THE EFFECT OF EXPERIENCES WITH ANIMALS ON THE READING COMPREHENSION SKILLS OF STUDENTS IN THE SEVENTH GRADE

_____

A

Dissertation

Presented to the Graduate Faculty of the

School of Education

Alliant International University

_____

In Partial Fulfillment

of the Requirements for the Degree of

Doctor of Education

_____

by

Annie Petersen

San Diego 2008

Abstract of Dissertation

THE EFFECT OF EXPERIENCES WITH ANIMALS ON THE READING COMPREHENSION SKILLS OF STUDENTS IN THE SEVENTH GRADE

by

Annie Petersen, Ed.D.

Alliant International University

THE PROBLEM. The study examined the difference that animal interactions had on the reading comprehension growth skills of students in the seventh grade.

METHOD. A quasiexperimental study was conducted with two seventh-grade classes at William Howard Taft Middle School. One class received daily 20-minute animal interaction experiences for 5 days. Following the week of animal interactions in fall 2007, students in both classrooms were given the Degrees of Reading power (DRP) test. The individual results for the two groups were compared to the individual results for the spring 2007 DRP test. An independent samples *t* test was used to analyze the differences in scores between the two groups.

RESULTS. The hypothesized significant difference in reading comprehension growth, as measured by the DRP test, between the seventh-grade students who had classroom exposure to animals and those who did not have classroom animal interactions was not supported. Analysis of the *t* test suggested no statistically significant difference between the two participating groups and their growth in reading comprehension, as measured by the DRP.

Additional findings based on test scores suggest no statistically significant difference in test scores by gender, ethnicity, or language proficiency level. Anecdotal qualitative data indicated an impact on student attitudes toward school participation and attendance.

TABLE OF CONTENTS

LIST OF TABLES

Chapter 1
INTRODUCTION

People of all ages have had experiences with animals. The love for a pet holds no cultural or generational boundaries. Historically, animals have been regarded as deserving of the highest levels of esteem and have held the lowest levels of caste: the creatures to be pitied. Regardless of one's opinion or regard for animals, they have held prominence within society around the world and have the capacity to greatly influence people's daily lives (Waldman, 1999).

Humans can acknowledge their likenesses with animals. The search for comfort, protection, and a means of survival is common among all living beings. Human dependence on animals for survival and comfort can be seen on the ancient cave drawings of Lascaux in France and Altamira in Spain, which were created over 20,000 years ago.

In literature, *Black Beauty* (Sewell, 1877), *Old Yeller* (Gipson, 1956), and *Shiloh* (Reynolds Naylor, 1992) conjure vivid memories of companion animals through the experiences of those who loved their pets as the dearest of friends. Conversely, domesticated animals have been used in literature for the purposes of political and sociological statements, such as in *Animal Farm* (Orwell, 1945).

The impact of literature on human emotions may also affect the learning process in children. The integration of animals into the process has the possibility of affecting the transformation of a child who has felt intimidation and fear while reading.

> So the reading process was no more seen as machine-like information processing, but as a true social practice relying on and shaping students' identities. If this is true, it obviously becomes important to show that there is a link between

> literacy and emotions, and to understand how the relationship could function. (Berg & Lick, 2001, p. 4)

Reading comprehension challenges have been a struggle for both educators and students. In 2003 the National Center for Education Statistics (NCES) stated that, although reading scores had improved since 1992, "The average reading score for eighth-graders decreased by 1 point between 2002 and 2003. Reading comprehension issues will affect children for the rest of their lives, and many programs have been implemented in an effort to improve ability and comprehension. However, the struggle continues.

In 1999 the Reading Education Assistance Dogs (R.E.A.D.) program began with the mission, "To improve the literacy skills of children through the assistance of registered Pet Partners therapy teams as literacy mentors" (2000, ¶ 1). This was one of the first reading programs to incorporate animal assistance, specifically dogs, and students. What was unique about this program is that it had not only joined together children who were intimidated by words but had incorporated reading with animals with which the children felt comfort. In turn, the children who had previously struggled with their reading skills appeared to enjoy reading to their animal assistants. Although the coordinators of the program and the educators who brought the animals observed the relaxation and comfort that these children had with animals, there has not been a study that determines the true effectiveness of such a program.

Background of the Problem

In 1955 the book *Why Johnny Can't Read: And What You Can Do About It* (Flesch, 1955) was published. Not only did this book have a tremendous impact on reading instruction; the title became part of American vernacular. Student numbers in the classroom, along with the recent implementation of the California High School

Exit Exam (CAHSEE), makes the time that teachers spend on children who need additional help with reading comprehension more and more defined.

> The teacher gives up and calls on little Susan to go on. After all, it's a rainy Monday morning and she has been doing this thing for thirty years. Harry is a poor reader, and she is doing her best. If Harry can't read, it's not her fault. Next year, in fourth grade, Harry will doubtless be classified as a remedial reading case. Perhaps the remedial reading teacher will be able to do something with him. She can give more time to him. (Flesch, 1955, p. 94)

Time and ever-present testing make even more evident the challenges that children who are involved in the school systems and the public at large have regarding education. Do exams, such as the CAHSEE, encourage student achievement, or do they create yet another level of anxiety for students who feel that, regardless of what they do, they cannot succeed? This is a problem that does not exist within California's school systems alone.

In an effort to address and alleviate the increased anxieties that many students have, humane organizations began to look for ways to educate in a nontraditional learning environment by developing programs utilizing animals and literacy to increase reading skills in children.

> There were clearly several key findings in this study which will be helpful determining the content as well as the activities for future summer school programs. Clearly, according to the student surveys, a majority of the students believed they learned to read better. Students learned about things that interested them like dinosaurs and animals. (DeWalt & Bartle, 1996, pp. 6-7)

Children are attracted to the subject of and interaction with animals. Organizations have strived to provide a win-win situation for both student and animal. Increased socialization for the animal promotes positive behavior while providing a safe and nonintimidating reading environment for the student. "There is some evidence that the affordances of companion animals are perceptually interesting to

young children, sustain their attention, and motivate their curiosity" (Melson, 2004, p. 4).

Statement of the Problem

The problem addressed by this study is the lack of evidence concerning the effect of animal exposure on the reading skills of children. Although some people may feel that pairing students with animals is a positive and effective learning tool for those with reading challenges, little is known about the actual effect, if any, of animals within the learning environment, specifically in an effort to increase a child's reading comprehension skills. Ultimately, there are influences to be considered when studying a student's classroom successes; family support and the quality of instruction have the most impact in determining the level of reading comprehension success of a student. However, teachers are encouraged and have the opportunity to utilize a variety of strategies to improve achievement. Animal exposure may be an effective strategy to engage students in learning. In an effort to meet teachers' needs, a research study measuring this effectiveness may have the following twofold effect on the continuation of these types of animal-related programs: (a) an assessment of the effectiveness of animal interaction experiences to increase funding from public and private sectors for these types of programs, and (b) an increased appreciation for animals as classroom educators.

Purpose of the Study

The purpose of this study was to examine the difference that animal exposure may have on the reading comprehension skills of students in the seventh grade. This study attempted to glean insight regarding effectiveness of this program by comparing

scores on the Degrees of Reading Power between seventh-grade classrooms in the San Diego Unified School District that had classroom animal interactions and those that did not have classroom animal interactions. The Degrees of Reading Power test is administered twice yearly to students in the fourth through eighth grades to measure reading comprehension skills. Two classes of similar population, age group, and grade were included in the study. Group 1 students had animal interaction experiences and Group 2 students did not have animal interaction experiences.

Importance of the Study

Although many people have had experiences with animals, many of which have been positive, there are very few studies that measure the impact of companion animals on learning in children. The results of this study may have an impact on the funding opportunities and participant base for animal assistance programs, pet assistance therapy programs, and general classroom environments that utilize companion animals as part of their daily curriculum.

Most important will be the use of another way to engage children in reading, thereby increasing their reading skills through practice. The encouragement of educators to utilize more companion animals in the learning environment and the classroom could expand knowledge of proper pet care, humane treatment of animals, and humane treatment, intra- and interculturally.

Research Question

This study was designed to examine the difference that animal exposure may have on the reading comprehension skills of students in the seventh grade. There are a number of factors that may impact the effectiveness and success of literacy programs

that incorporate animal assistance. In order to test the effectiveness of these types of programs, the following research question was formulated: *Is there a significant difference in reading comprehension growth, measured by the Degrees of Reading Power test, between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those who did not have classroom animal interactions?*

Methodology

It was hypothesized that there would be a statistically significant difference between scores on Degrees of Reading Power test by seventh-grade students who had interactions with animals before the test and children who did not have interactions with animals before the test. To obtain the data necessary to address the research question and test this hypothesis, the following steps were taken. First, a review of literature was conducted to identify existing research in the fields related to the study. The literature review began with research on the quality of classroom teachers in the learning environment. This was followed by an examination of testing anxiety and its impact on reading comprehension scores, followed by instructional strategies used in learning environments. The literature review concluded with an examination of how animals in the classroom may affect students.

Official approval to gather data was obtained from the San Diego Unified School District. The proposed study was reviewed and approved by the San Diego Unified School District's Standards, Assessment, and Accountability Division, as well as Alliant International University's Institutional Review Board. After dissertation committee approval of the proposal and research design, the research study was conducted on the two seventh-grade classes selected by the San Diego Unified School

District as most appropriate for the study. Appropriateness was defined as the two classes of seventh-grade students from the same school that were most closely matched in number, population, age group, and grade.

The district's 2007-2008 calendar for year-round schools indicated that the Degrees of Reading Power test would be administered October 4-5 and October 8-10, 2007. Therefore, students in the experimental group had daily, minimum 20-minute animal interaction experiences on the dates of September 27 through October 3, 2007; these dates included the week immediately preceding the administration of the Degrees of Reading Power test. Student scores from each class were collected, analyzed, and evaluated based on the San Diego Unified School District-mandated Degrees of Reading Power test results for both the treatment group and the experimental group. As a comparison, scores from the participants to whom the Degrees of Reading Power test was administered in April 2007 were collected as well.

The participants in the study included two classes of students, one class exposed to animal experiences and one class not exposed to animal experiences. The research was conducted through a quasiexperimental research design to compare the results of the reading test for these two groups of students.

Limitations of the Study

Potential limitations to the research were addressed throughout this study. Although educational programs that involve animal assistants are rapidly gaining popularity throughout the United States and other countries, the concept to have students utilize animals to enhance reading comprehension skills is still relatively new. Therefore, attitudes of educators involved in the study, as well as the students' previous experiences with animals, may have had an impact on the study results.

Student attendance during the course of this study may also have had an impact. Student absences that affected the amount of time in which they had an opportunity to interact with animals involved in the study, along with the instructor's education and experience, were considered during the course of the study.

Definitions of Key Terms

The following operational definitions are presented for application in the study.

Adoptable: Status of a companion animal that has successfully passed a behavioral and medical evaluation that has determined that there is a strong likelihood of adoption.

Animal assistance: The companion animal act of supplying help or support for the child in an educational environment.

Animal assistant: A companion animal that acts in the role of educational support for a child in a learning environment.

Animal interaction experience: A period of time in which a student may touch, hear, and learn information about a companion animal.

Canine Good Citizen (CGC): An internationally recognized, 10-part program offered at various organizations through the American Kennel Club. CGC promotes proper pet ownership and appropriate dog behavior. Canines that pass CGC tests are used frequently in pet-assisted and animal-assisted therapy programs (American Kennel Club, 2006).

Companion animal: Animal that lives with and is incorporated into human families. Although many animals, such as dogs and cats, may be referred to as companion animals, this term can be applied to all animals.

Degrees of Reading Power (DRP): A test administered to all fourth- through eighth-grade students in the San Diego Unified School District as a direct measure of reading comprehension.

Humane: Showing compassion and sympathy toward animals and other people; treating all living beings fairly and equitably.

Humane organization: An association that cares for animals that are awaiting adoption, are in need of medical care, and/or participate in learning environments. A humane organization is composed mainly of volunteers.

Humane society: Like a humane organization, a humane society is an association of individuals who care for companion animals while the animals are awaiting adoption, are in need of medical care, and/or participate in educating children in learning environments. However, a humane society is composed mainly of paid employees.

Librarian: A person who directly participates in the enhancement of literacy and promotion of reading for the public. At times, this person is involved in the coordination and implementation of reading programs involving animals.

The link: A term used to describe the connection between a person's abusive behavior toward animals and similar behavior toward family members.

Pet-assisted therapy: Also referred to as animal-assisted therapy. A therapeutic process involving dogs, cats, rabbits, guinea pigs, hamsters, rats, or birds that have passed a behavior assessment that may result in a recognized companion animal certification.

R.E.A.D.: An acronym for Reading Education Assistance Dogs, one of the first nationally recognized organizations to incorporate the use of animal assistants with students for reading programs.

Reading comprehension: A student's ability to understand information that is presented via the written word.

Reading intimidation: A psychological limitation that some students experience during reading lessons and/or tests.

Volunteer: A person who donates time to participate in animal-assisted or pet-assisted programs, typically with an animal assistant. This person receives no monetary compensation for time spent in the program.

Chapter 2

REVIEW OF LITERATURE

In an era of student accountability and achievement, educators are constantly in search of ways to improve student learning. One of the most important factors in this educational equation is the quality of the classroom teacher. An educator's experience, basic knowledge of subject matter, and personal education and academic goals greatly affect his or her ability to teach and have a major impact on student success (Darling-Hammond, 1999). Therefore, the first section of this chapter, Teacher Practice, examines the impact of teacher practice on student achievement and explores several educational strategies used within the learning environment.

An additional factor that may impact student achievement is student test anxiety. The fear of receiving a poor score can weigh heavily on a student, influencing the ability to perform at expected levels. Rotenberg (2002) described the impact of poor test performance on students who took examinations for admission to college or for a job:

> Faced with imperfect information, universities and businesses use test scores to discriminate among high school students in allocating scarce educational and employment opportunities. Students who fail to meet designated thresholds of performance are automatically excluded from the eligible pool. (p. 4)

The second section, Student Test Anxiety, explores the psychological effects of reading intimidation and how it can impact student performance during testing.

Because educators often express the need for "new and innovative" programs within the learning environment (Kayman, 2005), the third section, Classroom Exposure to Animals, examines how animals may influence student learning, reduce anxiety, and promote an increase in student test scores.

Teacher Practice

The success of children in school has been a subject of disagreement and debate for decades. From the invention of the light bulb to the utilization of the World Wide Web, the United States has taken pride in its ability to be first in scientific and practical endeavors. However, with all of these "firsts," what place does the nation hold in comparison with other countries' educational systems and instruction? An article in *Gifted Child Today* ("International Comparisons of Higher Education," 2007) described the U.S. educational system and its place in the world context:

> The United States has not made significant progress since the early 1990s, whereas other countries have improved their systems. The United States ranks second, behind Canada, in the percentage of its adults ages 35 to 64 who hold at least associate degrees; but ranks seventh when comparing adults ages 25 to 64. Given this statistic, the younger generation will be less well prepared for the workforce than their parents. The United States also ranks in the bottom half of the 27 countries compared on the proportion of students who complete a college degree or certificate program, with only 17 out of every 100 students earning a degree or certificate. (p. 9)

Many components affect learning, including economics, culture, and family and friends. A study by Darling-Hammond (1999) suggested that the impact of an ineffective teacher on student is the quality of classroom instruction, not just for the academic success of the student but for life success as well.

In an effort to promote the competencies of the nation's teachers and support policies that reflected the minimum competencies, a report by the North Central Regional Educational Laboratory (NCREL, 2005) stated,

> Improving teacher quality and closing academic achievement gaps are leading national priorities in education. As required by the NCLB Act, schools must ensure that all teachers in core academic areas (English, reading or language arts, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography) are or will be "highly qualified" by the end of the 2005-06 school year. All teachers newly hired after the first day of the 2002-03 school year already were required to meet the criteria. (¶ 2)

NCREL furthered defined that a highly qualified teacher would hold a Bachelor's degree, possess full state certification, and demonstrate competence in subject knowledge and teaching (¶ 4).

Furthermore, in an effort to support the nation's school districts in hiring qualified teachers, provisions offered by the NCLB Act included the following:

> Teachers in eligible rural districts who are highly qualified in at least one subject will have three years from the date of their employment to become highly qualified in the additional subjects they teach.
>
> States may decide, based on their current certification requirements, to allow science teachers to demonstrate that they are highly qualified in either "broad field" science or in individual fields of science (such as physics, biology, or chemistry).
>
> States may develop a method by which teachers who teach multiple subjects demonstrate through one process that they are highly qualified in each of their subjects. (¶¶ 6-8)

In addition to the report offered by NCREL, Darling-Hammond (1999) continued her discussion regarding teacher qualifications:

> As new standards for student learning have been introduced across the states, greater attention has been given to the role that teacher quality plays in student achievement. In the last few years, more than 25 states have enacted legislation to improve teacher recruitment, education, certification, or professional development. (p. 5)

These goals, policies, and expectations provided school districts with a framework for defining qualified teachers and evaluating classroom performance, while research has shown that teachers' practices and performance impact student achievement, regardless of the student's academic history (Darling-Hammond, 1999). As districts continued the effort to employ qualified teachers, research continued to focus on the element of how teachers were prepared for the classroom environment.

Teacher Preparation

In 2007 the United States was in the midst of a teacher shortage. Included in the reasons for this shortage is the need to replace large numbers of retiring teachers and those who choose to leave the profession. In a report by the Western Interstate Commission for Higher Education (2006) it was predicted that, in California, the need for new teachers would grow by 20%, from 451,000 in 2002 to approximately 540,000 by 2012 (p. 3).

Today's college students are seeking degree programs that will prepare them for the business realm and not an academic one. This is due in large part to the perception that teachers are not adequately compensated for their work. "In the absence of substantial gains in compensation for this profession, the difficulty of attracting and retaining skilled and well-qualified teachers has remained a persistent, often crisis-level problem for decades (Bellm & Whitebook, 2005, p. 1). Therefore, school districts have searched for ways to entice people into the classroom in order to fulfill their educational commitments to the community and its children.

In the search for teachers, some school districts have hired educators who lacked the necessary training and skills to instruct students and meet the state's standards.

> While most states have been increasing their standards since the 1980s, more than 30 states still allow the hiring of teachers who have not met their licensing standards, a practice that has been on the increase in some states as demand has grown in recent years. Some allow the hiring of teachers with no license. Others issue emergency, temporary, or provisional licenses to candidates who, depending on the state, may or may not have met varying requirements. (Darling-Hammond, 1999, p. 10)

In many states it was not unusual to find classroom educators who were still in the process of achieving a Bachelor's degree or who have not yet passed a basic skills test to determine their readiness for classroom instruction. Consequently, it was

important to look at the various state requirements for teachers. Although each state may have multiple requirements, there were some basic expectations in most states. These included an earned Bachelor's degree in the subject area taught, a minimum grade point average, and participation in a practicum or student teaching before entering the classroom. According to the U.S. Department of Education's (2004) list of state requirements for teacher certification, only 37 states required that a teacher hold a Bachelor's degree in the subject that he or she is instructing. Only 22 states required mandated a minimum grade point average. Only 46 states mandated that classroom instructors have student teaching experience before entering the classroom.

In a NCES survey of teachers (1998), educators rated themselves as either *moderately* or *somewhat* prepared to begin teaching. "Fewer teachers believed they were very well prepared to implement new teaching methods (41 percent), implement state or district curriculum and performance standards (36 percent), and use student performance assessment techniques (28 percent)" (Teachers' Preparedness for Classroom Requirements section, ¶ 5).

Lack of qualifications and preparedness are directly correlated with classroom success of students.

> One of the most important factors in raising student achievement is a highly qualified teacher. Research shows that teacher subject-matter knowledge is greatly associated with student learning. In this era of high standards and high expectations, having a highly qualified teacher has never been more important. (U.S. Department of Education, 2006, Proven Methods section, ¶ 2)

The opinions of the parent whose children are lacking in educational instruction vary. In a national survey of parents of school-age children conducted by Hart and Teeter (2002) the education of America's children ranked third on the nation's agenda. Family values and fighting terrorism were the only two categories that ranked higher

than education, with much of the U.S. population agreeing that America's educational system and methods of instruction were in need of complete restructuring.

Professional Development

In an effort to afford children the proper and necessary education that they deserve, many districts supported and individual teachers sought opportunities to further their educational expertise. This subsection explores the opportunities for teachers to advance their careers and improve their practice.

Darling-Hammond, Bullmaster, and Cobb (1995) observed the use of professional development schools as a tool for teachers, one that assists instructors in seeking avenues of education to support their students' educational experiences:

> As faculties become empowered to pose and solve problems, they assume leadership for change from rather than looking upward and outward for leadership. The process is often a crescive one. As change is sought within classrooms and schools, some teachers take the initiative to look further, to look for opportunities to make needed changes at the district level and beyond. (p. 100)

To continue to improve their practice, teachers must engage in ongoing professional development. A study conducted by NCES suggested that, along with participation in these designated schools, a significant number of teachers took part in professional development opportunities outside of school (NCES, 2005). Indeed, NCES indicated that "ninety-five percent of public school teachers reported attending a workshop, conference, or other training sessions in the previous year, compared with 42 percent who reported participating in mentoring, peer observation or coaching" (p. 1).

In an effort to alleviate the cost of providing professional development some districts offered monetary incentives for participation in professional development activities. This included increasing teacher salaries based on the number of hours spent

in workshops and conferences (NCES, 1994). However, attendance at such workshops and conferences was often limited, as the cost may have been prohibitive to most teachers. In addition to the cost of attending conferences and workshops was the cost of providing substitutes and half-day schedules for students (Fermanich, 2002, pp. 38-39).

Not all professional development involved expenditures affecting the school's budget. Along with organized programs, there was also the opportunity for teacher collaboration. In 2000 an NCES study showed that, among the various professional development opportunities for instructors, teacher collaboration is one of the most beneficial in terms of increasing instructional skills. Teacher collaborations is defined as team teaching, mentoring, or a partnership with another learning institution.

> Frequency of participation in a collaborative activity was generally positively related to teachers' beliefs about the extent to which the activity improved their classroom teaching. For example, teachers who engaged in regularly scheduled collaboration with other teachers at least once a week were more likely to believe that participation had improved their teaching a lot (45 percent), compared with teachers who participated two to three times a month (23 percent), once a month (15 percent), or a few times a year (7 percent). (NCES, 2000, ¶ 12)

All in all, more than half of the nation's schools have stated that their faculty have participated in professional development activities in their specific subject matter and that 70% of the schools had sought teaching methods workshops and other learning opportunities for their faculty (NCES, 2005), which speaks to the importance of professional development as a tool for educator growth.

Reading Comprehension

Language acquisition and comprehension begins at birth and continues through adulthood. Keene and Zimmermann (2007) suggested that the process of language

acquisition begins before a child is born and that there is a strong correlation between a young child's language use and the amount of time adults spend in conversation with the child.

> Oral language development plays a critical role in learning to read and write well. Children's syntax (oral and written grammar, story structures, and use of conventions) and vocabulary (using more precise and purposeful words) develop because they spend time talking at home, to their teachers, and with other children. (p. 40)

Beginning with picture books, understanding the written word through discussion can be an integral part of the child's comprehension processes.

> Talk about what the pictures mean to you and what they make you think, feel, envision, hear . . . . The illustrations provide a perfect vehicle for you and your child to practice elaborating on mind pictures as both of you describe the scenes and action in your own words. (Zimmermann & Hutchins, 2003, p. 31)

What does it mean for a student to comprehend text? The word *comprehension* is defined in *Webster's Dictionary* (1996) as "to understand, to include; comprise" (p. 134). However, *comprehension* may have different meanings dependent upon the circumstances of the learner.

> True comprehension goes beyond literal understanding and involves the reader's interaction with text. If students are to become thoughtful, insightful readers, they must merge their thinking with the text and extend their thinking beyond a superficial understanding. . . . Comprehension means that readers think not only about what they are reading but about what they are learning. (Harvey & Goudvis, 2007, pp.14-15)

In an evaluation of comprehension strategies, Zimmermann and Hutchins (2003) identified seven key descriptors: (a) creating mental images, (b) using background knowledge, (c) asking questions, (d) making inferences, (e) determining the most important ideas or themes, (f) synthesizing information, and (g) using "fix-up" strategies (pp. 5-6).

In an evaluative study of strategies used in achieving successful student reading comprehension skills, James-Burdumy, Myers, Deke, Mansfield, Gersten, Dimino, Dole, Liang, Vaughn and Edmonds (2006) offered observations of those strategies:

> The review of research syntheses suggests six techniques and approaches for teaching reading comprehension: (1) teach strategies; (2) use proven methods for instructional delivery; (3) use embedded instruction; (4) teach with highly engaging, interesting texts; (5) use cooperative learning; and (6) participate in ongoing professional development. (p. 18)

Along with comprehension is the desire of educators to instill a child's wish to read throughout his or her lifetime. Keene and Zimmermann (2007) expressed their view for this hope of lifetime reading:

> We must have the goal of educating children to become real readers, not simply students who answer test questions correctly but leave school with no interest in picking up a book ever again. If we want engaged, active readers and citizens, we must make reading a joyful adventure. (p. 31)

Furthermore, educators considered the metacognition, sometimes referred to as *thinking about thinking*, of their students. James-Burdumy et al. (2006) described metacognition of the learner as

> [the] student's conscious awareness of the cognitive processes they use and anything related to those processes. In reading, this concept explains students' awareness of whether they understand what they read and their ability to change and modify the strategies they use in order to help them comprehend better. (p. 7)

In other words, was the student able to understand what was being read? If not, did the student have the tools to rethink and reconstruct the text so that it was understandable? In an effort to address these questions Keene and Zimmermann offered the following list of metacognitive strategies as a means of enhancing comprehension among students: (a) monitoring for meaning, (b) using and creating schema, (c) asking questions, (d) determining importance, (e) inferring, (f) using sensory and emotional images, and (g) synthesizing (p. 14).

Harvey and Goudvis (2007) wrote, "Readers get better at reading by reading. Reading volume is critical to reading progress (p. 24). The following section focuses on the strategies that instructors used in order to achieve that goal.

Instructional Strategies

Teachers strive to achieve their districts' standards. Alexander, Heaviside, and Farris (1998) presented the following reform activities that challenge teachers:

> Using instructional strategies aligned with high standards; assisting all students to achieve to high standards; using curricula aligned with high standards; using textbooks or other instructional materials aligned with high standards; providing students or parents with examples of work that meets high standards; using authentic student assessments, such as portfolios, that measure performance against high standards; using innovative technologies such as the internet and telecommunications-supported instruction. (¶ 6)

As teachers considered the objectives, various instructional strategies were necessary to meet the needs of the students. As a result of reforms, educators began to utilize a range of instructional strategies as a means of improving student achievement.

How an educator chooses and uses strategies is greatly influenced by the teacher's perception of a strategy and how it can best be used for the student. A strategy may be formally defined as "the approach a teacher may take to achieve learning objectives" (Instructional Strategies Online, 2006, ¶ 1), or as something that is designed to make the curriculum fit the needs of the student (N. Sultana-McCall, personal communication, February 22, 2007). In utilizing a particular strategy, educators must bear in mind that people learn differently from one another and that one strategy will not always work for all people because likes and dislikes vary (Blachowicz & Ogle, 2001).

Identifying basic student needs was the first step in determining which strategies to use to accommodate diverse student learning styles. "Incorporating left-

and right-brain teaching strategies and learning activities can enrich students' learning" (Connell, 2005, p. 48). Connell contended that, when educators understand how their students think (with left or right brain), it is only then that they can use a suitable strategy for the appropriate lesson (p. 39). Connell described the impact of this type of strategy on student achievement:

> All students learn the content and meet the objectives, [of the lesson] although the way they do it varies. All students must participate in left-brain and right-brain activities, so students can connect to the content through their strengths, but they also work with their less-developed side. The result is a dynamic lesson that all students can participate in and learn from. (p. 48)

This type of instructional strategy may be used as a base for any learner in any given subject. However, when instructing children in reading comprehension, educators must continue to use different tools and to instruct students on how to use those tools.

While working with students specifically in reading instruction, one of the tools used was the Balanced Literacy approach to reading. Balanced Literacy incorporates the components of modeled reading, shared reading, guided reading, and independent reading. Also, Balanced Literacy approaches are designed to gradually release more responsibility to the reader in comprehending (or making sense of) the text.

Modeled reading is reading to the student and was often the first experience that a child had with literature. The positive impact to children can last throughout a child's life (Shaw, 2005). Modeled reading provided an opportunity for teachers to instill an appreciation of reading for the child and the experience of being read to may have inspired the child to remain a lifelong reader.

> We read to children for all the same reasons we talk to children: to reassure, to entertain, to bond, to inform or explain, to arouse curiosity, to inspire. But in reading aloud, we also condition the child's brain to associate reading with pleasure, create background knowledge, build vocabulary, [and] provide a reading role model. (Trelease, 2006, p. 4)

The impact that a parent may have on the child through modeled reading at home may influence the child in literacy development on many levels. Militante (2006) reported that reading at home "was a major component in later language growth, emergent literacy, and reading achievement" (p. 12).

In *shared reading* the teacher reads *with* the student instead of *to* the student. This was done as a group, such as a classroom lesson using a large chart, or in a lesson with an individual student and a single book. Payne (2005) described shared reading as an attempt to "re-create in the classroom the coziness of bedtime or lap reading that children experience at home" (p. 10). The teacher took time to reflect, or discuss, the contents of the text with the student, as opposed to strictly reciting text to the student. This engaged the student in discussion and helped the student to increase understanding of the subject matter of the book. "Shared reading, writing activities, as well as dialogues about the text, increased vocabulary, print concepts, and story comprehension skills. All in all, shared reading is a beneficial technique to use in advancing students' skills" (Militante, 2006, p. 18). Struggling readers who participate in reading experiences with more proficient readers were given the opportunity to duplicate the aptitude of the more skillful student; in essence, they learned from example (Payne).

Guided reading is a small group approach that joins children of similar reading levels into similar reading groups. Each child is encouraged to develop a personal strategy to aid in comprehension of the materials. Pinnell and Fountas (1996) discussed the advantages of guided reading within a balanced literacy program.

> It gives children the opportunity to develop as individual readers while participating in a socially supported activity.
>
> It gives teachers the opportunity to observe individuals as they process new texts.

> It gives individual readers the opportunity to develop reading strategies so that they can read increasingly difficult texts independently.
>
> It gives children enjoyable, successful experiences in reading for meaning.
>
> It develops the abilities needed for independent reading.
>
> It helps children learn how to introduce texts to themselves. (pp. 4-5)

Conklin and Wilkins (2002) reported, "Children displayed increased motivation during classroom activities and a new appreciation for literature" (p. 45) by using the guided reading approach. Bongratz, Bradley, Fisel, Orcutt, and Shoemaker (2002) found that students, after participating in a guided reading lesson, "revealed an improvement in their ability to comprehend text" (p. 37).

The final component of the Balance Literacy program is *independent reading*. As students move through each approach, they practice learned strategies that they have learned in order to read independently. Once they are able to comprehend text independently, the experience of reading "builds self-confidence, fluency, vocabulary and provides practice in applying reading strategies" (Instructional Strategies Online, 2006, Balanced Literacy section, ¶ 7).

However, even with the variety of approaches that are available to educators, America's students are still struggling.

> In 30 years, despite the different approaches to reading education that have prevailed at different times, reading scores have not really changed appreciably; about 40 percent of this country's fourth graders have always performed at a "below basic" category, while approximately 5 percent have been ranked in the "advanced" category at the other end of the distribution. (Wren, 2004, A Balanced Approach section, ¶ 10)

Testing and Test Anxiety

The struggle to improve student test scores involves more than teaching strategies. This section examines another factor that impacts student learning. A term

frequently used in the United States is *teaching to the test.* This phrase has become particularly relevant with the recent implementation of the CAHSEE and the Standardized Testing and Reporting (STAR) program. Testing can bring to the surface many questions that families have about the public school system regarding education. Do students fail due to inadequate instruction or because they are not challenged? Questions also exist regarding the STAR program regarding whether it encourages students to study to pass its exams or discourages them because they do not understand the tests.

In 2008 the STAR program tested students in grades 2-11 to measure academic success. STAR is divided into four sections: California Alternate Performance Assessment (CAPA), California Standards Tests (CST), California Achievement Test/Sixth Edition (CAT/6), and Spanish Assessment of Basic Education/Second Edition (SABE/2). These tests examine student progress in reading, writing, spelling, history-social science, mathematics, science, and English language proficiency (San Diego City Schools Standards, Assessment, and Accountability Division, 2004, ¶ 1). The San Diego Unified School District (2006) stated that the CAHSEE "is to improve student achievement in high school and ensure that students who graduate from high school can demonstrate competency in the content standards for English language arts and mathematics, adopted by the State Board of Education" (Overview section, ¶ 1).

The National Assessment of Educational Progress (NAEP) has stated that, although average reading scores for students ages 9 and 13 years have shown improvement, the average score for 17-year-olds has remained comparable to student scores in 1971.

Appendix A shows fourth-grade reading scores from 1992, 2003, and 2005 by state. The highest possible score for each state is 500. In evaluating the national

average reading score, Massachusetts held the highest score, 231, while Mississippi held the lowest score, 204. NAEP reported the average reading score for the nation to be 217 with a score of 207 or lower to be considered below basic reading level and 268 or above considered advanced (NCES, 2006). Along with four other states, California's students scored below basic reading level.

In 2008 the San Diego Unified School District utilized a variety of tests for reading comprehension and literacy for schools on traditional and year-round calendars. Appendix B contains a list of current tests that are either state or district mandated for students in elementary through high schools who are on year-round school schedules.

Another phrase that is used in American society is *test anxiety*. Anxiety may affect students in various ways, particularly during a testing situation. A study by Calvo and Carreiras (1993) showed that anxiety affected students in processing information during an examination and had the possibility of hindering general classroom learning. Calvo and Carreiras defined test anxiety as "the tendency to worry about one's own performance (e.g., expectations of failure), and one's own aptitude (e.g., self-deprecatory thoughts) under evaluative or test conditions" (p. 375).

Anxiety can hinder the students' testing success. It can manifest itself through the student's inability to recall information and it can lead to illness. Reports of student anxiety before standardized tests have also been attributed to a decrease in achievement on those tests, particularly by high-performing students (Mulvenon, Stegman, & Ritter, 2004).

According to Cassady (2004), anxiety during testing can be attributed to the lack of attention that a student may dedicate to the test at hand. This can be recognized as a level of high emotion, or anxiety, that the student possessed during a test. The

high emotional level presents a risk to the student's ability to focus and retrieve information. In an examination of how anxiety can affect a student's performance, Dutke and Stober (2001) stated, "High levels of test anxiety are known to cause decrements in cognitive performance" (p. 381). The consequences could be substandard test scores and an increase in self-deprecatory thoughts by the student.

Bodas and Ollendick (2005) studied the effects of test anxiety and self-deprecatory thoughts from a cross-cultural perspective. Reasons for anxiety and its impact on students was similar between American students and students from other countries. "Schools and exams are an inevitable aspect of most children's lives in our modern world. Academic stress and test anxiety are thus ubiquitous problems in today's world" (p. 83).

That stress can also impact the student's ability to retain information and retrieve previously learned materials during tests.

> Research conducted in the last 40 years has shown that high test anxiety is correlated with poor academic performance . . . which affect up to 35% of the student population. According to traditional test anxiety theory, the major effect of anxiety is as an interfering agent. A high anxiety level produces task-irrelevant responses, such as error tendencies and worry, which interfere in the test situation and block the retrieval of task relevant responses necessary for good performance. (Naveh-Benjamin, Lavi, McKeachie, & Lin, 1997, p. 508).

The authors detailed student accounts of further anxiety during testing. This increased anxiousness was a result of students knowing test information but being unable to retrieve the correct information due to the examination circumstances (p. 511).

The fear of being incorrect and making mistakes during assessment has been found to be a key component of anxiety during testing. This can be especially prevalent in students whose primary language is not English (Sato, 2003). A student who does not completely understand test information due to a language barrier may experience increased anxiety, with the consequence of a poor test score. Rotenberg

(2002) reported, “Less anxious students systematically outperformed those with high communicative stress in English, and students with stronger English skills were notably less anxious than low achievers” (p. 6).

The reasons for student test anxiety are numerous, including deficits in English language proficiency, psychoemotional stress, or simply not studying. Regardless of the reasons, educators have explored approaches to addressing the dilemma of anxiety in an effort to decrease incidence of classroom nervousness. The next section examines one tool for teachers as they work to ease the pressure on students during testing.

Classroom Exposure to Animals

Research on animals and their influence on the lives of children began over 100 years ago. In the late 19th and early 20th centuries, developmental psychologist G. Stanley Hall began to study the psyche of children and the influence of animals on adolescent consciousness. Ascione (2005) described the scientist and his early studies:

> Hall and his associates published a number of scientific papers on children’s knowledge, behavior, and attitudes toward animals. He became well known for the development of the questionnaire method of assessing children’s knowledge and understanding of a variety of concepts. (p. 15)

One hundred years ago, when the study was conducted, children were exposed to a more natural environment, which included wildlife. Children tended to be more aware of animals and their role in the environment. The findings of Hall’s study also indicated that children from the cities did not have the same awareness of animals as their pastoral counterparts, indicating a lack of knowledge regarding their physical world. As the rural way of life began to decrease and industrial existence increased,

more and more children became educated in the classroom setting and concerns regarding the lack of "real-world" lessons grew (Ascione).

Child psychologist Levinson (1962) studied specifically how companion animals affected children during therapy. He observed that children who had an animal with which to interact during sessions were more inclined to communicate freely in the therapeutic setting. Chandler (2005) reported that during Levinson's studies that,

> [Levinson] empirically demonstrated in the early 1960s that pets help to form a strong connection between client and therapist. Pet practitioners can be especially helpful when working with populations who might be discouraged, unmotivated, resistant, or defiant or who have poor self-insight, deficits in social skills, or barriers to developing relationships. (p. 13)

These relationships were furthered explored within the classroom environment. Chandler (2001) investigated the incorporation of classroom animals and their impact on the school environment:

> [Animals] may be used to curb violence in the schools. Animals in the classroom have empirically been proven to enhance humane attitudes toward animals and these more humane attitudes persisted in a one year follow up. This same study showed a generalization from humane attitudes toward animals to human-directed empathy. Thus, emotional connections made with animals can transfer to more empathic attitudes toward other persons. (p. 7)

Chandler examined a number of objectives regarding the incorporation of animals into the classroom setting, asserting that there was a positive psychological impact, a decrease in nervousness, and a helpful learning influence among students. Furthermore, she noted that classroom animals aided students in their problem-solving abilities, promoted student interaction, and reduced anxiety in the school setting (p. 4).

The potential result of animals in the classroom may be a more relaxed, less intimated child, with the outcome of high production in classroom and testing success. In an effort to alleviate many of the anxieties affecting students, many instructors have begun to introduce animals into the learning environment.

The relationship between humans and animals is antediluvian and complex and, as civilizations developed, so did the relationship between ancient people and animals. In some cases, that relationship turned toward reverence, as animals came to embody society and its environment (Watterson, 1999).

As humans' reliance animals developed, early North American cultures began to expand interdependence with domestic animals. Waldman (2000) stated that, within Chipewyan mythology of Canada, there was the belief that a dog had facilitated the creation of the human race. Also, dogs appear to be among the first animals not only to only share homes with people but to work side by side with people.

> Dogs were used on the prairies and plains to haul supplies on a travois—a wooden frame in the shape of a v, with the closed end over the animal's shoulders, the open end dragging on the ground, and a plan or webbing the middle to hold goods. (p. 62)

Over the centuries, as human populations expanded, the wild population of animals came closer to homes and communities of people. Slowly, these animals became domesticated and played a prevalent role, being elevated to the role of companion animal.

According and Wilson and Turner (1997), studies have shown that interaction with animals not only fulfills the need for companionship but improves general overall health.

> Contact with companion animals has been hypothesized to enhance the quality of life for their human partners. . . . The review concludes that although research progress continues to be slow in this area, findings of quality of life benefits derived from companion animal contact are consistent with the research reported during the past two decades in the literature on human social support. These benefits are evident in the psychological, physical, social and behavioral levels. (p. 3)

There were many ways in which teachers made use of animals as companions. Some educators used animals strictly as classroom fixtures. The educators may have

seen the animal merely as a means to occupy the student between lessons. Many organizations have created tools, such as reference books, workshops, and pamphlets, to inform educators and students about their classroom companion animals.

In an effort to assist teachers who wish to incorporate animals into their learning environments, Pitts (2004) offered a set of goals:

> Understanding that animals, as living beings, have intrinsic value. Students learn responsibility to protect, nurture and respect animals through careful husbandry and attention to animals needs.
>
> Observing that there are fundamental needs in all living creatures which are essential constituents of all life. Observing, classifying, recording, drawing and reading incorporated with class discussion, allows student internalization and reflection about human-animal connections and life.
>
> Recognizing that domesticated companion animals are pathways to animal study in both urban and in natural environments. Habitat, life cycles, healthy living, geography and ecosystem lessons come to life with classroom animals.
>
> Self-understanding through comparing anatomy, physiology, reproduction, nutrition, behavior, communication and interaction.
>
> Experience friendship, cooperation and joy in caring for other living creatures.
>
> Interaction among classmates in caring for, observing and discussing animals, promotes understanding of animal behavior. Caregiving leads to attachment and compassion which strengthens the human-animal bond. (pp. 2-3)

Another means of incorporating animals in the learning environment is the R.E.A.D. program. The implementation of the literacy program began with the mission, "To improve the literacy skills of children through the assistance of registered Pet Partners therapy teams as literacy mentors" (R.E.A.D., 2000, ¶ 1). Dogs were brought into learning environments, such as schools and libraries, and children spent time reading to them. Dogs who are therapy animals are accepted into the program.

The premise behind R.E.A.D. and other animal-assisted literacy programs was that animals did not judge. Therefore, a child who had difficulty in reading was more

likely to participate in reading to an animal, eliminating the fear of receiving criticism when mistakes were made.

> When a R.E.A.D. dog is listening, the environment is transformed, a child's dread is replaced by eager anticipation, and learning occurs. The handler is a skilled facilitator too – shifting performance pressure off the child and providing support, while the child gets the supervised reading practice necessary to build vocabulary, increase understanding of the material, and gain fluency as a reader. (R.E.A.D., 2000, p. 2)

Along with promoting learning, animals have the potential to address some of the issues of confidence and esteem that some children may have as a roadblock to learning success. A R.E.A.D. educator shared experiences of how animals helped to promote learning and literacy in the classroom:

> Working with [therapy dog] Thorndyke is a rewarding experience for all concerned. The students respond well to the R.E.A.D program and class visitations because the animal is non-judgmental. He likes everyone, accepts attention and pets from the children no matter if their clothes or shoes are new or old, if they are excellent readers, just mediocre or struggling with the text, if they smell clean or have body odors. Even if the child can not read, but looks at pictures and pretends to read a story, the dictated story can be written out, illustrated by the child and then practiced as a reading activity. (E. Hall, personal communication, January 16, 2007)

Literacy programs involving animals were a relatively new approach to reading education in 2007. These programs ranged from small group experiences to large programs that impacted the entire school and community. Whether or not animals are part of the learning environment for the instruction of basic pet care, or to increase achievement, the student who formed a connection with the animal may have been more interested in learning.

> It is important that children understand animals and their needs in an informed light. Nurturing should be a natural response, but without mentors and experience, a child may never experience positive human-animal contact. The classroom is a site where valuable lessons can be learned through discussion, hands-on exploration, care giving and interaction. Animal models abound in literature and this can spark a child's interest in reading or writing. (Pitts, 2004, p. 18)

Using an animal in learning could vary dramatically from one educator to another. What would be allowable on a particular campus might not be allowed on another. Some children may have allergies, and some students may be afraid of animals.

> The dog is a good influence on the classes with his friendly demeanor and proper work ethic. He visits individual students to help calm and settle them into silent reading or lesson review at the beginning of the class while I take roll and collect homework . . . everyone is approached but it is up to the individual if they want to pet the dog in silence. (E. Hall, personal communication, January 16, 2007)

If there were an appropriate connection and if the companion animal were incorporated properly into the classroom and its curriculum, the knowledge that students might gain when interacting with animals could be a potential tool for educators who search for additional avenues of learning for their students.

Chapter 3
METHODOLOGY

This chapter describes the process by which this research was conducted. This chapter addresses a restatement of the problem, research hypotheses, subjects, research design, reliability and validity, procedures, and data analysis.

Restatement of the Problem

The problem to be addressed by this study was the effect of exposure to animals on the reading skills of children. Although pairing students with animals may be perceived as a positive and effective learning experience, little is known about the actual effect, if any, of animals within the learning environment, specifically on a child's reading comprehension skills.

Ultimately, there are influences to be considered when studying a student's classroom successes. Family support and the quality of instruction that the student receives have the most impact in determining the level of student reading comprehension (Hart & Teeter, 2002). The utilization of animals in the classroom environment may be a contributing factor to that success.

Research Hypotheses

The research question for this study is, *Is there a significant difference in reading comprehension growth, measured by the Degrees of Reading Power test, between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those who did not have classroom animal interactions?*

To address the research question, the following hypotheses were constructed:

H_1. There will be a significant difference in reading comprehension growth, as measured by the Degrees of Reading Power test, between William Howard Taft Middle School students in San Diego who had classroom animal interactions and those who did not have classroom animal interactions.

H_0. There will be no significant difference in reading comprehension growth, as measured by the Degrees of Reading Power test, between William Howard Taft Middle School students in San Diego who had classroom animal interactions and those who did not have classroom animal interactions.

Subjects

This study analyzed differences in scores on the Degrees of Reading Power test between two groups of seventh-grade students at William Howard Taft Middle School in San Diego, California. William Howard Taft Middle School is on a traditional schedule, with approximately 750 students.

Group 1: This group was composed of 29 seventh-grade students. These students received animal interaction experiences for approximately 20 minutes each school day, September 27 through October 3, 2007. The San Diego Unified School District's 2007-2008 calendar for schools on a traditional schedule indicated that the Degrees of Reading Power test was administered October 4-10, 2007. Students in this group received the animal interaction experiences during the week immediately preceding the administration of the test.

Group 2: This group was composed of 26 seventh-grade students. These students did not receive animal interaction experiences before the Degrees of Reading Power test administered October 4-10, 2007.

William Howard Taft Middle School is part of the San Diego Unified School District. According to the district,

> SDUSD serves nearly 133,000 students and has marked more than 150 years of service to San Diego's children. It is the second largest district in California, and eighth largest urban district in the United States. The student population is extremely diverse, representing more than 15 ethnic groups and over 60 languages and dialects. (San Diego Unified School District, 2006, About the District section, ¶ 1)

The San Diego Unified School District categorizes its schools in the following ways: (a) elementary schools, kindergarten through sixth grades; (b) middle schools, sixth through ninth grades, (c) high schools, 9th through 12th grades; (d) charter schools, which receive public funding but are governed by their own group; (e) alternative schools, which serve students with special needs or considerations; and (f) atypical schools that do not fall within the norm in terms of grades served. William Howard Taft Middle School was considered a middle school in that it served students in sixth through ninth grades.

Research Design

This study was conducted using a quasiexperimental research design with a quasi-independent variable for two groups: (a) students who had animal interaction experiences in the classroom before the Degrees of Reading Power test, and (b) students who did not have animal interaction experiences in the classroom before the Degrees of Reading Power test. The dependent variable was the students' growth on the Degrees of Reading Power test.

Reliability and Validity

The Degrees of Reading Power test has been approved and administered by the San Diego Unified School District and has met its standards of educational assessment. The purpose of the Degrees of Reading Power test is to measure students' reading comprehension skills. Spies and Plake (2005) reported that the reliability of the test was based on estimates of "calibration and operational forms [ranging from] .94 and .97 for each grade between Grade 4 and Grade 12, and only slightly lower (.91 and .92) for Grades 2 and 3" (p. 292). This was considered to be a favorable comparison to scores on IQ tests.

Spies and Plake (2005) reported on the validity of the Degrees of Reading Power test, stating that the validity is based mainly on criterion validity, which has determined a connection between a student's understanding of the written material and his or her score. Degrees of Reading Power has been shown to do well in determining comprehension among students; however, there appears to be room for expansion regarding further assessments of its validity (p. 292).

Along with the San Diego Unified School District's and Alliant International University's Institutional Review Board approval of the research study, the researcher and members of the committee accepted the quasi-experimental design of the study. The research design was in alignment with the study's research question.

Procedures

Two groups of seventh-grade students from William Howard Taft Middle School in San Diego, California, were chosen to participate in the study. The classrooms were similar in terms of age, gender, and student population. The classes will be chosen by the school principal. The class whose students had the least

consistent in-class attendance was designated Group 1; the class whose students had the most consistent in-class attendance was designated Group 2. The reason for this designation was to address one of the limitations of this study, which was that student absences might affect the amount of time to interact with animals as well as to receive instruction.

After the two groups were determined, Group 1 received animal interaction experiences in class for approximately 20 minutes each day on the dates September 27 through October 3, 2007. During this same period of time Group 2 did not receive animal interaction experiences in class. The dates of the animal interactions were based on the 1-week time period immediately preceding the administration of the fall 2007 Degrees of Reading Power test. The amount of time of the animal interaction experiences per day was set to have as little impact on the classroom instructional schedule as possible.

The in-class animal interaction experiences included an initial discussion of appropriate behavior around the animals, how to touch the animals, and the types of animals with which they would interact. The students then chose their preferred animal for interaction. This option is given to eliminate any fear that the student might have in interacting with a specific animal and to avoid the student feeling forced to participate. The interactions included petting, sitting with, speaking to, or merely watching the animal. Each animal had passed a behavioral assessment and had a handler who was with the animal at all times.

Upon completion of this phase of data collection the Degrees of Reading Power test scores for fall 2007 were received from the San Diego Unified School District. The differences between the spring 2007 and fall 2007 Degrees of Reading Power test scores established a reading comprehension growth score (positive or

negative for each student. The average growth scores for the two groups were then compared, using a between-subjects *t* test.

Data Analysis

The purpose of this study was to examine differences in growth reading comprehension test scores between two groups of students in the seventh grade following classroom animal interaction experiences. At the completion of the data collection phase of the study, scores from the students' Degrees of Reading Power test were collected and organized according to group. In order to analyze and evaluate the data, a between-subjects *t* test was used to analyze the data and determine the differences in the reading comprehension growth scores of the two groups.

Summary

This chapter describes the methodology to be used to study the effect of animal exposure on the reading comprehension skills of selected seventh-grade students at William Howard Taft Middle School. The research used a quasi-experimental design. Two classrooms of seventh-grade students from William Howard Taft Middle School were included in the study. Students in Group 1 received animal interaction experiences in the classroom. Students in Group 2 did not receive animal interaction experiences in the classroom. Reading comprehension was measured by the Degrees of Reading Power test, administered district-wide to seventh-grade students.

In order to analyze and evaluate the data, a between-subjects *t* test was used to measure the data and evaluate the differences in the average scores of the students in the two groups. Student test scores from the Degrees of Reading Power test administered in fall 2007 were compared to scores from the test administered in spring

2007, producing a reading comprehension growth score. These growth scores were analyzed using a between-subjects *t* test.

Chapter 4
DATA ANALYSIS

The data reported in this study examined the difference that animal interactions may have had on the reading comprehension skills of students in the seventh grade at William Howard Taft Middle School in San Diego, California. This study compared the reading comprehension scores of seventh graders who had classroom animal interactions and seventh graders who did not have classroom animal interactions. Two classes of similar population, age group, and grade were included in this study. Group 1 students received animal interaction experiences and Group 2 students did not receive animal interaction experiences. The Degrees of Reading Power test was used to measure student reading comprehension.

This study was conducted used a quasi-experimental research design with a quasi-independent variable for two groups: (a) students who had animal interaction experiences in the classroom before the Degrees of Reading Power test, and (b) students who did not have animal interaction experiences in the classroom before the Degrees of Reading Power test. The dependent variable was the students' scores on the Degrees of Reading Power test.

In order to analyze and evaluate the data, a between-subjects *t* test was used to measure the data and evaluate the pretest/posttest differences in the scores of the students in the two groups. The data were student test scores from the Degrees of Reading Power test administered in spring and fall 2007. The data were further analyzed by a between-subjects *t* test to evaluate the differences in the scores of students between the two groups on the Degrees of Reading Power test administered in spring 2007. Finally, the scores from the administration of both sets of tests were

analyzed via a between-subjects *t* test to evaluate the differences between the two groups. The demographics of the study participants who participated in the study are presented in Table 1.

Table 1

Demographics of the Study Participants

Variable and category	Group 1 (n = 29)	Group 2 (n = 26)
Gender		
Female	13	13
Male	16	13
Ethnicity		
African American or Black	6	5
Chinese	0	1
Filipino	2	1
Hispanic/Latino	13	9
Japanese	1	0
Laotian	0	1
White	6	8
Vietnamese	1	1
Language proficiency rating		
Fluent English Proficient	21	13
Initially Fluent English Proficient	2	0
Reclassified Fluent English Proficient	6	5
Early Intermediate	0	1
Intermediate	0	6
Early Advanced	0	1

Research Question Results

The research question for this study was, *Is there a significant difference in reading comprehension growth, measured by the Degrees of Reading Power test,*

between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those who did not have classroom animal interactions?

Based on the district's application of performance levels that indicate grade-level success expectations, the following numerical score was applied to the performance levels achieved by students on the Degrees of Reading Power test: (a) at or above grade level (AA) was equal to 4 points, (b) at or close to grade level (AC) was equal to 3 points, (c) below grade level (B) was equal to 2 points, and (d) far below grade level (FB) was equal to 1 point.

In order to compare scores, the spring scores on the Degrees of Reading Power test were subtracted from the fall scores; this established the growth (or decline) in the students' reading comprehension. Table 2 presents an analysis of the range of mean pretest/posttest differences in scores by students in both groups.

Table 3 presents the *t* test of differences in reading comprehension growth between the students who had animal interaction experiences (Group 1) and the students who did not have animal interaction experiences (Group 2). Analysis of the *t* test suggested no statistically significant difference between the two participating groups in reading comprehension growth as measured by the Degrees of Reading Power test

It should be noted that participating students had advanced from the sixth grade when the spring 2007 Degrees of Reading Power test was administered to the seventh grade when the fall 2007 Degrees of Reading Power test was administered. Along with

Table 2

Measures of Central Tendency for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Students Who Had Animal Interaction Experiences (Group 1) and Students Who Did Not Have Animal Interaction Experiences (Group 2)

Variable and category	Group 1 (n = 29)	Group 2 (n = 26)
Range of test scores	1-4	1-4
Mean pretest score	2.31	2.46
Mean posttest score	2.21	2.04
Mean growth score	-0.10	-0.42

Table 3

Independent Samples Test for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Students Who Had Animal Interaction Experiences (Group 1) and Students Who Did Not Have Animal Interaction Experiences (Group 2)

	t	*df*	Sig. *p* (2-tailed)	Mean difference	SE of difference
Equal variances assumed	1.103	53.000	.275	.3196	.28983
Equal variances not assumed	1.129	48.170	.265	.3196	.28317

the adjustment of change of grade level was a change from a sixth-grade Language Arts instructor to a seventh-grade Language Arts instructor.

Additional Findings

The data generated additional findings on the differences that animal interaction experiences may have had on the reading comprehension skills of these students in the seventh grade. This section reports the data by gender, ethnicity, and language proficiency.

Degrees of Reading Power Scores Sorted by Gender

The number of female students by group, the means, and the standard deviations of the data are presented in Table 4. Table 5 presents the number of male students by group, the mean, and the standard deviation of the data. Table 6 presents the t-test for Equality of Means among both female and male students. No statistical difference in the growth scores between male and female students for either group were found. The limited number of students involved in the study may have contributed to the lack of statistical differences in the results.

Table 4

Group Statistics for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Female Students Who Had Animal Interaction Experiences and Female Students Who Did Not Have Animal Interaction Experiences

Group	*n*	Mean	*SD*
1	13	-0.3846	1.12090
2	13	-0.5385	0.66023

Table 5

Group Statistics for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Male Students Who Had Animal Interaction Experiences and Male Students Who Did Not Have Animal Interaction Experiences

Group	*n*	Mean	*SD*
1	16	0.1250	1.36015
2	13	-0.3077	0.94733

Table 6

Independent Samples Test for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Female and Male Students Who Had Animal Interaction Experiences and Female and Male Students Who Did Not Have Animal Interaction Experiences

Gender	Assumption	*t*	*df*	Sig. *p* (2-tailed)	Mean difference	SE of difference
Female	Equal variances assumed	0.426	24.000	.674	0.1538	0.36080
	Equal variances not assumed	0.426	19.432	.675	0.1538	0.36080
Male	Equal variances assumed	0.970	27.000	.341	0.4327	0.44599
	Equal variances not assumed	1.007	26.466	.323	0.4327	0.42972

A comparison of the animal interaction experiences between genders revealed no statistically significant difference between the mean scores of female and male

students. The limited number of students involved in the study may have contributed to lack of statistical difference in the results.

Degrees of Reading Power Scores Sorted by Ethnicity

William Howard Taft Middle School has a diverse community of students. Although several ethnic groups comprise Taft Middle School, samples sizes among most of the groups that participated in this study were too small for comparison. However, the Hispanic/Latino students formed an adequate representative sample, and analysis of the data is presented in Table 7, presenting the number, the mean, and standard deviation among Hispanic/Latino students in this study. Table 8 presents the results of the *t* test for the Hispanic/Latino groups. It should be noted that, due to the relatively small population of some ethnic groups, the following tables report only the group in which a representative number could be determined.

Table 7

Group Statistics for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Hispanic/Latino Students Who Had Animal Interaction Experiences and Hispanic/Latino Students Who Did Not Have Animal Interaction Experiences

Group	*n*	Mean	*SD*
1	13	-0.2500	2.06155
2	9	-0.3750	0.74402

Table 8

Independent Samples Test for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Between Hispanic/Latino Students Who Had Animal Interaction Experiences and Hispanic/Latino Students Who Did Not Have Animal Interaction Experiences

Assumption	*t*	*df*	Sig. *p* (2-tailed)	Mean difference	SE of difference
Equal variances assumed	.158	10.000	.877	0.1250	0.78958
Equal variances not assumed	.118	3.397	.913	0.1250	1.06381

The data revealed no statistical difference in Hispanic/Latino students who had animal interaction experiences and those who did not have animal interaction experiences. A total of 22 Hispanic/Latino students participated in this study; this low number may have contributed to the lack of statistical differences in the results.

Degrees of Reading Power Scores Sorted by Language Proficiency Level

Along with the diverse ethnicities was a variety of primary languages of study participants. Table 9 presents the numbers, means, and standard deviations for students in Group 1 categorized by each language proficiency level represented in the study. Table 10 presents the same data for students in Group 2. Table 11 presents the results of the *t* test for independent samples for all language proficiency levels represented in the study. Due to the relatively small representation of some language proficiency levels, the following tables report only groups with 5 or more students.

Table 9

Group Statistics for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Among Language Proficiency Levels for Students Who Had Animal Interaction Experiences (Group 1)

Language proficiency level	*n*	Mean	*SD*
Fluent English Proficient	21	-0.0870	1.16436
Reclassified Fluent English Proficient	6	-0.1667	1.72240

Table 10

Group Statistics for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Among Language Proficiency Levels for Students Who Did Not Have Animal Interaction Experiences (Group 2)

Language proficiency level	*n*	Mean	*SD*
Fluent English Proficient	13	-0.5385	0.96742
Reclassified Fluent English Proficient	5	-0.2000	0.44721
Intermediate	6	-0.3333	0.81650

Table 11

Results of Independent Samples Test for Differences in Reading Comprehension Growth on the Degrees of Reading Power Test Among Language Proficiency Levels of Students Who Had Animal Interaction Experiences (Group 1) and Language Proficiency Levels of Students Who Did Not Have Animal Interaction Experiences (Group 2)

Gender	Assumption	*t*	*df*	Sig. *p* (2-tailed)	Mean difference	SE of difference
Fluent English Proficient	Equal variances assumed	1.184	34.000	.245	0.4515	0.38130
	Equal variances not assumed	1.248	29.066	.222	0.4515	0.36185
Reclassified Fluent English Proficient	Equal variances assumed	0.042	9.000	.968	0.0333	0.79807
	Equal variances not assumed	0.046	5.794	.965	0.0333	0.73106

Analysis of the *t* test results showed no statistically significant differences among the student language proficiency groups in reading comprehension growth, with a mean difference of .4515 for both equal variances assumed and not assumed. There was no significant difference in reading comprehension growth when sorted by language proficiency between students who had animal interaction experiences and students who did not have animal interaction experiences.

It should be noted that many of the students' language proficiency levels changed during this study. Some students whose language proficiency levels had been categorized as Less Than Fluent English Proficient may have improved in the months separating the administrations of the spring 2007 test and the fall 2007 test, resulting in a better understanding of test requirements and an effect on test scores.

Anecdotal Qualitative Results

In addition to the reported quantitative data, the researcher gathered qualitative data that were indicative of student reports of their experiences with the companion animals used in this study.

William Howard Taft Middle School has a diverse community of students. "Humans, even more than animals, learn many behaviors by observing the behavior of others, without personally experiencing any reinforcement" (Berger, 2003, p. 43). In the field of human education it has been observed that behaviors or attitudes toward animals, especially specific dog breeds, may be modeled by family members and peers.

On the first day of the study many of the students demonstrated an aversion to certain animals (rats) and certain dog breeds (pit bulls). As part of the study, the students were encouraged to interact with all of the animals, but personal feelings were respected if a student chose not to interact with a specific animal. Therefore, when the pit bull entered the room, three students' express desire to leave was respected. However, when the same dog returned to the classroom 2 days later, the students who had left previously chose to stay this time. The dog's handler noted that other students had complimented the dog for his good behavior and happy demeanor. Perhaps the peer reinforcement received by the fearful students influenced their decision to stay and participate in a new experience.

Although the outcomes for the spring and fall 2007 administrations of the Degrees of Reading Power test did not reflect statistically significant differences between the scores of the two groups, individual student responses indicated that the students who participated in the animal interaction experiences reported a difference in their enjoyment and attitudes toward school while participating in this study. These

responses were communicated in a commemorative book and slide show that were presented to the researcher on the last day of the study. The following statements are excerpts from letters written by study participants in Group 1.

> I can't wait to come to school every day and meet the animals. This experience has been awesome, I will remember this for a long time.
>
> I thought this experience was great . .. this was a wonderful opportunity for us to interact with these different types of animals.
>
> I also liked the animals . . . they were fun to have in the classroom.
>
> Thank you for coming to our special classroom. I felt awesome that you came.
>
> My classmates were grateful because the dogs were so cool.
>
> Thank you very much for the experience that you gave me because I know that my mom and dad would have never got a opportunity like this before in their life and I am sure that when I have my children I know that I will never have a opportunity like this [for them] especially in school.

Summary

This chapter presents the findings of the study. Results of the *t* test revealed no statistically significant difference in reading comprehension growth between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those students who did not have animal interaction experiences. Thus, the *t* test results supported the null hypothesis that animal interaction experiences would not produce a significant difference in student reading comprehension growth. Further analysis of the data revealed no statistically significant differences in reading comprehension growth between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those who did not have animal interaction experiences when sorted by gender, ethnicity, and language proficiency.

Chapter 5
SUMMARY, DISCUSSION, AND RECOMMENDATIONS FOR FUTURE RESEARCH

This chapter contains four sections. The first section restates the research problem and reviews the methods used in the study. The second section summarizes the results of the study. The third section presents recommendations for practice. The fourth section presents recommendations for future research.

Restatement of the Research Problem

In an effort to alleviate the anxieties of students, animal organizations have begun to look for ways to educate students in nontraditional learning environments by developing programs utilizing animals and literacy to increase reading skills. These organizations have strived to provide a positive experience for both student and animal. Increased socialization for the animal promotes the animal's positive behavior and provides a safe and nonintimidating environment for the student.

There is limited research concerning the effects of animal exposure on the reading skills of students. Although pairing students with animals has been seen as a positive and effective learning experience for those with reading challenges, little is known about the actual effect of animal interaction experiences on student reading comprehension skills. Several variables have been identified as influencing classroom academic success; family support and the quality of instruction have shown the greatest impact on reading comprehension (Darling-Hammond, 1999).

Teachers utilize a variety of strategies to improve achievement, and exposure to animals may be an effective strategy to engage students in learning. In an effort to

meet teachers' and students' needs, a study measuring the effectiveness of animal experiences could produce assessment of the effectiveness of animal interaction experiences to increase funding from public and private sectors for these types of programs and an increased appreciation for animals as classroom educators.

The purpose of this study was to examine the differences that animal interactions had on the reading comprehension growth of students in the seventh grade. The study was designed to determine the effectiveness of an animal-related program by comparing student growth in reading comprehension between seventh-grade classrooms in the San Diego Unified School District that had classroom animal interactions and those that did not have classroom animal interactions.

It was hypothesized that there would be a statistically significant difference in reading comprehension growth scores between students who had interactions with animals and students who did not have interactions with animals. To obtain data to address the research question and test the hypothesis, official approval to gather data was obtained from the San Diego Unified School District and the proposal was reviewed and approved by the San Diego Unified School District's Standards, Assessment, and Accountability Division and Alliant International University's Institutional Review Board. After the dissertation committee approved the proposal and research design, the research study was conducted with two seventh-grade classes at the same middle school in the San Diego Unified School District, matched by number, age group, and grade.

Students in the treatment group had daily 20-minute animal interaction experiences during the week immediately preceding the administration of the Degrees of Reading Power Test, which is used to measure student reading comprehension. In order to compare scores for this study, the spring scores on the test were subtracted

from the fall scores to establish the growth (or decline) in the students' reading comprehension scores. The data were analyzed using a between-subjects *t* test to measure differences in mean pretest/ posttest scores of students in both groups.

Results of the Study

The research question of this study was, *Is there a significant difference in reading comprehension growth, measured by the Degrees of Reading Power test, between seventh-grade students at William Howard Taft Middle School in San Diego who had classroom animal interactions and those who did not have classroom animal interactions?*

It was hypothesized that interactions with animals in the classroom would make a significant difference in reading comprehension. For the purpose of this study, growth in reading comprehension was determined by the differences in the range of mean pretest/posttest scores of students in both groups. The results of the study revealed that no statistically significant difference in reading comprehension growth between the two groups. The animal interactions for approximately 20 minutes over a 5-day time period had no measured association with growth in student reading comprehension. However, the short period of time in which the students interacted with the animals and the limited number of days in which the animals visited the students may have had an impact on study results.

Although there was no statistically significant difference in scores between the two groups in the present study, other studies have shown evidence regarding the impact that animal interaction experiences have on the psyche of children. Levinson (1962) indicated that children who have animals present are more apt to communicate in stressful situations. Chandler (2001) suggested that students who had consistent

animal interaction experiences were more inclined to exhibit compassionate behavior toward others. The impact of test anxiety remains prevalent among some students; Mulvenon et al. (2004) suggested that anxiety exhibited by students taking standardized tests lessens the chance of success of those students due to the lack of their ability to recall important information. Teacher preparation and practice have been shown to have a significant effect on student achievement as well.

Several factors impact student success, and classroom animal interaction experiences are but one of many approaches to enhancing student achievement. Determining which approach works effectively for an individual student is a goal of educators. Darling-Hammond (1999) wrote, "Effective teachers adjust their teaching to fit the needs of different students and the demands of different instructional goals, topics, and methods" (p. 14). In determining teaching strategies that will support students, assessment of student needs is important in helping them to achieve academic success. This may include a continuing study of students with animals in the classroom.

Recommendations for Practice

Although this study was delimited to students in a seventh-grade classroom in the San Diego Unified School District, the following recommendations may be considered across many educational environments.

1. *Provide tutoring to enhance test-taking skills for students*. Anxiety exists in some students and has been shown to hinder progress. The pressure of testing may continue to impact students if they are not taught appropriate coping skills. Districts should offer more tutoring opportunities and continue to work with school counselors, teachers, and families to reduce student anxiety before tests.

2. *Create professional development opportunities for teachers in incorporating animals into the learning environment.* In order to provide support for teachers, districts should continue to look for unique and innovative teaching methods. Creating opportunities for different modes of instruction can enhance the classroom experience for student and instructor. Within the area of skills and training, the aim should be to provide the necessary funding to enable faculty members to attend classes, workshops, and conferences in the field of animal-related education programs. This can encourage the expansion of knowledge that can be applied in the classroom.

Pitts (2004) indicated incorporating animals into the classroom may produce the following results: increased observational and classification skills; improved understanding of life cycles, habitats, and geography; comparison skills in life sciences including anatomy, physiology, and biology; and increased social interaction among students as they care for the classroom animal. Although funding for programs that may be considered extracurricular continues to be a challenge in all learning environments, support for programs that involve animals in the classroom must be sought.

3. *Develop a strategic plan to incorporate the above components into the school setting.* In order to incorporate animals in the classroom environment as a way of developing vocabulary and reducing test anxiety, districts should develop a strategic planning model. This model could include budgetary processes and program evaluation that would involve the district's community of staff, parents. and committee members to implement and support the plan. The U.S. Department of Education's 2002-2007 strategic plan (2002), listed six strategic goals: (a) create a culture of achievement, (b) improve student achievement, (c) develop safe schools and strong character, (d) transform education into an evidence-based field, (e) enhance the quality

of access to postsecondary and adult education, and (f) establish management excellence. These goals could be incorporated in a plan to create animal-based literacy programs in schools. Strategic plan goals should encompass both student achievement and appropriate management to promote successful program implementation.

Suggestions for Future Research

The possibilities for incorporating new and exciting programs into the learning environment are endless, especially those that include animals. To expand the knowledge base about the effects of student-animal interaction experiences on academic success, the following suggestions are presented for future research.

1. *Conduct an animal interaction study for an extended period of time.* While current research in therapeutic settings has shown that children receive the most benefit with an animal experience within the first 5 to 24 minutes of the interaction (Chandler, 2005), this occurs during consistent, sometimes weekly, animal contact. Due to the time constraints of the participating school, this research study could not be conducted for an extended period of time. It would be interesting to determine whether the animal interaction experiences that students receive would have a greater impact on reading comprehension growth if such experiences continued for several weeks rather than for a few days.

2. *Enhance the flexibility of students with animal interactions.* Ideally, students should have the opportunity to interact with animals in a more relaxed manner in untimed sessions. Some professionals would probably agree that the experience with animals is most beneficial for a child when it is done by choice and with no time limits. Also, working with animals has been shown to enhance relaxation by lowering blood pressure, which may reduce anxiety.

> The presence of a certified therapy dog . . . was found to significantly alleviate distress in children undergoing standard pediatric physical examinations. Although distress scores increased for both groups over time regardless of the dog's presence, when the dog was in the examination room, fewer behaviors indicative of distress were exhibited, so the children had significantly different distress scores. (Chandler, 2005, p. 17)

3. *Identify teacher attitudes and school environments that support animals in the classroom*. Teacher attitudes toward classroom animals can influence their effectiveness in the classroom. For example, a companion animal that spends the majority of the class day in a cage or tank would probably not have a significant impact on student learning just by virtue of its presence in the learning environment. However, actual "hands on" animal interaction experiences might make as much of an impact in the classroom as it does in a therapeutic setting. Future research may be able to determine whether the type of interaction that each student receives influences reading comprehension growth and test scores. Also, school policies regarding classroom animals and the amount of time an animal may spend in the classroom environment should be factored into research as well.

Conclusion

The diversity of the student population continues to grow and so does the diversity of the educators. As rapidly as communities transform and shape themselves to fit into the rest of world society, so must the educational institutions within those communities. It is imperative that educational institutions demonstrate a basic knowledge of their communities and establish a groundwork order to keep up with these changes. By incorporating various strategies and means of understanding, the advanced, average, and at-risk student will benefit from the mission of education to produce literate and well-educated students.

Included within the various strategies to improve student achievement is the incorporation of companion animals into the classroom. Mahatma Gandhi wrote, “The greatness of a nation and its moral progress can be judged by the way its animals are treated” (2006, ¶ 1). When educators integrate animals into the classroom while educating students, they are teaching far more than testing skills and academic success; they are also teaching life skills and attitudes. Animals can be used as a powerful tool to inspire and engage students.

REFERENCES

REFERENCES

Alexander, D., Heaviside, S., & Farris, E. (1998). *Status of education reform in public elementary and secondary schools: Teachers' perspectives* (NCES Report No. 1999-045). Washington, DC: U.S. Department of Education, National Center for Education Statistics. Retrieved February 1, 2007, from http://nces.ed.gov/programs/quarterly/vol_1/1_1/4-esq11-g.asp

Ascione, F. R. (2005). *Children and animals: Exploring the roots of kindness and cruelty.* Lafayette, IN: Purdue University Press.

American Kennel Club. (2006). *AKC's Canine Good Citizen (CGC) program.* Retrieved September 22, 2006, from http://www.akc.org/events/cgc/index.cfm

Bellm, D., & Whitebook, M. (2005, August). Compensation and comparable worth: What lies ahead for California's preschool teachers? *Center for the Study of Childcare Employment*, 1-9.

Berg, C., & Lick, P. (2001, July). *Literacy and emotions: Data analysis from the Dudelange Project*. Paper presented at the European Reading Conference, Dublin, Ireland.

Blachowicz, C., & Ogle, D. (2001). *Reading comprehension: Strategies for independent learners*. New York: Guilford.

Bodas, J., & Ollendick, T. (2005). Test-anxiety: A cross-cultural perspective. *Clinical Child and Family Psychology Review*, *8*(1), 65-84.

Bongratz, K., Bradley, J., Fisel, K., Orcutt, J., & Shoemaker, A. (2002). *Improving student comprehension skills through the use of reading strategies*. Master of Arts Action Research Project, Saint Xavier University and SkyLight Professional Development Field-Based Master's Program. Retrieved April 9, 2007, from http://edres.org/eric/ED471074.htm (ERIC Document Reproduction Service No. ED471074)

Calvo, M., & Carreiras, M. (1993). Selective influence of test anxiety on reading processes. *British Journal of Psychology*, *84*, 375-388.

Cassady, J. (2004). The impact of cognitive test anxiety on text comprehension and recall in the absence of external evaluative pressure. *Applied Cognitive Psychology*, *18*, 311-325.

Chandler, C. (2001). *Animal-assisted therapy in counseling and school settings*. Retrieved April 9, 2007, from http://www.ericdigests.org/2002-3/animal.htm (ERIC Document Reproduction Service No. ED459404)

Chandler, C. (2005). *Animal assisted therapy in counseling.* New York: Taylor and Francis.

Conklin, S., & Wilkins, K. (2002). *Improving student reading skills through the use of guided reading*. Master of Arts Action Research Project, Saint Xavier University and SkyLight Professional Development Field-Based Master's Program. Retrieved April 9, 2007, from http://eric.ed.gov/ERICWebPortal/custom/portlets/recordDetails/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED471575&ERICExtSearch_SearchType_0=eric_accno&accno=ED471575 (ERIC Document Reproduction Service No. ED471575)

Connell, J. D. (2005). *Brain-based strategies to reach every learner*. New York: Scholastic.

Darling-Hammond, L. (1999). *Teacher quality and student achievement: A review of state policy evidence*. Seattle: University of Washington, Center for the Study of Teaching and Policy.

Darling-Hammond, L., Bullmaster, M., & Cobb, V. (1995). Rethinking teacher development through professional development schools. *Elementary School Journal*, *96*(1), 87-104.

DeWalt, M., & Bartle, P. (1996, February). *Student perceptions of a summer school reading program*. Paper presented at the Annual Meeting of the Eastern Educational Research Association, Cambridge, MA.

Dutke, S., & Stober, J. (2001). Test anxiety, working memory, and cognitive performance: Supportive effects of sequential demands. *Cognition and Emotion, 15*, 381-389.

Fermanich, M. (2002). School spending for professional development: A cross-case analysis of seven schools in one urban district. *Elementary School Journal*, *103*(1), 27-49.

Flesch, R. (1955). *Why Johnny can't read: And what you can do about it*. New York: Harper & Row.

International comparisons of higher education. (2007, January). *Gifted Child Today*. (2007, January), 9.

Gipson, F. P. (1956). *Old yeller.* New York: Perennial Library.

Hart, P., & Teeter, R. (2002). *A national priority: Americans speak on teacher quality*. Princeton, NJ: Educational Testing Service.

Instructional Strategies Online. (2006). *What is balanced literacy?* Saskatoon, SA: Saskatoon Public Schools. Retrieved March 11, 2007, from http://olc.spsd.sk.ca/DE/PD/instr/strats/balancedliteracy/index.html

Kayman, M. (2005). *Exploring animal-assisted therapy as a reading intervention strategy*. Unpublished master's thesis, Dominican University of California.

Levinson, B. M. (1962). The dog as co-therapist. *Mental Hygiene, 46,* 59-65.

Melson, G. (2004, March). *Animals in the lives of children: A bio-centric perspective on development*. Paper presented at Tufts University, Boston.

Militante, D. (2006). *Read aloud versus shared reading: The effects on vocabulary acquisition, comprehension, and fluency*. Unpublished master's thesis, Kean University.

Mulvenon, S., Stegman, C., & Ritter, G. (2004). Test anxiety: A multifaceted study on the perceptions of teachers, principals, counselors, students and parents. *International Journal of Testing, 5*(1), 37-61.

National Center for Education Statistics. (1994). *Toward better teaching: Professional development in 1993-94/chapter 3*. Retrieved November 15, 2006, from http://nces.ed.gov/pubs98/teaching9394/chapter3.asp

National Center for Education Statistics. (1998). *Teacher quality: A report on the preparation and qualifications of public school teachers*. Retrieved February 16, 2007, from http://nces.ed.gov/surveys/frss/publications/1999080/index.asp?sectionID=6

National Center for Education Statistics. (2000). *Teacher preparation and professional development*. Retrieved January 10, 2007, from http://nces.ed.gov/surveys/frss/publications/2001088/

National Center for Education Statistics. (2003). *The nation's report card: Reading highlights 2003*. Retrieved August 15, 2006, from http://nces.ed.gov/nationsreportcard/pdf/main2003/2004452.pdf.

National Center for Education Statistics. (2005). *Characteristics of public school teachers' professional development activities, 1999-2000*. Retrieved January 10, 2007, from http://nces.ed.gov/pubs2005/2005030.pdf

National Center for Education Statistics (2006). *State-level reading results*. Retrieved October 2, 2006, from http://nces.ed.gov/nationsreportcard/reading/stateassessment.asp

Naveh-Benjamin, M., Lavi, H., McKeachie, W., & Lin, Y. (1997). Individual differences in students' retention of knowledge and conceptual structures learned in university and high school courses: The case of test anxiety. *Applied Cognitive Psychology, 11,* 507-526.

Orwell, G. (1945). *Animal farm*. London, UK: Secker and Warburg.

Payne, C. (2005). *Shared reading for today's classroom*. New York: Scholastic.

Pinnell, G. S., & Fountas, I. (1996). *Guided reading: Good first reading for all children*. Portsmouth, NH: Heinemann.

Pitts, J. (2004). *Animals in the classroom.* Montclair, NJ: Bellwether Consulting.

Reading Education Assistance Dogs (R.E.A.D.). (2000). *Intermountain Therapy Animals.* Retrieved September 9, 2006 from the Reading Assistance Education Dogs web site http://www.therapyanimals.org/read/index.php

Reynolds Naylor, P. (1992). *Shiloh.* New York: Atheneum.

Rotenberg, A. M. (2002). *A classroom research project: The psychological effects of standardized testing on young English language learners at different language proficiency levels.* Unpublished research paper, American University.

San Diego City Schools. (2006). *Test scores.* Retrieved October 20, 2006, from http://www.sandi.net/indices/testscores.html

San Diego City Schools Standards, Assessment, and Accountability Division. (2004). *Standardized testing and reporting (STAR) program: Fact sheet*. Retrieved December 15, 2006, from http://studata.sandi.net/research/cst/.

San Diego Unified School District. (2006). *California High School Exit Exam (CAHSEE): Overview*. Retrieved December 30, 2006, from http://www2.sandi.net/assessment/cahsee/index.htm

Sato, K. (2003). *Improving our students' speaking skills: Using selective error correction and group work to reduce anxiety and encourage real communication.* Retrieved January 3, 2007, from http://eric.ed.gov/ERICDocs/data/ericdocs2/content_storage_01/0000000b/80/27/e0/97.pdf (ERIC Document Reproduction Service No. ED475518)

Sewell, A. (1877). *Black beauty: The autobiography of a horse.* London, UK: Jarrold & Sons.

Shaw, D. (2005). *Retelling strategies to improve reading comprehension*. New York: Scholastic.

Spies, R., & Plake, B. (2005). *The sixteenth mental measurements yearbook*. Lincoln: University of Nebraska Press.

Trelease, J. (2006). The read-aloud handbook (6th ed.). New York: Penguin.

U.S. Department of Education. (2004). *Requirements for initial teaching certification or licensure: 2003*. Retrieved February 13, 2007, from http://www.ed.gov/about/reports/annual/teachprep/2004/edlite-a1.html

U.S. Department of Education. (2006). *Proven methods: Highly qualified teachers for every child*. Retrieved January 28, 2007, from http://www.ed.gov/nclb/methods/teachers/stateplanfacts.html

Waldman, C. (1999). *Encyclopedia of Native American tribes*. New York: Checkmark Books.

Waldman, C. (2000). *The North American Indian*. New York: Checkmark Books.

Watterson, B. (1999). *Gods of ancient Egypt.* London, UK: Allan Sutton.

Western Interstate Commission for Higher Education. (2006). *Higher education and the workforce*. Boulder, CO: Author.

Wilson, C., & Turner, C. (1997). *Companion animals in human health*. Thousand Oaks, CA: Sage.

Wren, S. (2004). *What does a balanced literacy approach mean?* Retrieved March 15, 2007, from http://www.sedl.org/reading/topics/balanced.html

APPENDICES

APPENDIX A

READING RESULTS BY STATE FOR GRADE 4 STUDENTS

Reading Results by State for Grade 4 Students

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Alabama	208	207	207
	Facts from 2005: Highest percentage of students (47%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
Alaska	211	212	
	Facts from 2005: Highest percentage of students (42%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
Arizona	207	209	209
	Facts from 2005: • Highest percentage of students (48%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		
Arkansas	217	214	211
	Facts from 2005: Highest percentage of students (37%) performed at a below basic reading level. Overall reading score was equal to the nation's average.		
California	207	206	202
	Facts from 2005: Highest percentage of students (50%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
Colorado	224	224	217
	Facts from 2005: • Highest percentage of students (33%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Connecticut	226	228	222
	Facts from 2005: • Highest percentage of students (32%) scored at a basic reading level • Overall reading score was higher than the nation's average.		
Delaware	225	224	213
	Facts from 2005: • Highest percentage of students (39%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Florida	219	218	208
	Facts from 2005: An equal number of students (35% in each category) performed at a below basic and basic reading level. Overall reading score was higher than the nation's average.		
Georgia	214	214	212
	Facts from 2005: Highest percentage of students (42%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
Hawaii	210	208	203
	Facts from 2005: Highest percentage of students (47%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
Idaho	222	218	219
	Facts from 2005: Highest percentage of students performed at a basic reading level. Overall reading score was higher than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Illinois	216	216	
	Facts from 2005: • Highest percentage of students (38%) performed at a below basic reading level. • Overall reading score showed no significant difference from the nation's average.		
Indiana	218	220	221
	Facts from 2005: Highest percentage of students (34%) performed at a below basic reading level. Overall reading score showed no significant difference from the nation's average.		
Iowa	221	223	225
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Kansas	220	220	
	Facts from 2005: • An equal number of students (34% in each category) performed at a below basic and basic reading level. • Overall reading score was higher than the nation's average.		
Kentucky	220	219	213
	Facts from 2005: • Highest percentage of students (35%) performed at a below basic reading level. • Overall reading score was higher than the nation's average.		
Louisiana	209	205	204
	Facts from 2005: • Highest percentage of students (47%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Maine	225	224	227
	Facts from 2005: • Highest percentage of students (36%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Maryland	220	219	211
	Facts from 2005: • Highest percentage of students (35%) performed at a below basic reading level. • Overall reading score was higher than the nation's average.		
Massachusetts	231	228	226
	Facts from 2005: Highest percentage of students (34%) performed at a basic reading level. Overall reading score was higher than the nation's average.		
Michigan	218	219	216
	Facts from 2005: Highest percentage of students (37%) performed at a below basic reading level. Overall reading score showed no significant difference from the nation's average.		
Minnesota	225	223	221
	Facts from 2005: • Highest percentage of students (33%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Mississippi	204	205	199
	Facts from 2005: • Highest percentage of students (52%) performed at a below basic reading level • Overall reading score was lower than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Missouri	221	222	220
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Montana	225	223	
	Facts from 2005: Highest percentage of students (36%) performed at a basic reading level. Overall reading score was higher than the nation's average.		
Nebraska	221	221	221
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Nevada	207	207	
	Facts from 2005: Highest percentage of students (48%) performed at a below basic reading level. Overall reading score was lower than the nation's average.		
New Hampshire	227	228	228
	Facts from 2005: • Highest percentage of students (36%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
New Jersey	223	225	223
	Facts from 2005: • Highest percentage of students (32%) performed at a below basic reading level. • Overall reading score was higher than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
New Mexico	207	203	211
	Facts from 2005: • Highest percentage of students (49%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		
New York	223	222	215
	Facts from 2005: • Highest percentage of students (36%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
North Carolina	217	221	212
	Facts from 2005: • Highest percentage of students (38%) performed at a below basic reading level. • Overall reading score was equal to the nation's average.		
North Dakota	225	222	226
	Facts from 2005: • Highest percentage of students (36%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Ohio	223	222	217
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Oklahoma	214	214	220
	Facts from 2005: • Highest percentage of students (40%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Oregon	217	218	212
	Facts from 2005: • Highest percentage of students (38%) performed at a below basic reading level. • Overall reading score was equal to the nation's average.		
Pennsylvania	223	219	221
	Facts from 2005: • Highest percentage of students (33%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Rhode Island	216	216	217
	Facts from 2005: • Highest percentage of students (38%) performed at a below basic reading level. • Overall reading score showed no significant difference from the nation's average.		
South Carolina	213	215	210
	Facts from 2005: • Highest percentage of students (43%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		
South Dakota	222	222	
	Facts from 2005: • Highest percentage of students (37%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Tennessee	214	212	212
	Facts from 2005: • Highest percentage of students (41%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Texas	219	215	213
	Facts from 2005: • Highest percentage of students (36%) performed at a below basic reading level. • Overall reading score showed no significant difference from the nation's average.		
Utah	221	219	220
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Vermont	227	226	
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Virginia	226	223	221
	Facts from 2005: • Highest percentage of students (35%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
Washington	223	221	
	Facts from 2005: • Highest percentage of students (34%) performed at a basic reading level. • Overall reading score was higher than the nation's average.		
West Virginia	215	219	216
	Facts from 2005: • Highest percentage of students (39%) performed at a below basic reading level. • Overall reading score was lower than the nation's average.		

State	Average Reading Scores by Year		
	2005	**2003**	**1992**
Wisconsin	221	221	224
	Facts from 2005: • Highest percentage of students (34%) scored at a basic reading level. • Overall reading score was higher than the nation's average.		
Wyoming	223	222	223
	Facts from 2005: • Highest percentage of students (36%) scored at a basic reading level. • Overall reading score was higher than the nation's average.		

Source: *State-Level Reading Results*, by National Center for Education Statistics, 2006. Retrieved October 2, 2006, from http://nces.ed.gov/nationsreportcard/reading/stateassessment.asp

APPENDIX B

TESTING CALENDAR 2006-2007

Testing Calendar 2006-2007

Grades	Test	State Mandated	District Mandated
Kindergarten – 3rd	DRA (Developmental Reading Assessment) – administered twice yearly		X
Kindergarten – 9th	CELDT (California English Language Development Test)	X	
2nd – 7th	STAR (Standardized Testing and Reporting) Program California Standards Tests (CSTs)	X *English Language Arts, Mathematics and Science*	
2nd – 11th	STAR Program DPLT (Designated Primary Language Test)	X	
2nd – 11th	STAR Program CAPA (California Alternate Performance Assessment)	X *English Language Arts, Mathematics, and Science*	
3rd and 7th	CST	X *Reading/Language Arts, Mathematics and spelling*	
4th and 7th	STAR	X *Writing assessment*	
4th – 8th	DRP (Degrees of Reading Power) – administered twice yearly		X *Reading Comprehension assessment*
4th – 8th	ARI (Analytical Reading Inventory)		X
8th	CST	X *English Language Arts, History-Social Science, and Mathematics*	
9th – 11th	CST	X *English Language Arts, Mathematics, and Science*	
10th	CAHSEE (California High School Exit Exam) Practice Test		X
10th – 12th	CAHSEE	X *English Language Arts*	

Source: San Diego City Schools, *Test Scores,* 2006, Retrieved October 20, 2006, from http://www.sandi.net/indices/testscores.html