

## ABSTRACT

### The Impact of Providing Two Years of Pre-Kindergarten on Academic Performance and Cost Benefits in the San Antonio Independent School District

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The purpose of this study was to examine the academic performance of students who attended two years of pre-kindergarten in San Antonio Independent School District (SAISD), and to determine if there was a cost benefit for the district in providing an additional year of pre-kindergarten. Previous research studies have shown that participation in a high-quality pre-kindergarten can have both positive academic and social outcomes (Barnett, 2005; Gormley, Phillips, & Gayer, 2008; Ramey, Ramey, & Stokes, 2009; Reynolds & Temple, 1998; Saluja, Early, & Clifford, 2001; Schweinhart, 2004; Wong, Cook, Barnett, & Jung, 2008). However, these studies focused only on 4-year-olds who attended pre-kindergarten for one year. This study addressed the participation of 3-year-olds in the SAISD pre-kindergarten program.

The academic performance of students who attended pre-kindergarten for two years was analyzed along with those who attended one year of pre-kindergarten and those who did not participate in pre-kindergarten at all. Students in all three study groups were those that had been continuously enrolled in SAISD from their point of entry into school through third grade. Academic performance was analyzed based on participants' results

on the Texas Primary Reading Inventory and the third grade Texas Assessment of Knowledge and Skills (TAKS) in reading and mathematics. In addition, the expenditures and cost benefits associated with providing the pre-kindergarten program were analyzed, as well as the costs associated with retention, special education, and remediation.

The Impact of Providing Two Years of Pre-Kindergarten on Academic Performance and  
Cost Benefits in the San Antonio Independent School District

by

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A Dissertation

Approved by the Department of Educational Administration

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## TABLE OF CONTENTS

List of Tables .....	x
Acknowledgments .....	xii
Dedication .....	xii
CHAPTER	
ONE .....	1
Statement of the Problem .....	2
Purpose of the Study .....	3
Research Questions .....	3
Definition of Terms .....	7
TWO .....	12
Review of Literature .....	12
Historical Context .....	12
The Rationale for Early Childhood Education .....	21
The Importance of Quality in Early Childhood Programs .....	35
The Involvement of Public Schools in Early Childhood Education .....	39
Pre-kindergarten in Texas .....	40
The Addition of 3-year-old Children in Pre-kindergarten Programs .....	49
The Pre-kindergarten Program in San Antonio ISD .....	50
THREE .....	52
Methods and Procedures .....	52
Research Questions .....	52
District Description .....	55
Pre-kindergarten Program in SAISD .....	56
The Population of the Study .....	57
Procedures for the Collection of Data .....	59
Research Design .....	62
Procedures for Analysis of Data .....	65
FOUR .....	68
Analysis of Data .....	68
Research Question 1 .....	70
Research Question 2 .....	72
Research Question 3 .....	74

Research Question 4 .....	75
Research Question 5 .....	92
Research Question 6 .....	103
Research Question 7 .....	107
Research Question 8 .....	110
Research Question 9 .....	112
Research Question 10 .....	115
Research Question 11 .....	119
Research Questions 12 and 13 .....	124
Grade Retention .....	131
Special Education .....	135
Remediation .....	136
FIVE .....	140
Discussion, Conclusions, and Recommendations .....	140
Discussion of Results .....	141
Conclusions and Recommendations for SAISD .....	154
Recommendations for Additional Research .....	162
REFERENCES .....	164

## LIST OF TABLES

Table	Page
1. Student Participants by Group .....	59
2. Student Participants by Group – Total Participants .....	68
3. Retention Rates of Student Participants by Group .....	71
4. Comparison of Retention Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks .....	72
5. All Pairwise Multiple Comparison Procedures (Dunn’s Method) of Retention Numbers among Study Groups .....	72
6. Gifted and Talented (GT) Identification Rates of Study Participants by Group .....	73
7. Comparison of GT Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks .....	74
8. Special Education Identification Rates of Study Participants by Group .....	75
9. Comparison of Special Education Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks .....	75
10. Kindergarten End-of-year TPRI Results Depicting Number of Students Developed in Each Skill Area .....	76
11. Statistical Analysis of Students Developed in Phonemic Awareness on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks .....	77
12. Comparison of Kindergarten End-of-year TPRI Phonemic Awareness Assessment Results using Dunn’s Method .....	78
13. Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks .....	79

14. Statistical Analysis of Students Developed in Listening Comprehension on The Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks .....	79
15. Comparison of Kindergarten End-of-year TPRI Listening Comprehension Assessment Results using Dunn’s Method.....	81
16. Statistical Analysis of Students Developed in All Skills Areas on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	81
17. First Grade End-of-year TPRI Results Depicting Number of Students Developed in Each Skill Area.....	82
18. Statistical Analysis of Students Developed in Phonemic Awareness on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	83
19. Statistical Analysis of Students Developed in Graphophonemic Knowledge on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis Variance on Ranks.....	84
20. Comparison of First Grade End-of-year TPRI Graphophonemic Knowledge Assessment Results using Dunn’s Method.....	85
21. Statistical Analysis of Students Developed in Reading Comprehension on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	86
22. Comparison of First Grade End-of-year TPRI Reading Comprehension Assessment Results using Dunn’s Method.....	87
23. Statistical Analysis of Students Developed in All Skill Areas on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks .....	87
24. Second Grade End-of-year TPRI Results Depicting Number of Student Developed in Each Skill Area.....	88
25. Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	89
26. Statistical Analysis of Students Developed in Reading Comprehension on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	90



27. Comparison of Second Grade End-of-year TPRI Reading Comprehension Assessment Results using Dunn’s Method.....	91
28. Statistical Analysis of Students Developed in All Skill Areas on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	91
29. Kindergarten End-of-year Tejas Lee Results Depicting Number of Students Developed in Each Skill Area.....	93
30. Statistical Analysis of Students Developed in Phonemic Awareness on the Kindergarten End-of-year Tejas Lee using Kruskal-Wall One-way Analysis of Variance on Ranks.....	94
31. Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	94
32. Statistical Analysis of Students Developed in Listening Comprehension on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	95
33. Statistical Analysis of Students Developed in All Skill Areas on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	96
34. First Grade End-of-year Tejas Lee Results Group Depicting Number of Students Developed in Each Skill Area.....	97
35. Statistical Analysis of Students Developed in Phonemic Awareness on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	97
36. Statistical Analysis of Students Developed in Graphophonemic Knowledge On the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	98
37. Statistical Analysis of Students Developed in Reading Comprehension on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	99
38. Statistical Analysis of Students Developed in All Skills Areas on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	99

39. Second Grade End-of-year Tejas Lee Results Depicting Number of Students Developed in Each Skill Area.....	100
40. Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	101
41. Statistical Analysis of Students Developed in Reading Comprehension on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	102
42. Statistical Analysis of Students Developed in All Skill Areas on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks.....	102
43. TAKS Reading Assessment Administered in English, 1st Administration.....	104
44. Kruskal-Wallis One-way Analysis of Variance on Ranks of Students Passing Rates on the 1st Administration of the Third Grade TAKS Reading Assessment, English Version.....	105
45. Comparison of Passing Rates on the 1 <sup>st</sup> Administration of TAKS Reading, English Version using Dunn’s Method.....	105
46. Kruskal-Wallis One-way Analysis of Variance on Ranks of Number of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, English Version.....	106
47. TAKS Reading Assessment Administered in Spanish, 1st Administration.....	108
48. Kruskal-Wallis One-way Analysis of Variance on Ranks of Students Passing Rates on the 1st Administration of the Third Grade TAKS Reading Assessment, Spanish Version.....	109
49. Kruskal-Wallis One-way Analysis of Variance on Ranks of Number of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, Spanish Version.....	109
50. TAKS Reading Assessment 2nd and 3rd Administration, English.....	111
51. Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Required to Re-take the Reading TAKS Assessment.....	112
52. TAKS Reading Assessment 2nd and 3rd Administration, Spanish.....	113

53. Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Required to Re-take the Reading TAKS Assessment in Spanish .....	114
54. Comparison of Re-takes by Group on Spanish TAKS Reading using Dunn’s Method .....	115
55. Results of TAKS Mathematics Assessment, English Version, Third Grade.....	117
56. Kruskal-Wallis One-way Analysis of Variance on Ranks Students Performance on the Third Grade TAKS Mathematics Assessment, English Version .....	118
57. Comparison of Passing Rates by Group on the TAKS Mathematical Assessment using Dunn’s Method .....	118
58. Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, English Version .....	119
59. Results of TAKS Mathematics Assessment, Spanish Version, Third Grade.....	121
60. Kruskal-Wallis One-way Analysis of Variance on Ranks Students Performance on the Third Grade TAKS Mathematics Assessment, Spanish Version .....	121
61. Comparison of Passing Rates by Group on the Spanish TAKS Mathematical Assessment using Dunn’s Method .....	122
62. Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, Spanish Version .....	123
63. Comparison of Commended Performance by Group on the Spanish TAKS Mathematical Assessment using Dunn’s Method .....	124
64. Costs to Expand Pre-kindergarten Services in SAISD .....	126
65. Revenue Sources for SAIDS Pre-kindergarten Expansion .....	128
66. Summary of Expenses and Revenue 2003 and 2009 .....	129
67. Cost Analysis of Students Being Retained (Third Graders 2006-2007) .....	133
68. Cost Analysis of Students Being Retained (Third Graders 2007-2008) .....	133

69. Cost Analysis of Students Identified for Special Education (Third Graders (2006-2007).....	137
70. Cost Analysis of Students Identified for Special Education (Third Graders (2007-2008).....	137
71. Remediation Costs for Third Graders (2006-2007) in 2007 Dollars.....	138
72. Remediation Costs for Third Graders (2007-2008) in 2007 Dollars.....	139

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## DEDICATION

To my husband  
Rudy  
For his endless love, support, and patience  
Thank you for not letting me quit!

To my parents  
Woody and Linda Johnson  
Whose belief in me and encouragement never wavered  
Even when it seemed I would never finish.

## CHAPTER ONE

Pre-kindergarten and other types of early educational experiences for young children have been accelerated growth areas in American education. Proponents of these early education programs stress the importance of providing this intervention for minority and economically disadvantaged children in an effort to close the ever widening performance gap. Research has consistently demonstrated that providing high-quality early childhood education services to economically disadvantaged students will provide them with the knowledge and skills needed to be ready for kindergarten (U.S. Department of Education, National Center for Education Statistics, 2005b).

In 1985, the state of Texas implemented a half-day pre-kindergarten program for 4-year-old children considered to be at-risk. Now, some 22 years later, the Texas program has continued to grow and expand and ranks fifth in the nation for the number of 4-year-old children served in its program. The purpose of the Texas pre-kindergarten program is to ensure that disadvantaged children develop the skills necessary for success in the regular public school curriculum, including language, mathematics, and social skills (Warren, 2003).

In 1999, Texas provided pre-kindergarten expansion grants to districts whose third grade Texas Assessment of Academic Skills (TAAS) scores were below the state average. The purpose of the grants was to expand pre-kindergarten programs from half-day programs to full-day programs. Local school districts were also given the option to serve eligible 3-year-old children in their pre-kindergarten programs. San Antonio Independent School District (SAISD) took advantage of the expansion grant by

expanding their pre-kindergarten program from half-day to full-day status and adding classes for eligible 3-year-old children. While serving at-risk 4-year-olds in state funded pre-kindergarten programs has become the norm, with over one million 4-year-old children across the nation participating in such programs, providing programs for 3-year-olds has not been as common. Furthermore, programs for 3-year-olds have not been studied as extensively as those for 4-year-olds. As school districts explore options for improving student academic success, the option of adding 3-year-old students to their pre-kindergarten programs is one that may be considered. The drawback is the lack of data that indicates if this option is both academically and financially feasible.

#### Statement of the Problem

In 2001, San Antonio Independent School District expanded their pre-kindergarten program to include eligible 3-year-old children, thus providing the opportunity for some qualifying students to participate in the program for two full school years, as opposed to the traditional one year. This created a need for an expansion in facilities, as well as additional costs associated with program expansion. The problem of this study seeks to answer the following questions:

1. Are there academic benefits for children who participate in the district pre-kindergarten program for two years, beginning at the age of three?
2. Are the additional expenses of providing an additional year of pre-kindergarten for eligible students cost effective?



## Purpose of the Study

The purpose of this research project was to study the academic performance and progress of students who attended two years of pre-kindergarten in San Antonio ISD with those who attended one year of pre-kindergarten in San Antonio ISD and those who did not participate in pre-kindergarten at all. Second, this research project analyzed the expenditures associated with providing the pre-kindergarten program, as well as the costs associated with retention and special education, to determine if there was a cost benefit for the district in providing an additional year of pre-kindergarten.

The academic progress and performance indicators studied were retention rates among the identified groups; special education identification among the groups; gifted and talented identification among the groups; reading development at the end of kindergarten, first grade, and second grade among the groups; and third grade Texas Assessment of Knowledge and Skills (TAKS) performance in reading and math among the groups.

The first goal of the study was to determine if there was a difference in student academic progress and performance among the groups. The second goal was to determine if there were significant differences among the groups that supported the cost of providing an additional year of pre-kindergarten.

## Research Questions

1. Are there differences in retention rates among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a). attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-

kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

2. Are there differences in identification for Gifted and Talented (GT) programs among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
3. Are there differences in identification for special education programs among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
4. Are there differences in reading development at the end of kindergarten, first grade, and second grade, as measured by the Texas Primary Reading Inventory (TPRI), among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
5. Are there differences in reading development at the end of kindergarten, first grade, and second grade, as measured by the Tejas Lee Spanish Inventory, among San Antonio ISD 2006-07 bilingual third graders and 2007-08 bilingual third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San

Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

6. Are there differences in performance scores on the reading TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
7. Are there differences in performance scores on the reading TAKS test administered in Spanish among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
8. Are there differences in the number of students who were required to take additional administrations of the reading TAKS test in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
9. Are there differences in the number of students who were required to take additional administrations of the reading TAKS test in Spanish among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended

pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

10. Are there differences in performance scores on the math TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
11. Are there differences in performance scores on the math TAKS test administered in Spanish among San Antonio ISD 2006-07 bilingual third graders and 2007-08 bilingual third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
12. Are there differences in student academic performance and progress among San Antonio ISD 2006-07 third graders and 2007-08 third grades who attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4, which supported the cost of providing an additional year of pre-kindergarten?
13. Are there differences in expenditures for grade retention, and special education among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years,

at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

### Significance of the Study

While early childhood education has been a rapidly increasing field of interest and expansion in states and local school districts during the last two decades, there are still virtually few current studies indicating if these public school pre-kindergarten programs are in fact reaching their desired goals and outcomes. A report from the National Center for Education Statistics in 2003 indicated that there was performance data on private school programs, day care programs, and the Head start program; however, there has been very little data reported on public school pre-kindergarten programs. In addition, since the vast majority of the public school prekindergarten programs only provide services for 4-year-old children, there is no current data that indicates if incorporating 3-year-old children into the pre-kindergarten program is effective.

The study of San Antonio ISD's inclusion of 3-year-old children into their pre-kindergarten program, will add data to an area of early childhood education studies that has not been addressed. In addition, this study will also add data regarding the costs associated with pre-kindergarten and remediation that will assist the studied district in making financial decisions regarding the program.

### Definition of Terms

The following terms used in this study are identified for clarity.

1. *At-risk students* – Students who are at-risk of dropping out of school according to state criteria defined in Texas Education Code 29.081 are defined by this term (Texas Education Agency, 2005).

2. *Economically disadvantaged students (pre-kindergarten)* – This term identifies students who are eligible to participate in the National Free or Reduced Price Lunch Program established by 42 U.S.C. 1751 et seq. and TEC 5.0011 (4). The family income level is determined by current income documentation (Texas Education Agency, 2005).
3. *Early intervention* – This term applies to children of school age or younger who are discovered to have or be at-risk of developing a handicapping condition or other special need that may affect their development. Early intervention consists of the provision of services to such children and their families for the purpose of lessening the effects of the condition. Services can be remedial or preventive in nature (U.S. Department of Education, 2005a).
4. *Free and reduced meal status* – This term identifies the method used to determine eligibility for specific programs by using proof of limited income presented at the time the student registers for school (Texas Education Agency, 2005).
5. *Limited English proficiency* – This is a term used to describe students whose native language is a language other than English (Texas Education Agency, 2005).
6. *PEIMS Data* – These data are demographic data taken from the district’s Public Education Information Management System (PEIMS) Report (Texas Education Agency, 2009). The PEIMS system encompasses all data requested and received by TEA about public education, including student

demographic and academic performance, personnel, financial, and organizational information.

7. *Public school* – A public school provides services to students, has an assigned administrator, receives public funds as its primary support, and is operated by an education agency (National Center for Education Statistics, 2003).
8. *Pre-kindergarten student* – This term identifies students who participated in a district’s pre-Kindergarten program. These students are eligible for free or reduced price lunch (based on income survey) and are 4-years old by September 1. These children are also eligible to participate if they are determined to be Limited English Proficient, homeless, in the foster care system or children of military personnel (Texas Education Agency, 2008c).
9. *Pre-Kindergarten student, 3 year olds* – This term identifies students who participated in a district’s pre-Kindergarten program. These students are eligible for free or reduced price lunch (based on income survey) and are 3 years old by September 1. These children are also eligible to participate if they are determined to be Limited English Proficient, homeless, in the foster care system, or children of military personnel. (Texas Education Agency, 2008c)
10. *School age* – School age is defined as the age of the child on September 1 of the current school year and is used for the purpose of establishing eligibility for school/program enrollment (Texas Education Agency, 2008a).

11. *TAKS-Texas Academic Knowledge and Skills* – This term refers to the criterion-referenced test administered to students in grades 3-11 in the areas of reading, English language arts, math, writing, science and social studies. Students in third grade are tested in reading and math only. The third grade test is administered in English or Spanish (Texas Education Agency, 2008e).
12. *Tejas Lee* – The Tejas Lee (2010) is an early Spanish reading instrument designed to be administered to students in Kindergarten, Grade 1, Grade 2, and Grade 3. The instrument allows teachers to observe and record student performance in areas important to the development of Spanish reading and comprehension.
13. *Texas Essential Knowledge and Skills (TEKS)* – TEKS are the state of Texas’ curriculum standards. The State Board of Education periodically updates the state’s curriculum standards textbooks and other instructional materials are then written based on those standards (Texas Education Agency, 2008e).
14. *Texas Primary Reading Inventory (TPRI)* – The TPRI is a valid and reliable assessment tool that provides a comprehensive picture of a student’s reading/language arts development. Designed to be used with students in Kindergarten, Grade 1, Grade 2, and Grade 3, the TPRI offers a balanced and reliable approach to reading instruction (Texas Primary Reading Inventory, 2010).
15. *Title I Schools* – Title I schools are schools that are designated as eligible for participation in programs authorized by Title I or Public Law 107-110, the Elementary and Secondary Education Act of 2002. Those with school wide



programs are schools in which all students have been designated by state and federal regulations as eligible for participation in Title I programs (National Center for Statistics, 2003).

## CHAPTER TWO

### Review of Literature

#### *Historical Context*

Historically, young children have been cared for at home by their mothers and other family members. In the 19th century, Europe and the United States went through a transitional time period, referred to as the Industrial Revolution, which had the effect of changing family life. Women and older children began working in factories, which created a need for childcare for the youngest children in the family. France responded to this need by creating the first day nurseries, an idea that quickly spread to other European countries and the United States (Mitchell, 1989). The first recorded day nursery in the United States was the Boston Infant School started in 1828 (Morrison, 1997). Day nurseries basically provided minimal care and were simply places for poor working women to leave their young children while they worked (Mitchell, 1989).

There were some exceptions to the basic day nursery. The New York City Nursery School, opened in 1854, expanded basic childcare to include hygiene and parenting skills training (Morrison, 1997). Robert Owen, a British socialist pioneer and factory owner in the early 19th century, believed that children should not work in factories but should be educated instead. This was a radical idea for that time period. He built his own school to educate the children of his factory workers and did not permit children under the age of 10 to work in factories. His school also included infant classes for children, 2 to 6 years of age. These infant classes consisted of learning activities along with the normally provided childcare (Gutlek, 2001). However, despite these

stand-outs, the majority of the early day nurseries provided minimal child care (Kagan, 1994).

In the late 1800s, the United States was faced with a growing wave of new immigrants from Europe. Many of the immigrants had minimal skills and poor job prospects. They tended to settle in the poorest sections of large cities, living in overcrowded tenements with poor sanitation (Kagan, 1994). In order to help the new Americans adjust and become productive citizens, local schools began implementing such programs as school lunches, medical and dental screenings, home visits, vocational guidance, summer programs and counseling programs (Kagan, 1994). One program that was implemented with great success was the Kindergarten Program. Modeled after the successful kindergarten programs in Germany, the St. Louis public schools opened their first Kindergarten Program in 1873. The Kindergarten Program quickly became popular and within seven years had grown to an enrollment of 77,828 children, 4 to 6 years of age. Other cities in the United States began their own kindergarten programs, most funded by donations from wealthy donors. By 1898, kindergarten programs were well established in over 400 United States cities (Mitchell, 1989).

Day nurseries and kindergarten programs continued well into the beginning of the 20th century, despite those opponents who argued that young children should be cared for at home. The 1930s brought the Great Depression that forced many day nurseries and kindergarten programs to close. In 1933, the Federal Government made its first contribution to early childhood education through the Federal Emergency Relief Administration that provided funds to public schools for the purpose of establishing early childhood programs. The purpose of these programs was first and foremost to provide

employment for many teachers, nurses, and daycare workers who were out of work. In addition to childcare, these programs also provided meals, health services, staff training, and parent education (Mitchell, 1989). With the onset of World War II, women once again entered the workforce in large numbers. The Lanham Act of 1941 provided federal funds for communities to open daycare centers to assist working mothers (Mitchell, 1989).

As the United States moved into the second half of the 20th century, there were several significant events that led to an increased interest in early childhood education. First, in 1957 the launch of Sputnik by the Soviet Union had a major impact on American education which was criticized for lacking in science and math instruction. When compared to Soviet Union schools, one of the differences that emerged was that the Soviet Union provided earlier educational opportunities for their young children (Morrison, 1997). Then in the 1960s, the United States experienced an era of political and social upheaval caused by such major events as the Civil Rights movement, Viet Nam, the counterculture movement, and widespread drug use. There was also an increased focus on those living in poverty (Morrison, 1997).

As the federal government began looking for solutions to these social problems, education reforms became viewed as one mechanism that could be used to support families in need, as well as communities overall (Kagan, 1994). This led to a wave of new federal legislation enacted with the purpose of reducing poverty levels and closing the educational gaps. These acts included the 1962 Social Security Act, which provided funds for daycare; the Title VII of the Housing and Urban Development Act of 1965, which provided funds and technical support for daycares; the Elementary and Secondary

Act (ESEA) of 1965 (also known as Title 1), which provided funds to schools to supplement instruction for disadvantaged children; the Title IV of 1967, which provided daycares for impoverished mothers so they could participate in job training programs; and the Handicapped Children's Early Education Assistance Act of 1968, which provided support for early childhood programs that increased enrollment for young children with disabilities (Edwards, 1999).

In addition, the federally funded program Head Start began during this time period. It was created in 1965 through federal legislation and was targeted for poor children ages 2 through 4. The purpose of the program was to prepare disadvantaged children for school through a program that focused on health, cognitive development, and social skills. This program spread rapidly through the nation and continues today. Head Start has had a significant impact on early childhood education (Gilliam & Zigler, 2004).

Along with the federal legislative acts and programs for early childhood education, there were also some other early childhood education programs in the nation that were being implemented, studied, and showed promising results. One of the most notable of these programs was the Perry Preschool Project which started in 1962 in Ypsilanti, Michigan. The participants in this study included 123 African American children ages 3 and 4 who were living in poverty. The children were randomly divided into two groups. One group attended preschool and the other group did not. This group of students has been followed and studied for 40 years (Schwienhart, 2004). In 1967, the Chicago Child Parent Center was established in North Carolina. Funded through Title 1 this program was designed as an intervention program for disadvantaged young children. In this particular program, both educational and family services were provided (Christina

& Nicholson-Goodman, 2005). Another notable early childhood education project was the Abecedarian Project conducted in Chicago between the years 1972-1987. This program also targeted at-risk families in low socio-economic situations. The families in this study received high quality, full daycare for their children from the ages of six weeks through the age of three (Reynolds & Temple, 1998). Children who participated in these programs were followed for years afterwards, providing information on how their participation in early childhood education programs affected their future success, both educationally and professionally (Landry, 2005).

After this surge in interest and funding for early childhood programs, the growth in early childhood programs slowed down. As the economy soured in the early 1970s, funding became an issue, and there continued to be those opposed to early childhood programs because they feared the government was interfering with the role of the family. However, it was also during this time period that more women began entering the workforce which created a need for more childcare options. Early childhood programs began moving from the federal level to the state level, and the first pre-kindergarten programs entered the public schools. By 1979, seven states had appropriated funding for pre-kindergarten programs (Mitchell, 1989). The next surge in the early childhood education field occurred following the publication of the 1983 report “A Nation At-risk”. This report led to a nationwide educational reform movement (Gilliam & Zigler, 2004). One of the findings cited in this report showed that preschool programs had long-term, positive effects for students who participated in them. States jumped on this information and began to fund and develop their own pre-kindergarten programs. Within six years, 31 states had state pre-kindergarten programs and were spending \$300 million annually.

Typically, these state pre-kindergarten programs were half-day programs for identified at-risk 4-year-olds (Mitchell, 1989).

While states were moving forward with the implementation of pre-kindergarten programs, the federal government was also reviewing early childhood education programs. In 1988, two new pieces of legislation related to early childhood education were introduced. The Chapter 1 Reauthorization Act extended migrant services to three and 4-year-olds, and the Family Support Act provided funding for childcare so parents on welfare could receive childcare in order to allow them to go to work or attend job training programs (Mitchell, 1989). In 1990, President George H. W. Bush set an educational goal that by 2000 every child would enter school ready to learn. This new educational goal once again put the focus on early childhood education programs and proponents saw these programs as a way to meet the goal (Boyer, 1993). From this point forward, no other area of education has grown like preschool (Barnett, 2005).

The America's Children Report of 2009 reported that in 2006, 61% of America's children, from birth to five years of age, attended a center-based early childhood care and/or education program. This included day care centers, nursery schools, play programs, Head Start, and state pre-kindergarten programs. While state funded pre-kindergarten programs were designed to target at-risk children, the America's Children Report showed that children living in poverty were less likely to participate in any type of early childhood program. The report showed that 51% of children ages 0-6, who were living below the poverty line, were participating in early childhood programs. Whereas, 68% of children ages 0-6 who were above the poverty line were enrolled in early childhood programs (America's Children, 2009). The researchers also looked at the

education level of the children's mothers. They found that 80% of children whose mothers had college degrees were enrolled in preschool programs compared to only 59% of children whose mothers' had a high school diploma or less (National Institute for Early Childhood Education Research, 2009). The ethnicity of students participating in early childhood program was another key indicator studied. The findings showed that in 2008, 59% of white children aged 3 to 5 were in programs, 64% of black children aged 3 to 5 were in programs, and 49% of Hispanic children aged 3-5 (America's Children, 2009).

The Early Childhood Program Participation Survey (ECP) of the 2005 National Household Education Surveys Program provided some additional information about America's youngest children. The information was gathered from 7,198 parent interviews. The parents represented 20,665,000 children birth through five years of age. The findings of these interviews showed that 73% of children aged 3-5 were being cared for in a non-parental care arrangement. Of the children in non-parental care, 60% were in center-based care, 28% in relative care, and 12% in non-relative care (U.S. Department of Education, National Center for Education Statistics, 2005a).

In 2003, the National Institute for Early Education Research (NIEER) began publishing an annual survey titled "The State of Preschool." The annual report looked at the progress of state-funded preschool programs in all 50 states. The study focused on three key areas: student enrollment, quality of programs, and financial resources. In the State of Preschool 2007 Yearbook, the report showed that in 2006-2007, for the first time in the history of state funded preschool education, state funding improved in per-child spending, expanding student access to programs, and increased movement toward meeting more of the 10 standards that indicate a high quality preschool program



(National Institute for Early Childhood Education Research, 2007). However, the State of Preschool 2009 Yearbook, showed a decline in progress in all three key areas. The researchers attributed this to the economic downturn being experienced in the United States (National Institute for Early Childhood Education Research, 2009).

Based on the NIEER 2009 report, student enrollment in state funded preschool programs for the year 2008-2009 actually increased by 81,593 children (National Institute for Early Childhood Education Research, 2009). There were 1.2 million children enrolled, 1 million of whom were four years old. This figure does not include Head Start or special education students and showed that states continued to be the largest source of government provided early childhood education. The data also showed that 30% of the nation's 4-year-olds were being served in state programs in 2008-2009, an increase from 22% in 2005-2006. Overall, 29 states had increased in enrollment, while nine states had decreased (National Institute for Early Childhood Education Research, 2009).

In 2007, the NIEER Report showed three states that offered universal pre-kindergarten to all of their state's 4-year-olds, regardless of family incomes. These states were Oklahoma, Georgia, and Florida, and they served more than half of their state's 4-year-olds (National Institute for Early Childhood Education Research, 2007). However, in the 2009 report, only Oklahoma continued to offer universal services to all of their state's 4-year-olds and remains the number one state in providing early childhood education for children aged four (National Institute for Early Childhood Education Research, 2009). While there have been increases in student participation in early childhood programs, participation is still uneven across the nation. Twelve states do not have pre-kindergarten programs: Alaska, Hawaii, Idaho, Indiana, Mississippi, Montana,

New Hampshire, North Dakota, Rhode Island, South Dakota, Utah, and Wyoming, which places at-risk youngsters in these states at an even greater disadvantage (National Institute for Early Childhood Education Research, 2009). In states that do provide pre-kindergarten programs, there are differences among them. For instance, length of day varies from state to state with 10 states offering full day programs, 10 offering half-day, and 31 states allowing the local district to decide if they will offer full or half-day programs. When looking at access to programs, 32 states have a parent income requirement for admission and one state provides service to all students regardless of the parent's income (National Institute for Early Childhood Education Research, 2009).

Funding of state preschool programs also ranged from state to state. In 2008-2009, annual state funding ranged from nothing in the 12 states that do not provide pre-kindergarten to more than \$760 million in the state of Texas (National Institute for Early Childhood Education Research, 2009). The average amount spent per child ranged from \$5,000 or more in 14 states to \$2,500 or less in five states. While there was a slight increase in 2009 in the average per state spending per child to \$4,143, when adjusted for inflation, there was actually a slight decrease. This decrease occurred in 24 of 38 states with preschool programs. The data shows that state funding did not keep up with inflation (National Institute for Early Childhood Education Research, 2009).

For purposes of the NIEER Study and annual report, the federally funded Head Start Program was viewed as a separate program from state funded pre-kindergarten programs. Because Head Start is funded with federal funds, the program must adhere to federal regulations and guidelines. Some states have provided additional funds to help expand Head Start in their states so that more children can be served, and at times, the

states have also played a role in assisting to administer the programs. However, in all cases, the Head Start program is still categorized as a federally funded program and is not viewed by researchers as equivalent to state pre-kindergarten run programs. The reasons for the difference in views between the two programs is that historically Head Start has not required teachers to have degrees or certifications, has provided a minimal educational program , and has a history of poor academic results. When studying preschool, however, researchers must consider the impact that Head Start has on pre-kindergarten programs, in terms of competition for the same clientele and resources (National Institute for Early Childhood Education Research, 2009).

#### *The Rationale for Early Childhood Education*

Nobel Prize winning economist, James Heckman, has studied preschool education in context of global competitiveness, and he says it best, “we can’t afford not to” (Barnett, 2005, p. 15).

Upon reviewing the historical development and context of early childhood education programs, it is clear to see that interest in these programs has continued to increase, not only with the general public, but in government, business, and science sectors as well. While early childhood education programs began as a need to provide daycare for working mothers, several other factors have contributed to this increased awareness and interest in early childhood education. Research has increasingly shown the importance of early brain development and stimulation to a child’s later success in school. In addition, research findings show that many children from disadvantaged backgrounds are entering school not ready to learn which puts these children at-risk for

failure from the very beginning. This creates learning gaps that become difficult to close (Gallagher, Clifford, & Maxwell, 2004).

School readiness has been identified as being related to almost every educational benchmark from being on grade level and promotion to staying in school and graduation. Studies have shown that significant differences exist in how some children enter school. Proponents of early childhood education programs believe that participation in early programs would provide children who lack the background experiences to develop vocabulary a chance to close the gap before entering Kindergarten (National Association of Elementary School Principals, 2005).

The 6th Annual Report to the Nation on the Condition of Children in America research study published in 2002 was conducted for six years and focused on a variety of indicators on America's children. One of the indicators studied was participation in early childhood programs. The findings from this study have shown that participation of children from disadvantaged backgrounds in high-quality early education programs has led to positive gains in IQ, in academic achievement, and in school completion rates (America's Children, 2002). The study found that participation in early childhood programs gave otherwise at-risk students the skills, experiences, and enrichment that would help them enter school ready for what was expected and thus improving their chances of being successful.(America's Children, 2002).

In addition, there have been other studies of early childhood education programs that have yielded important information about the benefits of implementing these programs. Three of the best known research studies were the Perry Preschool Project, The North Carolina Abecedarian Project, and the Chicago Child-Parent Centers. The

findings from the studies of these programs showed that students who participated, when compared to their peers who did not attend a program, decreased their risk for being retained, dropping out of school, being identified for special education, or getting into trouble with the law (Quality Counts, 2002).

The Perry Preschool Project was implemented in the 1960s in Ypsilanti, Michigan. The program identified 123 African American three and 4-year-old students from low socioeconomic backgrounds and randomly placed some into the district's preschool program. After completing the preschool program, the researchers continued following the students and the control group as they progressed through school and adulthood. The last interviews of participants were conducted when the participants were 40 years old. What the researchers have found is that the participants increased their IQ significantly compared to the control group, were less likely to have been retained, and were more likely to have graduated from high school. In adulthood, the research found that the median monthly income of those who participated was \$1,856 versus \$1,308 median monthly income for those who did not. Also, there was significantly less criminal activity in the participant group. The researchers calculated that there were cost savings for the public school system and for the community. For example, the public school saved \$17.07 for every dollar spent on the preschool program in terms of later remediation programs, dropouts, and retentions (Schweinhart, 2004).

The Abecedarian Early Childhood Intervention Project was another program that provided early childhood preschool for students in families in low socioeconomic backgrounds. Again, the researchers followed these students into adulthood. In this study there was the intervention group (program participants) and a control group (non-

program participants). Based on these findings, the researchers found that 40% of the intervention group was still in school at the age of 21 versus 20% of the control group. In addition, they found that 35% of the intervention group had graduated from college, versus 14% of the control group. They estimated that the project created approximately \$4.00 in benefits for every dollar invested. They went on to assert that local school districts actually saved more than \$11,000 per child because the participants typically did not require special education or remedial services (Saluja, Early, & Clifford, 2001).

In 2002, researchers from NIEER, conducted a benefit cost analysis on the Abecedarian project. The researchers chose the Abecedarian project because it was considered a high-quality program, and followed children's progress through early adulthood. The findings showed that the participants were estimated to earn more in their lifetimes than non-participants; mothers of participants had higher earnings; and school districts saved an estimated \$11,000 per child due to a decrease in special education and remedial programs (Masse & Barnett, 2002).

The Chicago Child-Parent Centers, like the others already discussed, provided early childhood care and educational services for children from low-socioeconomic backgrounds. Again, students were studied as they progressed through school and the findings indicated that the participants had a 29% increase in completion of high school and a 47% higher rate for high school completion for boys. There were also decreased rates of arrests among program participants with a 33% lower rate for juvenile arrests and a 41% lower rate of arrests for violent crimes. The researchers calculated that \$7.14 was returned to society for every dollar spent on the preschool program in terms of increased

earnings of participants, as well as reduced costs for remediation, special education, and legal fees (Reynolds & Temple, 1998)

Most recently, as state pre-kindergarten programs have grown throughout the nation; research on program effectiveness and student outcomes has accelerated. The National Institute of Child Health and Human Development studied preschool programs in 2001 and reported that students who participate in high-quality preschool programs have positive gains in both language and math skills. Additional evaluations of state pre-kindergarten programs have found that students who participated increased their language and math skills, and demonstrated school readiness at the beginning of kindergarten. They even found that there were some positive correlations between participation in preschool and prevention of later grade retention (U.S. Department of Health and Human Services, 2003).

Several research studies have been done on the Oklahoma pre-kindergarten program. The reason the Oklahoma pre-kindergarten program is often researched is because the state provides universal access to pre-kindergarten for all 4-year-olds, regardless of family income.

One study was conducted by William T. Gormley and his research team from the Georgetown Public Policy Institute and Center for Research on Children in the United States. They studied the effects of the pre-kindergarten program in Oklahoma, specifically the program in the Tulsa Public Schools. They selected the Oklahoma pre-kindergarten program because it has relatively high standards compared with those of other states and requires that every lead teacher have a bachelor's degree and be certified in early-childhood education (Gormley, Phillips, & Gayer, 2008).

The study was conducted in the 2006-2007 school year and assessed Tulsa students entering both the pre-kindergarten and Head Start programs. Researchers used three subtests of the Woodcock-Johnson Achievement Test. The three subtests used were the letter word identification test, which assesses pre-reading skills; the spelling test, which assesses pre-writing skills; and the applied problems test, which assesses pre-math skills. The results show that the Tulsa Public Schools pre-kindergarten program significantly improved students' cognitive development in all three assessed areas. The researchers noted that the results were statistically higher for the majority of disadvantaged children but were still strong for non-disadvantaged children. The results for the Tulsa Head Start program, while not as high as those for the Tulsa pre-kindergarten program, were still strong (Gormley, Phillips, & Gayer, 2008).

Again, state pre-kindergarten students performed significantly higher than Head Start students. One difference between the programs is that Head Start teachers have not been required to have a degree or to be certified, and they also earn considerably less than their counterparts in state funded pre-kindergarten programs. This difference in teacher training may be one of the factors that explain the difference in student performance between state-funded prekindergarten programs and Head Start (Barnett, 2005).

In another study, conducted by researchers at National Institute of Early Education Research (NIEER), pre-kindergarten programs in five states were studied to determine the impact on the development of children's receptive vocabulary, early literacy, and math skills. The five states selected for this study were Michigan, New Jersey, Oklahoma, South Carolina, and West Virginia. The states were not selected randomly, but instead were selected because these states were identified as typically



having higher quality preschool programs and had degreed, early-childhood education certified teachers in their preschool classrooms. A sample of 5,071 students from the five participating states was studied. Students were selected from pre-kindergarten classes of 4-year-olds, and were comprised of at-risk, heterogeneous groups. The assessors were trained by NIEER to maintain consistency and students were given a test at the beginning of the year and an end of year test during the 2004-2005 school year. Students were tested in either English or Spanish (Wong, Cook, Barnett, & Jung, 2008).

The results of the assessments showed that the students who participated in the state-funded preschools knew more letters, more letter-sound associations, and were more familiar with words and book concepts when they entered kindergarten. They also scored higher on the test for early math skills which included basic concepts, simple addition, telling time and counting money. Furthermore, students who came from low-income families also showed a significant increase in their print awareness skills (Barnett, Lamy, & Jung, 2005). The results of this study varied from state to state, but showed that there were statistically significant impacts in at least one of the three domains. In all five states, there were substantial gains in the students' learning and development, and their vocabulary scores showed an average 8% increase, which equated to an additional four months of progress in vocabulary growth. (Wong, Cook, Barnett, & Jung, 2008)

In another research study, Dr. Craig Ramey, Director of the Georgetown University Center on Health and Education teamed with representatives of The Center for Child Development at the University of Louisiana at Lafayette and the University of Alabama Center on Education Accountability to annually evaluate the state of Louisiana's prekindergarten program, known as *LA4*. This team of researchers has

studied *LA4* since 2002-2003. *LA4* is a full-day pre-kindergarten program provided for children who meet the eligibility for free or reduced-price meals and who are four years old by September 1st. This five year study has shown that students who participated in *LA4* have made strong gains in the areas of language, print, and mathematics. The researchers studied five cohorts of students, beginning when they entered the pre-kindergarten program and following them as they progressed through school. Students were given both a fall and spring assessment in pre-kindergarten, and the results showed that their scores increased in all areas - language, print, and mathematics. These results were consistent and replicated for five years in a row, with each cohort group (Ramey, Ramey, & Stokes, 2009).

In 2006-2007, the first *LA4* cohort took the third grade state assessment, known as iLEAP. The assessment was given in reading and in mathematics. The results showed that 68% of *LA4* students performed at level or above on the third grade iLEAP in English Language Arts, compared to 56% of non *LA4* participants. Seventy percent performed at standard or higher on the third grade iLEAP in mathematics, compared to 55% of non *LA4* participants (Ramey, Ramey, & Stokes, 2009). The findings also showed that grade retention rates in Kindergarten, first, and second grades were reduced with an average of 12.5% of economically disadvantaged *LA4* non- participants being retained, versus 8% of *LA4* participants. Special education placement rates were also decreased from Kindergarten through second grade. Special education placement rates showed an average of 14.5% identification for *LA4* non participants and 8% for *LA4* participants. Overall, the study results were consistent and showed a replicated pattern of results among all five cohorts. The *LA4* study also shows that large state pre-

kindergarten programs can provide high-quality preschool programs. At-risk children show larger gains in their school readiness and academic achievement than their non at-risk counterparts (Ramey, Ramey, & Stokes, 2009).

The New Mexico Pre-kindergarten Study was started with the initiation of the New Mexico state funded pre-kindergarten program in 2005. When the state of New Mexico made the decision to implement a prekindergarten program, they hired NIEER to conduct a comprehensive evaluation of the new program, beginning with the first year of implementation. This research study analyzed four areas of the program: 1) benefits children participating in the program received, 2) pre-kindergarten classroom quality, 3) economic impacts of the pre-kindergarten program, and 4) perceptions toward the pre-kindergarten initiative using focus groups. The researchers made the following findings: 1) the research shows that children who attended the New Mexico pre-kindergarten program scored higher in early math, language and literacy, than those who did not attend the program; 2) classroom quality was good, but could be improved; 3) an estimated \$5 in benefits was generated in New Mexico for every dollar invested in the New Mexico pre-kindergarten program; and 4) perceptions of the program were favorable. In addition, the New Mexico Public Education Department (PED) and the Children, Youth and Families Department (CYFD) conducted separate sets of analyses on student performance which showed similar results to the NIEER study. When the researchers combined child assessment data from the first three years of the New Mexico pre-kindergarten program, their findings showed that the program continued producing positive impacts on students' language, math and literacy skills (Hustedt, Barnett, Jung, & Goetze, 2009).

Another study of a statewide pre-kindergarten program was a longitudinal study of the New Jersey Abbott pre-kindergarten program. This program was implemented for at-risk 4-year-old children who lived in the economically disadvantaged Abbott neighborhoods. In addition, the Abbott program has a strong reputation for being a high quality pre-kindergarten program. One of the major strengths of the program was the alignment of standards, assessments, and curriculum from pre-kindergarten through third grade, which eliminates the achievement gap for disadvantaged students and produces learning gains. The study followed students from pre-kindergarten through the end of second grade. The research findings show that there were positive effects on language, literacy, and mathematics achievement, and that these gains were sustained through second grade. In addition, the study showed that retention was significantly reduced in kindergarten and first grade. The researchers concluded that at-risk students who attended the New Jersey Abbott pre-kindergarten program had greater educational gains than students who did not attend the program. Furthermore, the academic gains showed to be sustained into the early elementary years (Frede, Jung, Barnett, & Figueras, 2009).

Thus far, all of the pre-kindergarten research studies discussed focused on school readiness indicators, because student academic success is usually the focus of preschool program design, implementation, and outcomes. However, most researchers and pre-kindergarten proponents stress that academic progress is not the only purpose for preschool programs. In addition, to the academics, proponents and researchers say that high-quality preschool programs must also include social, behavioral, and health objectives. Unfortunately, these are often ignored or receive minimum focus as there has

been little research or data to show the effectiveness of these objectives (Wong, Cook, Barnett, & Jung, 2008)

Equally important to the academic benefits of pre-kindergarten programs for at-risk students, are the demographic changes the United States is experiencing. According to the annual America's Children report,

In 2008, 56 percent of U.S. children were White, non-Hispanic; 22 percent were Hispanic; 15 percent were Black; 4 percent were Asian; and 5 percent were 'All other races.' The percentage of children who are Hispanic has increased faster than that of any other racial or ethnic group, growing from 9 percent of the child population in 1980 to 22 percent in 2008. By 2021, it is projected that 1 in 4 children in the United States will be of Hispanic origin. (America's Children, 2009, p. xv)

When looking at children whose parents are foreign-born, the data shows that the percentage of children living with at least one foreign-born parent "rose from 15% in 1994 to 22% in 2008" (America's Children, 2009, p. 8)

The concern with these demographic changes is that the statistics show that Hispanic and black children more often live in poverty. In 2008, 29% of Hispanic children were living in poverty as compared to 10% of White, non-Hispanic children and 35% of Black children. Furthermore, Hispanic children, aged 18 and younger, comprised only 17.7% of all children in the nation; however, they made up 30.4% of children in poverty (Collins & Ribeiro, 2004, America's Children, 2009). The data also extends to children living with at least one foreign-born parent, who also have a greater chance of living in poverty. In 2008, 30% of foreign-born children living with foreign-born parents lived below the poverty line, compared with 21% of native children with foreign-born parents and 16% of native children with native parents (America's Children, 2009).

Between 1991 and 2005, the United States Department of Education studied the enrollment in various early childhood education settings. Included in this study were day care centers, Head Start, preschools, nursery schools, and pre-kindergarten programs. The results of the study showed there were more black and white children participating in early childhood education programs than Hispanic children. For instance, in 2005 the enrollment in early childhood education programs was as follows: 66% black, 59% white, and 43% Hispanic. There was also a 13% difference in enrollment between economically advantaged and disadvantaged children, with more advantaged children being enrolled in early childhood education programs than disadvantaged children. Additionally, enrollments were found to be higher for children whose mothers worked, and for those whose mothers held college degrees (U.S. Department of Education, 2005). Another finding in studies of demographic trends is that Black and Hispanic children were more mobile, changing schools more frequently than other demographic groups. For example, between first and third grades, 25% of Hispanic students and 27% of black students were found to change schools three times or more, in comparison to white students, only 13% of black students changed schools that frequently (Evans, 2005).

According to the 2000 Census, 82% of Hispanics resided in the following 10 states: Arizona, California, Colorado, Florida, Georgia, Illinois, New Jersey, New Mexico, New York, and Texas. However, the Hispanic population is moving into more states and communities throughout the rest of the United States which means that all states will need to look at the inclusion of this population when planning and coordinating services and programs. Hispanic families bring with them four major policy issues: a language barrier, families with large numbers of children who need affordable

childcare, immigrant status, and educational expectations (Collins & Ribeiro, 2004). A review of the National Assessment of Education Progress or NAEP reading test showed that Hispanic nine year olds scored 13% lower than non-Hispanic whites, which was a gap of 28 points. Collins and Ribeiro (2004) say that when it comes to English language learners, the child who cannot speak English when they enter kindergarten is most at-risk for academic failure and dropping out of school. In 2000, Hispanics had a 28% high school dropout rate which was more than double that of black students and four times the dropout rate of non-Hispanic white students. There is also a significant difference in attendance at higher education institutes. The statistics show that between 1980 and 2000 only 22% of Hispanic 18-24 year olds were attending higher education institutes, compared with 39% of non-Hispanic whites and 31% of blacks in the same age group (Collins & Ribeiro, 2004)

Looking at academic variables that affect different cultural and economic groups, family literacy and vocabulary are two significant areas that have an impact on a young child's development and readiness for school. A 2005 sample study of households conducted by the United States Department of Education shows that 91% of Asian and Anglo preschool age children (ages 3-5), were told a story by a family member, compared to only 82% of Black and Hispanic preschool age children. In fact, Hispanic children were less likely than non-Hispanic white or black children to be read to or to visit a library (U.S. Department of Education, National Center for Education Statistics, 2005b). In the area of vocabulary development, some Kindergarteners enter school with a vocabulary of as little as 4000 words, while others enter Kindergarten with a vocabulary of 12,000 plus words. Researchers noted that the low vocabulary was most

noted in children who come from impoverished backgrounds. Reasons cited for the differences in vocabulary acquisition were that children who come from impoverished backgrounds are read to less often and have parents who speak less to them. For example, research has shown that in economically disadvantaged homes adults speak as little as 600 words per hour to their children versus the 2000 words spoken per hour to children in advantaged homes (Evans, 2005).

In addition to the findings on school and life success for participants, many of the research findings have also shown an economic impact regarding participation in preschool programs. In the 1980s the National Governor's Association Task Force recommended the implementation of early childhood programs. They saw these programs as not only being educationally successful but also as economically successful (Mitchell, 1989). The RAND Corporation issued a study on preschool in 2005. This study focused on California and the growing evidence that participation in high quality preschool before Kindergarten will improve a child's overall academic achievement as they progress through school. The RAND Corporation took these findings and estimated that if preschool were available to every 4-year-old in California, that it would generate an estimated two-to-four million dollars in benefits for every dollar spent on prekindergarten. The RAND researchers claimed that by putting public money into quality preschool programs today, the state will benefit in later years with a stronger, more educated workforce; a reduction in juvenile crime; and increased standard of living (RAND, 2005).

The demographic landscape in America is changing at a dramatic rate, and these changing demographics are impacting how state and local governments and school



officials make policies, provide education, and finance programs. In short, the research findings have shown over and over again that high-quality early childhood education programs can contribute to later educational achievement and success; it can prepare at-risk children with the skills needed to enter school ready to learn so they do not fall behind; and it has the best chance at closing the educational gaps between minorities and non-Hispanic whites. Also, as the demographics continue to change, providing early childhood education programs will also have an impact on jobs, economics, social welfare, and criminal activity in the United States.

### *The Importance of Quality in Early Childhood Programs*

As a result of the interest and emphasis, not to mention increased funding of early childhood education programs, policy makers and stakeholders have become interested in ensuring that programs are high-quality and are meeting the desired outcomes. However, among the interested parties, there is an ongoing debate about the type of instruction that works best for young children (Marcon, 1994). Research indicates that while no single program or instructional strategy has been shown to be better than another, the preschool programs with a planned curriculum are more effective than programs that do not have a set curriculum (Marcon, 1994). The National Research Council published a book on educating preschool age children which, states that when preschools have specific curricular goals, are well planned, and deliver a strong instructional program, the students typically learn more, develop better social and academic skills, and are better prepared for formal schooling than do students who participate in schools of lower quality (Saluja, Early, & Clifford, 2001).

In order to ensure that early childhood programs are high-quality, standards and benchmarks are often used to evaluate them. Quality standards that are often looked at include child-teacher ratios, teacher training, curriculum and instruction, funding, parental involvement, and administrator experiences (Saluja, Early, & Clifford, 2001). The NIEER annual report also measures states implementation of 10 quality indicators that ensure a high-quality early childhood education program. The quality indicators and number of states that require them are:

- comprehensive early learning standards, 47 states require;
- teachers with a BA degree, 26 states require;
- teachers with specialized training in early childhood education, 44 states require;
- assistant teacher training, 14 states require;
- annual teacher professional development, 42 states require;
- class size limitations with 1:10 adult to child ratio, 45 states require;
- screenings and referrals for vision, hearing, and health, 32 states require;
- at least one meal a day, 21 states require; and
- state monitoring with site visits, 40 states require.

In the NIEER 2009 annual yearbook report, eight states improved on their implementation of quality indicators, but three states decreased in the indicators they were implementing. Unfortunately, the results also show that the states that implemented the least amount of the quality benchmarks included three of the four states with the largest number of children enrolled in their state pre-kindergarten programs: California, Texas, and Florida. In addition, the states of Texas and Pennsylvania are the only states

that do not set class size limitations. There were only 16 states that showed they provided enough funding to meet all 10 of the quality indicators (National Institute for Early Childhood Education Research, 2009).

Teacher education and training are significant quality indicators. When a teacher is able to identify and provide instruction based on the young child's development and needs, the more successful the child will be (Jacobson, 2002). The NIEER 2009 report also looked at teacher quality by state and found that 26 of the 38 states with pre-kindergarten programs required all lead teachers in their programs to hold a bachelor's degree. The rest of the participating states only required a bachelor's degree in certain circumstances, typically when the program was located in a public school setting. Eight states did not require any pre-kindergarten teachers to have bachelor's degrees. The fact that there has been limited progress in this area affects the quality and overall effectiveness of pre-kindergarten programs (National Institute for Early Childhood Education Research, 2009).

Along with the push toward providing high quality preschool programs and the increase in funding, the demand for accountability has increased (Olson, 2002). Early childhood programs that receive federal state funds, as well as many state-funded programs, are now being required to assess the progress of their students to meet the accountability requirements. The No Child Left Behind federal legislation passed in 2001 required that early childhood education programs receiving federal funds must use curriculum programs and instructional strategies that are based on scientifically based research (Walsh & Gardner, 2005). In addition, students participating in Head Start programs must now be assessed using identified performance measures (Hoff, 2002).

The move towards more accountability for preschool programs has not been easy for lawmakers or educators because of the variance in programs, as well as the disagreement on how best to assess young children. There has also been a movement across the nation to increase the expectations for kindergarten students in order to meet the requirement that every child is reading on level by third grade. This increase in expectations for kindergarten students has led to a fear that the K-12 curriculum will be pushed down even further to the pre-kindergarten classroom. This is considered developmentally inappropriate (Hoff, 2002). Typically, young children are assessed on their development of social and motor skills, which is best conducted using observations of the child rather than a formal testing (Hoff, 2002). Educators also find it difficult to assess young children because they are inconsistent in their development, a factor which makes it difficult for the establishment of assessment benchmarks (Olson, 2002).

In 2003, the National Association for the Education of Young Children (NAEYC) developed standards for early childhood programs which are used for program accreditation. The standards focus more on how teaching of young children should take place, rather than on what is taught. The NAEYC is strongly opposed to the moving of curriculum down to young learners. Today, Head Start and other compensatory preschools model their programs using the NAEYC standards (Gallagher, Clifford, & Maxwell, 2004). President Bush's *Good Start, Grow Smart Initiative* urged states to establish standards for their pre-kindergarten programs that aligned with the state standards for their K-12 programs (White House, 2002). While no states have adopted the NAEYC standards for their pre-kindergarten programs, 34 states have developed learning standards for their programs (Gallagher, Clifford, & Maxwell, 2004).

### *The Involvement of Public Schools in Early Childhood Education*

Currently, 38 states fund pre-kindergarten education with the majority of funds going to the public schools (Saluja, Early, & Clifford, 2001), and these programs are growing. This expansion of preschool into the public school setting has created a debate over what the programs should look like and how they should operate in a public school setting (Rowley, 1991). Public elementary schools have great resources in material, trained staff, and environment that make prekindergarten programs high quality. For parents, the programs are free and easy to access in terms of location, and parents will typically have all their children in one location (Mitchell, 1989). Furthermore, pre-kindergarten programs in public schools afford the opportunity for children who are at-risk or who have special needs to be identified at an earlier age, thus receiving needed interventions sooner rather than later after academic failures have been experienced (Rowley, 1991).

However, the addition of these programs into public schools has not been without problems. Due to limited resources and the structure of the public school, pre-kindergarten programs often operate only five to eight hours a day. In fact, only 14% of pre-kindergarten programs in public elementary schools operate for more than eight hours a day. Conversely, programs that are run by private and non-profit groups tend to be open for more than eight hours a day which provides a great need for many working parents. This creates an unfortunate situation because pre-kindergarten programs are specifically designed to target at-risk children. Because parents of at-risk children often have the least resources for additional child care, many children are not attending the programs that were specifically designed for them (Saluja, Early, & Clifford, 2001).

Another negative for including pre-kindergarten in public schools is that the facilities are often too big and impersonal for young children and may necessitate facility upgrades to accommodate young learners. Also, shifting early childhood education to the public school system has an impact on the private sector of daycare. For example, preschool workers in the private sector do not have the education required to work in public schools, and therefore would lose their job (Rowley, 1991). There is also a concern that by placing pre-kindergarten programs into elementary schools, formal instruction will be pushed onto our youngest learners too early, especially with the advent of the No Child Left Behind legislation that requires all children to be reading by third grade (Rowley, 1991).

In short, research shows that early childhood education in the United States varies greatly. Preschool services vary in funding, teacher training, quality standards, accountability, accessibility and purpose, all of which leads to program inequities (Kagan, 1994). What does appear to be happening, however, is a push for early childhood education to be provided through the public school, as the majority of programs already are (Mitchell, 1989).

### *Pre-kindergarten in Texas*

The Texas Public School Pre-kindergarten Program began in the 1985-1986 school year. When the 1984 report “A Nation At-risk” came out, the state of Texas called a special legislative session to discuss the state of Texas public education (Warren, 2003). The result of this session was House Bill 72, the Education Reform Bill that included the pre-kindergarten initiative which targeted at-risk 4-year-old children. The stated purpose of the Texas Public School Pre-kindergarten program is “to ensure that

disadvantaged children develop the skills necessary for success in the regular public school curriculum, including language, mathematics and social skills” (Texas Education Agency, 2008a).

At the time HB 72 was created, Texas had the financial resources to fund the pre-kindergarten initiative and budgeted \$30 million for half-day programs. In addition, many of the state’s universities were providing early childhood education classes leading to teacher certification (Warren, 2003).

The Texas pre-kindergarten program required that all districts with 15 or more eligible 4-year-olds were required to offer the pre-kindergarten program. Children were considered eligible to participate in the pre-kindergarten program if they met one or more of the following criteria: were limited English proficient, were homeless, and/or qualified for a free or reduced price lunch. Programs were half-day in length. That first year of implementation, 34,412 students were served in the Texas public school pre-kindergarten programs. Three hundred and two out of 1,204 districts participated and the state funded approximately \$30 million (National Institute for Early Childhood Education Research, 2007). By the year 2001-02, the program had grown to 164,359 students; 925 participating districts and funding of more than \$278 million. As the pre-kindergarten program rapidly grew, it quickly became considered a regular school funding budget item for the state. In fact, within five years of implementation, the pre-kindergarten initiative had become part of the K-12 Foundation Program, which is the funding mechanism for Texas public schools. Today, pre-kindergarten is the established norm for most school districts in Texas, continuing to service at-risk and disadvantaged children. The number

of children attending public school pre-kindergarten programs is approximately half of the students attending kindergarten (Warren, 2003).

Today, local districts are required to provide a minimum of three hours of class; however, local districts may expand their pre-kindergarten to full day programs using local funds, federal funds, such as Title 1 and migrant funds, or with state expansion grants. In 1999, the state of Texas provided pre-kindergarten expansion grants to districts that applied. The purpose of the grant was to increase half-day programs to full day programs, and the preference was given to districts whose third grade Texas Assessment of Academic Skills (TAAS) scores were below the state average. The grant required that districts provide at least six hours of daily instruction (Warren, 2003). One hundred fifty-seven school districts received expansion grants which cost an additional \$200 million for the 1999-2000 and 2000-2001 school year, in addition to the \$278 million already being funded for pre-kindergarten programs (Warren, 2003). In 2001-2002, 164,359 students participated in the pre-kindergarten programs.

The expansion of the Texas pre-kindergarten initiative has continued throughout the state. When the program began, students were eligible to participate if they met one or more of the eligibility requirements which were limited to English proficient, economically disadvantaged, and/or were homeless. These eligibility requirements are still in effect, but in 2006-07 the state expanded eligibility to include children whose parents are on active military duty or have been injured or killed on duty. Children who were in foster care became eligible for Texas' pre-kindergarten program for the first time during the 2007-2008 school year (Texas Education Agency, 2008b). Furthermore, local districts have always had the option to provide additional funds for their pre-kindergarten



programs using local monies and/or federal Title 1 funds (Warren, 2003). Local districts also have the option to service other children who do not meet eligibility requirements, but these students may not displace children who are eligible for the programs. Local districts are required to fund non-eligible students participating in the pre-kindergarten programs, by local funds or charging tuition (Texas Education Agency, 2008b).

The most recent statistics on the Texas pre-kindergarten program shows that for the 2008-2009 school year, the state of Texas increased their per child spending by \$102.00 to \$3,790 for a total state expenditure of \$760,059,287. This was the second year in a row that Texas showed increased spending per student. This does not include any pre-kindergarten expansion grant funds, federal funds, or local funds that individual districts may have contributed to their pre-kindergarten program (National Institute for Early Childhood Education Research, 2009). Enrollment has steadily increased, with a total of 200,529 students enrolled in pre-kindergarten in 2008-2009. Of this amount, 26,504 (4.5%) were 3-year-olds and 187,429 (95%) were 4-year-olds. Texas currently ranks seventh in the nation in pre-kindergarten access for eligible 4-year-olds and 13th for access for eligible 3-year-olds (National Institute for Early Childhood Education Research, 2009).

Pre-kindergarten classes do not fall under the mandatory classroom cap size of 22:1, which applies to kindergarten through fourth grade classrooms. However, TEA does recommend that districts use this ratio in their pre-kindergarten classrooms. The state requires that teachers in pre-kindergarten classrooms have a Bachelor's degree and certification in PK-4th grade or have an Early Childhood Education or Kindergarten endorsement. If the teacher is working with limited English proficient (LEP students),

then the teacher must also have a LEP or bilingual endorsement. While many districts do provide a teaching assistant for each pre-kindergarten classroom, local districts are not required to provide this. In addition, the state does not require schools serve meal to students in half-day pre-kindergarten programs, but most districts do provide a minimum of one meal per day (National Institute for Early Childhood Education Research, 2009).

When the pre-kindergarten program began in Texas, there was not a required curriculum or required skills. In 1991, Texas added Essential Elements for pre-kindergarten programs in the areas of communication, cognition, motor, fine arts, social/emotional, intellectual, aesthetic, and physical development. In 1997, the state developed and adopted the Texas Essential Knowledge and Skills (TEKS) for grades K-12. In 1999, curriculum guidelines were provided by TEA that identified the skills three and 4-year-old children needed to know and be able to do. The most recent revision to the Texas Pre-kindergarten Guidelines was completed in May 2008 by the Texas State Center for Early Childhood Development. As per TEA, the guidelines were developed based on the research findings on how young children develop and learn, as well as from feedback gathered during the public input phase. While the adherence to the TEA guidelines is voluntary for local districts, they do offer districts a comprehensive guide for developing pre-kindergarten programs that will align with the K-12 TEKS (Texas Education Agency, 2008e).

The pre-kindergarten program in Texas has been controversial from the beginning, with a disagreement between the state and local districts as to who should control the program. Because of this, the state has basically left local districts alone in regards to the implementation and monitoring of early childhood programs. However, in

1989, TEA did conduct a five year study of the implementation and results of the Texas pre-kindergarten program. The findings of the study showed that during the first two years of the program's implementation, developmentally appropriate practices (DAP) were not often used by teachers. However, towards the end of the study, the data showed teachers were using more DAP instruction. The researchers attributed this change in instruction to more professional development (Warren, 2003). Another reason for the change in instruction may have been that the first pre-kindergarten teachers simply held elementary certification, and were not certified in early childhood education (Warren, 2003).

Student achievement was also studied. TEA researchers found that children who participated in pre-kindergarten classes showed gains in academic performance as they progressed through school, were more likely to be on grade level, were less likely to be retained, and less likely to be referred to special education. Students who attended pre-kindergarten scored about two or more points higher on the state reading and mathematics TAAS test, and LEP students performed even higher. While these students' still averaged scores lower than the statewide average for Texas third graders, they had higher scores when compared to at-risk students who did not participate in the prekindergarten programs. Overall this was a significant study for the pre-kindergarten program in Texas, because it showed that the program was producing successful outcomes (Warren, 2003).

Another significant study was the report *Improving Student Achievement: What State NAEP Test Scores Tell Us*, which was published by RAND in 2000. The report findings showed that Texas was one of the leading states in the nation where students

were making achievement gains and performing at higher levels (Warren, 2003). One of the top three reasons cited for these gains was the large numbers of children attending pre-kindergarten in Texas public schools. However, the study also found some areas of concern in early childhood education in Texas. Throughout the state there are a variety of preschool programs, such as state pre-kindergarten, federal Head Start, private schools, and daycare providers. This variety of programs and providers creates a very fragmented early childhood education system in Texas, as each of these programs has their own standards, enrollment criteria, and program goals. These programs also compete for clientele from the same populations; for example, the federal Head Start program serves children from birth through age five, averaging approximately 54,230 students per year (Warren, 2003). According to the Texas Workforce Commission, there are about 70,000 children, ages birth through age 12, receiving some form of daycare from approximately 5,500 providers (Warren, 2003). That means these children are not participating in the state pre-kindergarten programs. Because of this overlap in services, the state is currently working towards coordinating all of the different preschool programs (Texas Education Agency, 2008d).

While Texas does have opponents to spending more for pre-kindergarten programs, there are strong proponents in all sectors of the community that view pre-kindergarten as a wise investment. The body of research on the brain and early childhood development is growing. The research shows that the types of experiences and learning opportunities young children are exposed to have a big impact on a child's cognitive development (Landry, 2005). This affects how prepared they are to enter school, as well as how successful they will be in school (North Central Regional Educational Laboratory,

1999). Research has also identified the contributing factors that make a preschool program high-quality. Universities and colleges throughout the state now include early childhood education programs in their coursework (Olson, 2002). Proponents also point out that there are cost saving benefits to providing pre-kindergarten programs, such as the reduced need for remedial programs, dropout prevention programs, and special education (RAND, 2005). In the state of Texas, formal student achievement assessments do not begin until third grade. Experts say it is difficult to exactly pinpoint when a child starts to fall behind in school. There are some research findings that indicate at-risk children actually start to fall behind in Kindergarten (Edwards, 1999). In the year 2004-2005, economically disadvantaged K-6th grade students had higher retention rates than non-economically disadvantaged students (Texas Education Agency, 2005).

In 2006, the Bush School of Government and Public Services at Texas A & M University, published a study titled, “A Cost-Benefit Analysis of Universally Accessible Pre-Kindergarten Education in Texas” (Aguirre, Gleeson, McCutchen, Mendiola, Rich, Schroder, et al., 2006). The purpose of the study was to provide information regarding the costs and potential benefits of providing a universal pre-kindergarten for all 4-year-olds in the state of Texas. The researchers used the Chicago Child-Parent Center program as the model of what a high-quality pre-kindergarten program should look like. What they found was that pre-kindergarten programs in Texas lacked many of the high-quality indicators that lead to benefits for society. At the conclusion of the study, the findings showed that for every \$1.00 put into a high-quality universal pre-kindergarten program, the state would expect to see a return of \$3.50 per participant.

While the state of Texas has established a pre-kindergarten program that has been successful for many at-risk students, the state is facing some pressing and on-going challenges (Warren, 2003). First, is the problem of reaching the identified population with only 45.2% of eligible students being served in the pre-kindergarten program (Warren, 2003; National Institute for Early Childhood Education Research, 2009). Then, there is the rapid increase in the identified population, most notably in the Hispanic group. In 2002, 42% of the Texas population was Hispanic (U.S. Department of Education, National Center for Education Statistics, 2005a). Texas is also experiencing an economic slowdown, the continued struggle over equity in school finance, strong tax opposition, and facilities shortages. In addition, the state does not renew expansion grants for local districts after the first two years, leaving local districts having to fund the expansions. The state is also struggling with teacher shortages, especially in the area of bilingually certified teachers (National Institute for Early Childhood Education Research, 2009). Eighty-two percent of districts offered a pre-kindergarten program in 2009, with the majority being half-day.

The NIEER study rates Texas below standard in meeting the required quality benchmarks. When the NIEER quality checklist was applied to Texas pre-kindergarten programs, Texas only met four of the 10 standards. The state met quality indicators in the area of having comprehensive early learning standards, requiring pre-kindergarten teachers to have a bachelor's degree with a specialization in early childhood education, and a requirement for continued annual professional development. Texas did not meet the following quality indicators: maximum class size, a teacher student ratio of 1:10 or better; provision of at least one meal; assistant training; screenings, referrals and support

services; and site monitoring visits (National Institute for Early Childhood Education Research, 2009).

*The Addition of 3-year-old Children in Pre-kindergarten Programs*

A new trend in pre-kindergarten program expansion is to provide access to 3-year-old children (National Institute for Early Childhood Education Research, 2007). A 1992 survey of early childhood education programs showed that only three states provided programs for 3-year-olds, and there were no states that had programs for two year olds (Robinson & Lyon, 1994). In the NIEER 2009 study, the researchers also looked at programs for 3-year-olds, and found that since 2001-02, access for this age group has risen 28%. Across the nation, state pre-kindergarten programs are now serving 5% of at-risk 3-year-old children, up from 3% in 2002. Today, 25 states, including Texas, serve 3-year-old children in their pre-kindergarten programs and in 2008-2009 the enrollment for 3-year-olds remained stable at 5% of the at-risk population (National Institute for Early Childhood Education Research, 2009). Illinois became the first state to commit to serving all of its eligible 3-year-old children, and is now the leading state, serving 19% of its 3-year-olds. The next states to follow are Vermont and New Jersey, serving approximately 15% of their eligible 3-year-olds (National Institute for Early Childhood Education Research, 2009).

In the state of Texas, local districts have the option of providing pre-kindergarten for 3-year-olds. Local districts may open a program for 3-year-olds if they can identify 15 or more eligible students. The eligibility requirements are the same as those for 4-year-olds: economically disadvantaged, limited English proficient, homeless, military and/or in foster care; however, before a district can provide pre-kindergarten service for

3-year-olds, they must first service all eligible 4-year-olds. Districts may service three and 4-year-olds together in the same class (Warren, 2003). In 2008-2009, Texas served 26,504 (4.5%) 3-year-olds in state pre-kindergarten programs (National Institute for Early Childhood Education Research, 2009).

Advocates of preschool view the addition of programs for 3-year-olds as a positive trend, noting that the lack of educational experiences is *evident by age three*. However, the growth of services for 3-year-olds has been minimal, and occurs in only a handful of states when compared to programs for 4-year-olds. Texas currently ranks 13th in providing access to programs for 3-year-olds. Funding is the largest barrier to expanding programs to 3-year-olds. States already are providing the majority of the cost for providing pre-kindergarten for 4-year-olds in order to prepare them to be successful in schools (National Institute for Early Childhood Education Research, 2009).

#### *The Pre-kindergarten Program in San Antonio ISD*

San Antonio Independent School District (SAISD) has operated a pre-kindergarten program for eligible 4-year-old students since the 1985-86 school year. When the 76th Texas Legislature passed Senate Bill 4 in 1999, they included funding to support the expansion of pre-kindergarten programs in the state. San Antonio ISD applied for the initial grants and in the 1999-2000 school year piloted expansion in some of their pre-kindergarten programs from a half-day program to a full-day program. In the next two years the district moved from providing half-day classes to full-day in all of their pre-kindergarten locations. The district also added additional classrooms. The grant funds were used to hire additional teachers and teaching assistants, as well as materials, furniture, and supplies for the additional classrooms. The move to full day was first to



engage at-risk preschool age children in more educational experiences in order to increase their readiness skills for kindergarten, but it also helped parents who were unable to negotiate child care issues with the half-day model. This would allow more children to attend a pre-kindergarten program. Along with the expansion to full-day programs, SAISD began enrolling 3-year-olds to the pre-kindergarten program as a way to not only increase student enrollment but to provide young students with an additional year of preschool. In 2001, SAISD passed a \$126.5 million bond that built stand alone early childhood facilities at 24 elementary-level schools. Today, all 52 elementary schools and nine PK-8 academies offer full day pre-kindergarten programs. Not all campuses offer classes for 3-year-old students as campuses are required to service all eligible 4-year-olds before they are able to enroll 3-year-olds. As per TEA guidelines, 3-year-olds may be serviced in the same classroom as 4-year-old students. Funding for the pre-kindergarten programs is provided through the State of Texas Foundation School Program which provides funding for half-day pre-kindergarten. SAISD has funded the other portion of the day through the pre-kindergarten expansion grant (SAISD, 2009a).

While there is always variance among teachers in program delivery, all SAISD schools are to adhere to the district's curriculum guides as to the content, timeline, and textbooks to be used for content delivery. The district curriculum guides are developed by the curriculum and instruction academic specialists for all grade levels, and all subject areas, including pre-kindergarten. In addition, the SAISD provides professional development to all teachers in the district that is focused on the curriculum guides and common instructional strategies (SAISD, 2009b).

## CHAPTER THREE

### Methods and Procedures

The purpose of this study was to provide information to the subject school district about the academic performance and progress of students who attended the district's pre-kindergarten program for two years, at the ages of three and four, in comparison with students who attended the district's pre-kindergarten program for only one year at the age of four or did not attend pre-kindergarten at all. Secondly, the purpose was to determine if there were significant differences among the groups that supported the cost of providing an additional year of prekindergarten. Data will assist district administrators in evaluating both the academic impact and cost effectiveness of providing a pre-kindergarten program for eligible 3-year-olds.

#### *Research Questions*

1. Are there differences in retention rates among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a). attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
2. Are there differences in identification for Gifted and Talented (GT) programs among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

3. Are there differences in identification for special education programs among San Antonio ISD 2006-07 third graders and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
4. Are there differences in reading development at the end of kindergarten, first grade, and second grade, as measured by the Texas Primary Reading Inventory (TPRI), among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
5. Are there differences in reading development at the end of kindergarten, first grade, and second grade, as measured by the Tejas Lee Spanish Inventory, among San Antonio ISD 2006-07 bilingual third graders and 2007-08 bilingual third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
6. Are there differences in performance scores on the reading TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San

Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

7. Are there differences in performance scores on the reading TAKS test administered in Spanish among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
8. Are there differences in the number of students who were required to take additional administrations of the reading TAKS test in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
9. Are there differences in the number of students who were required to take additional administrations of the reading TAKS test in Spanish among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
10. Are there differences in performance scores on the math TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD

for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

11. Are there differences in performance scores on the math TAKS test administered in Spanish among San Antonio ISD 2006-07 bilingual third graders and 2007-08 bilingual third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?
12. Are there differences in student academic performance and progress among San Antonio ISD 2006-07 third graders and 2007-08 third grades who attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4, which supported the cost of providing an additional year of pre-kindergarten?
13. Are there differences in expenditures for grade retention, and special education among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a pre-kindergarten program?

#### *District Description*

The study took place in the San Antonio Independent School District, located in San Antonio, Texas. San Antonio Independent School District (SAISD) ranks third in student population among the 15 school districts that are entirely or primarily within

Bexar County. SAISD is the 13th largest of the 1,057 school districts in Texas. It encompasses 79 square miles and has a total population of 315,714 (U.S. Census, 2000). Most of the District is within the city limits of San Antonio, but also serves parts of the cities of Olmos Park and Balcones Heights and some unincorporated areas of the county.

San Antonio ISD is an urban district located in South Central Texas. The district is land-locked and is surrounded by growing suburban areas in all directions. The ethnic composition of the district is 2.7% white, 7.3% African American, 89.6% Hispanic, and 0.3% other. The socio-economic makeup of the student population is 92.4% economically disadvantaged based on the number of students who qualify for free or reduced lunch.

At the time of the study the population of students in the pre-kindergarten program was 4,083 out of 53,769 students or 7.6% of total population. There were 939 (23%) 3-year-old students in the program, and 18% of the pre-kindergarten population was in the bilingual program.

#### *Pre-kindergarten Program in SAISD*

Eligibility for the SAISD pre-kindergarten program is based on Texas state eligibility requirements for pre-kindergarten participation, as defined by Texas Education Code, §29.153(a). In order to meet eligibility students must be 3 or 4 on or before September 1st and must reside within the SAISD boundaries. In addition, students must meet one or more of the following criteria: is educationally disadvantaged; is unable to speak and comprehend the English language; is homeless, as defined by 42 U.S.C. § 11302; is the child of an active duty member of the armed forces of the U.S., including the state military forces or a reserve component of the armed forces, who is ordered to

active duty by proper authority; and/or is or ever has been in the conservatorship of the Department of Family Protective Services following an adversary hearing held as provided by § 262.201, Family Code. Educationally disadvantaged pre-kindergarten students are defined by the Texas Education Agency as students eligible to participate in the national free or reduced-price lunch program, as defined by Texas Education Code §29.153(a).

The SAISD pre-kindergarten program is an Early Childhood student centered, developmentally appropriate program that strives to provide young children with the developmental skills necessary to create a strong foundation for future success through a collaborative effort with families, communities, and related agencies. All SAISD pre-kindergarten teachers are required to have a minimum of a bachelor's degree and be certified in early childhood education. SAISD pre-kindergarten teachers are required to use the district's curriculum guides for pre-kindergarten when planning and delivering lessons.

SAISD pre-kindergarten classes are full-day and follow the district school calendar of 176 days of instruction. All 52 elementary schools (PK-5) and all nine academies (PK-8) offer pre-kindergarten programs; however, not all campuses offer programs for 3-year-olds as 4-year-old students have priority. Three-year-old classes vary from year to year at each campus based on space availability.

### *The Population of the Study*

Upon approval from the San Antonio ISD, the researcher used the district's iDataPortal system, Crystal Data System, and the Texas Public Education Information Management System (PEIMS) to identify the students enrolled in third grade in 2006-2007

and students enrolled in third grade in 2007-2008. Based on this information, the researcher first removed all students from the study who had not been continuously enrolled in SAISD from their beginning point of entrance to schooling through third grade. Next, the researcher reviewed the revised list to further identify the students who attended pre-kindergarten in San Antonio ISD as 3-year-olds in 2001-2002 and in 2002-2003; as 3-year-olds in 2002-2003 and 2003-2004; and as kindergartners in 2003-2004 and 2004-2005. Identified students were then placed into one of six groupings for the study.

Group 1-A: began school as a 3-year-old in 2001-2002; continued as a 3-year-old in 2002-2003; continued in SAISD through kindergarten, first grade, and second grade; and took the TAKS exams in 2006-2007 as a third grader. This assumes that they were not retained between kindergarten and third grade.

Group 1-B: began school as a 3-year-old in 2002-2003; continued in SAISD through kindergarten, first grade, and second grade; and took the TAKS exams in 2006-2007 as a third grader. This assumes that they were not retained between kindergarten and third grade.

Group 1-C: did not attend pre-kindergarten in SAISD; entered school as a kindergarten student in 2003-04; continued through SAISD as a first grader and second grader; and took the TAKS exam as a third grader in 2006-2007. This assumes that they were not retained between kindergarten and third grade.

Group 2-A: began school as a 3 year old in 2002-03; continued as a 3-year-old in 2003-04; continued in SAISD through kindergarten, first grade, and second grade; and took the TAKS exams in 2007-08 as a third grader. This assumes that they were not retained between kindergarten and third grade.



Group 2-B: began school as a 3-year-old in 2003-04; continued in SAISD through kindergarten, first grade, and second grade; and took the TAKS exams in 2007-08 as a third grader. This assumes that they were not retained between kindergarten and third grade.

Group 2-C: did not attend pre-kindergarten in SAISD; entered school as a kindergarten student in 2004-05; continued through SAISD as a first grader and second grader; and took the TAKS exam as a third grader in 2007-08. This assumes that they were not retained between kindergarten and third grade.

The number in each group was limited by students who met the criteria for each group and were still in attendance in SAISD. Table 1 shows the numbers in each group:

Table 1

*Student Participants by Group*

Group	Total Enrolled In Third Grade	Total Continuously Enrolled in SAISD	Attended PK Two Years	Attended PK One Year	Attended Kindergarten
1: 2006 - 2007	4,239	1,563	357	754	452
2: 2007- 2008	4,454	1,699	388	922	389

*Procedures for the Collection of Data*

Once the six study groups had been identified the researcher used the district's iDataPortal system and Crystal Data System to study the groups of student. The SAISD iDataPortal and the SAISD Crystal Data System are SAISD electronic databases that store and provide district, campus, program, and student data. The researcher used these

databases to collect participant information in the following areas: retention, gifted and talented program identification, and special education program identification. In addition, the database systems were used to collect TAKS performance results in mathematics and for each administration in reading for the 2007 group of third graders and the 2008 group of third grade students.

For information regarding the subject groups' reading performance in kindergarten through second grade, the researcher accessed the mClass data system for students' historical performance data on the Texas Primary Reading Inventory and/or Tejas Lee Reading Inventory.

For purposes of student academic performance the researcher reviewed student performance on the following evaluation instruments:

- *The Texas Academic Knowledge and Skills (TAKS):* The Texas Assessment of Academic Knowledge and Skills or TAKS, is the current assessment being used in the state of Texas and has been administered to students in grades 3-10 since the 2002-03 school year. TAKS is a criterion-referenced test administered to students in grades 3-11 in the areas of reading, English language arts, math, writing, science, and social studies. The TAKS tests are based on the required state curriculum or Texas Essential Knowledge and Skills (TEKS). The results of the state assessments are also used to determine accountability ratings for both campuses and districts.

Students in third grade are tested in reading and math only. The third grade test is administered in English or Spanish (Texas Education Agency, 2009). A significant part of the Texas assessment program is the Student Success Initiative (SSI) which was put in

place by the 76th Texas Legislature in 1999 and first applied in 2003. The SSI requires that students pass specific TAKS assessments in order to advance to the next grade level. Students in third grade are required to meet the passing standard in reading in order to be promoted to fourth grade; students in fifth grade must pass reading and mathematics to be promoted to sixth grade; and students in eighth grade must pass reading and mathematics to be promoted to ninth grade. Students in these grades are provided three opportunities to take the designated test. If they still have not mastered the identified TAKS assessment, then a Grade Placement Committee (GPC) comprised of a school administrator, the student's teacher, and the parent may determine promotion. By law, students who fail to meet the passing standard on any one of the required promotion TAKS must be provided remedial instruction (Texas Education Agency, 2008e).

Third grade is identified as a pivotal point for students, because if they do not have a mastery of basic skills in literacy and mathematics, then they have a much greater risk for school failure (Brooks-Gunn & Markman, 2005).

- *The Texas Primary Reading Inventory (TPRI)*: The TPRI is a research-based reading assessment that is administered individually three times a year to students in kindergarten, first grade, second grade, and third grade. The TPRI assess all five domains of reading, and is a valid and reliable assessment that provides teachers with information about a student's reading development. Educators use the assessment results to target instruction based on individual student needs (Texas Education Agency, 2009).
- *The Tejas Lee*: The Tejas Lee is a research-based Spanish reading assessment that is administered individually three times a year to students in kindergarten,

first grade, and second grade. The Tejas Lee assesses all five domains of reading, and is a valid and reliable assessment that provides teachers with information about a student's reading development. Educators use the assessment results to target instruction based on individual student needs (Texas Education Agency, 2009).

In order to study the cost benefits of the program, the researcher procured budget and expenditure reports from the San Antonio ISD Finance Department, PEIMS, and TEA AEIS district reports for the following years: 2001-02, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07, and 2007-08. Funding sources analyzed included local funds, federal funds (Title 1), state funds (Pre-Kinder Grant, State Compensatory), and special education funds. These reports were used to analyze the costs of the pre-kindergarten program, as well as the costs per student participant for the pre-kindergarten program, retention, remedial programs, and special education.

### *Research Design*

This study was designed to determine if there were differences between the number of years students participate in the district's pre-kindergarten program and their academic development and success as they progress from kindergarten through third grade. This study also analyzed the costs of providing the pre-kindergarten program, as well as the costs for retention, remediation, and special education to determine if there was a cost benefit for the district. This was a study of existing data. The study had two groups of students, with three subgroups in each group. Group 1 consisted of students who were in third grade during the 2006-07 school year, and Group 2 were students in third grade during the 2007-08. Within each group there were three subgroups:

a) attended prekindergarten for two years at ages three and four; b) attended pre-kindergarten for one year at the age of four; or c) did not attend pre-kindergarten. Students that were part of the study were those that once enrolled in SAISD, had continuously remained enrolled in SAISD schools.

Once students were identified and grouped according to criteria, then their individual academic performance was collected and analyzed to determine if there were significant differences among the groups and subgroups. Specifically, participant information was studied to determine the following:

- number and percentage in each group and subgroup that were retained at the end of kindergarten, first grade, second grade, and third grade
- number and percentage in each group and subgroup that were identified for speech therapy and/or special education programs in prekindergarten, kindergarten, first grade, second grade, and third grade
- number and percentage in each group and subgroup that were developed on end of year reading benchmarks as assessed on the TPRI/Tejas Lee in kindergarten, first grade and second grade
- number and percentage in each group and subgroup that scored at the met standard performance level (2,100+) on the first administration of the third grade TAKS reading test administered in March (2007 TAKS for group 1; 2008 TAKS for group 2).
- number and percentage in each group and subgroup that scored at the met standard performance level (2,100+) on the second administration of the third

grade TAKS reading test administered in April (2007 TAKS for group 1; 2008 TAKS for group 2).

- number and percentage in each group and subgroup that scored at the met standard performance level (2,100+) on the third administration of the third grade TAKS reading test administered in June (2007 TAKS for group 1; 2008 TAKS for group 2).
- number and percentage in each group and subgroup that scored at the met standard performance level (2,100+) of the third grade TAKS mathematics test administered in March (2007 TAKS for group 1; 2008 TAKS for group 2).
- number and percentage in each group and subgroup that scored at the commended performance level (2,400+) on the third grade TAKS reading test administered in April (2007 TAKS for group 1; 2008 TAKS for group 2).
- number and percentage in each group and subgroup that scored at the commended performance level (2,400+) on the third grade TAKS mathematics test administered in April (2007 TAKS for group 1; 2008 TAKS for group 2)
- number and percentage in each group and subgroup that moved and were not in attendance in SAISD by third grade.

In order to identify cost benefits of the pre-kindergarten program the following expenditures were analyzed:

- 2000-01: the start-up costs associated with the expansion of the pre-kindergarten program.
- 2001-02: cost of pre-kindergarten program and cost per program participant.
- 2002-03: cost of pre-kindergarten program and cost per program participant.

- 2003-04: cost of pre-kindergarten program and cost per program participant; and cost of special education per student.
- 2004-05: annual cost per student (kindergarten) to calculate cost of retention; cost of special education per student.
- 2005-06: annual cost per student (kindergarten, first grade) to calculate cost of retention; cost of special education per student; cost of remedial program and/or interventions.
- 2006-07: annual cost per student (kindergarten, first grade, second grade) to calculate cost of retention; cost of special education per student; cost of remedial program and/or interventions.
- 2007-08: annual cost per student (kindergarten, first grade, second grade, third grade) to calculate cost of retention; cost of special education per student; cost of remedial program and/or interventions.

#### *Procedures for Analysis of Data*

The raw data and student passing rates on academic measures were analyzed using the Kruskal-Wallis analysis of variance (ANOVA) on ranks to determine the effect of each independent variable on the dependent variable. The Kruskal-Wallis ANOVA on ranks is a non-parametric test used to compare three or more unpaired groups. For this study the number of years students participated in the SAISD pre-kindergarten program served as the independent variable.

The dependent variables were as follows:

- the number of retentions in kindergarten, first grade, second grade, and third grade for each group and subgroup are the dependent variable,

- number of students identified for special education programs for each group and subgroup,
- number of students in each group and subgroups that is developed on each TPRI indicator and in all areas at the end of year in kindergarten, first grade, and second grade,
- number of students meeting the met standard performance scale score on the third grade reading TAKS test,
- number of students meeting the met standard performance scale score on the third grade mathematics TAKS test, and
- number of students who needed to take additional administrations of the third grade TAKS reading test.

The ANOVA on ranks was performed to determine the effect, if any, of participation in two years, one year, or no years, in the San Antonio Independent School District's pre-kindergarten program. The results were computed in an H-value to determine if the sample means were statistically significant. The significance level for the data analysis was set at  $p \leq .05$ .

When the Kruskal-Wallis ANOVA showed an H-value that indicated a significant difference among the groups, the Dunn's multiple comparison post test was applied. The purpose of using the Dunn's test was to identify among which pair of groups the differences were. The significance level for the data analysis using the Dunn's test was set at  $p \leq .05$ .



The null hypothesis that there was no difference between the means was computed using SigmaPlot® for Windows, Version 11.0, a statistical software package, with alpha being set at .05.

## CHAPTER FOUR

### Analysis of Data

The following chapter shows the analysis of data collected in the study. The purpose of the study was to provide the participating district with data that will assist district officials in evaluating the academic impact, cost effectiveness, and other benefits of providing a pre-kindergarten program for eligible 3-year-olds.

Data were collected from a review of existing student records and district financial reports. The data and results from the quantitative statistical analysis are organized and presented by each research question. Students identified for the study were limited to those who met the criteria for each group and must have had continuous enrollment in SAISD from their entry point into school. Table 2 shows the total number of participants studied in each group.

Table 2

*Student Participants by Group – Total Participants*

Group	Total Enrolled In Third Grade (By Year)	Total Continuously Enrolled in SAISD	Attended PK Two Years Group A	Attended PK One Year Group B	Attended Kindergarten Group C
1: 2006-2007	4,239	1,563	357	754	452
2: 2007-2008	4,454	1,699	388	922	389
Total of Both Groups	8,693	3,262	745	1,676	841

Table 2 shows the numbers of students by group that were included in this study. Group 1 are students who were enrolled in third grade in the 2006-2007 school. PEIMS data for SAISD shows that there were 4,239 students enrolled in third grade in 2006-2007 and 4,454 students enrolled in third grade in 2007-2008. The total number of students enrolled in third grade for both years was 8,693. From the overall total, 3,262 students were identified as having entered school in either pre-kindergarten or kindergarten and had been continuously enrolled in SAISD since entering school.

These 3,262 students were divided into three groups based on the year they entered school. The groups are as follows:

Group A: Students in this group began school as a pre-kindergarten 3-year-old in either 2001-2002 or 2002-2003, and were continuously enrolled in SAISD completing two years of pre-kindergarten, kindergarten, first grade, second grade, and third grade. This assumes that they were not retained between kindergarten and third grade. There were a total of 745 students identified in this group. Three hundred fifty-seven took the third grade TAKS in 2006-2007, and 388 took the third grade TAKS in 2007-2008.

Group B: Students in this group began school as a pre-kindergarten 3-year-old in either 2002-2003 or 2003-2004, and were continuously enrolled in SAISD completing one year of pre-kindergarten, then kindergarten, first grade, second grade, and third grade. This assumes that they were not retained between kindergarten and third grade. There were a total of 1,676 students identified in this group. Seven hundred fifty-four took the third grade TAKS in 2006-2007, and 922 took the third grade TAKS in 2007-2008.

Group C: Students in this group did not attend pre-kindergarten in SAISD. They entered school as a kindergarten student in either 2003-2004 or 2004-2005. They continued through SAISD as a first grader and second grader, and took the TAKS exam as a third grader in 2006-2007, or 2007-2008. This assumes that they were not retained between kindergarten and third grade. There were a total of 841 students identified in this group. Four hundred fifty-two students took the third grade TAKS in 2006-2007 and 389 took the TAKS in 2007-2008.

Once the students were identified by group, student records were reviewed to collect data in response to each of the 13 research questions. The data and statistical analysis are presented by research question.

### *Research Question 1*

The first research question asked: Are there differences in retention rates among San Antonio ISD 2006-07 and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of three and four; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of four; or c) did not attend a pre-kindergarten program?

Table 3 shows the number of students retained between kindergarten and third grade for each of the three study groups. In group A there were a total of 101 students retained between kindergarten and third grade. In group B there were a total of 255 students retained. In group C there were a total of 54 students retained.

Table 3

*Retention Rates of Study Participants by Group*

Group	Group Total	Total # of Students Retained	Number Retained			
			K	First Grade	Second Grade	Third Grade
A: 2 years of PK (ages 3 and 4)	745	101	6	37	31	27
B: 1 year of PK (age 4)	1,676	255	8	99	82	66
C: No PK	839	54	2	24	12	16

Table 4 shows the results of the statistical analysis applied to the retention data for the three study groups. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 39.224 with 2 degrees of freedom. The differences in the median values among the three study groups were greater than would be expected by chance. There was a statistically significant difference ( $p = <0.001$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differed from the others, Dunn's test, a multiple comparison procedure, was applied to each pair (Table 5).

Table 5 shows the results of the Dunn's post-test analysis. In the comparison between group B and group C, the correlation coefficient (Q) was 3.570, which was statistically significant. The comparison between group B and group A produced a Q of 0.675, which was not statistically significant. The comparison between group A and group C produced a Q of 2.409, which was statistically significant.

Based on the Dunn's multiple comparison test, there was a statistical difference in retention numbers between students who attended pre-kindergarten, either for two-years or one-year, and those who did not attend pre-kindergarten.

Table 4

*Comparison of Retention Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A 2 years of PK (ages 3 and 4)	745	0.000	0.000	0.000	39.224 with 2 degrees of freedom	0.001
B 1 year of PK (age 4)	1,676	0.000	0.000	0.000		
C No PK	839	0.000	0.000	0.000		

Table 5

*All Pairwise Multiple Comparison Procedures (Dunn's Method) of Retention Numbers among Study Groups*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
B vs. C	142.120	3.570	Yes
B vs. A	27.994	0.675	No
A vs. C	114.126	2.409	Yes

*Research Question 2*

The second research question asked: Are there differences in the identification of Gifted and Talented students among San Antonio ISD 2006-07 and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of three

and four; b) attended pre-kindergarten in San Antonio ISD for one year, at the age of four; or c) did not attend a pre-kindergarten program?

Table 6 shows the number of students identified as Gifted and Talented (GT) by the end of third grade for each of the three study groups. In group A there were a total of 97 students identified as GT. In group B there were 200 students identified as GT, and in group C there were 105 students identified as GT.

Table 6

*Gifted and Talented (GT) Identification Rates of Study Participants by Group*

Group	Group Total	Total # of Students Identified GT
A: 2 years of PK (ages 3 and 4)	745	97
B: 1 year of PK (age 4)	1,676	200
C: No PK	839	105

Table 7 shows the results of the statistical analysis applied to the GT identification data for the three study groups. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.562 with 2 degrees of freedom. The differences in the median values among the three study groups were not great enough to exclude the possibility that the difference was due to random sampling variability. There was not a statistically significant difference ( $p = 0.755$ ) among the groups in identification of GT students.

Table 7

*Comparison of GT Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	745	0.000	0.000	0.000	0.562 with 2 degrees of freedom	0.755
B: 1 year of PK (age 4)	1,676	0.000	0.000	0.000		
C: No PK	839	0.000	0.000	0.000		

*Research Question 3*

The third research question asked: Are there differences in identification for special education programs among San Antonio ISD 2006-07 and 2007-08 third graders who: a) attended pre-kindergarten in San Antonio ISD for two years, at the ages of three and four, b) attended pre-kindergarten in San Antonio ISD for one year, at the age of four, or c) did not attend a pre-kindergarten program?

Table 8 shows the number of students identified for special education by the end of third grade for each of the three study groups. In group A there were a total of 54 students identified for Special Education, in group B there were 95 students identified, and in group C there were 54 students identified for Special Education.

Table 9 shows the results of the statistical analysis applied to the special education identification data for the three study groups. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.354 with 2 degrees of freedom. The differences in the median values among the three study groups were not great enough to exclude the possibility that the difference was due to random sampling variability.



Therefore, there was not a statistically significant difference ( $p = 0.308$ ) among the groups in identification of students who qualified for special education.

Table 8

*Special Education Identification Rates of Study Participants by Group*

Group	Group Total	Total # of Students Identified Sp. Ed.
A: 2 years of PK (ages 3 and 4)	745	54
B: 1 year of PK (age 4)	1,676	95
C: No PK	839	54

Table 9

*Comparison of Special Education Data of the Three Study Groups using a Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	745	0.000	0.000	0.000	2.354	0.308
B: 1 year of PK (age 4)	1,676	0.000	0.000	0.000	with 2 degrees of freedom	
C: No PK	839	0.000	0.000	0.000		

*Research Question 4*

The fourth question asked: Are there differences in reading development at the end of kindergarten, first grade, and second grade, as measured by the Texas Primary Reading Inventory (TPRI), among San Antonio ISD 2006-07 and 2007-08 third grades who: a) attended pre-kindergarten in San Antonio ISD for two-years, at the ages of three

and four; b) attended pre-kindergarten in San Antonio ISD for one-year, at the age of four; or c) did not attend a pre-kindergarten program?

Table 10 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the kindergarten end-of-year TPRI. On the phonemic awareness skill assessment, 391 students were developed in group A, 811 developed in group B, and 427 developed in group C. On the graphophonemic knowledge skill assessment, there were 530 students developed in group A, 1,133 in group B, and 646 students developed in group C. On the listening comprehension skill assessment, there were 466 students developed in group A, 970 students developed in group B, and 610 students developed in group C. In the category developed in all skill areas, group A had 353 students developed, group B had 707, and group C had 382 students developed in all skill areas.

Table 10

*Kindergarten End-of-year TPRI Results Depicting Number of Students Developed in Each Skill Area*

Groups	Group Total	Kindergarten: End-of-year TPRI Results Showing Number of Students Developed in each Category			
		PH	GK	LC	DA
A: 2 years of PK (ages 3 and 4)	590	391	530	466	353
B: 1 year of PK (age 4)	1,228	811	1,133	970	707
C: No PK	706	427	646	610	382

*Note:* PH = Phonemic Awareness; GK = Graphophonemic Knowledge; LC = Listening Comprehension; DA = Developed in all categories

To determine if there was a statistically significant difference among the study groups on the results of the kindergarten end-of-year TPRI, an ANOVA on ranks was conducted on the results of each assessed skill area. The next four tables show the findings of the statistical analysis.

Table 11 shows the findings of the statistical analysis applied to the results of the end-of-year kindergarten TPRI phonemic awareness skill assessment. The ANOVA on ranks produced an H value of 7.194 with 2 degrees of freedom. The differences in the median values among the three study groups were greater than would be expected by chance. Therefore, there was a statistically significant difference ( $p = 0.027$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's test, a multiple comparison procedure, was applied to each pair (Table 12).

Table 11

*Statistical Analysis of Students Developed in Phonemic Awareness on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	0.000	1.000	7.194 with 2 degrees of freedom	0.027
B: 1 year of PK (age 4)	1,228	1.000	0.000	1.000		
C: No PK	705	1.000	0.000	1.000		

Table 12 shows the results of the Dunn's test. In the comparison between group A and group C, the correlation coefficient (Q) was 1.814, which was not statistically significant. And the comparison between group B and group C produced a Q of 2.058

which did not test and therefore was not statistically significant. And the comparison between group A and group B produced a Q of 0.0791 which was not statistically significant, but was tending towards a significant finding.

Table 12

*Comparison of Kindergarten End-of-year TPRI Phonemic Awareness Assessment Results using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
A vs. C	73.743	1.814	No
A vs. B	2.887	0.0791	Did Not Test
B vs. C	70.856	2.058	Did Not Test

Table 13 shows the findings of the statistical analysis applied to the results of the end-of-year kindergarten TPRI graphophonemic knowledge skill assessment. The ANOVA on ranks produced an H value of 3.026 with 2 degrees of freedom. The differences in the median values among the three study groups was not great enough to exclude the possibility that the difference was due to random sampling variability. There was not a statistically significant difference ( $p = 0.220$ ) in the number of students in each group that were developed in graphophonemic awareness.

Table 14 shows the findings of the statistical analysis applied to the results of the end-of-year kindergarten TPRI listening comprehension skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 16.731 with 2 degrees of freedom. The differences in the median values among the three study groups was greater than would be expected by chance, indicating there was a statistically

significant difference ( $p = <0.001$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's post-test, a multiple comparison procedure, was applied to each pair (Table 15).

Table 13

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	3.026	
B: 1 year of PK (age 4)	1228	1.000	1.000	1.000	with 2 degrees of freedom	0.220
C: No PK	705	1.000	1.000	1.000		

Table 14

*Statistical Analysis of Students Developed in Listening Comprehension on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	16.731	
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000	with 2 degrees of freedom	0.001
C: No PK	705	1.000	1.000	1.000		

Table 15 shows the results of the Dunn's analysis. In the comparison between group C and group A the correlation coefficient (Q) was 2.297 which was not statistically

significant. The comparison between group C and group B produced a Q of 2.530, which did not test, and therefore, was not statistically significant. The comparison between group B and group A produced a Q of 0.171, which did not test, and therefore was not statistically significant.

Based on Dunn's multiple comparison test, it was concluded that while the one-way analysis of ranks produced a statistically significant result among the groups on the kindergarten TPRI listening comprehension assessment, the multiple comparison test could not determine where and if there was a statistically significant difference between the groups. Between group C (no prekindergarten) and group A (two years of prekindergarten) there was not a statistical difference. However, between group C (no prekindergarten) and group B (one year of prekindergarten), as well as between group B (one year of prekindergarten) and group A (two years of prekindergarten) the multiple comparison test could not determine if there was a statistically significant difference in the area of listening comprehension.

Table 16 shows the findings of the statistical analysis of students developed in all skill areas on the end-of-year Kindergarten TPRI. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 4.351 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.114$ ) in the number of students in each group that were developed in all skill areas.

Table 15

*Comparison of Kindergarten End-of-year TPRI Listening Comprehension Assessment Results using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
C vs. A	93.350	2.297	No
C vs. B	87.096	2.530	Did Not Test
B vs. A	6.254	0.171	Did Not Test

Table 16

*Statistical Analysis of Students Developed in All Skill Areas on the Kindergarten End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	0.000	1.000	4.351	0.114
B: 1 year of PK (age 4)	1228	1.000	0.000	1.000	with 2 degrees of freedom	
C: No PK	705	1.000	0.000	1.000		

The next set of data and assessment results looks at the students in each of the three study groups and how they performed on the end-of-year TPRI in first grade. Table 17 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the first grade end-of-year TPRI. On the phonemic awareness skill assessment, 515 students were developed in group A, 1,106 students developed in group B, and 639 were developed in group C. On the graphophonemic knowledge skill assessment, there were 538 students developed in group

A, 1,100 in group B, and 662 students developed in group C. On the reading comprehension skill assessment, there were 526 students developed in group A, 1,099 students developed in group B, and 631 students developed in group C. In the category developed in all skill areas, group A had 487 students developed, group B had 1,008, and group C had 597 students developed in all skill areas.

Table 17

*First Grade End-of-year TPRI Results Depicting Number of Students Developed in Each Skill Area*

Group	Group Total	First Grade: End-of-year TPRI Results Showing Number of Students Developed in each Category			
		PH	GK	RC	DA
A: 2 years of PK (ages 3 and 4)	590	515	538	526	487
B: 1 year of PK (age 4)	1228	1106	1100	1099	1008
C: No PK	705	639	662	631	597

*Note:* PH = Phonemic Awareness; GK = Graphophonemic Knowledge; RC = Reading Comprehension; DA = Developed in all categories

To determine if there was a statistically significant difference among the study groups on the results of the first grade end-of-year TPRI, a one-way analysis of variance on ranks was conducted on the results of each assessed skill area, and on the results of the developed in all areas category. The next four tables show the findings of the statistical analysis completed on the first grade end-of-year TPRI results.

Table 18 shows the findings of the statistical analysis applied to the results of the end-of-year Kindergarten TPRI phonemic awareness skill assessment. The Kruskal-



Wallis one-way analysis of variance on ranks produced an H value of 4.242 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.120$ ) among the three groups in the area of phonemic awareness.

Table 18

*Statistical Analysis of Students Developed in Phonemic Awareness on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	4.242	
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000	with 2 degrees of freedom	0.120
C: No PK	705	1.000	1.000	1.000		

Table 19 shows the findings of the statistical analysis applied to the results of the end-of-year first grade TPRI graphophonemic knowledge skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 9.684 with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. There is a statistically significant difference ( $p = 0.008$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 20).

Table 19

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	9.684	
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000	with 2 degrees of freedom	0.008
C: No PK	705	1.000	1.000	1.000		

Table 20 shows the results of the Dunn’s analysis. In the comparison between group C and group B the correlation coefficient (Q) was 1.533, which was not statistically significant. The comparison between group C and group A produced a Q of 0.798 which did not test and therefore was not statistically significant. The comparison between group A and group B produced a Q of 0.557 which did not test and therefore was not statistically significant.

Based on the Dunn’s Method multiple comparison test, it is concluded that while the one-way analysis of ranks produced a statistically significant result among the groups on the first grade TPRI graphophonemic knowledge assessment, the multiple comparison test could not determine where there was a statistically significant difference between the groups. Between group C (no prekindergarten) and group B (one year of prekindergarten) there was not a statistical difference. However, between group C (no prekindergarten) and group A (two years of prekindergarten), as well as between group B (one year of prekindergarten) and group A (two years of prekindergarten) the multiple comparison test

could not determine if there was a statistically significant difference in the area of graphophonemic knowledge.

Table 20

*Comparison of First Grade End-of-year TPRI Graphophonemic Knowledge Assessment Results using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
C vs. B	52.760	1.533	No
C vs. A	32.451	0.798	Did Not Test
A vs. B	20.309	0.557	Did Not Test

Table 21 shows the findings of the statistical analysis applied to the results of the end-of-year first grade TPRI reading comprehension skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 16.731 with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. There is a statistically significant difference ( $p = <0.001$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 22).

Table 22 shows the results of the Dunn's analysis on the first grade TPRI reading comprehension results. In the comparison between group C and group A, the correlation coefficient (Q) was 2.297, which was not statistically significant. The comparison between group C and group B produced a Q of 2.530, which did not test. The comparison between group B and group A produced a Q of 0.171 which did not test.

Table 21

*Statistical Analysis of Students Developed in Reading Comprehension on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	16.731 with 2 degrees of freedom	0.001
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000		
C: No PK	705	1.000	1.000	1.000		

Based on the Dunn’s Method multiple comparison test, it is concluded that while the one-way analysis of ranks produced a statistically significant result among the groups on the first grade TPRI reading comprehension assessment, the multiple comparison test could not determine where there was a statistically significant difference between the groups. Between group C (no prekindergarten) and group A (two years of prekindergarten) there was not a statistical difference. However, between group C (no prekindergarten) and group B (one year of prekindergarten), as well as between group B (one year of prekindergarten) and group A (two years of prekindergarten) the multiple comparison test could not determine if there was a statistically significant difference in the area of reading comprehension.

Table 23 shows the findings of the statistical analysis of students developed in all skill areas on the end-of-year first grade TPRI. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 1.961 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is

not a statistically significant difference ( $p = 0.375$ ) in the number of students in each group that were developed in all skill areas.

Table 22

*Comparison of First Grade End-of-year TPRI Reading Comprehension Assessment Results using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance $p < 0.05$
C vs. A	93.350	2.297	No
C vs. B	87.096	2.530	Did Not Test
B vs. A	6.254	0.171	Did Not Test

Table 23

*Statistical Analysis of Students Developed in All Skill Areas on the First Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	1.961	0.375
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000	with 2 degrees of freedom	
C: No PK	705	1.000	1.000	1.000		

The next set of data and assessment results looks at the students in each of the three study groups and how they performed on the end-of-year TPRI in second grade. Table 24 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the second grade end-of-year TPRI. The second grade TPRI does not assess students on phonemic awareness.

On the graphophonemic knowledge skill assessment, there were 401 students developed in group A, 874 developed in group B, and 503 students developed in group C. On the reading comprehension skill assessment, there were 480 students developed in group A, 1,022 students developed in group B, and 550 students developed in group C. In the developed in all skill areas category, group A had 339 students developed, group B had 773, and group C had 438 students developed in all skill areas.

Table 24

*Second Grade End-of-year TPRI Results Depicting Number of Students Developed in Each Skill Area*

Group	Group Total	Second Grade: End-of-year TPRI Results Showing Number of Students Developed in each Category			
		PH	GK	RC	DA
A: 2 years of PK (ages 3 and 4)	590	Not tested	401	480	339
B: 1 year of PK (age 4)	1,228	Not tested	874	1,022	773
C: No PK	705	Not tested	503	550	438

*Note:* PH = Phonemic Awareness (not tested on second grade TPRI); GK = Graphophonemic Knowledge; RC = Reading Comprehension; DA = Developed in all categories

To determine if there was a statistically significant difference among the study groups on the results of the second grade end-of-year TPRI, a one-way analysis of variance on ranks was conducted on the results of each assessed skill area, and on the results of the developed in all areas category. The next three tables show the findings of the statistical analysis completed on the second grade end-of-year TPRI results.

Table 25 shows the findings of the statistical analysis applied to the results of the end-of-year second grade TPRI graphophonemic skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.248 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.325$ ) among the three groups in the area of graphophonemic knowledge.

Table 25

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	2.248 with 2 degrees of freedom	0.325
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000		
C: No PK	705	1.000	1.000	1.000		

Table 26 shows the findings of the statistical analysis applied to the results of the end-of-year second grade TPRI reading comprehension skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 8.877 with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. There is a statistically significant difference ( $p = 0.012$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 27).

Table 26

*Statistical Analysis of Students Developed in Reading Comprehension on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	8.877	
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000	with 2 degrees of freedom	0.012
C: No PK	705	1.000	1.000	1.000		

Table 27 shows the results of the Dunn’s analysis on the second grade TPRI reading comprehension results. In the comparison between group B and group C, the correlation coefficient (Q) was 2.014, which was not statistically significant. The comparison between group B and group A produced a Q of 0.646, which did not test. And the comparison between group A and group C produced a Q of 1.125 which did not test.

Based on the Dunn’s Method multiple comparison test, it is concluded that while the one-way analysis of ranks produced a statistically significant result among the groups on the second grade TPRI reading comprehension assessment, the multiple comparison test could not determine where there was a statistically significant difference between the groups. Between group B (one year of prekindergarten) and group C (no prekindergarten), there was not a statistically significant difference. However, between group B (one year of prekindergarten) and group A (two years of prekindergarten), as well as between group A (two years of prekindergarten) and group C (no



prekindergarten), the multiple comparison test could not determine if there was a statistically significant difference in the area of reading comprehension.

Table 27

*Comparison of Second Grade End-of-year TPRI Reading Comprehension Assessment Results using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
B vs. C	69.310	2.014	No
B vs. A	23.575	0.646	Did Not Test
A vs. C	45.735	1.125	Did Not Test

Table 28 shows the findings of the statistical analysis of students developed in all skill areas on the end-of-year second grade TPRI. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 5.210 with 2 degrees of freedom.

Table 28

*Statistical Analysis of Students Developed in All Skill Areas on the Second Grade End-of-year TPRI using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	0.000	1.000	5.210 with 2 degrees of freedom	0.074
B: 1 year of PK (age 4)	1,228	1.000	0.000	1.000		
C: No PK	705	1.000	0.000	1.000		

The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability; there is not a statistically significant difference ( $p = 0.074$ ) in the number of students in each group that were developed in all skill areas on the second grade end-of-year TPRI.

#### *Research Question 5*

The fifth research question asked: Will there be differences in reading development at the end of Kindergarten, first grade, and second grade, as measured by the Tejas Lee Spanish Reading Inventory, among San Antonio ISD 2006-07 and 2007-08 bilingual third graders who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

Table 29 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the kindergarten end-of-year Tejas Lee Spanish Reading Inventory (Tejas Lee, 2010). On the phonemic awareness skill assessment, 141 students were developed in group A, 398 developed in group B, and 122 developed in group C. On the graphophonemic knowledge skill assessment, there were 143 students developed in group A, 404 in group B, and 122 students developed in group C. On the listening comprehension skill assessment, there were 123 students developed in group A, 376 students developed in group B, and 106 students developed in group C. In the category developed in all skill areas, group A had 121 students developed, group B had 372, and group C had 103 students developed in all skill areas.

Table 29

*Kindergarten End-of-year Tejas Lee Results Depicting Number of Students Developed in Each Skill Area*

Group	Group Total	Kindergarten: End-of-year Tejas Lee Results Showing Number of Students Developed in each Category			
		PH	GK	LC	DA
A: 2 years of PK (ages 3 and 4)	156	141	143	123	121
B: 1 year of PK (age 4)	448	398	404	376	372
C: No PK	135	122	122	106	103

*Note:* PH = Phonemic Awareness; GK = Graphophonemic Knowledge; LC = Listening Comprehension; DA = Developed in all categories

To determine if there was a statistically significant difference among the study groups on the results of the Kindergarten end-of-year Tejas Lee, a one-way analysis of variance on ranks was conducted on the results of each assessed skill area, and on the results of the developed in all areas category. The next four tables show the findings of the statistical analysis of each skill area.

Table 30 shows the findings of the statistical analysis applied to the results of the end-of-year Kindergarten Tejas Lee phonemic awareness skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 4.323 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.115$ ).

Table 30

*Statistical Analysis of Students Developed in Phonemic Awareness on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	4.323	
B: 1 year of PK (age 4)	448	1.000	1.000	1.000	with 2 degrees of freedom	0.115
C: No PK	135	1.000	1.000	1.000		

Table 31 shows the findings of the statistical analysis applied to the results of the end-of-year Kindergarten Tejas Lee graphophonemic knowledge skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.303 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference (p = 0.859).

Table 31

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	0.000	1.000	0.303	
B: 1 year of PK (age 4)	1,228	1.000	0.000	1.000	with 2 degrees of freedom	0.859
C: No PK	705	1.000	0.000	1.000		

Table 32 shows the findings of the statistical analysis applied to the results of the end-of-year Kindergarten Tejas Lee graphophonemic knowledge skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 3.257 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.196$ ).

Table 32

*Statistical Analysis of Students Developed in Listening Comprehension on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	590	1.000	1.000	1.000	3.257 with 2 degrees of freedom	0.196
B: 1 year of PK (age 4)	1,228	1.000	1.000	1.000		
C: No PK	705	1.000	1.000	1.000		

Table 33 shows the findings of the statistical analysis of the number of students in each group who were developed in all skill areas on the end-of-year Kindergarten Tejas Lee. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 4.220 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.121$ ).

Table 33

*Statistical Analysis of Students Developed in All Skill Areas on the Kindergarten End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	590	1.000	0.000	1.000	4.220	
B: 1 year of PK (age 4)	1,228	1.000	0.000	1.000	with 2 degrees of freedom	0.121
C: No PK	705	1.000	0.000	1.000		

Table 34 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the first grade end-of-year Tejas Lee Spanish Reading Inventory (Tejas Lee, 2010). On the phonemic awareness skill assessment, 139 students were developed in group A; 403 developed in group B; and 126 developed in group C. On the graphophonemic knowledge skill assessment, there were 141 students developed in group A; 419 in group B; and 123 students developed in group C. On the reading comprehension skill assessment, there were 129 students developed in group A; 392 students developed in group B; and 120 students developed in group C. In the category developed in all skill areas, group A had 126 students developed; group B had 355; and group C had 115 students developed in all skill areas.

Table 35 shows the findings of the statistical analysis applied to the results of the end-of-year first grade Tejas Lee phonemic awareness skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 1.740 with 2 degrees of freedom. The differences in the median values among the three study groups

are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.419$ ).

Table 34

*First Grade End-of-year Tejas Lee Results Depicting Number of Students Developed in Each Skill Area*

Group	Group Total	Kindergarten: End-of-year Tejas Lee Results Showing Number of Students Developed in each Category			
		PH	GK	RC	DA
A: 2 years of PK (ages 3 and 4)	156	139	141	129	126
B: 1 year of PK (age 4)	448	403	419	392	355
C: No PK	135	126	123	120	115

*Note:* PH = Phonemic Awareness; GK = Graphophonemic Knowledge; RC = Reading Comprehension; DA = Developed in all categories

Table 35

*Statistical Analysis of Students Developed in Phonemic Awareness on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	1.740 with 2 degrees of freedom	0.419
B: 1 year of PK (age 4)	448	1.000	1.000	1.000		
C: No PK	135	1.000	1.000	1.000		

Table 36 shows the findings of the statistical analysis applied to the results of the end-of-year first grade Tejas Lee graphophonemic knowledge skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.034 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $P=0.362$ ) in the area of graphophonemic knowledge on the first grade Tejas Lee.

Table 36

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	2.034 with 2 degrees of freedom	0.362
B: 1 year of PK (age 4)	448	1.000	1.000	1.000		
C: No PK	135	1.000	1.000	1.000		

Table 37 shows the findings of the statistical analysis applied to the results of the end-of-year first grade Tejas Lee reading comprehension skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.985 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.225$ ) in the area of reading comprehension on the first grade Tejas Lee.



Table 37

*Statistical Analysis of Students Developed in Reading Comprehension on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	2.985	
B: 1 year of PK (age 4)	448	1.000	1.000	1.000	with 2 degrees of freedom	0.225
C: No PK	135	1.000	1.000	1.000		

Table 38 shows the findings of the statistical analysis of the number of students in each group who were developed in all skill areas on the end-of-year first grade Tejas Lee. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.347 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.309$ ) in the area of developed in all skills on the first grade Tejas Lee.

Table 38

*Statistical Analysis of Students Developed in All Skill Areas on the First Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	2.347	
B: 1 year of PK (age 4)	448	1.000	1.000	1.000	with 2 degrees of freedom	0.309
C: No PK	135	1.000	1.000	1.000		

Table 39 shows the number of students in each study group that were developed in each skill inventory and developed in all skill areas on the second grade end-of-year Tejas Lee Spanish Reading Inventory (Tejas Lee, 2010). Phonemic awareness is not assessed on the second grade Tejas Lee. On the graphophonemic knowledge skill assessment, there were 115 students developed in group A, 327 in group B, and 99 students developed in group C. On the reading comprehension skill assessment, there were 128 students developed in group A, 364 students developed in group B, and 108 students developed in group C. In the category developed in all skill areas, group A had 109 students developed, group B had 287, and group C had 93 students developed in all skill areas.

Table 39

*Second Grade End-of-year Tejas Lee Results Depicting Number of Students Developed in Each Skill Area*

Group	Group Total	Second Grade: End-of-year Tejas Lee Results Showing Number of Students Developed in each Category			
		PH	GK	RC	DA
A: 2 years of PK (ages 3 and 4)	156	Not tested	115	128	109
B: 1 year of PK (age 4)	448	Not tested	327	364	287
C: No PK	135	Not tested	99	108	93

*Note:* PH = Phonemic Awareness (not tested in second grade); GK = Graphophonemic Knowledge; RC = Reading Comprehension; DA = Developed in all categories

Table 40 shows the findings of the statistical analysis applied to the results of the end-of-year first grade Tejas Lee graphophonemic knowledge skill assessment. The

Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.0325 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.984$ ) in the area of graphophonemic on the second grade Tejas Lee.

Table 40

*Statistical Analysis of Students Developed in Graphophonemic Knowledge on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	$p < 0.05$
A: 2 years of PK (ages 3 and 4)	156	1.000	0.000	1.000	0.0325 with 2 degrees of freedom	0.984
B: 1 year of PK (age 4)	448	1.000	0.000	1.000		
C: No PK	135	1.000	0.000	1.000		

Table 41 shows the findings of the statistical analysis applied to the results of the end-of-year first grade Tejas Lee reading comprehension skill assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.202 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.904$ ) in the area of reading comprehension on the second grade Tejas Lee.

Table 41

*Statistical Analysis of Students Developed in Reading Comprehension on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	0.202	
B: 1 year of PK (age 4)	448	1.000	1.000	1.000	with 2 degrees of freedom	0.904
C: No PK	135	1.000	1.000	1.000		

Table 42 shows the findings of the statistical analysis of the number of students in each group who were developed in all skill areas on the end-of-year second grade Tejas Lee. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 2.287 with 2 degrees of freedom.

Table 42

*Statistical Analysis of Students Developed in All Skill Areas on the Second Grade End-of-year Tejas Lee using Kruskal-Wallis One-way Analysis of Variance on Ranks*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	0.000	1.000	2.287	
B: 1 year of PK (age 4)	448	1.000	0.000	1.000	with 2 degrees of freedom	0.319
C: No PK	135	1.000	0.000	1.000		

The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling

variability. There is not a statistically significant difference ( $p = 0.319$ ) in the area of developed in all skills on the first grade Tejas Lee.

#### *Research Question 6*

The sixth research question asked: Will there be differences in performance scores on the reading TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b). attended prekindergarten in San Antonio ISD for one year, at the age of 4; or, c). did not attend a prekindergarten program?

Table 43 shows the results of the English TAKS reading assessment that was given to third grade students in the spring of 2007 and in the spring 2008. Students have met the passing standard if they have a scale score of 2,100 or higher. In group A there was a total of 590 students, of which 17 special education students were given a state approved alternative assessment for reading based on their ARD committee recommendations. There were 573 students who took the TAKS reading on the first administration, and 244 students met the passing standard. Students have scored at the commended level if they have a scale score of 2,400 or higher. In group A 171 students scored at the commended level.

In group B there was a total of 1,228 students. There were 22 special education students who were given a state approved alternative assessment for reading. A total of 1,206 students took the TAKS reading on the first administration and 1,071 students met the passing standard. There were 365 students who scored at the commended level.

In group C, there were a total of 705 students. Ten special education students were given a state approved alternative assessment for reading. There were 695 students who took the TAKS reading on the first administration, and 596 students met the passing standard. Two hundred four students scored at the commended level.

Table 43

*TAKS Reading Assessment Administered in English, 1st Administration*

GROUPS	Group Total	Number Who Did Not Take TAKS	Number Who Took TAKS	Passed 1 <sup>st</sup> Admin of TAKS, Score 2,100+	Scored Commended 2,400+
A: 2 years of PK (ages 3 and 4)	590	17	573	502	171
B: 1 year of PK (age 4)	1,228	22	1206	1,071	365
C: No PK	705	10	695	596	204

Table 44 shows the findings of the statistical analysis applied to the results of the first administration of the third grade TAKS reading assessment given to students in groups A, B, and C. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 7.438 with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. There is a statistically significant difference ( $p = 0.024$ ) when compared to the critical value of ( $p < 0.05$ ) in the passing rates of students on the TAKS reading assessment, 1st administration. To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 45).

Table 44

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Student Passing Rates on the 1st Administration of the Third Grade TAKS Reading Assessment, English Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	573	1.000	1.000	1.000	7.438 with 2 degrees of freedom	0.024
B: 1 year of PK (age 4)	1,206	1.000	1.000	1.000		
C: No PK	695	1.000	1.000	1.000		

Table 45 shows the results of the Dunn’s analysis on the TAKS Reading Assessment, first administration. In the comparison between group B and group C the correlation coefficient (Q) was 1.566, and was not statistically significant. The comparison between group B and group A produced a Q of 0.409, which did not test. And the comparison between group A and group C produced a Q of 0.952, which did not test.

Table 45

*Comparison of Passing Rates on the 1st Administration of TAKS Reading, English Version using Dunn’s Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance P < 0.05
B vs. C	53.247	1.566	No
B vs. A	14.859	0.409	Did Not Test
A vs. C	38.388	0.952	Did Not Test

Based on the Dunn’s Method multiple comparison test, it is concluded that while the one-way analysis of ranks produced a statistically significant result among the groups in the passing rates on the first administration of the TAKS reading assessment, the multiple comparison test could not determine where there was a statistically significant difference between the groups. Between group B (one year of prekindergarten) and group C (no prekindergarten), there was not a statistically significant difference. However, between group B (one year of prekindergarten) and group A (two years of prekindergarten), as well as between group A (two years of prekindergarten) and group C (no prekindergarten), the multiple comparison test could not determine if there was a statistically significant difference in the passing rates on the first administration of the TAKS reading assessment.

Next, a one-way analysis of variance on ranks was done on the commended level of performance in each of the study groups. The findings are shown in Table 46.

Table 46

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, English Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	573	0.000	0.000	1.000	0.353	with 2 degrees of freedom 0.838
B: 1 year of PK (age 4)	1206	0.000	0.000	1.000		
C: No PK	695	0.000	0.000	1.000		

The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.353 with 2 degrees of freedom. The differences in the median values among the



three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.838$ ) in the commended performance levels in TAKS reading among the groups.

#### *Research Question 7*

The seventh research question: Will there be differences in performance scores on the reading TAKS test administered in Spanish among San Antonio ISD 2006-07 and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program

Table 47 shows the results of the Spanish TAKS reading assessment given to third grade bilingual students in the spring of 2007 and in the spring 2008. Students have met the passing standard if they score a scale score of 2,100 or higher. In group A, there were a total of 155 students that took the Spanish reading TAKS assessment, and there were 0 special education students taking an alternative assessment. The results show that 147 students met the passing standard and 40 scored at the commended level.

In group B, there were a total of 448 students, including 3 special education students who were given a state approved alternative assessment for reading. Of the 445 students that took the Spanish TAKS reading on the first administration, 396 students met the passing standard with 109 students scoring at the commended level.

In group C, there were a total of 135 students. One special education student was given a state approved alternative assessment for reading and 134 students took the Spanish TAKS reading assessment. The results show that 118 students met the passing standard, and 37 scored at the commended level.

Table 47

*TAKS Reading Assessment Administered in Spanish, 1st Administration*

GROUPTS	Group Total	Number Who Did Not Take TAKS	Number Who Took TAKS	Passed 1 <sup>st</sup> Admin of TAKS, Score 2,100+	Scored Commended 2,400+
A: 2 years of PK (ages 3 and 4)	155	0	155	147	40
B: 1 year of PK (age 4)	448	3	445	396	109
C: No PK	135	1	134	118	37

Table 48 shows the findings of the statistical analysis as applied to the results of the first administration of the third grade Spanish TAKS reading assessment given to students in groups A, B, and C. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 4.054 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.132$ ) in the passing rates on the Spanish TAKS reading assessment.

Next, a one-way analysis of variance on ranks was done on the commended level of performance in each of the study groups on the Spanish TAKS reading assessment. The findings are shown in Table 49. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.551 with 2 degrees of freedom.

Table 48

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Student Passing Rates on the 1st Administration of the Third Grade TAKS Reading Assessment, Spanish Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	155	1.000	1.000	1.000	4.054	
B: 1 year of PK (age 4)	445	1.000	1.000	1.000	with 2 degrees of freedom	0.132
C: No PK	134	1.000	1.000	1.000		

Table 49

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, Spanish Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	155	0.000	0.000	1.000	0.551	
B: 1 year of PK (age 4)	445	0.000	0.000	0.000	with 2 degrees of freedom	0.759
C: No PK	134	0.000	0.000	1.000		

The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.759$ ) in the commended performance levels in TAKS reading among the groups.

### *Research Question 8*

The eighth research question: Will there be differences in the number of students who must take additional administrations of the reading TAKS test in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

Third grade students who did not meet the passing standard on the first administration of the TAKS reading assessment were provided with academic interventions, and were given up to two more opportunities to take the TAKS reading assessment. Table 50 shows the performance of students in each study group who had to retake the TAKS reading test. In group A, there were 71 students who did not pass the first administration of TAKS reading and were required to take the TAKS test again. Twenty-six passed the second administration of the TAKS reading test, 11 passed the third administration. There were 34 students who still did not meet the passing standard.

In group B, 135 students were required to take the TAKS test again. On the second administration of the TAKS reading, 63 students met the passing standard, 13 passed the third TAKS administration, and 59 students did not meet the passing standard. In group C, there were 90 students who were required to take the TAKS. On the second administration of the TAKS, 47 students met the passing standard, 13 passed the third administration, and there were 30 who did not meet the passing standard.

Table 50

*TAKS Reading Assessment 2nd and 3rd Administrations, English*

Groups	Group total	Number Who Took Additional TAKS Tests	Number Passed 2 <sup>nd</sup> Time	Number Passed 3 <sup>rd</sup> time	Number Failed All Tests
A: 2 years of PK (ages 3 and 4)	573	71	26	11	34
B: 1 year of PK (age 4)	1,206	135	63	13	59
C: No PK	704	90	47	13	30

A one-way analysis of variance on ranks was done on the numbers of students in each of the study groups that did not meet the passing standard on the first administration of the reading TAKS in English. These students were provided the educational interventions prior to taking additional administrations of the TAKS reading assessment for third grade. Table 51 shows the results of the analysis. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.634 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There is not a statistically significant difference ( $p = 0.634$ ) in the numbers of students required to take additional administrations of the TAKS reading assessment.

Table 51

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Required to Re-take the Reading TAKS Assessment*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	71	0.000	0.000	0.000	0.911 with 2 degrees of freedom	0.634
B: 1 year of PK (age 4)	135	0.000	0.000	0.000		
C: No PK	90	0.000	0.000	0.000		

*Research Question 9*

The ninth research question: Will there be differences in the number of students who must take additional administrations of the reading TAKS test in Spanish among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

As with the English version of the third grade TAKS reading assessment, students who did not meet the passing standard on the first administration of the Spanish TAKS reading assessment were provided with academic interventions and were given up to two more opportunities to take the Spanish TAKS reading assessment. Table 52 shows the performance of students in each study group who had to retake the Spanish TAKS reading test. In group A, there were 9 students who did not pass the first administration of TAKS reading and were required to take the TAKS test again, 2 passed the second

administration of the TAKS reading test, 1 passed the third administration, and there were 6 students who still did not meet the passing standard.

In group B, 49 students were required to take the TAKS test again. On the second administration of the TAKS reading, 9 students met the passing standard, 5 passed the third TAKS administration, and 35 students did not meet the passing standard. In group C, there were 16 students who were required to take the TAKS. On the second administration of the TAKS, 5 students met the passing standard, 3 passed the third administration, and there were 8 who did not meet the passing standard.

Table 52

*TAKS Reading Assessment 2nd and 3rd Administrations, Spanish*

Groups	Group Total	Number Who Took Additional TAKS Tests	Number Passed 2 <sup>nd</sup> Time	Number Passed 3 <sup>rd</sup> time	Number Failed All Tests
A: 2 years of PK (ages 3 and 4)	155	9	2	1	6
B: 1 year of PK (age 4)	445	49	9	5	35
C: No PK	134	16	5	3	8

Table 53 shows the findings of the statistical analysis applied to the results of the number of students in each study group who were required to take additional administrations of the third grade Spanish TAKS reading assessment. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 7.810 with 2 degrees of freedom. The differences in the median values among the three study groups

are greater than would be expected by chance. There is a statistically significant difference ( $p = 0.020$ ) when compared to the critical value of ( $p < 0.05$ ) in the number of students who were required to take additional assessments of the TAKS reading assessment. To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 54).

Table 53

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Required to Re-take the Reading TAKS Assessment in Spanish*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	9	0.000	0.000	0.000	7.810	
B: 1 year of PK (age 4)	49	0.000	0.000	0.000	with 2 degrees of freedom	0.020
C: No PK	16	0.000	0.000	0.000		

Table 54 shows the results of the Dunn's analysis on the numbers of students in each study group that were required to re-take the Spanish TAKS reading. In the comparison between group C and group A, the correlation coefficient (Q) was 1.442, and was not statistically significant. The comparison between group C and group B produced a Q of 0.026, which did not test. The comparison between group B and group A produced a Q of 1.796, which did not test.



Table 54

*Comparison of Re-takes by Group on Spanish TAKS Reading using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	P < 0.05
C vs. A	36.064	1.442	No
C vs. B	0.548	0.026	Did Not Test
B vs. A	35.516	1.796	Did Not Test

Based on the Dunn's Method multiple comparison test, it is concluded that while the one-way analysis of ranks produced a statistically significant result among the groups in the number of students required to re-take the Spanish TAKS reading assessment, the multiple comparison test could not determine where there was a statistically significant difference between the groups. Between group C (no prekindergarten) and group A (two years of prekindergarten) there was not a statistically significant difference. However, between group C (no prekindergarten) and group B (one year of prekindergarten), as well as between group B (one year of prekindergarten) and group A (two years of prekindergarten), the multiple comparison test could not determine if there was a statistically significant difference in the number of students required to re-take the Spanish TAKS reading assessment.

*Research Question 10*

The tenth research question: Will there be differences in performance scores on the math TAKS test administered in English among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD

for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

Table 55 shows the results of the TAKS mathematics assessment, English version, given to third grade students in the spring of 2007 and in the spring 2008. Students met the passing standard if they scored a scale score of 2,100 or higher. Students scored at the commended level of performance if their scale score was 2,400 or higher. Results for each study group are displayed in Table 55. In group A, there were a total of 590 students, including 17 who were special education students that took a state approved alternative mathematics assessment as recommended by their ARD committee. There were 573 students who took the mathematics TAKS assessment in English where 457 met the passing standard with a score of 2,100 or higher, and 118 students scored at the commended level with a score of 2,400 or higher.

In group B, there were a total of 1228 students. Thirty-one special education students were given a state approved alternative mathematics assessment. There were 445 students who took the Spanish TAKS reading on the first administration and 396 students met the passing standard with 109 students scoring at the commended level.

In group C, there were a total of 135 students; one special education student was given a state approved alternative assessment for reading, and 134 students that took the Spanish TAKS reading assessment. The results show that 118 students met the passing standard and 37 scored at the commended level.

Table 55

*Results of TAKS Mathematics Assessment, English Version, Third Grade*

Groups	Group Total	Number Who Did Not Take TAKS	Number Who Took TAKS	Passed Math TAKS 2,100+	Number Scored 2,400+ Commended
A: 2 years of PK (ages 3 and 4)	590	17	573	457	118
B: 1 year of PK (age 4)	1,228	31	1,197	907	244
C: No PK	705	23	682	519	144

Table 56 shows the findings of the statistical analysis applied to the results of the third grade TAKS mathematical assessment, specifically analyzing for significant differences in numbers of students passing among the three study groups. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 29.973 with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. There is a statistically significant difference ( $p = <0.001$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn’s Method, a multiple comparison procedure, was applied to each pair (Table 57).

Table 57 shows the results of the Dunn’s analysis comparing the TAKS mathematical results for each group. In the comparison between group A and group C, the correlation coefficient (Q) was 3.940, and was statistically significant. The comparison between group A and group B produced a Q of 1.358 and was not

statistically significant. The comparison between group B and group C produced a Q of 3.216, was statistically significant.

Table 56

*Kruskal-Wallis One-way Analysis of Variance on Ranks Students Performance on the Third Grade TAKS Mathematics Assessment, English Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	573	1.000	1.000	1.000	29.973 with 2 degrees of freedom	0.001
B: 1 year of PK (age 4)	1,197	1.000	1.000	1.000		
C: No PK	682	1.000	0.000	1.000		

Table 57

*Comparison of Passing Rates by Group on the TAKS Mathematical Assessment using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance P < 0.05
A vs. C	158.074	3.940	Yes
A vs. B	48.830	1.358	No
B vs. C	109.244	3.216	Yes

Based on the Dunn's Method multiple comparison test results, the findings showed that there was a statistically significant difference in math performance between group A (two years of prekindergarten) and group C (no prekindergarten). There was also a statistically significant difference between group B (one year of prekindergarten) and group C (no prekindergarten). However, between group A (two years of

prekindergarten) and group B (one year of prekindergarten), there was not a statistical difference.

Next, a one-way analysis of variance on ranks was done on the commended level of performance on the TAKS mathematics test in each of the study groups, the findings are shown in Table 58. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 0.142 with 2 degrees of freedom. The differences in the median values among the three study groups are not great enough to exclude the possibility that the difference is due to random sampling variability. There was not a statistically significant difference ( $p = 0.931$ ) in the commended performance levels in TAKS reading among the groups.

Table 58

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, English Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	573	0.000	0.000	0.000	0.142 with 2 degrees of freedom	0.931
B: 1 year of PK (age 4)	1,197	0.000	0.000	0.000		
C: No PK	682	0.000	0.000	0.000		

*Research Question 11*

The eleventh research question: Will there be differences in performance scores on the math TAKS test administered in Spanish among San Antonio ISD 2006-07 bilingual third graders and 2007-08 bilingual third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended

prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

Table 59 shows the results of the Spanish TAKS mathematics assessment, given to bilingual third grade students in the spring of 2007 and bilingual third grade students in the spring 2008. Students met the passing standard if they scored a scale score of 2,100 or higher. Students scored at the commended level of performance if their scale score was 2,400 or higher. In group A there were a total of 156 students; there were no special education students taking alternate mathematics assessments in this group. There were 156 students that took the Spanish TAKS mathematics assessment. There were 126 who met the passing standard with a score of 2,100 or higher, and 25 students scored at the commended level with a score of 2,400 or higher.

In group B, there were a total of 448 students. Three special education students were given a state approved alternative mathematics assessment. There were 445 students ~~took~~ taking the Spanish mathematics TAKS test where 247 students met the passing standard and 119 students scored at the commended level.

In group C, there was a total of 116 students. Two special education students were given a state approved alternative assessment for mathematics and 114 students took the Spanish mathematics TAKS test. The results show that 97 students met the passing standard in group C and 26 scored at the commended level.

Table 60 shows the findings of the statistical analysis applied to the results of the Spanish third grade TAKS mathematical assessment, specifically analyzing for significant differences in numbers of students passing among the three study groups. The Kruskal-Wallis one-way analysis of variance on ranks produced an H value of 22.147

with 2 degrees of freedom. The differences in the median values among the three study groups are greater than would be expected by chance. Therefore there was a statistically significant difference ( $p = <0.001$ ) when compared to the critical value of ( $p < 0.05$ ). To isolate the group or groups that differ from the others, Dunn's Method, a multiple comparison procedure, was applied to each pair (Table 61).

Table 59

*Results of TAKS Mathematics Assessment, Spanish Version, Third Grade*

Groups	Group Total	Number Who Did Not Take TAKS	Number Who Took TAKS	Passed Math TAKS 2,100+	Number Scored 2,400+ Commended
A: 2 years of PK (ages 3 and 4)	156	0	156	126	25
B: 1 year of PK (age 4)	448	3	445	247	119
C: No PK	116	2	114	97	26

Table 60

*Kruskal-Wallis One-way Analysis of Variance on Ranks Students Performance on the Third Grade TAKS Mathematics Assessment, Spanish Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	1.000	1.000	1.000	22.147 with 2 degrees of freedom	0.001
B: 1 year of PK (age 4)	445	1.000	1.000	1.000		
C: No PK	114	1.000	1.000	1.000		

Table 61 shows the results of the Dunn’s analysis comparing the TAKS mathematical results for each group. In the comparison between group B and group A the correlation coefficient (Q) was 2.407, and was statistically significant. The comparison between group B and group C produced a Q of 0.554 and was not statistically significant. The comparison between group C and group A produced a Q of 1.346 and was not statistically significant.

Based on the Dunn’s Method multiple comparison test results, the findings showed that there was a statistically significant difference in math performance between group A (two years of prekindergarten) and group B (one year of prekindergarten). There was not a statistically significant difference between group B (one year of prekindergarten) and group C (no prekindergarten). Nor, was there a difference between group C (no prekindergarten) and group A (two years of prekindergarten).

Table 61

*Comparison of Passing Rates by Group on the Spanish TAKS Mathematical Assessment using Dunn’s Method*

Comparison	Diff of Ranks	Correlation Coefficient Q	Significance p < 0.05
B vs. A	46.256	2.407	Yes
B vs. C	12.001	0.554	No
C vs. A	34.254	1.346	No

Next, a one-way analysis of variance on ranks was done on the commended level of performance on the Spanish TAKS mathematics test in each of the study groups, the findings are shown in Table 62. The Kruskal-Wallis one-way analysis of variance on



ranks produced an H value of 7.379 with 2 degrees of freedom. The differences in the median values among the treatment groups are greater than would be expected by chance. There was a statistically significant difference ( $p = 0.025$ ) when compared to the critical value of ( $p < 0.05$ ) in the commended performance on the Spanish mathematics TAKS. To isolate the group or groups that differ from the others, Dunn’s Method, a multiple comparison procedure, was applied to each pair (Table 63).

Table 62

*Kruskal-Wallis One-way Analysis of Variance on Ranks of Numbers of Students Scoring at the Commended Level on the Third Grade TAKS Reading Assessment, English Version*

Group	N	Median	25%	75%	H	p < 0.05
A: 2 years of PK (ages 3 and 4)	156	0.000	0.000	0.000	7.379 with 2 degrees of freedom	0.025
B: 1 year of PK (age 4)	445	0.000	0.000	1.000		
C: No PK	114	0.000	0.000	0.000		

Table 63 shows the results of the Dunn’s analysis comparing the Spanish TAKS mathematical results for each group. In the comparison between group B and group A the correlation coefficient (Q) was 1.99, and was not statistically significant. The comparison between group B and group C produced a Q of 0.649 and did not test. Also, the comparison between group C and group A produced a Q of 0.953 and did not test.

Table 63

*Comparison of Commended Performance by Group on the Third Grade Spanish TAKS Mathematical Assessment using Dunn's Method*

Comparison	Diff of Ranks	Correlation Coefficient	Significance p < 0.05
		Q	
B vs. A	38.309	1.993	No
B vs. C	14.066	0.649	Did Not Test
C vs. A	24.243	0.953	Did Not Test

However, between group B (one year of prekindergarten) and group C (no prekindergarten), as well as between group C (no prekindergarten) and group A (two years of prekindergarten), the multiple comparison test could not determine if there was a statistically significant difference in the commended level of performance between these pairs of groups.

*Research Questions 12 and 13*

The final two questions study the costs associated with providing an additional year of pre-kindergarten, the costs of grade retention, special education services, and remediation. The financial data studied comes from the SAISD Comprehensive Annual Financial Report End of Fiscal Year for 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008. Also, financial data came from the SAISD Academic Excellence Indicator System (AEIS) reports from academic school years 2001, 2002, 2003, 2004, 2005, 2006, 2007, and 2008.

Before analyzing questions 12 and 13, the researcher looked at the district financial reports to assess the costs associated with the pre-kindergarten program, specifically in regards to the three study groups.

Prior to school year 2001-2002, SAISD averaged 2,700 4-year-olds enrolled in their half-day pre-kindergarten program. In the school year 2001-2002, SAISD enrolled 3,783 pre-kindergarten students; 2,806 were 4-year-old students, and 977 were 3-year-old students. The increase from the prior years was due to 3-year-olds. The average cost per student in 2001-02 was \$7,017, which added up to \$26,545,311 for the pre-kindergarten program, of which \$6,855,609 was spent for 3-year-olds. It was during this school year that SAISD moved from a half-day program to providing a full-day program. The classroom ratio for students and teachers for 4-year-olds was 22:2 (one teacher, one assistant); and 20:2 for 3-year-olds. Based on the numbers enrolled, SAISD required a total of 128 teachers and 128 instructional assistants for the 4-year-old program, and 49 teachers and assistants for 3-year-olds, for a total of 177 teachers and teacher assistants. This was a significant increase from 63 teachers and 63 assistants in 2000-2001. The district needed to add 114 teachers and 114 assistants to provide a full-day program and increase enrollment. The average teacher salary was \$45,504, and when multiplied by 114, the cost for additional teachers was \$5,187,456. The average instructional assistant salary was \$20,635, which added to a total of \$2,352,390 for 114 assistants.

This addition of students in the pre-kindergarten program also required additional classroom space, furniture, materials and supplies for 114 classrooms and material upgrades for 63 existing classroom. As depicted in Table 64, the district spent

\$2,850,000, or \$25,000 per classroom, to furnish and supply each new classroom and an additional \$346,500 to upgrade existing classrooms.

Table 64 depicts the expenses, both direct and indirect costs, incurred by SAISD in the expansion of the pre-kindergarten program in 2001-2002.

Table 64

*Costs to Expand Pre-kindergarten Services in SAISD*

Costs	Group A		Group B		Total PK Students	
	(PK 3 year olds)		(PK 4 year olds)		(3 & 4 year olds)	
	N	Cost	N	Cost	N	Cost
Direct Costs	977					
*Teachers:						
1:20 (3 yr olds);	49	\$2,229,696	128	\$5,824,512	177	\$8,054,208
1:22 (4 yr olds)						
*Assistants	49	\$1,011,115	128	\$2,641,280	177	\$3,652,395
*Fringe Benefits (28%)	98	\$907,427	256	\$2,370,421	354	\$3,277,848
Improved Material						
Costs: Existing Rooms	0	0	63	\$346,500	63	\$346,500
(Est. \$5500 per room)						
Improved Material						
Costs: New Rooms	49	\$1,225,000	65	\$1,625,000	114	\$2,850,000
(\$25,000 per room)						
Total Direct Costs		\$5,373,238		\$12,807,713		\$18,180,951

(continued)

Costs	Group A		Group B		Total PK Students	
	(PK 3 year olds)		(PK 4 year olds)		(3 & 4 year olds)	
	N	Cost	N	Cost	N	Cost
<b>Indirect Costs</b>						
*Infrastructure Improvement	---	\$32,661,000	---	\$93,839,000	----	\$126,500,000
<i>*Technical Assistance</i>						
Sr. Coordinator Early Childhood	---	---	---	---	1	\$72,000
Teacher Specialist ECE	1	\$52,000	1	\$52,000	2	\$104,000
Total Indirect Costs	---	\$32,713,000	---	\$93,891,000		\$126,676,000
Total Direct and Indirect Costs	---	\$38,086,238	---	\$106,698,713		\$144,784,551

*Note:* \*Annual recurring costs that increase each year: average salary of teacher in 2001-02 \$45,504, average salary of assistant in 2001-02 \$20,635, Fringe benefits estimated at 28% - amount indicates fringe benefits for teachers and assistants in each group, \*Infrastructure Improvement: 31 new Early Childhood Facilities and improvements to ECE classrooms - \$33.43 per child, \*Technical Assistance: 1 Sr. Coordinator ECE (73,000); 2 ECE Specialist (52,000 average salary) 2002 dollars

SAISD was provided with state Pre-kindergarten Expansion Grant funds to expand the pre-kindergarten program from half-day programs to full-day programs. The total cost to expand the pre-kindergarten program and add 3-year-olds was an estimated \$44,941,847. The average daily attendance (ADA) funding allocation for 2001-2002 was \$4,020 per student. However, the district only received half-day ADA funding for pre-kindergarten students, which equated to \$7,603,830. The state provided \$7 million in expansion grants, for a total of \$14,603,830. Table 65 shows the total revenues and costs for the 2001-2002 school year, this includes the bond that was used to build the new early

childhood facilities, as well as the upgrades to existing classrooms. After deducting the costs from the revenues, there was a remaining deficit of \$3,680,748. The district had to cover these expenses from other funds.

Table 65

*Revenue Sources for SAISD Pre-kindergarten Expansion*

Revenue Sources	Total From Source
State ADA Funding (\$2,010 per child)	\$7,603,830
PK State Expansion Grant	\$7,000,000
SAISD Bond	\$126,500,000
Total Revenue	\$141,103,803
Total Expenses (see Table 64)	\$144,784,551
<i>Difference: Additional Cost to SAISD</i>	<i>\$3,680,748</i>

*Note:* 2002 Dollars

In the subsequent years following the initial year of the program, SAISD did not have start-up costs, but has had recurring expenses to run the program. Table 66 shows the revenue sources and expenses for the SAISD program in fiscal year 2002-2003 and fiscal year 2008-2009. In 2003 there were 3,909 students, ages 3 and 4, enrolled in the prekindergarten program. The district received \$7.8 million in ADA funding from the state and \$6 million from the state PK expansion grant funds. The district spent a \$7,506 per student for a total expense of \$29,340,954. The difference was \$15,461,492, which the district had to fund from other sources, such as local funds. As the total enrollment of 3-year-olds is about 30%, the district spent estimated \$9,780,318 for this group. If this

amount is taken from the difference in funds, without the 3-year-old group, the district's cost for the program would be \$5,681,174.

Table 66

*Summary of Expenses and Revenue 2003 and 2009*

Expenses and Revenue	Year 2002-03	Year 2008-09
<i>Revenue Sources:</i>		
State ADA Funding	\$7,857,090	\$9,608,917
PK Expansion Grant	\$6,022,372	\$6,202,594
Total Revenue:	\$13,879,462	\$15,811,511
<i>Expenses:</i>		
District Expenditures per student	\$29,340,954	\$35,810,775
Total Expenses:	\$29,340,954	\$35,810,775
<i>Difference Additional SAISD Funds</i>	<i>\$15,461,492</i>	<i>\$19,999,264</i>
Total Expenses for 3 yr olds (33% of total)	\$9,780,318	\$11,936,925
Difference Additional SAISD Funds if not funding 3 year olds	\$5,681,174	\$8,062,339

*Note:* Number of PK Students: 2002-2003 – 3,909; 2008- 2009 – 4,095, State ADA Funding in 2003 \$4020 per student, state pays half for PK which is \$2,010; State ADA Funding in 2009 \$4,693 per student, state pays half for PK which is \$2,346.50; Cost per student in 2003 \$7,506; Cost per student in 2009 \$8,745

In 2008-2009, there were 4,095 students enrolled in prekindergarten. The district received half-day ADA for prekindergarten for a total of \$9,608,917 and \$6,202,594 in PK Expansion Grant Funds. The total expenditures were \$35,810,775. The difference was \$19,999,264, which again had to be provided from other district funds. The

estimated cost for the 3-year-old group only is \$11,936,925. If this group is not included the district cost goes down to \$8,062,339.

In 2009-2010 the district learned they would no longer be receiving prekindergarten expansion grant funds, which averaged \$6.0 - \$6.5 million. The district will now have to fund this amount if they wish to continue providing the same level of prekindergarten services.

Also, the researcher looked at the student groups themselves. Out of the group of 977 three-year-olds that entered prekindergarten in 2001-2002, 357 (36%) students remained continuously enrolled in SAISD through third grade. Sixty-four percent (64%) of the students moved out of the district at some point. In the group of 985 students that entered SAISD as 3-year-olds in prekindergarten in 2002-2003, 388 (39%) remained continuously enrolled in SAISD through third grade. Five hundred ninety-seven students did not remain continuously enrolled in SAISD, or 61%.

The twelfth question: Will there be differences in student academic performance and progress among San Antonio ISD 2006-07 third graders and 2007-08 third graders who attended pre-kindergarten in San Antonio ISD for two years, at the ages of 3 and 4, which will support the cost of providing an additional year of pre-kindergarten?

The academic performance in reading and math of the three study groups of students was analyzed in questions 4, 5, 6, 7, 10, and 11. To support the costs of providing an additional year of pre-kindergarten, the findings should show that students who attended as 3-year-olds had a higher academic performance. The cost benefit for higher academic performance would be seen in reduction of grade retention, remediation, decrease in drop-out rates, and higher graduation rates. All of which cost additional



funding by the district. The findings in questions 4, 5, 6, 7, 10, and 11 did not show a significant difference in performance for group A (two-years of pre-kindergarten). There were some significant differences in math between students who attended pre-kindergarten and those that did not.

The one academic measure that is directly associated with funding is the TAKS assessment in reading and math. The TAKS tests, not only are given to assess student's progress, but also to meet the No Child Left Behind Adequate Yearly Progress (AYP) requirement. Schools that do not meet the AYP requirement, risk losing their federal Title I funds (Aguirre et al., 2006). SAISD receives approximately 21.8% of its budget from Federal funds, and in 2009 this equaled \$36,458,923 million (SAISD, 2009a). This is a substantial amount of money for the district to lose.

The thirteenth question: Will there be differences in expenditures for remediation, grade retention, and special education among San Antonio ISD 2006-07 third graders and 2007-08 third grades who: a) attended prekindergarten in San Antonio ISD for two years, at the ages of 3 and 4; b) attended prekindergarten in San Antonio ISD for one year, at the age of 4; or c) did not attend a prekindergarten program?

### *Grade Retention*

The statistical analysis of grade retention showed a significant difference among both pre-kindergarten groups and the non-prekindergarten group, indicating that the treatment does have an effect on grade retention. This next section looks at the costs incurred with grade retention.

Table 67 shows the 2006-2007 third grade cohorts that were continuously enrolled in SAISD, and the numbers of that group that were retained. The chart also

shows in what grade between Kindergarten and third grade the students' retention occurred. That is important to note, because the cost spent per child increases each year, so the later a child is retained, the more expensive it will be for the district. For this group the district spent a total of \$287,720 for student in Group A (2 years of prekindergarten); \$913,109 for students in Group B (1 year of prekindergarten); and \$107, 229 for students in Group C (no prekindergarten).

Table 68 shows the 2007-2008 third grade cohorts that were continuously enrolled in SAISD, and the numbers of that group that were retained. Again, the chart also shows in what grade between Kindergarten and third grade the students' retention occurred. For this group the district spent a total of \$476,827 for student in Group A (2 years of prekindergarten); \$1,228,845 for students in Group B (1 year of pre-kindergarten); and \$348,051 for students in Group C (no pre-kindergarten).

Looking at these tables it is clear that retention rates have increased, but this can be attributed to the Student Success Reading Initiative (SSI), that required students in third grade to pass the TAKS reading test in order to be promoted. This took effect with the third grade group in the 2002-2003 school year. AEIS reports show that the overall retention rate between Kindergarten and third grade increased, from 13.6% in 2001-02, the year of the pre-kindergarten expansion, to 23.5% in 2007-08.

Looking at the third grade retentions in our two cohorts, in the 2007 group there 201 retentions. Of the 201 retentions, there were 32 who had attended pre-kindergarten (5 had two years of pre-kindergarten, and 27 had one year of pre-kindergarten) and had been continuously enrolled in SAISD. These 32 students constituted 17% of the third grade retention group.

Table 67

*Cost Analysis of Students Being Retained (Third Graders 2006-2007)*

Year and Grade Retained		Kinder 03-04		First 04-05		Second 05-06		Third 06-07		Total Spent	
Cost Per Student		\$7,926		\$8,182		\$8,287		\$8,519			
Group	Total N in Group	N	Total	N	Total	N	Total	N	Total	N	Total
A: 2 years of PK	357	5	\$39,630	16	\$130,912	9	\$74,583	5	\$42,595	35	\$287,720
B: 1 year of PK	754	---	---	45	\$368,190	38	\$314,906	27	\$230,013	110	\$913,109
C: No PK	452	---	---	7	\$57,274	5	\$41,435	1	\$8,519	13	\$107,228

133

Table 68

*Cost Analysis of Students Being Retained (Third Graders 2007-2008)*

Year and Grade Retained		Kinder 03-04		First 04-05		Second 05-06		Third 06-07		Total Spent	
Cost Per Student		\$7,926		\$8,182		\$8,287		\$8,519			
Group	Total N in Group	N	Total	N	Total	N	Total	N	Total	N	Total
A: 2 years of PK	388	1	\$8,182	21	\$174,027	12	\$102,228	22	\$192,390	56	\$476,827
B: 1 year of PK	922	8	\$65,456	54	\$447,498	44	\$374,836	39	\$341,005	145	\$1,228,845
C: No PK	389	2	\$16,364	17	\$140,879	7	\$59,633	15	\$131,175	41	\$348,051

In the 2008 third grade cohort, there were 223 retentions out of 4,454 third graders, or 5%. Out of the 223 retentions, 61 had attended pre-kindergarten (22 for two years, 39 for 1 year) and had been continuously enrolled. This group of 61 constituted 27.3% of the third grade retention group.

According to the Bush 2005 study, there are many research studies of early childhood programs that have claimed that a high-quality pre-kindergarten program leads to a decrease in the number of students being retained (Aguirre et al., 2006). The benefit to a school district is that by decreasing retention rates it will also save them the expense of educating a student for an additional year. The Chicago Program that was used as a model for the Bush study estimated that “pre-kindergarten decreases grade retentions by up to forty percent” (Aguirre et al., 2006).

It is difficult to say with certainty that the pre-kindergarten program has decreased the retention rate of participants. First, out of the initial group of students that attended pre-kindergarten for two years or one year, only one-third were continuously enrolled in SAISD through the end of third grade. Thus, those retained in third grade had different educational experiences, and some may even have been retained before. Second, the introduction of the SSI reading initiative may have increased third grade retention numbers overall. Finally, the retention rates of the pre-kindergarten students prior to pre-kindergarten expansion in 2001-2002 cannot be compared, with those after the expansion because the programs were different. Prior to the expansion, students attended a half-day program, versus after the expansion when it became a full-day program.

The results do show that when looking at the third grade retentions in both cohorts, there is a smaller percentage of students who had one or two years of pre-

kindergarten in the retention group. Also, the statistical analysis did indicate that there was a significant difference between the pre-kindergarten groups and the no pre-kindergarten group. This suggests a cost benefit to the district in terms of reducing the costs of grade retention.

### *Special Education*

As with grade retention, special education identification and participation, has been studied in previous pre-kindergarten benefit studies. These studies have shown a positive correlation between pre-kindergarten participation and a decrease in special education identification. In this study we reviewed the numbers of students in both third grade cohorts who were identified for special education. The statistical analysis showed there was no statistically significant difference in the identification of students among the three groups, those that attended pre-kindergarten for two year, those that attended for one-year, and those that did not attend.

Education costs for special education students can be approximately double the cost of a general education student. For example, in 2005 the average cost of regular education students in Texas was \$5,606.74 and for special education students it was \$12,247.20. Table 69 shows the cost associated with students being identified and placed into special education for each subgroup in Group 1. The annual cost per special education student for each year is identified. The earlier students are identified, the more cost is involved. In subgroup 1-A there was total of 35 students identified for special education between pre-kindergarten and third grade. The total cost to provide services was based on when the child was identified through the 2006-2007 school year was \$108,505. In subgroup 1-B there was a total of 57 students identified for special

education services for a total cumulative cost of \$913,109. And in subgroup 1-C there was a total of 35 students identified for special education services, for a total cost of \$107,899.

Table 70 shows the cost associated with students being identified and placed into special education for each subgroup in Group 2. The annual cost per special education student for each year is identified. In subgroup 2-A there was total of 30 students identified for special education between pre-kindergarten and third grade. The total cost to provide services was based on when the child was identified through the 2006-2007 school year was \$92,124. In subgroup 2-B there was a total of 38 students identified for special education services for a total cumulative cost of \$109,257. And in subgroup 2-C there was a total of 20 students identified for special education services, for a total cost of \$44,534.

Summarizing the costs of special education for each group, the total spent for Group A (two years of pre-kindergarten) (n = 65) was \$200,629; for Group B-one year of pre-kindergarten (n = 95) was \$277,267; and for Group C-no pre-kindergarten (n = 55) the total spent for special education services was \$152,433.

### *Remediation*

The final cost analysis done on the three study groups was in the area of remediation. As per state law, students in third grade who fail the TAKS test are required to have remediation. If they fail the second administration they are required to have another round of remediation. Based on district financial reports and SAISD AEIS reports, information was gathered on the average amount spent per student for remediation.

Table 69

*Cost Analysis of Students Identified for Special Education (Third Graders 2006-2007)*

Grade Identified		Kinder 03-04		First 04-05		Second 05-06		Third 06-07		Total Spent	
Cost Per SE Student		\$9,305		\$9,436		\$9,686		\$9,954			
Group	Total N in Group	N	Total	N	Total	N	Total	N	Total	N	Total
A: 2 years of PK	357	43	\$400,115	26 (69)	\$651,084	26 (95)	\$920,170	35 (130)	\$1,294,020	130	\$3,265,389
B: 1 year of PK	754	32	\$297,760	19 (51)	\$481,236	33 (84)	\$813,624	57 (141)	\$1,403,514	141	\$2,996,134
C: No PK	452	10	\$93,050	21	\$292,516	25	\$542,416	35	\$905,814	91	\$1,833,796

*Note:* Average expenses for Special Ed. can be double or more depending on disability; (N) cumulative number as progress because students do not exit program; some of the Kinder were identified in PK – mostly speech

137

Table 70

*Cost Analysis of Students Identified for Special Education (Third Graders 2007-2008)*

Grade Identified		Kinder 04-05		First 05-06		Second 06-07		Third 07-08		Total Spent	
Cost Per SE Student		\$9,436		\$9,686		\$9,954		\$9,982			
Group	Total N in Group	N	Total	N	Total	N	Total	N	Total	N	Total
A: 2 years of PK	388	19	\$179,284	13 (32)	\$309,952	14 (46)	\$457,884	30 (76)	\$758,632	76	\$1,705,752
B: 1 year of PK	922	10	\$94,360	16 (26)	\$251,836	25 (51)	\$507,654	38 (89)	\$888,398	89	\$1,742,248
C: No PK	389	3	\$28,308	5 (8)	\$77,488	8 (16)	\$159,264	20 (36)	\$359,352	36	\$624,412

Sources for remediation come from various funds, including Title 1, state compensatory, and local. Tables 71 and 72 show the amounts the district spent per student in third grade.

Table 71

*Remediation Costs for Third Graders (2006-2007) in 2007 Dollars*

Groups	Group Total	Number Who Needed Remediation	Cost Per Student	Total Cost
A: 2 years of PK (ages 3 and 4)	357	44	\$882.50	\$38,830
B: 1 year of PK (age 4)	754	138	\$882.50	\$121,923
C: No PK	452	43	\$882.50	\$37,947

In 2006-07, the average cost per student for remediation was \$882.50. Forty-four students in group A (two years of pre-kindergarten) needed one or more rounds of remediation in reading for a total cost of \$38,830. In group B (one-year of pre-kindergarten) there were 138 students for a total cost of \$121,923 and in group C (no pre-kindergarten) there 43 students for a total cost of \$37,947. In question nine, the analysis done on the numbers of retentions among the groups showed no significant difference.

In 2007-08, the average cost per student for remediation was \$868.50. The average cost for remediation actually decreased. In group A (two years of pre-kindergarten) there were 88 students who needed one or more rounds of remediation in the area of reading for a total cost of \$ 76,384. In group B (one-year of pre-kindergarten)



there were 158 students for a total cost of \$137,223, and in group C (no pre-kindergarten) there 117 students for a total cost of \$ 101,614.

Table 72

*Remediation Costs for Third Graders (2007-2008) in 2008 Dollars*

Groups	Group Total	Number Who Needed Remediation	Cost Per Student	Total Cost
A: 2 years of PK (ages 3 and 4)	388	88	\$868.50	\$76,384
B: 1 year of PK (age 4)	922	158	\$868.50	\$137,223
C: No PK	389	117	\$868.50	\$101,614

The unknown variable with retention costs is how many students received remediation between kindergarten and second grade. That information is not documented in district data systems, and would only be accessible through each campus. However, based on the TAKS results the district can predict the numbers of students in each group that will continue to need remedial services, and are at-risk for dropping out.

In conclusion, the purpose of the above data analysis was to determine if there was a statistically significant difference in academic performance among the three study groups: group A had two years of pre-kindergarten, group B had one year of pre-kindergarten, and group C had no pre-kindergarten. The data analysis also studied the costs associated with the pre-kindergarten program expansion and maintenance, as well as to determine if there were any cost benefits. The findings will be discussed and analyzed in the next chapter.

## CHAPTER FIVE

### Discussion, Conclusions, and Recommendations

As stated in Chapter One, the purpose of this research project was to study the academic performance and progress of students who attended two years of full-day pre-kindergarten in the San Antonio Independent School District (SAISD) with those who attended one year of pre-kindergarten in SAISD and those who did not participate in pre-kindergarten at all. Since expansion of SAISD's pre-kindergarten program in 2001, the district has successfully provided a full-day program for over 4,000 three- and 4-year-old students. The expansion included moving from a half-day to a full-day schedule and enrolling eligible 3-year-old students.

Costs associated with the expansion included building new facilities; modifying existing classrooms; hiring additional staff (teachers and administrative); and purchasing additional furniture, equipment, and supplies. At the time of SAISD's pre-kindergarten expansion, the district was awarded funding from the Texas Pre-kindergarten Expansion Grant Program. The grant funds provided a significant portion of funding for the costs associated with increasing enrollment and expanding to a full-day program but fell short in covering all incurred district expansion costs. Like many school districts throughout the nation, SAISD has faced increasing costs in providing all standard and required educational functions, while at the same time working with declining revenue from all streams of funding. As a result, the district must review all programs to determine efficiency, effectiveness, and viability.

Texas implemented the Pre-kindergarten Expansion Grant as a result of research that had drawn conclusions that a high-quality pre-kindergarten program has positive benefits for at-risk children. Most notably, the research concluded that at-risk children who participated in high-quality pre-kindergarten programs made greater academic gains documented by improved test scores, decreased numbers referred for special education, decreased grade level retentions, increased level of educational attainment, decreased drop-out rates, and lowered incidences of juvenile criminal activity.

Expanding pre-kindergarten services to include eligible 3-year-olds was a unique part of the pre-kindergarten program in SAISD. However, current economic conditions and declining revenue requires tightening of the budget and forcing the district to look at the viability and necessity of all of their programs in meeting state legislated requirements. Since providing pre-kindergarten for 3-year-olds is not a mandated state requirement; the district must ask themselves some important questions:

1. First, is there a measurable academic impact for children who participated in the program for two years compared with children who participate for one-year or did not participate at all?
2. Second, can additional costs associated with providing these services be justified when measured against potential reduction in other district programs?

### *Discussion of Results*

To provide answers to these questions, the researcher collected and analyzed academic performance and progress of three groups of students who had participated in the district's pre-kindergarten program for two-years, one-year, or had not participated in pre-kindergarten at all. The three groups were analyzed by performance on grade level

Texas state assessments in academic core elements of reading and mathematics. The students identified for this research were third graders in 2007 or 2008 that had been continuously enrolled in SAISD from their point of entry into school through third grade.

The researcher collected data from development of reading skills as students in the three study groups progressed from kindergarten through second grade. Students in SAISD were measured on the development of reading skills using either the Texas Primary Reading Inventory (TPRI) for English speaking students or the Tejas Lee Inventory for Spanish speaking students. Students were assessed at the end of kindergarten and first grade in the areas of phonemic awareness, graphophonemic knowledge, and comprehension. In second grade, students were assessed at the end of the year on their development in the areas of graphophonemic knowledge and comprehension.

Statistical analysis of the TPRI results revealed a significant difference among the three study groups in the areas of phonological awareness in kindergarten, graphophonemic knowledge in first grade, and comprehension in kindergarten, first grade, and second grade.

In order to identify among which groups these differences occurred, a multiple comparison statistical analysis was done. The results from the multiple comparison analysis showed that there was no statistical difference among the groups.

Based on the findings from published research studies, the expected result for this study was that pre-kindergarten participants would have a higher performance rate in reading development than those that did not participate in pre-kindergarten. However,

the analysis of data showed there were no data indicating a statistically significant difference in performances among the study groups.

The Tejas Lee reading assessments were administered to Spanish speaking students from kindergarten through second grade and the analysis showed no significant differences among the three groups. This finding held true in all skill areas and in all three grade levels assessed. Analytical results of these data indicated that for the Spanish speaking students, attending pre-kindergarten for either two-years or one-year did not have a significant impact on the development of reading skills.

The study also looked at student performance on the third grade administration of the Texas Assessment of Knowledge and Skills (TAKS) in both reading and mathematics. Beginning in 2003, Texas required that third grade students pass the third grade TAKS in reading or they were retained in third grade. This ruling applied to the students in the three study groups. Bilingual students were given the TAKS tests in Spanish based on LPAC recommendations.

The results of the TAKS reading assessment, first administration, in English showed that there was a significant difference among the groups in passing rates. However, the multiple comparison analysis results showed that there was no statistically significant difference among the groups. This finding indicates that attending pre-kindergarten versus not attending pre-kindergarten does not impact the number of students who pass the TAKS reading assessment in third grade. Because of the conflicting results, additional analysis of other cohorts of students, as well as this group of students as they progress through school, would need to be done.

Commended levels of performance on the third grade reading TAKS were also analyzed. This is important, because commended levels of performance indicate that students have a solid mastery of reading skills. For students, having strong reading skills will enable them to successfully progress through school. For the district, it means reduced costs associated with struggling students. The findings of the analysis on the commended level performance in reading show there was no significant difference among the three groups. This indicates that participation in pre-kindergarten, either for two years or one year, does not have an impact on students performing at high levels in reading.

In regards to the first administration of the TAKS reading performance on the Spanish version, the findings show there was no significant difference among the groups. There was also no significant difference among the groups on the commended level of performance on the Spanish TAKS reading. As with the results from Tejas Lee, it appears that attending pre-kindergarten for either two-years or one-year does not significantly affect the reading performance of third grade bilingual students on the first administration of the TAKS reading assessment, nor does it affect the commended level performance rate. This in and of itself, is a finding that should be further studied. The lack of any significant differences could be due to the limited sample size of the three bilingual study groups, or it could signify that for bilingual students, there are other factors affecting this grouping of students. Additional groups of students would need to be studied to see if the results repeat or change.

Mathematic performance among the three groups was also studied. The research specifically looked at the third grade TAKS mathematics performance, in English and

Spanish, of the three study groups. The findings showed that there was a statistically significant difference in the numbers of students passing on the English TAKS.

Additional analysis to pinpoint where the differences occurred showed there was a difference between the performance of both pre-kindergarten groups (Groups A and B) and the kindergarten only group (Group C). There was not a difference between the two pre-kindergarten groups. Therefore, attending pre-kindergarten, either for one year or two years, did have a significant impact on the math performance, when compared to the group that did not attend pre-kindergarten. However, the study does not show that the extra year of pre-kindergarten makes a significant impact. An analysis of the commended level of performance on the TAKS mathematics assessment showed no significant difference in the English performance.

The findings from the analysis of the TAKS mathematics performance in Spanish showed there was no difference among the three groups. However, the findings did show there was a significant difference among the groups on the commended level performance. The additional analysis to pinpoint where the differences were was not successful.

Improving school success and reducing the need for remediation is the main purpose of providing a pre-kindergarten program. The analysis of the reading and math performance of the students in the three study groups showed some significant differences that indicate pre-kindergarten might make a difference. But, the results from the multiple comparison analysis could not pinpoint among which groups differences occurred. The only conclusive academic performance area was the mathematics performance in English, which showed a significant difference between both pre-

kindergarten groups and the non pre-kindergarten group. In addition, with our main question in this study, there were no findings that indicated an additional year of pre-kindergarten made a difference in a student's progress through third grade. One of the reasons that these results may not match those found in research is the relatively small samples of children.

The academic findings also have financial implications for the school district. Academic performance is connected to retention, remediation, and drop-out rates, all of which add additional financial burdens to the district. If pre-kindergarten can improve the academic performance of students, then the costs associated with student failures will be reduced. Additionally, school districts receive federal Title I funds based on need and student performance. School districts that do not meet the Adequate Yearly Progress (AYP) measures established by the federal government may lose federal Title 1 funds. In Texas, the AYP is measured by the results of the TAKS reading and mathematics assessments. Losing federal Title 1 funds would have a huge impact on SAISD. As an urban district, with a high percentage of economically disadvantaged students, SAISD receives up to 25% of their budget from federal funds.

The findings on retention rates showed that there was a significant difference in numbers of retentions between Group A (two-years of pre-kindergarten) and Group C (no pre-kindergarten), as well as Group B (one-year of pre-kindergarten) and Group C (no pre-kindergarten). This signifies that attending pre-kindergarten, either for one or two years, does have a significant impact on retention rates. This is an important benefit for the district in terms of costs. When a student is retained, the district has to fund an additional year of education for that student. In addition, students who are retained often



need additional remediation, which costs in terms of tutoring, materials, and extended year services. Reducing retention rates also benefits the district in terms of drop-out costs, as students who have been retained are also at-risk for dropping out of school. Drop-outs cost the district in terms of drop-out prevention programs, credit recovery programs, and the overall district performance. When a district's performance does not meet state or federal required performance levels, then a district is in danger of losing state and or federal funding. If pre-kindergarten can decrease the number of retentions, then the cost of the pre-kindergarten program might cancel out or even decrease the amount spent on students who are retained in later years.

Special education identification was another indicator studied. The reduction of students identified for special education has been shown as one of the benefits of a high-quality pre-kindergarten program. Providing special education is also a major cost for school districts. The average cost of educating a special education student is double or more than the cost of educating a general education student. The researcher looked at the number of students in each of the three study groups that had been identified for special education. The analysis of these data showed that there were not significant differences among the three study groups. Thus, in this study it does not appear that attending pre-kindergarten, either for two-years or one-year, reduced special education identification. This lack of significant differences means that the district did not benefit from lowered costs in the area of special education. On the other hand, entering school at an earlier age may have the benefit of earlier identification of disabilities for some students, which affords these students earlier interventions.

The final area studied on academic performance was the number of students in each group that needed remediation. The researcher did this by looking at the number of students in each study group that did not pass the first administration of the reading TAKS assessment. For each of these students the district was required to provide remediation prior to the next administration of the TAKS assessment. The findings showed there were no significant differences among the three groups on the English TAKS assessments. However, there was a significant difference on the Spanish TAKS. Additional analysis identified that there was no difference between group A (two-years of pre-kindergarten) and group C (no pre-kindergarten). What the district must consider is that if pre-kindergarten (two-years or one-year) does not significantly reduce the number of students who need remediation in later grades, the district is not benefitting in cost reduction.

The final two questions in the study looked at the costs associated with providing the program, as well as costs associated with retention, special education, and remediation. As discussed in several cost-benefit analyses of pre-kindergarten programs, it is not easy to provide monetary values to all of the benefits associated with the program (Barnett, 2005). In this study, the researcher was able to identify the costs for SAISD associated with the expansion of the program in 2001, as well as the costs required to provide the service each year thereafter.

The Texas Pre-kindergarten Expansion Grant enabled the district to expand from a half-day program to a full-day program. This benefitted students with additional time in an educational setting and had the added benefit of allowing parents to enter the workforce. As with many other cost-analysis studies, the researcher could not

definitively identify the number of parents who have been able to go to work full-time because childcare was no longer an issue. However, the childcare issue was one reason SAISD moved to a full-day pre-kindergarten program. Working parents often had a difficult time procuring childcare and transportation for a half-day pre-kindergarten program. Adding 3-year-olds to the program provided children with two years of additional time in an educational setting, and provided parents an additional year of being in the workforce.

Another part of the SAISD pre-kindergarten expansion, was the addition of 3-year-olds to the program. On average, 33% of the enrolled pre-kindergarten students each year were 3-year-olds. The ratio for a classroom of 4-year-olds is 2:22; whereas, the ratio for 3-year-olds is 2:20. This means more teachers and assistants are needed for 3-year-olds. When SAISD expanded to include 3-year-olds, it equated to adding 49 teachers and 49 classroom assistants to accommodate this group. This is a recurring expense.

Another part of the expansion involved increasing the classroom capacity. SAISD used a bond to build 31 early childhood facilities, and remodel 54 classrooms. Grant funds were used to purchase materials, furniture, and supplies for the new classrooms. These were one-time expenses. Since the expansion year, the SAISD has funded their pre-kindergarten program through Texas pre-kindergarten expansion grant funds and state ADA funds. Since the district only receives half-day ADA funding for pre-kindergarten students, the grant money made up the difference. On average the district received \$6.2 million annually in grant funds. However, even with the grant and

ADA funding, the district has still had to provide an additional \$16 million of funds from other revenue sources.

This research study looked at academic performance, retention rates, special education participation, and remediation. Strong academic performance is a desired outcome for the program in terms of cost benefits. The findings showed a minimal difference in academic performance, among the three groups. The most notable performance area was in math, while the reading performance was inconclusive. While we cannot definitively say that the program participants did not benefit, we did not find any results that substantiated a difference between two-years of pre-kindergarten and one-year of pre-kindergarten. There were some potential differences between the pre-kindergarten group and no pre-kindergarten group, which supports having the program.

The costs of remediation, special education, and retention all create additional costs for the district. Retaining a student includes the costs of providing an additional year of education for the child being retained. While this study found significant differences, the multiple comparison analysis did not pinpoint where the significant differences were. It is true that the cost of a year of education at the age of three will be less costly than a repeated year in later grades. However, if that extra year of pre-kindergarten does not affect the retention rate, it ends up costing the district more. The Abcedarian study estimated that participation in a high-quality pre-kindergarten program can reduce retention rates by forty percent (Masse & Barnett, 2002). While this study compared retention rates among the three groups, this study could not determine if retention rates had been reduced with the SAISD pre-kindergarten program. The researcher noted that the year 2003 was the first year of the Student Success Initiative

(SSI), which required that students in third grade who did not pass the reading TAKS test were to be retained. This prohibited the researcher from looking at retention rates prior to the implementation of the program and comparing them to retention rates in the study groups. Students in the subject groups fell under the SSI rule; whereas, students prior to the expansion did not. Overall, the district experienced an increase in retentions, so determining if pre-kindergarten was a variable in reduction could not be done.

Remediation costs were another variable considered in the study. The Abcedarian program study found that the district saved on average 18% on remedial services. And in other research studies, one of the main benefits noted in all of them was the reduction in remedial services. In this study, the findings showed that there was a significant difference among the groups that took the Spanish reading TAKS. This would indicate that the district saved on providing remedial services to students who attended pre-kindergarten. Interestingly, the Tejas Lee and TAKS Reading's first administration in Spanish did not show significant differences with this group. This could be due to the small sample sizes in the bilingual groups, or that the differences are so slight in all of the different analyses that this is the only indicator where differences were indicated. There were no significant differences on the English TAKS reading re-testing groups.

Looking at just the 3-year-old cohorts, none of the cost-benefit analyses done by other researchers have looked at programs that provided pre-kindergarten for two years versus one year. During the nine years of service for 3-year-olds, the percentage of 3-year-olds in the program has averaged about 33% of the total enrolled, which is \$15 million of the total cost. If the district was not providing services for 3-year-olds, it would cost them \$15 million less, \$8 million of which comes from local or other district

funds. There are an average of 49 teachers and 49 instructional assistants dedicated to the 3-year-old population, which would save the district in salaries and benefits if the district was not providing a program for 3-year-olds.

The district also needs to look at the movement of students. Of the 3,800 students who begin in pre-kindergarten, only approximately 33% stay continuously enrolled in the district from pre-kindergarten through third grade. The district is funding approximately 2,500 students, at the cost of \$18 million for one year of pre-kindergarten, and \$5 million for the 3-year-olds. This is a total of \$23 million spent on students who do not remain continuously in SAISD.

One final issue that SAISD needs to look at is the loss of funding. In the 2009-2010 school year, the district lost the funds from the state Pre-kindergarten Expansion Grant. One ramification of this is a loss of \$6-\$7 million per school year. The district will more than likely not get these funds back. Therefore, the district will have to look at additional sources of funding, such as local funds, to continue to provide the same level of service for pre-kindergarten students.

When making decisions about the program, the district also has to consider the potential benefits of pre-kindergarten that were not studied in this project. As noted in other well-known research studies, other benefits that have been seen with high-quality pre-kindergarten program participants include the following: reduction in drop-out rates, increased graduation rates, higher education participation and attainment, increased earnings of participants which means increased tax revenues, increased earnings of mothers, improved child welfare, and a decrease in crime as well as costs to the justice system (Masse & Barbett, 2002; Aguirre et al., 2006). The students in this study are still

too young to study drop-out rates, educational attainment, participant earnings, and criminal statistics. In addition, we have no comparisons with other studies or programs, to see if the additional year of pre-kindergarten increases these particular benefits. But these are additional potential benefits, not only for the participants, but for the families, district, and the community, that the district must consider when making decisions about the program.

All of this is based on assumptions about the future and making predictions about wages and taxes. Will the district save by reducing the costs of retentions, remediation, and drop-out prevention programs? Will the district benefit from increases in taxes due to increases in wages due to higher education attainment? Will the community benefit? What is clear is that the benefits to society as a whole could be quite positive. The Bush study projected that for every dollar spent on a pre-kindergarten program, Texas would have a return rate of \$3.31 (Aguirre et al., 2006). The average cost of educating one student in SAISD is approximately \$8,000, applying the formula from the Bush study shows that the return rate would be \$26,480 per student. This indicates that there could be potential significant returns from the program, both in the short term and the long term.

Clearly, there are more questions than answers in looking at the results in this study. While some areas studied showed benefits between the pre-kindergarten groups and the non pre-kindergarten group; there was nothing that showed benefits between two-years of pre-kindergarten and one-year of pre-kindergarten. Furthermore, even if the district suspended the 3-year-old program at this point in time, there are additional cohorts of students that could be studied as they progressed through school to determine

if there are additional costs benefits. It is important that the district continue to look at all of the students who have participated in the pre-kindergarten program. This study looked at three cohorts of students, but additional cohorts should be looked at as well. Also, the groups in this study should be studied as they continue to progress through school to see if they show differences in drop-out rates, graduation rates, higher education pursuits, and criminal rates.

### *Conclusions and Recommendation for SAISD*

What this research study has shown, is that SAISD has implemented a strong, viable pre-kindergarten program for eligible three- and 4-year-olds. The district strategically used the Texas Pre-Kindergarten Expansion Grant, to expand the program in ways that met the needs of both students and families. The program provides full-day services which enable young children to be in an educational environment and full-day care for parents so they may work. The district went further by proposing a bond that led to the building of 31 early childhood facilities and remodeling existing early childhood classrooms to meet the needs of their youngest learners.

Expanding the program to include 3-year-olds was a bold move, as most state funded pre-kindergarten programs do not include 3-year-olds. However, this segment of the SAISD program may not be producing benefits that justify the costs. This research study showed that while there are some benefits for students who attended pre-kindergarten versus those who did not; there were no findings that showed a difference between those who attended for two-years versus those who attended for one-year. The cost of providing the additional year of pre-kindergarten is \$11 million, of which the district is responsible for \$3-4 million.



With the current financial climate, funds are tight from all revenue streams – local, state, and federal. In addition, the district must look at the loss of the \$6 million in grant funds. This means the district has to pick up more of the cost for its pre-kindergarten program. District options include returning to a half-day model. The pros of this recommendation are that it would reduce the number of staff needed. The cons would be that it would create hardship for families, create loss of jobs for staff, and would potentially reduce the number of students being served. After providing full-day for over nine years, this would not be a popular recommendation.

Another option would be to provide services only for 4-year-old students. Eliminating services for 3-year-olds would take off \$11 million from the total cost of pre-kindergarten, and save the district an estimated \$3-4 million. This would help defray the additional \$6 million in costs to the district, due to the loss of grant funds. However, cutting services for 3-year-olds would also create excess staff that the district would have to either absorb with attrition, or cut.

In summarizing the results the researcher has compiled pros and cons for the SAISD pre-kindergarten program that might assist the district in making decisions about its future. The pros are as follows:

- On average approximately 62% of kindergarten students attended pre-kindergarten as 4-year-olds.
- Students who are in pre-kindergarten are getting full-day educational experiences versus day-care and other alternatives.

- Pre-kindergarten attendance showed that there was a positive effect in the area of math performance, retention rates, and in some areas of reading development.
- While the study could not determine if there were benefits for attending an additional year of pre-kindergarten, there are some benefits for 3-year-olds that could not be measured by performance and costs. Namely, students were provided a full-day educational environment versus day-care and other alternatives. And it also provided mothers an additional year of being able to enter the workforce.
- There is the potential for additional benefits that cannot be measured at this time, but may constitute an investment in the future. These include decreased drop-out rates, higher educational attainment, reduced costs to taxpayers, increased income earnings, reduction in crime, decreased need for welfare, and overall economic benefits.
- The infrastructure for the pre-kindergarten program is already in place. This includes facilities, materials, program structure, and trained staff.
- Local business, educational institutions, and the SAISD community strongly support the SAISD pre-kindergarten program.

However, in light of the positives for the pre-kindergarten program, there are some negatives. The cons include the following:

- There are no significant findings or cost reductions to support benefits for children attending the program an additional year as 3-year-olds.

- Only 62% of kindergarten students attended pre-kindergarten. Does this mean that 3-year-olds are taking spots away from 4-year-olds?
- SAISD has lost the \$6 million in pre-kindergarten expansion grant monies, meaning they will have to cover the additional expense.
- Lack of a true cost-benefit analysis done by a trained expert.
- Quality, consistency, and alignment of primary instruction (kindergarten through second grade).
- Lack of accountability for kindergarten through second grade instruction and performance.

One of the biggest questions that emerged from this study is why the SAISD pre-kindergarten program did not produce similar results as those found in other studies. One possible answer is the issue of “high-quality” in a pre-kindergarten program. The annual NIEER reports of 2007, 2008 and 2009 show that the state of Texas only met four of the 10 indicators that show a high-quality pre-kindergarten program. If the SAISD pre-kindergarten program mirrors the findings for the state of Texas and is meeting only some of the quality indicators, then in fact, their program may not be performing at a high standard such as the ones in the case studies. Improving the quality of the pre-kindergarten program may increase the performance and progress of the participants, as well as, show more substantial cost benefits.

As research has shown consistently, high-quality pre-kindergarten programs can produce benefits for participants, school districts, and over-time for society as a whole. SAISD has already established the infrastructure for a solid pre-kindergarten program, the recommendation based on this study is for the district to find ways to strengthen the

program. First, the district needs to identify the strengths and weaknesses of the program, through a quality program framework, such as the NIEER quality indicators or NAEYC program indicators. Since the research clearly states that it is a high-quality program that produces the most benefits, if SAISD can improve on the quality of their pre-kindergarten program then the academic outcomes would be expected to improve.

In order for the district pre-kindergarten program to reach the high-quality level, they must look at the quality standards that need to be improved to higher levels or added to the program. The quality standards that the district pre-kindergarten program must have include: an exceptionally strong curriculum focusing on math and reading, low teacher to student ratio, strong teacher qualifications, effective interventions, and good communication between teachers and students (Aguirre et al., 2006). On the NIEER report, it showed that Texas does have comprehensive curriculum standards for pre-kindergarten, it is lacking on a strong emphasis on reading and mathematics. It is this factor that has been shown to exist in exemplary pre-kindergarten programs throughout the nation (Masse & Barnett, 2002; Aguirre et al., 2006). In addition, Texas does not have a parent component requirement for pre-kindergarten, and neither does SAISD. This is another quality indicator that has been identified as a significant component of successful programs (Aguirre et al., 2006).

Next, since 90% of the district student population is identified as economically disadvantaged, SAISD needs to take measures to serve more 4-year-olds in the pre-kindergarten program, before considering 3-year-olds. Currently, of the kindergarten students entering school each year, approximately 67-70% attended pre-kindergarten. If 90% of kindergarteners match the district demographics, then 90% are economically

disadvantaged. Potentially, the district is missing 20-23% of children, that are eligible, but not attending pre-kindergarten. While this option does not necessarily reduce the costs of the program, it will provide more at-risk children with at least one year of preschool experience.

Another recommendation is that the district needs to take advantage of the data from the pre-kindergarten CIRCLE assessments to identify strengths and weaknesses, as well as provide timely interventions for students in need. While the district has interventions in place for kindergarten through 12th grade, intervention support for both academic and behavior are needed for the youngest learners. Although pre-kindergarten can be considered an intervention, simply attending pre-kindergarten may not meet the needs of students. As stated above, providing strong, timely interventions is a quality indicator of a good program. In addition, the district needs to collect data at the beginning of kindergarten to determine school readiness levels. Without this data, there is no way for the district to truly develop a picture of the success of the pre-kindergarten program to prepare students for school success. Clearly, the results of this study show that the expected academic gains are not evident.

Another possible reason for the lack of significant findings might be the strength and alignment of the primary program (grades kindergarten through second grade). As the district was not using assessments with pre-kindergarten students in the groups studied for this project, there was no way to determine if students entering kindergarten met the criteria for being ready for kindergarten. There was simply no measure to see where students had progressed at the end of each year of pre-kindergarten. The district now uses the CIRCLE assessment with pre-kindergarten students, which would help

answer this question. It would also help determine if the lack of progress begins from pre-kindergarten or if it begins later in the primary grades. While, kindergarten through second grade were assessed using the TPRI or Tejas Lee, there was not a mathematical assessment for these grades. This meant that there was no measure of math skills as students progressed. It is an interesting finding that the area where the most significant differences occurred was on the mathematics TAKS performance, in both English and Spanish.

Along with consistent and systematic evaluation of students, is the need for a strong vertical alignment in the curriculum from pre-kindergarten through third grade. When the students in the study groups began in the program, the district had just begun developing a scope and sequence. In 2006, after a district wide curriculum audit showed that the district did not have a vertically aligned curriculum, SAISD developed one. However, there is still a division between the Early Childhood Education department which oversees pre-kindergarten and kindergarten, and the 1st-12th grade reading and math departments. This separation, between the departments, may be contributing to a lack of alignment in reading and math as students progress from pre-kindergarten through third grade. There needs to be a connection between pre-kindergarten and the primary grades. The district needs to keep in mind that the programs that have shown the most promising outcomes for students, have a strong focus on language development. Furthermore, high-quality pre-kindergarten programs are highly focused on reading and mathematics development (Aguirre et al., 2006).

Additional recommendations for SAISD include conducting interviews and surveys of early childhood specialists, teachers, and administrators from pre-kindergarten through second grade to begin identifying strengths and weaknesses of the program. Analyze the performance of additional cohorts to see if the results mirror those of the students in this study, or show increases or declines. In addition, the district should continue studying the groups through graduation to see if anticipated benefits such as drop-out reduction, increased graduation rates, and higher education attendance occur. In other words, is the SAISD pre-kindergarten program seeing the same benefits as those studied in other research projects?

Although, this is the study of one district's pre-kindergarten program and should not serve as the sole model for implementation; there are some findings, although small, that indicates there are some positive outcomes to providing a full-day prekindergarten program. The recommendation is that the district continues to investigate student performance beginning with pre-kindergarten pre-and- post assessments, and then follow student groups as they progress through third grade. If the district can pinpoint where the academic performance levels off, they would have a better understanding on the effectiveness of their pre-kindergarten program. For example, if the problem is occurring between kindergarten and second grade, then the district needs to focus on the teaching and learning occurring in those grades.

The main questions of this study were does an additional year of pre-kindergarten provide additional benefits for students and does it justify the costs. In short, this could not be determined from this study. While, the district would save money by not providing services for 3-year-olds, the study also raised more questions. The researcher

recommends that more studies be done on additional cohorts to see if the program has strengthened over time. The students in this study were in the first three years of the program, and there are seven more years of the program. In addition, it is recommended that the district seriously look at assessment, curriculum alignment, and quality indicators in order to strengthen the program.

### *Recommendations for Additional Research*

As a result of the findings and conclusions of this study, the following recommendations for additional research are suggested:

- Replicate the study with larger samples of students in each of the study groups to determine if there is a closer match with the findings from other research studies.
- Expand the study to include the SAISD third grade students in 2008-2009 and 2009-2010, who were continuously enrolled and attended pre-kindergarten for two years, pre-kindergarten for one year, and did not attend pre-kindergarten.
- Conduct a surveys and interviews of early childhood specialists, pre-kindergarten through 3rd grade teachers, administrators and parents of the SAISD pre-kindergarten program, in order to identify strengths and weaknesses of the program.
- Continue following the groups in this research study through graduation to see if anticipated benefits, such as, drop-out reduction, increased graduation rates, and higher education attendance occur. Is the SAISD program seeing the same benefits as those studied in other research studies?
- Apply the NIEER pre-kindergarten high-quality standards and the NAEYC standards to the SAISD pre-kindergarten program to determine which high-



quality standards are evident and which high-quality standards are not evident in the program.

- As most curriculum resources for early childhood programs are designed for a half-day program, the researcher recommends the following. Research and identify high-quality pre-kindergarten curriculum that has been designed for a full-day program.
- Analyze the results from the beginning of the year and end of year pre-kindergarten CIRCLE assessment results, beginning with the 2004-2005 pre-kindergarten cohort and each year thereafter to determine if findings are aligned with current research.
- Identify other districts in the state of Texas who provide full-day pre-kindergarten for 3-year olds and replicate this study to see if there are similar findings.

In conclusion, since pre-kindergarten and other types of early childhood education programs have been expanding rapidly throughout the nation, it is imperative that those implementing these programs are doing so effectively. Research has clearly shown that high-quality pre-kindergarten programs do have a positive impact on the academic success of children from impoverished backgrounds. However, as these programs also are costly, educational agencies must be mindful of this and ensure that they are getting the results needed.

## REFERENCES

- Aguirre, E., Gleeson, T., McCutchen, A., Mendiola, L., Rich, K., Schroder, R., et al. (2006). *A cost-benefit analysis of universally-accessible pre-kindergarten education in Texas*. College Station, TX: The Bush School of Government and Public Service, Texas A & M University.
- America's Children. (2002). *America's children: Key national indicators of well-being*. Retrieved from <http://www.childstats.gov>
- America's Children. (2009). *America's children: Key national indicators of well-being 2009*. Retrieved from [http://www.childstats.gov/pdg/ac2009/ac\\_09.pdf](http://www.childstats.gov/pdg/ac2009/ac_09.pdf)
- Barnett, S. W. (2005). Preschool education: A concept whose time has come. *Principal*, 85(1), 15-18.
- Barnett, W. S., Lamy, C., & Jung, K. (2005). The effects of state prekindergarten programs on young children's school readiness in five states. *The National Institute for Early Education Research*, Rutgers University.
- Brooks-Gunn, J., & Markman, L. (2005). The contribution of parenting to ethnic and racial gaps in school readiness. *The Future of Children*, 15(1), 139-268
- Boyer, E. (1993, March). Ready to learn: A mandate for the nation. *Young Children*, 54-57.
- Christina, R., & Nicholson-Goodman, J. (2005). *Going to scale with high-quality early education: Choices and consequences in universal pre-kindergarten efforts*. Santa Monica, CA: Rand Corporation.
- Collins, R., & Ribeiro, R. (2004). Toward an early care and education agenda for Hispanic children. *Early Childhood Research and Practice*, 6(4), 23-45.
- Edwards, D. (1999, Fall). Public factors that contribute to school readiness. *Early Childhood Research and Practice*, 1(2), 1-11.
- Evans, R. (2005). Reframing the achievement gap. *Phi Delta Kappan*, 86(1), 582-900.
- Frede, E., Jung, K., Barnett, W. S., & Figueras, A. (2009). *The APPLES blossom: Abbott preschool program longitudinal effects study (APPLES), Preliminary results through 2nd grade*. New Brunswick, NJ: National Institute for Early Education Research.

- Jacobson, L. (2002). Quality counts 2002: Building blocks for success. *Defining Quality*. Downloaded from [www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21](http://www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21)
- Gallagher, J.J., Clifford, R. M., & Maxwell, K. (2004). Getting from here to there: To an ideal early preschool system. *Early Childhood Research and Practice*, 23(1), 32-34.
- Gilliam, W. S., & Zigler, E. F. (2004). State efforts to evaluate the effects of prekindergarten 1977 to 2003. *Early Childhood Research Quarterly*, 1(1), 441-473.
- Gormley, W. T., Jr., Phillips, D., & Gayer, T. (2008). Preschool programs can boost school readiness. *Science*, 320, 1723-1724.
- Gultek, G. L. (2001). *Historical and philosophical foundations of education, Third edition*. Upper Saddle River, NJ: Merrill Prentice Hall.
- Hoff, D. J. (2002). Quality counts 2002: Building blocks for success. *Measuring Results*. Retrieved from [www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21](http://www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21)
- Hustedt, J. T., Barnett, W. S., Jung, K., & Goetze, L. D. (2009). The New Mexico preK evaluation: Results from the initial four years of a new state preschool initiative. Final report. New Brunswick, NJ: National Institute for Early Education Research.
- Jacobson, L. (2002). Quality counts 2002: Building blocks for success. *Nurturing Caregivers*. Retrieved from [www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21](http://www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21)
- Kagan, S. (1994). Readyng schools for young children: Polemics and priorities. *Phi Delta Kappan*, 76(3), 226-233.
- Landry, S. H. (2005). *Effective early childhood programs: Turning knowledge into action*. Houston, TX: University of Texas Health Science Center at Houston, Center for Improving the Readiness of Children for Learning and Education.
- Marcon, R. A. (1994, November). Doing the right thing for children linking research and policy reform in the District of Columbia public schools. *Young Children*, 50(1), 8-20.
- Masse, L. N., & Barnett, S. (2002). *A benefit cost analysis of the Abecedarian early childhood intervention*. New Brunswick, NJ: National Institute for Early Education Research.
- Mitchell, A. (1989). Old baggage, new visions: Shaping policy for early childhood programs. *Phi Delta Kappan*, 70(9), 665-672.

- Morrison, G. (1997). *Fundamentals of early childhood education*. Upper Saddle River, NJ: Prentice-Hall.
- National Association of Elementary School Principals (NAESP). (2003). *Leading early childhood learning: What principals should know and be able to do*. Washington, DC: NAESP and Collaborative Communications Group.
- National Association for the Education of Young Children (NAEYC). (2005). *Early childhood curriculum, assessment, and program evaluation*. Retrieved from [www.naeyc.org/resources/positionstatement](http://www.naeyc.org/resources/positionstatement)
- National Center for Education Statistics. (2003). *Overview and inventory of state education reforms: 1990-2000. Ready for Success: Expanding effective early childhood education: Texas case study 2003*. Washington, DC: Author.
- National Institute for Early Childhood Education Research. (2007). *The state of preschool 2007*. Rutgers Graduate School of Education. Retrieved from [www.nieer.org](http://www.nieer.org)
- National Institute for Early Childhood Education Research. (2009). *The state of preschool 2009*. Rutgers Graduate School of Education. Retrieved from [www.nieer.org](http://www.nieer.org)
- North Central Regional Educational Laboratory. (1999). *Critical issue: Organizing for effective early childhood programs and practices*. Retrieved from [www.ncrel.org/sdrs/areas/issues/students/earlycld/ea100.htm](http://www.ncrel.org/sdrs/areas/issues/students/earlycld/ea100.htm)
- Olson, L. (2002). Starting early. Quality counts 2002: Building blocks for success. *Education Week*. Retrieved from [www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21](http://www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21)
- Quality Counts. (2002). In early-childhood education and care: Quality counts, Executive summary. Quality Counts 2002. Retrieved from [www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21](http://www.edweek.org/sreports/qc02/templates/article.cfm?slug=17measure.h21)
- Ramey, C. T., Ramey, S. L., & Stokes, B. R. (2009). Research evidence about program dosage and student achievement: Effective public prekindergarten programs in Maryland and Louisiana. In R. C. Pianta, & C. Howes (Eds.), *The promise of pre-K* (pp. 79-105). Baltimore, MD: Paul H. Brooks Publishing Co.
- RAND. (2005, March). Rand study says creating universal preschool in California would create benefits that surpass costs. Retrieved from <http://www.rand.org/news/press.05/03.30.html>
- Reynolds, A. J., & Temple, J. A. (1998). Extended early childhood intervention and school achievement: Thirteen findings from the Chicago longitudinal study. *Child Development*, 69(1), 231-246.

- Robinson, S., & Lyon, C. (1994, June). Early childhood offerings in 1992, Will we be ready for 2000? *Phi Delta Kappan*, 75, 775-778.
- Rowley, S. R. (1991). Do early childhood programs belong in elementary schools. *Principal*, 70(5), 29-31.
- Saluja, G., Early, D. M., & Clifford, R. M. (2001, May). Public school pre-kindergarten: Does it make a difference. *Principal Magazine*. Retrieved from <http://www.naesp.org/comm/p0501b.htm>
- SAISD. (2009a). San Antonio budget books 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009. Retrieved from <http://www.saisd.net>
- SAISD. (2009b). San Antonio district plan 2009: Pre-kindergarten program. Retrieved from <http://www.saisd.net>
- Schweinhart, L. (2004). *The high/scope Perry preschool study through age 40: Summary, conclusions, and frequently asked questions*. Ypsilanti, MI: High/Scope Research Foundation.
- Tejas Lee. (2010). Information. Retrieved from [www.tpri.org](http://www.tpri.org)
- Texas Education Agency. (2005). Definition of at-risk students. Retrieved from [http://ritter.tea.state.tx.us/peims/faq/faq\\_files/sheet009.htm](http://ritter.tea.state.tx.us/peims/faq/faq_files/sheet009.htm)
- Texas Education Agency. (2008a, November). *Texas Education Code, Chapter 29 – Subchapter E kindergarten and prekindergarten programs 2008*. Retrieved from [www.tea.state.tx.us/curriculum/early/preklaws](http://www.tea.state.tx.us/curriculum/early/preklaws)
- Texas Education Agency. (2008b). *Pre-kindergarten curriculum guidelines handbook*. Retrieved from [www.tea.state.tx.us/curriculum/early/preklaws/](http://www.tea.state.tx.us/curriculum/early/preklaws/)
- Texas Education Agency (2008c). *Student attendance accounting handbook, Section VII, Pre-kindergarten*. Retrieved from [www.tea.state.tx.us/student attendance accounting handbook/](http://www.tea.state.tx.us/student%20attendance%20accounting%20handbook/)
- Texas Education Agency. (2008d). Student success initiative. Retrieved from [www.tea.state.tx.us/studentsuccess/](http://www.tea.state.tx.us/studentsuccess/)
- Texas Education Agency. (2008e). Texas essential knowledge and skills. Retrieved from [www.tea.state.tx.us/teks/](http://www.tea.state.tx.us/teks/)
- Texas Education Agency. (2009). Student assessment division. Retrieved from [www.tea.state.tx.us/student.assessment/](http://www.tea.state.tx.us/student.assessment/)
- Texas Education Code, §29.153(a) *Texas Primary Reading Instrument*. (2010). Information. Retrieved from [www.tpri.org](http://www.tpri.org)

- U.S. Census Bureau. (2000). *2000 census data*. Retrieved from [www.census.gov/](http://www.census.gov/)
- U.S. Department of Education, National Center for Education Statistics. (2005a). *The condition of education 2005 (ES 2005-094)*. Washington, DC: US Government Printing Office.
- U.S. Department of Education, National Center for Education Statistics. (2005b). *Serving preschool children under title 1 non-regulatory guidance*. US Department of Education Office of Elementary and Secondary Education. Washington, DC: US Government Printing Office.
- U.S. Department of Health and Human Services. (2003). *State-funded pre-kindergarten: What the evidence shows*. Washington, DC: US Government Printing Office.
- Walsh, G., & Gardner, J. (2005). Assessing the quality of early years learning environments. *Early Childhood Research and Practice*, 7(1), 456-466.
- White House. (2002). *Good start, grow smart: The Bush administration's early childhood initiative*. Retrieved from [www.whitehouse.gov/infocus/earlychildhood](http://www.whitehouse.gov/infocus/earlychildhood)
- Warren, L. B. (2003). *Ready for success: Expanding effective early childhood education: Texas case study*. Washington, DC: Council of Chief State School Officers.
- Wong, V. C., Cook, T. D., Barnett, W. S., & Jung, K. (2008). An effectiveness-based evaluation of five state pre-kindergarten programs. *Journal of Policy Analysis and Management*, 27(1), 122-154.