staff, not just core curriculum teachers, were included in the research-based training in vocabulary instruction. All members of the administrative team, including teacher curriculum leaders, had roles and responsibilities in the implementation of the academic vocabulary program. This provided opportunities for each member of the administration to perform as an instructional leader and staff developer.

Every teacher in the school was included in the vocabulary training; not only those involved in preparing students for FCAT. This school-wide approach helped support the academic focus of every course offered at the study school, not just the major curricular subjects of English, mathematics, science, social studies, and foreign language.

The additional benefit to the introduction of the academic vocabulary program at the study school was the change in the culture of the school. Teachers have continued to plan instruction together rather than in isolation, and the time provided for these planning sessions has become standard practice at this school. Additionally, professional working relations have continued to develop among the teaching staff with curriculum, instruction, and assessment serving as the foundation for department, course, or team meetings.

This program also afforded teacher leaders the opportunity to take on additional responsibilities for advancing the educational mission of the school while growing in their capacity for leadership. These responsibilities included facilitating the curriculum meetings to develop individual course academic vocabulary lists as well as serving as moderators for the discussions of which words to include or exclude. Additionally, teacher leaders worked with teachers in their curriculum areas to ensure that the lists provided a logical scope and sequence of the academic vocabulary terms. The responsibility for the publication and updating of the lists of academic vocabulary terms by course

was shared by the teacher curriculum leaders and the administrator for each curricular area.

Each assistant principal in the study school was responsible for curriculum areas or departments, and it was the responsibility of each assistant principal to ensure that teachers were developing the requisite lists of critical/essential terms for each course within each course and then sequenced within the department. Assistant principals also observed classrooms to ensure that the research-based vocabulary instruction strategies were being implemented with fidelity. These visits provided assistant principals instructional coaching opportunities as part of their development as instructional leaders.

A core belief of the researcher, who was also the principal of the study school, was that students should be able to speak, read, and write about the specifics of the courses taken. The program of staff development provided all teachers with vocabulary strategies to advance the skills of speaking, reading, and writing across the curriculum.

Because of changes in student and teacher population size, as well as significant changes in the instructional day, no conclusion should be drawn that vocabulary professional development was not helpful in improving reading comprehension. Vocabulary instruction, especially the research-based method

presented, was essential, but perhaps not sufficient alone to improve reading comprehension as measured by FCAT.

Though the results of the sophomore reading performance were not as hoped for, the program of academic vocabulary continued at the study school. It provided the point of departure in department meetings in determining what was essential for student mastery in each course and subject area. The lists of critical/essential academic vocabulary terms remained a living document at the school and was revised and updated as state curriculum standards were revised and updated by the Florida Department of Education.

Of educational significance was the overall benefit to the study school, FCAT reading scores notwithstanding. Through the process of identifying essential terms and then the implementation of the research-based vocabulary instruction process, teacher collegiality emerged. Rather than working in isolation, teacher groups developed into planning teams to design instructional focus calendars for each subject area. The notion of high school teachers meeting to plan together became part of the culture of the study school. This shared ownership of the curriculum elevated the instructional practice of all teachers in the school. The end result was that the students in the school reaped the benefits of curriculum and instructional practices that were well thought out and strategically implemented.

The author believes that the research-based vocabulary instruction program that was been implemented at the study school was a successful addition to the instructional practice of all the teachers. Even though FCAT reading scores during the implementation phase did not reflect a positive change, other contributing factors intervened negatively. Reading scores of sophomores dropped in 2009 from 2008, but their performance remained strong enough for the study school to be considered a high-performing school by the Florida Department of Education. Though many secondary teachers planned their lessons in isolation, the development of the academic vocabulary lists for each course provided an initial focus for teachers who teach the same course to work and plan together for the academic success of their students.

Recommendations for Further Research

Results of this study and the findings of related literature demonstrate that it is worthwhile to continue the program of academic vocabulary in the study school. Recommendations for further research are provided as follows:

1. The study should be replicated with tighter controls on the data including using matched groups of student scores that are not only demographically comparable, but also comparable in incoming reading proficiency level.

2. The study should be replicated at a time in which no major contributing factor could skew the results of the analysis (such a loss of instructional time from one school year to the next).
3. To look at teacher change, it would be useful to replicate the study with matched teacher pretests and posttests which was not done for this study (for the sake of anonymity since the researcher was the principal of the study school). This would allow for a clearer analysis of change in knowledge and practice reported by the teachers.
4. While looking at student score change and teacher practice change were interesting, this study could be replicated and expanded by matching teachers with students. This would allow a more thorough comparison of teacher-reported knowledge and practice with student performance after the professional development program in vocabulary instruction.
5. A study that monitors teacher instructional practice through collection of classroom walkthrough data could provide more than anecdotal evidence of instructional change.
6. Because there was an indication this program made a difference with students typically labeled “at risk,” this study should be replicated in schools with a large at-risk student population.

7. This study should be replicated using the lists of academic vocabulary terms for each course as a pretest/posttest to assess student learning rather than FCAT reading scores.
8. This study should be replicated at a school where the staff developer is someone other than the principal who assess instructional personnel to determine if fidelity to the program is affected by the nature of the professional relationship between teacher and presenter.

Summary

Chapter Five has presented the findings of the data analysis described in Chapter Four. Conclusions, recommendations, and recommendations for further research were also presented. The results of this study may be helpful to school leaders who are interested in working with teachers on instructional practices in vocabulary instruction. It would also be worth considering as a vehicle to improve teacher collegiality and curriculum planning.

APPENDIX A: TEACHER PERCEPTIONS OF VOCABULARY INSTRUCTION

Teacher Perceptions of Vocabulary Instruction

Instructions: Please rate how strongly you agree or disagree with each of the following statements by circling the appropriate number (1=strongly disagree 2=disagree 3= neither agree nor disagree 4= agree 5= strongly agree).

START HERE

	<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neither Agree nor Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1. I know what the research says about teaching vocabulary to students.	1	2	3	4	5
2. Vocabulary instruction is an essential part of my curriculum.	1	2	3	4	5
3. Knowledge of vocabulary enables students to understand my textbook.	1	2	3	4	5
4. Students can learn up to 30 new words at one time.	1	2	3	4	5
5. Students learn vocabulary best in context.	1	2	3	4	5
6. Looking up definitions and writing sentences is an effective vocabulary learning strategy.	1	2	3	4	5
7. Before planning a lesson or unit, I identify essential subject-specific terms.	1	2	3	4	5
8. I confer with colleagues to identify essential terms, names, and knowledge.	1	2	3	4	5
9. I review essential vocabulary terms with my students throughout the year.	1	2	3	4	5
10. My students keep their own record of essential vocabulary terms.	1	2	3	4	5
11. Students in my classes create symbols or graphic representations of words.	1	2	3	4	5
12. Learning prefixes, roots, and suffixes is an antiquated strategy.	1	2	3	4	5

Instructions: Please circle the most appropriate response.

13. Teaching Experience	0-5 years	6-10 years	11-15 years	16-20 years	21-25 years	25+
14. Highest Degree Earned	Bachelor	Master	Specialist	Doctorate		
15. Curriculum Area	Language Arts	Mathematics	Reading	Science	Social Studies	Foreign Language
	Performing/Visual Arts	Physical Education/Health	Technology	Other		

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APPENDIX B: ACADEMIC VOCABULARY TERMS

Foreign Language Academic Vocabulary Terms

Spanish I

vocabulary	adverb
cognate	direct object
noun	indirect object
gender	culture
number	formal
agreement	informal/familiar
subject	stem
pronoun	stem-changing verb
verb	comparative
infinitive	ordinal
conjugate	personal a
tense	possession
adjective	interrogative
definite article	affirmative
indefinite article	imperative/command

Spanish II

present indicative	imperfect
preterite	context
present progressive	compound
present participle	superlative
reflexive	demonstrative
irregular verbs	negative/negation
past participle	preposition

Spanish III

subjunctive
impersonal
conjunction
clause

conditional
past progressive
future
reciprocal

Spanish IV

present perfect
pluperfect/past perfect
passive/passive voice

future perfect
conditional perfect

French I

subject
verb
noun
adjective
adverb
infinitive
conjugation
stem
ending
helping verb
regular verb
irregular verb
liaison
tense
3rd person
pronoun
gender

negation
inversion
definite articles
indefinite articles
possessive adjectives
agreement
preposition
imperative
cognate
formal vs. familiar
interrogative expressions
partitive
stress pronouns
contraction
invariable
indirect object
direct object

French III & IV

<i>le passé composé</i>	<i>une république</i>
<i>l'imparfait</i>	<i>un siècle</i>
agreement	<i>le roi</i>
order of pronouns	1066
<i>le futur</i>	<i>la Guerre de Cent Ans</i>
<i>le conditionnel</i>	<i>la Normandie</i>
reflexive verbs	<i>la Provence</i>
<i>le passé simple</i>	<i>gothique</i>
the subjunctive mood	<i>les châteaux</i>
relative pronouns	<i>les cathédrales</i>
compound tenses	<i>la Renaissance</i>
"if" clauses	<i>Versailles</i>
imperative	<i>les arrondissements</i>
<i>une fable</i>	<i>la poésie</i>
<i>la Gaule</i>	<i>le romantisme</i>
<i>une province</i>	<i>une pièce</i>
<i>francophone</i>	<i>un roman</i>
<i>le Moyen Age</i>	<i>le 20e siècle</i>
<i>la monarchie</i>	

Language Arts Academic Vocabulary Terms

English I

alliteration	main idea
allusions	metaphor/simile
analysis	organizational patterns
author's purpose	persuasive devices
cause and effect relationship	plagiarism
character development	plot development

comparison/contrast
conclusions (commentary)
conflict resolution
diction (word choice)
epic
foreshadowing
grammar vocabulary
Homer
Homeric simile
idiom
imagery
inferences
irony

point of view
pun
reference/research vocabulary
relevant supporting details
satire
setting
Shakespeare
sonnet
theme
thesis
tone
works cited page
Write Traits

English II

allegory
allusion
anecdote
assonance
author's bias
consonance
connotation
context
conventions
couplet
credible sources
denotation
figurative language
genre
Holocaust
irony

lyric poem
MLA format
ode
onomatopoeia
parable
plagiarism
point of view
rhetorical question
sarcasm
soliloquy
symbolism
thesis statement
theme
tone
Write Traits

English II Gifted

expository	analysis
persuasive	tragedy
descriptive	comedy
rhetoric	modernism
diction	existentialism
syntax	history play
sentence fragment v. run on	Globe theater/Wooden O
clause	genre
parts of speech	TP-CASTT method of poetic
verbals - gerunds, participles,	analysis
infinitives	surrealism
figurative language	science fiction
Bloom's taxonomy -	non-fiction
comprehension to synthesis	lyric v. narrative poetry
metaphor and simile	

English III

analogy	Romanticism
connotative meaning	Fireside Poets
emotional appeal/pathos	Irving
literary criticism/analysis	Realism
nuance	Crane
literary theme	Douglas
foil	naturalism
paradox	transcendentalism
conceit	Emerson
extended metaphor	Thoreau
phrases/clauses	modernism
symbolism	Hemingway
Puritans	Faulkner
Southern Planters	Fitzgerald
American Renaissance	Harlem Renaissance

Hawthorne
Melville
Poe

Hughes
Johnson
McKay

English IV

allusion
alliteration
assonance
consonance
critical perspectives (archetypal,
historical, feminist, cultural)
epic
ballad
couplet
irony (verbal, situational,
dramatic)
romance
paradox
comic relief
soliloquy
parody
parallel structure

diction
connotation
antithesis
tone
imagery
aside
atmosphere
frame story
heroic types

characterization (direct, indirect,
static character, dynamic
character, round character)
figurative language
satire
literary analysis

AP Literature & Composition

synthesize
analyze
trope
motif
verisimilitude
metaphor
diction
alliteration
TP-CASTT

sonnet forms - Petrarchan,
Elizabethan, Spenserian
point of view/perspective
scansion
lyric poetry
comparison/contrast
personification
pathos, logos, ethos
existentialism

"assess the validity"
inventiveness
depth of understanding
style/voice
exposition
narrative

naturalism
neoclassicism
the unreliable narrator
symbolism
allusion

Journalism

active voice verb
angle
ascender
attribution
authority
balance
baseline
beat
black space
bleed
body copy
body type
boldface
butt
byline
camera ready (photo ready)
COB (cut out background, also
called knockout)
caption (also called cutline)
center of interest
CMYK
colophon
columnar design
conflict of interest
contrast
copy
copy alignment
crop

gray space
grid system (also called a
block system)
gutter
headline
hot foil stamping
ID
impartial
index
integrity
internal spacing (also called
internal margin)
inverted pyramid
isolated element
justify
kerning
kicker
label head
ladder diagram
layer
layout
lead-in
leading (pronounced ledding)
logo
masthead
matte finish
mini-mag
PDF

cut-off test	reverse type
deadline	rule line
deboss	rule of thirds
descender	sans serif
die cut	secondary story (also called a sidebar)
display type	serif
divider (also known as division page)	signature
dominance	silk screen
downstyle (also called sentence style)	slammer
dummy	spin-off phrase
duotone	spine
editorialize	spot color
emboss	spread
endsheet	style
ethics	subhead (also called a deck)
external margin	theme
eyeline	tip-in
feature	title page
flat(also called a multiple)	tool line
folio	trapped white space
font	trim size
four-color process	typography
ghosted photo	white space
gill clear	widow
graphics	wraparound (also called a textwrap)

Reading

alliteration	idiom
analogy	imagery
assessment	irony
author's bias	italics
author's purpose	main idea or essential message
author's tone	making an inference
bold print	nonfiction

break in text	phonics
cause & effect relationship	plot development
character development	point of view
comparison & contrast	pre/during/post reading
comprehension	strategies
conflict & resolution	prediction
connecting text to other text(s)	preview
connecting text to self	prior knowledge
connecting text to world	reference materials
content	rubric
context clues	schema
drawing conclusions	sequence of events
fact & opinion	setting
fiction	stamina
figurative language	summary
flashback	supporting details
fluency	text
genre	text feature
hyperbole	theme
fixators	vascular
flaccid	ventral

Mathematics Academic Vocabulary Terms

Algebra I

algebraic function	matrix addition
base	matrix subtraction
binary system	monomial
Cartesian coordinates	multiply radical expressions
compound event	natural number
direct function	negative exponent
direct measure	number subsystem
divide radical expressions	polynomial addition
equivalent forms of equations	polynomial division

equivalent forms of inequalities
exponent
factorial notation
fraction inversion
independent trials
matrix

polynomial function
polynomial multiplication
polynomial subtraction
radical expression
reciprocal
systems of inequalities

Geometry

angle of depression
arc
central angle
chord
circle without center
cosine
dilation of object in a plane
geometric function
indirect measure
isometry
line segment
line segment congruence
line segment similarity
point of tangency
postulate

proof paragraph
protractor
radius
reflection in space
right triangle geometry
rotation in plane
surface area cone
surface area cylinder
surface area sphere
theorem
theorem direct proof
theorem indirect proof
three-dimensional
vector
vector addition

Algebra II

absolute error
absolute function
asymptote of function
complex number
compound interest
correlation
decibel

logarithm
logarithmic function
matrix equation
matrix inversion
matrix multiplication
monitor progress of problem
natural log

density
domain of function
exponential function
Fibonacci sequence
function composition
imaginary number
inverse function
log function

rational function
recursive equation
Richter Scale
series
sigma notation
step function
total distance graph
vertex edge graph

Analytic Geometry

Polynomial function
quadratic
cubic
quartic
quintic
Factor Theorem
Fundamental Theorem of
Algebra
Remainder Theorem
synthetic division
long division
zeros of a function
roots of a polynomial
quadratic formula
complete the square
end behavior
x-intercepts
factors
vertical asymptote
horizontal asymptote
oblique asymptote
removable discontinuity
non-removable discontinuity
rational function
exponential decay
exponential growth

half-life
compound interest
conic section
midpoint formula
distance formula
circle
ellipse
hyperbola
parabola
degenerate conic
standard form
general form
focus
foci
directrix
vertex
vertices
conjugate axis
transverse axis
major axis
minor axis
eccentricity
axis of symmetry
center
parametric equation
parameter

Trigonometry

Angles:	range
initial side	amplitude
terminal side	period
standard position	phase shift
Coterminal angles	vertical shift
Radian Measure	asymptotes
Degree Measure	inverse trigonometric function
revolution	trigonometric ratios
reference angle	right angle trigonometry
Unit Circle	trigonometric identities
vectors	pythagorean identities
magnitude	quotient identities
component	reciprocal identities
resultant	half-angle formula
trigonometric functions	double angle formula
sine	polar coordinates
cosine	polar form of complex number
tangent	Heron's formula
secant	DeMoivre's Theorem
cosecant	Law of Sines
cotangent	Law of Cosines
domain	

Pre-Calculus

acceleration	polar coordinates
circular function	polynomial solution by
classes of functions	sign change
curve fitting median method	polynomial solution successive
finite graph	precision of estimation
force	relative error
formal mathematical induction	sinusoidal function

global/local behavior
inflection
limit
maximum of function
minimum of function
parameter
parameter estimate
parametric equation
periodic function
phase shift

speed
trigonometric relation
truth table proof
univariate data
univariate distribution
variance
vector addition/
multiplication/division
velocity

Statistics

Bivariate data transformation
Bivariate distribution
Categorical data
continuity probability
distribution
control group
discrete probability
discrete probability distribution
empirical verification
experimental design
experimental probability
law of large numbers
law of probability
Monte Carlo simulation
normal curve

parallel box plot
population
probability distribution
random sampling technique
recurrence relationship
regression coefficient
representativeness of sample
sample statistic
sampling distribution
smallest set of rules
spurious correlation
standard deviation
statistical experiment
statistical regression
treatment group

AP Calculus AB

acceleration
area
concavity
continuity

indeterminate form
integral
limit
optimization problems

derivative	maximum of a function
differentials	minimum of a function
fundamental theorem of	point of inflection
Calculus	rate of change
Functions:	related rates
Algebraic	Riemann Sum
Transcendental (exponential,	velocity
logarithmic, & trigonometric)	volume

AP Calculus BC

acceleration	optimization problems
area	polar equations
concavity	ratio test
continuity	root test
derivative	sequences
differentials	vector
fundamental theorem of	work
Calculus	maximum of a function
arc length	minimum of a function
convergent	point of inflection
divergent	rate of change
improper integrals	related rates
integral test	Riemann Sum
parametric equations	velocity
partial fractions	volume
Functions:	series:
Algebraic	alternating
Transcendental (exponential,	P-series
logarithmic, & trigonometric)	power
indeterminate form	Taylor
integral	Maclaurin

Science Academic Vocabulary Terms

Anatomy and Physiology

alimentary	foramen
antagonist	gonads
auditory	gastration
autonomic	histology
brachial	homologous
capillary	hypotonic
cleavage	inguinal
cortex	lumen
cranial	mastication
cutaneous	metabolism
defecation	mictruition
digestion	occipital
distal	olfaction
dorsal	otic
efferent	parietal
epidermis	prone
excretion	reflex
expiration	renal
fibrillation	sphincter
fissure	systemic
fixators	vascular
flaccid	ventral

Physics Honors

displacement	torque
velocity	Coulumb's Law
acceleration	electric field
free-fall	charge
vector	magnetic field

scalar
projectile motion
force
gravitational force
free-body diagram
inertia
friction
centripetal force
work
kinetic energy
potential energy
power
conservative force
non-conservative force
momentum
impulse
conservation laws

magnetic flux
simple harmonic motion
period
amplitude
wavelength
frequency
transverse wave
longitudinal wave
Doppler Effect
pitch
superposition
standing wave
resonance
diffraction
refraction
photoelectric effect

AP Physics AB

displacement
velocity
acceleration
free-fall
vector
scalar
projectile motion
force
gravitational force
free-body diagram
inertia
friction
centripetal force
work
kinetic energy
potential energy
power

isothermal
isochoric
isobaric
latent heat
Coulomb's Law
electric field
charge
magnetic field
magnetic flux
simple harmonic motion
period
amplitude
wavelength
frequency
transverse wave
longitudinal wave
Doppler Effect

conservative force
non-conservative force
momentum
impulse
conservation laws
torque
adiabatic

pitch
superposition
standing wave
resonance
diffraction
refraction
photoelectric effect

Physics C

displacement
velocity
acceleration
free-fall
vector
scalar
projectile motion
force
gravitational force
free-body design
inertia
friction
centripetal force
work
kinetic energy
potential energy
power
conservative force
non-conservative force
momentum
impulse
conservation laws

torque
Coulomb's Law
electric field
charge
magnetic field
magnetic flux
simple harmonic motion
period
amplitude
wavelength
frequency
transverse wave
longitudinal wave
Doppler Effect
pitch
superposition
standing wave
resonance
diffraction
refraction
photoelectric effect

AP Environmental Science

adaption	environmental degradation
affluenza	eutrophication
biodiversity	exponential growth
biomagnifications	global warming
biome	pollution
carrying capacity (K)	recycling
developed country	renewable resource
developing country	rule of 70
ecological diversity	species diversity
ecological footprint	sustainability
ecology	tragedy of the commons
environment	wildlife management

Social Studies Academic Vocabulary Terms

American History

George Washington	migrations
self-determination	imperialism
Thomas Jefferson	Theodore Roosevelt
(American) Revolution	yellow journalism
James Madison	nationalism
Constitution	reparations
Bill of Rights	Harlem Renaissance
Andrew Jackson	Great Depression
slavery	Franklin Delano Roosevelt
sectionalism	appeasement
abolition/emancipation	propaganda
Abraham Lincoln	Cold War
Reconstruction	Red Scare
suffrage	civil rights

Manifest Destiny
Native Americans
immigration
industrialization
labor unions
Social Darwinism

civil disobedience
Martin Luther King
Brown v. Board of Education
space race
Watergate
Vietnam War

World History

apartheid
appeasement
aristocracy
atheism
assimilation
autocracy
bureaucracy
capitalism
city-state
civilization
Communism
commercial revolution
conservatism
constitutional government
coup d'etat
culture
democracy
dictator
divine rights
dynasty
ethnic cleansing
empire
enlightenment
fascism
feudalism

mercantilism
naturalism
oligarchy
parliamentary government
proletariat
propaganda
reformation movement
renaissance
republic
scientific revolution
separation of powers
socialism
sovereignty
technology
theocracy
totalitarian
Gautama Budha
Confucius
Jesus
Julius Caesar
Mohammed
Karl Marx
Mohammed
Michelangelo
Leonardo da Vinci

genocide
guerilla warfare
Holocaust
humanism
imperialism
industrialism
liberalism

Joan of Arc
Socrates
Gandhi
Columbus
Cleopatra
Genghis Khan

APPENDIX C: INSTITUTIONAL REVIEW BOARD



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1
FWA00000351, IRB00001138**

To: **Margaret McMillen**

Date: **September 10, 2009**

Dear Researcher:

On 9/10/2009, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: THE IMPACT OF ACADEMIC VOCABULARY
INSTRUCTION ON READING PERFORMANCE OF
SOPHOMORE STUDENTS ON THE FLORIDA
COMPREHENSIVE ASSESSMENT TEST FROM 2008 TO
2009
Investigator: Margaret McMillen
IRB Number: SBE-09-06408

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Janice Turchin on 09/10/2009 02:32:25 PM EDT

A handwritten signature in black ink that reads 'Janice Turchin'.

IRB Coordinator

APPENDIX D: PERMISSION TO USE DATA

Submit this form and a copy of your proposal to:
 Accountability, Research, and Assessment
 P.O. Box 271
 Orlando, FL 32802-0271

Orange County Public Schools
RESEARCH REQUEST FORM

Your research proposal should include: Project Title; Purpose and Research Problem; Instruments; Procedures and Proposed Data Analysis

Requester's Name MARGARET McMILLON Date 9/1/09
 Address: Home 2519 ABBEY ROAD WP 32782 Phone 407.657.3405
 Business 2100 S MILLS AVE DELAND FL 32720 Phone 407.993.1201
 Project Director or Advisor Dr. ROSE TAYLOR Phone 407.833.1469
 Address PO Box 141227 COLLEGE OF EDUCATION DELAND 32716-1250

Degree Sought (check one):
 Associate Doctorate Bachelor's Master's Specialist
 None

Project Title THE IMPACT OF ACADEMIC VOCABULARY INSTRUCTION ON READING PERFORMANCE OF SECOND-GRADE STUDENTS ON THE FLORIDA ASSESSMENT TEST FROM 2005 TO 2007

ESTIMATED INVOLVEMENT

PERSONNEL/CENTERS	NUMBER	AMOUNT OF TIME (DAYS, HOURS, ETC.)	SPECIFY/DESCRIBE GRADES, SCHOOLS, SPECIAL NEEDS, ETC.
Students	6		
Teachers	6		
Administrators	6		
Schools/Centers	1		BOONE H.S.
Others (specify)	1		

Specify possible benefits to students/school system: ANALYSIS OF DATA COULD REVEAL BENEFIT TO STUDENTS FROM ACADEMIC VOCABULARY PROGRAM

ASSURANCE

Using the proposed procedures and instrument, I hereby agree to conduct research in accordance with the policies of the Orange County Public Schools. Deviations from the approved procedures shall be cleared through the Senior Director of Accountability, Research, and Assessment. Reports and materials shall be supplied as specified.

Requester's Signature Margaret McMillon

Approval Granted: Yes No Date 9-2-09
 Signature of the Senior Director for Accountability, Research, and Assessment Joe Bolderi

NOTE TO REQUESTER: When seeking approval at the school level, a copy of this form, signed by the Senior Director, Accountability, Research, and Assessment, should be shown to the school principal.

Reference School Board Policy GCS, p. 249

FORM #1-080811/05/11/07 REV 104

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