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The Age and Condition of Texas High Schools as Related to Student Academic Achievement

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The Age and Condition of Texas High Schools as Related to Student Academic Achievement

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The Age and Condition of Texas High Schools as Related to Student Academic Achievement

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There are many inadequate high school facilities in Texas, and unfortunately many of these are found in areas of low socioeconomic status and high minority percentages. According to a Texas Comptroller's Office (2006) report on the conditions of school facilities in Texas, roughly 40% were considered in the categories of fair, poor, or needs replacing, with the average age of these facilities being 34.5 years old. Most states, including Texas, have not properly assessed high school buildings for indoor air quality, lighting, acoustical control, heating and air conditioning, electrical systems, or secondary science laboratories. It is also not clear if these conditions and the age of the building have an impact on student academic achievement in Texas.

This study investigated three research questions: (a) the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the Texas

Assessment of Knowledge and Skills (TAKS); (b) the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by TAKS; and (c) the relationship between building age and condition of public high schools in Texas and graduation rate?

This quantitative study utilized an ex post facto methodology to examine the relationship between the high school facilities and standardized test scores. This study sampled high schools whose data were presented in the 2006 Texas Comptrollers report and compared to TAKS data. The instrument utilized was developed and tested by the Texas Comptroller's Office. This study utilized an analysis of variance (ANOVA) and a regression model.

Statistically significant findings showed a relationship between excellent condition of a school, as compared to schools in lesser condition, and student TAKS scores in science, math, and English language arts scores. Age of the school also had a significant relationship: Schools over 49 years old had a significant impact on student TAKS scores in science, math, and English language arts. Similar findings showed a negative correlation between schools over 49 years old and graduation rate. Schools in excellent condition had a positive correlation to student graduation rate.

Determining the effect of inadequate high school facilities on student achievement can help inform the education and legislative communities of any correlations between the condition and age of a high school building and the academic achievement of the students in these buildings. Providing school facilities

that are safe and provide quality learning conditions are issues that must be addressed in Texas.

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CHAPTER 1

INTRODUCTION OF THE STUDY

Introduction

The earliest educational reformers realized the impact that educational facilities had on the learning environment. They understood that a high-quality, adequate, physical learning environment depended on appropriately designed school facilities. Not until 1865 was there a conscious, organized effort to create quality school facilities that positively influenced the programs inherent to an effective learning environment (Loughlin & Suina, 1982)

In the last 20 years, courts throughout the United States have entertained claims relating to disparities in school funding; Texas is no exception. Over the past several years, there has been a continuous stream of legal battles in the courtrooms of Texas to determine adequacy and equity of education funding. Most recently, the decision in *Neeley v. West Orange-Cove* (2005) led to radical changes in the taxing structure of the state and how financial resources are distributed to school districts. Even with these radical changes, the state legislature chose not to address adequacy of school facilities and equity in how state financial assistance for facilities is distributed.

Most recently, the infusion of rigorous state accountability plans and the No Child Left Behind Act of 2001 (2002) has made schools question the resources and conditions necessary for all students to learn at high levels. Many in the education profession argue, according to Schrag (2003), “If the states are making schools and students accountable, then surely the states have a reciprocal duty to make certain that the students have an opportunity to learn" (p. 6).

On May 1, 2006, the Texas Controller of Public Accounts, at the request of Senator Eddie Lucio, sent a survey to every superintendent in the state to help determine the current age and conditions of the schools in their districts. The results of this survey, which became available on October 16, 2006, were to be used to assist Senator Lucio as he prepared to file a bill to address adequacy of school facilities and the need for additional state revenue for facility improvements, but the 80th legislative session did not take up the issue.

The topic of adequate facilities is one whose roots stretch back to the landmark case of *Brown vs. Board of Education*. In this case, the Supreme Court combined five cases under the heading of *Brown vs. Board of Education* because they all sought the same legal remedy (Brown Foundation for Equity, 2006). The combined cases from Delaware; Kansas; South Carolina; Virginia; and Washington, DC, all referenced the conditions of the schools that African American children were forced to attend and how the schools were different from those that Anglo students attended. The Delaware case referenced the rural community of Hockessin, where African American students were forced to attend a dilapidated, one-room school house, whereas the Anglo children in the area were provided a better school facility (Brown Foundation for Equity, 2006). In the South Carolina case the court found that the schools designated for African Americans were grossly inadequate in terms of buildings when compared to the schools provided for Anglo children. In Virginia, one of the few public high schools available to African Americans in the state was Robert Moton High School in Prince Edward County. Built in 1943, it was never large enough to house its student population (Brown Foundation for Equity, 2006). Eventually, hastily constructed, tarpaper-covered buildings were added as classrooms. The gross inadequacies of these classrooms sparked a student strike in 1951 in which the students sought to acquire a new building with indoor plumbing (Brown Foundation for Equity, 2006).

Although the level of differences in school facilities might not be as dramatic today as it was prior to *Brown vs. Board of Education*, there is still a difference in the schools in suburban and wealthy districts versus schools in rural and urban, poor districts. In Texas, the current law (Texas Constitution, 2007, Article 7, §1) only states that schools need to be adequate enough to provide for a "general diffusion of knowledge." The recent court ruling (*Neeley v. West Orange-Cove,* 2005), however, stated that schools as a whole were indeed meeting this minimum requirement. Many in education do not necessarily agree that this is true on a school-by-school basis. Adequacy of school facilities has been addressed in many different ways in documented research and in state codes and laws, but one true definition of adequacy does not seem to exist.

Over the past three decades there has been a tremendous amount of interest from educational researchers regarding the influence the school physical environment has upon student achievement and attendance. Earthman (2004) stated, "There is sufficient research to state without equivocation that the building, in which student spends a good deal of their time learning, does in fact influence how well they learn" (p. 15). Numerous studies have indicated that students in inadequate facilities (those that lack an appropriate heating, ventilating, and air conditioning [HVAC] system; have poor lighting; are old; are noisy; lack functional furniture; and lack functional, secondary science laboratories) perform less well than students in adequate facilities. In Earthman's all-encompassing report, he found,

> With research conducted in four different states and two major cities the research findings give ample guidance as to what needs to be done to insure a healthy and productive physical environment for all students to permit them to learn to the limit of their capacities rather than hinder them in the acquisition of knowledge and skills (Edwards, 1991; Cash, 1993; Earthman et al, 1996; Hines, 1996; Lanham, 1999; Lewis, 2000). …Each researcher found a significant difference in the achievement scores of students in poor buildings (inadequate) and in good buildings (adequate). The difference these researchers found ranged from 3 percentile rank scores to 17 percentile rank scores. …In almost every report, the differences were statistically significant. (p. 16)

The elements necessary to address when considering a building adequate or inadequate are health and safety, age of the building, human comfort, indoor air quality, lighting, acoustical control, and secondary science laboratories (Earthman, 2004).

On October 16, 2006, Texas Comptroller Carole Keeton Strayhorn published the results of the Texas Comptroller's Office facilities study. A total of 309 school districts representing a cross-section of districts from across the state completed the survey (Texas Comptroller's Office, 2006). Results showed that school instructional facilities are on average 34.5 years old, well past the laws that define a current adequate facility. Districts with an economically disadvantaged student population of

80% or more reported the oldest average age of facilities (41 years), whereas districts with an economic disadvantaged student population of less than 30% reported the newest facilities (20 years old). Of the 309 districts reporting, 5.78% of the instructional facilities were reported as “poor” or “needing replacing,” with many others rating their buildings in “fair” condition (Texas Comptrollers Office, 2006). This study did not take into account specific adequacy standards, such as indoor air quality, lighting, acoustical control, and secondary science labs, but it did provide a baseline for the instructional facilities’ general condition.

To get a better picture of whether or not school facilities meet adequacy standards in all areas, a more specific appraisal instrument that local school districts can use to evaluate their buildings would have to be developed. For instance, Earthman (2004) reported that the state of Maryland developed an instrument that local school districts have used to evaluate their buildings. The data resulting from the evaluations have been used to help determine the cost to bring all buildings to the standard set by the task force. Further, the final report from the Maryland Task Force to Study Public School Facilities (2004) stated that the workgroup developed 31 fundamental elements, or minimum standards, deemed essential for a new school facility constructed in 2003. The fundamental elements were developed based on applicable federal and state requirements, state guidelines for various components of facilities, and local practices.

Texas could develop similar guidelines as those developed in Maryland, based on the codes and laws on “adequacy.” Once these standards were set, each campus leader could be responsible for evaluating campus buildings and reporting back to the appropriate state office. Once the reports were received, the state could determine the cost to get all buildings to an adequate level and then begin the process of funding such an endeavor so as to provide adequate learning facilities for all schoolchildren in Texas.

Statement of the Problem

In a large majority of schools, as students enter the classroom they are taking a step backwards in time. According to a Texas Comptroller's Office (2006) report on the conditions of school facilities in Texas, roughly 40% were considered in fair, poor, or needs-replacing condition categories, with the average age of these facilities being 34.5 years old. Most schools needing repair or upgrades are typically found in urban or rural areas that are more likely to have high numbers of economically disadvantaged students. The American Association of School Administrators (2004) noted that many school structures are unsafe and fail to meet safety codes; roofs leak; mold and poor indoor air quality are common; wiring is old and inadequate; and all of this can lead to lowering student achievement as much as 11%. Most states, including Texas, have not properly assessed school building adequacy as determined by indoor air quality, lighting, acoustical control, HVAC, electrical systems, or secondary science labs. Most states also have not compared the age and condition of buildings to the academic achievements by the students who attend school in these buildings.

Compounding the problem of school buildings in poor condition is the fact that graduation requirements for recommended and distinguished levels have now added more rigorous courses that will require good instructional facilities. Chapter 74 revisions in the Texas Administrative Code (2007) direct school districts to require four credits of mathematics instead of three and four credits of science instead of the previous three credits. These dictates, especially in science, will require schools to have more science labs that are properly equipped in order to fully cover all Texas Essential Knowledge and Skills (TEKS) objectives.

Schrag (2003) eloquently defined the issue by stating,

> There's incontrovertible logic, ethical, fiscal, and legal, in the tight two-way link between standards and adequate resources. If a state demands that schools and students be accountable—for meeting state standards, for passing exit exams and other test—the state must be held equally accountable for providing the wherewithal to enable them to do it. That means calculations to determine the cost of those resources. The most mundane entrepreneur asks the same question: How much will it cost to produce each unit? (p. 246)

Higgens, Hall, Wall, Woolner, and McCaughey (2005) stated, "Further empirical investigation should be carried out into key elements which are insufficiently covered in the research literature" (p. 37).

While the data have indicated that insufficient building conditions have led to lower academic achievement in other states in the nation, similar studies have not been conducted in Texas. Lair (2003) completed an extensive study of the impact of school facilities as compared to Texas Assessment of Academic Skills (TAAS) scores in Ysleta Independent School District. Lair recommended, "This study could be replicated in other districts across Texas. With the change from TAAS to TEKS, information influencing growth in student achievement is important. Studies must be conducted using TEKS as the criterion" (p. 64). Hughes (2005) examined the relationship of school design variable and student academic achievement in elementary schools in Texas, and Monk (2006) studied the adequacy of educational facilities and their impact on academic achievement at middle schools in Texas. An assessment of this kind has not been completed at the high school level in Texas. It is not clear if the age and condition of high school facilities have an impact on academic achievement in Texas.

Purpose of the Study

The purpose of this study was to determine what effect high school facilities' condition and age have on students' academic achievement in Texas and their ability to perform at an acceptable or better rating on standardized tests. This study examined the relationship between the high school building condition and age and the academic achievement of students who completed the Texas Assessment of Knowledge and Skills (TAKS) in science, math, and English language arts. The assessment of the school building condition came from the facility assessment completed in October 2006 by the Texas Comptroller's Office, in which a building could receive a rating of excellent, good, fair, poor, or needs replacing. The documentation of the school-building age also came from the recent facility assessment completed by the Texas Comptroller's Office. The TAKS scores in science, math and English language arts came from the Texas Education Agency (TEA) Academic Excellence Indicator System (AEIS) reports from testing completed in the spring of 2006.

Research Questions and Hypotheses

The following three research questions guided the research process:

1. What is the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

2. What is the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

3. What is the relationship between building age and condition of public high schools in Texas and graduation rate?

Further, the following three null hypotheses were tested:

1. There will be no significant relationship between the building condition of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building.

2. There will be no significant relationship between the building age of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building.

3. There will be no significant relationship between building age and condition of public high schools in Texas and graduation rate.

Methodology

This study used a quantitative methodology and an ex post facto design specifically to examine correlations between school building conditions and student performance on the state standardized test. As stated by Leedy (1974), while considered under the heading of experimentation, this method has little that is experimental about it. Mouly, as cited by Leedy (1974), stated,

> A relatively questionable quasi-experimental design is the ex post facto experiment, in which a particular characteristic of a given group is investigated with a view to identify its antecedents. This is experiment in reverse: instead of taking groups that are equivalent and exposing them to different treatment with a view to promoting differences to be measured, the ex post facto experiment begins with a given effect and seeks the experimental factors that brought it about. (p. 155)

This is a method of experiment that "pursues the truth and seeks the solution of a problem through the analysis of data" (Leedy, 1974, p. 155). Sometimes also referred to as *after the fact*, these experiments have a posttest-only, control design, where the control group is formed after the fact and after the variable of interest has had its effect (Krathwohl, 1993).

Definitions

The following operational definitions have been provided to clarify specific terms used throughout this study.

Academic achievement – A status that is determined through standardized testing measurement. For this study, the Texas Assessment of Knowledge and Skills (TAKS) was used—specifically, science, math, and English language arts scores.

Academic Excellence Indicator System (AEIS) – A reporting system used by the state of Texas to report all significant accountability data for school districts and individual schools in that district.

Age of facilities – Number of years since the initial construction date of the facility.

Condition of facilities – The condition is determined by the score the building was assigned by the district when completing the Texas Comptroller's Office survey of facilities in 2006. The scores include the designation of excellent, good, fair, poor, and needs replacing.

Environment for education – The building environment and its emphasis on physical comfort, ease of movement, and overall educational learning process and environment.

Location of facility – Urban (downtown), suburban (inside city limits, on the edge of town), and rural (outside major city limits, with sparse population).

Safety and security – The protection of the building and its occupants by ensuring and providing the safest possible condition.

Texas Assessment of Knowledge and Skills (TAKS) – An annual standardized assessment given to students in Grades 3–11 to determine academic progress.

Texas Education Agency (TEA) – Agency in charge of all primary and secondary education in the state of Texas.

Texas Essential Knowledge and Skills (TEKS) – The standardized curriculum as prepared by the TEA and used by districts and teachers as a guideline to preparing curricula for instruction.

Significance of Study

Determining the effect of the condition of school facilities on student achievement would help inform the education and legislative communities if a correlation exists between the condition and age of a school building and the academic achievement of the students in these buildings. If this study established that a correlation indeed does exist, the education and legislative communities could work together to identify school buildings in below average condition and provide the avenues to bring every school in Texas up to an adequate condition level. The Texas Comptroller's Office (2006) report established that school facilities are well aged. On average, participating districts reported that high schools (Grades 9–12) are 32.66 years old on average and have gone almost 8 years since last renovation. Major urban districts had, on average, the oldest facilities and the lowest percentage of facilities reported in good or excellent condition. The most upsetting finding in the Texas Comptroller's Office report is that districts with an economically disadvantaged student population of less than 20% reported the highest percentage of facilities in good or excellent condition, whereas districts with an economically disadvantaged student population of 80% or more reported the lowest percentage of instructional facilities in good or excellent condition. What was not clear, however, is if the age and condition of these facilities have an impact on student learning, especially in the area of science, where laboratory facilities are necessary for instruction.

In Texas, facilities account for a substantial amount of the local investment in education, and they should provide the most efficient and effective learning environment possible. Providing school facilities that are safe and support quality learning conditions must be addressed in Texas as well as the rest of the United States so that all students, regardless of where they live or how much money their parents make, have an equal chance to receive a good education.

Limitations and Delimitations

This study has the following three limitations:

1. Ex post facto methodology does not allow for control over the situation that already has occurred.

2. It is hard to determine how many other circumstances might have been involved in the outcomes of the academic achievement scores recorded.

3. Ex post facto research has a problem in showing causation, such as problems in determining precedence of cause, inability to manipulate treatment, and inability to assign individuals to groups randomly (Krathwohl, 1993).

This study has the following five delimitations:

1. This study did not look into the human aspect of how teachers and students felt about attending school in buildings that are old and in poor condition.

2. This study focused on science, mathematics, and English language arts TAKS scores at the high school level and did not consider social studies TAKS scores.

3. This study focused on science, mathematics, and English language arts TAKS scores and did not consider achievement scores on other standardized tests, such as the ACT and the SAT.

4. This study only look at data from 2006, and did not consider results of previous or subsequent years.

5. This study did not take into consideration the intangible effects of old buildings in poor condition, such as loss of student enrollment, inability to attract highly qualified teachers, and inability to attract new businesses that would increase the tax base in a district.

Assumptions

Two assumptions were established regarding this study. First, all high schools selected and included in the Texas Comptroller's Office (2006) report were assessed using the guidelines provided by the comptroller, and the results are assumed valid. Second, data related to student academic achievement were assumed to be an accurate reflection of the students' true achievement.

Summary

The topic of adequate school facilities is one that stretches back to the landmark case of *Brown v. Board of Education.* Over the past three decades there has been a tremendous amount of interest from educational researchers regarding the influence the school environment has upon student achievement. The Texas Comptroller's Office (2006) completed a recent study to look into the age and condition of existing facilities but did not take into account specific areas such as science facilities. The purpose of this study was to determine what impact inadequate high school facilities have on students' ability to learn the state-mandated curriculum.

This study is presented in five chapters. Chapter 1 and provides an introduction, statement of the problem, purpose of the study, research questions and hypotheses, brief description of methodology, definitions, significance of the study, limitations and delimitations, assumptions, and the organization of the report. Chapter 2 provides a review of current literature relating to adequacy of school facilities and the impact on academic achievement. Chapter 3 provides the methods and procedures for conducting the research. Chapter 4 provides analysis of the data and findings. Chapter 5 presents the findings, conclusions, implications, and recommendations for further studies.

CHAPTER 2

REVIEW OF RELEVANT LITERATURE

Introduction

This review of literature focuses on several areas important to the inquiry of the relationship between the age and condition of school facilities and academic achievement of students attending these schools. This review is organized into three sections: defining adequacy of school facilities as it relates to the requirement of a general diffusion of knowledge, (b) the effect that adequate or inadequate school facilities may have on student achievement, and (c) studies on adequate school facilities and their impact on academic achievement that pertain specifically to case studies in Texas.

The Conflicting Definitions of "Adequacy" in Texas

The main issue of addressing adequacy in school facilities is trying to decide whose definition to use when evaluating the facilities. Educational researchers have provided multiple definitions and codes that address the issue, with none ever acknowledging the other. The Supreme Court of Texas has gone to extreme lengths to set a definition of adequacy of facilities in Texas but did not take into account the Commissioner of Education's definition as defined in the Texas Education Code (2005). The Americans With Disabilities Act (ADA, 1991) also addressed adequate school facilities as it pertained to students with disabilities in 1988, which were adopted in Texas as the Texas Accessibility Standards (Texas Department of

Licensing and Regulation [TDLR], 2007). Most recently, Texas Senate Bill 11 (2005) addressed adequacy as it pertains to student safety. This section of the literature review addresses all four definitions of adequacy and summarizes the findings.

Adequacy as defined by the Supreme Court of Texas. The most recent Supreme Court case, which was cumulative of all previous attempts of defining adequacy, was *Neeley v. West Orange-Cove* (2005). On November 22, 2005, the Texas Supreme Court, in a 7–1 opinion, struck down the state's school financing system, finding that it essentially had become an unconstitutional state property tax (*Neeley v. West Orange-Cove,* 2005). In this ruling the Court also addressed the issues of adequacy and equity, but unlike the property tax opinion, the Court overruled the lower court's opinion and found the state's policies do currently meet constitutional requirements. The plaintiffs contended that the public school system cannot achieve a "general diffusion of knowledge" as required by Article VII, Section 1 of the Texas Constitution, because the system is underfunded. Article VII, Section 1 states,

> A general diffusion of knowledge being essential to the preservation of the liberties and rights of the people, it shall be the duty of the legislature of the State to establish and make suitable provision for the support and maintenance of an efficient system of public free school. (as cited in *Neeley v. West Orange-Cove,* 2005, p. 5)

The plaintiff contended that this provision sets three standards central to this case: (a) efficiency, (b) adequacy, and (c) suitability. In addressing the adequacy provision, the Court stated,

> In this context, the word "adequate" does not carry its broader dictionary meaning: "commensurate in fitness; equal or amounting to what is required;

> fully sufficient, suitable, or fitting." Our responsibility in this case is limited to determining whether the public education system is "adequate" in the constitutional sense, not in the dictionary sense. That is, we must decide only *whether public education is achieving the general diffusion of knowledge the constitution requires.* (*Neeley v. West Orange-Cove,* 2005, p. 6, emphasis added)

Thus, it seems the only requirement of adequacy that the court considered was that of "a general diffusion of knowledge," which can be broadly applied and easy to justify.

The Supreme Court ruling specifically addressed the school funding system for facilities in Section C, Part III of the *Neeley v. West Orange-Cove* (2005) opinion. The Court noted, "The district court concluded that the facilities funding system is inefficient and in violation of article VII, section 1" (*Neeley v. West Orange-Cove,* 2005, p. 70). The court opinion referenced *Edgewood ISD v. Meno,* or *Edgewood IV*: "An efficient system of public education requires not only classroom instruction, but also the classroom where that instruction is to take place. These components of an efficient system—instruction and facility—are inseparable" (*Neeley v. West Orange-Cove,* 2005, p. 70). This opinion meant that the Constitution does not applies to instruction and facilities separately, but to the two components *together,* thus making it more difficult to prove the inefficiency of facilities. In the end the Court concluded,

> There is much evidence that many districts' facilities are inadequate, but it is undisputed that some 25% of the districts levy no I&S taxes. The state defendants argue that disparities among districts in available facilities are not proof of inefficiency absent evidence that the districts needs are similar. They contend that facilities needs vary widely depending on the size and location of schools, construction expense, and other variables. *We agree that such evidence is necessary and lacking.* The State defendants also argue that to prove constitutional inefficiency the interveners must offer evidence of an inability to provide a general diffusion of knowledge without additional facilities, and that they have failed to do so. Again, we agree. *Efficiency requires only substantially equal access to revenue for facilities necessary for*

> *an adequate system.* Accordingly, we conclude that the public school finance system is not inefficient in violation of article VII, section 1. (*Neeley v. West Orange-Cove,* 2005, pp. 72–73, emphasis added)

Essentially, the plaintiff did not provide the evidence that the Court needed to conclude that all facilities in the state are not adequate. With these findings, it could be concluded that more research is needed to provide more evidence regarding what is lacking and necessary to provide adequate facilities for all children in Texas. For all that the Court addressed in trying to define adequate facilities, one thing that it did not address is the current guidelines set in the Texas Education Code for adequate school facilities.

Adequacy as defined by the Commissioner of Education. The Texas Education Code directs the Commissioner of Education to set specific guidelines that address adequacy of school facilities. Chapter 46 of the Texas Education Code (2005) states,

> The commissioner shall establish standards for adequacy of school facilities. The standards must include requirements related to space, educational adequacy, and construction quality. All new facilities constructed after September 1, 1998, must meet the standards to be eligible to be financed with state or local tax funds. (§ 46.008)

Essentially, a school district could not build new facilities without meeting these adequacy standards after September 1, 1998; these standards were updated January 1, 2004. As outlined by the Texas Education Code (2005), the commissioner posted the necessary standards in chapter 61 of the Commissioner's Rules—which sets another definition of "adequate" school facilities. Chapter 61.1036 in the Commissioner's Rules for school facility standards for construction on or after January 1, 2004, lists the minimum classroom square footage; chemical storage requirements; gymnasium square footage requirement; library square footage requirement; building code requirement; adequate technology requirement; adequate communication requirement; indoor air quality requirement; Texas accessibility requirement, ADA requirements; and all other local, state, and federal requirements as applicable. For example, the criterion for science facilities reads as follows:

> Science classrooms combined with laboratories must be at least 900 square feet for elementary schools, 1,200 square feet for middle schools, and 1,400 square feet for high schools. Similarly, laboratories separate from classrooms must be at least 800–1,000 square feet, depending on school level. A separate chemical storage room must be provided. (Texas Administrative Code, 2007)

The commissioner's definition of *adequacy* is much more specific than the Texas Supreme Court's definition and much easier to judge as far as meeting the requirements. It did not appear that the Supreme Court took these standards into consideration when making their judgment on adequacy of school facilities; these standards were never referenced in their ruling or cited as necessary to meet minimal adequacy standards. The fact of the matter is that all new buildings do have to meet this standard; constructing a new school facility includes the requirement to submit all plans, prior to construction, to the TEA for approval of design.

Adequacy as defined by Texas accessibility standards. The TDLR (2007) is the state's umbrella, occupational regulatory agency, responsible for the regulation of 22 occupations and industries. The duties of this state agency are to set standards for accessibility to public buildings and facilities, privately owned buildings, facilities leased or occupied by state agencies, places of public accommodation, and commercial facilities by individuals with disabilities (TDLR, 2007). These standards are to be applied during the design, construction, and alteration of such buildings and facilities to the extent required by regulations issued by the department. These standards closely follow the ADA accessibility guidelines and are intended to facilitate equivalency certification of the state program for the elimination of architectural barriers by the U.S. Department of Justice (TDLR, 2007). For schools to meet the minimum standard considered adequate, all areas of newly designed or newly constructed buildings and facilities must comply with all standards. On top of these standards in construction, the state legislature also added safety requirements by passing Texas Senate Bill 11 in 2005.

Adequacy as defined by the Texas School Safety Center. Texas Senate Bill 11 (2005) brought a new dimension to school facilities adequacy. Texas Senate Bill 11 stated, "Districts that construct or renovate instructional facilities with funds from the Instructional Facility Allotment (IFA) must consider the security criteria developed by the Texas School Safety Center" (p. 3). The Texas School Safety Center (2007) was established in 1999 by then Governor George Bush and authorized by the 77th Texas Legislature in 2001 to serve as a central location for school safety information and to provide schools with information, training, and technical assistance to promote safety in the state. The center's role was expanded in 2005 by the new requirement of overseeing districts that construct new facilities with Instructional Facility Allotment money and insuring that they are adequate in terms of safety and security. The Texas School Safety Center has developed a campus safety and security audit toolkit that outlines the necessary criteria for security. The criteria include grounds, building exterior, buses and parking, outdoor recreation areas, building access, building interior, science laboratory, shops, special use rooms, and communications and information. Security recently has become a high priority initiative because of the rising number of assaults on schools. While Texas Senate Bill 11 did insure that school buildings in the future will be more protective of the children and staff, it also added another layer to the definition of an adequate school building.

The many layers defining an adequate school facility. If you stack all the layers that define an “adequate” school facility that have been discussed thus far, the resulting definition would be thorough and complex. First, the definition supplied by the Texas Supreme Court (*Neeley v. West Orange-Cove*, 2005) consisted only of providing a “general diffusion of knowledge” to all the students of the state (p. 6). This definition did not take into account individual school results on standardized tests, but instead looked at the statewide results and determined that the state was performing adequately. The Supreme Court did note much evidence that many districts’ facilities are inadequate, but that specific evidence “is necessary and lacking.”

Second, adequacy as defined by the commissioner of education provided much more specific standards, but only applied to buildings built after 1999. If the state was able to apply these to all schools in the state, a tremendous amount of renovation and new construction would be necessary to meet the current commissioner standards for adequacy.

Third, the rules and laws of the Texas Accessibility Standards defined by the TDLR (2007) are aligned with the ADA (2001) and are to insure that all facilities are accessible for those with disabilities. These standards are only enforceable to buildings renovated or constructed after 1990; enforcing these standards on all existing buildings would require a tremendous amount of renovation.

The fourth and final definition of adequacy applied was the Texas School Safety Center's (2007) definition as directed by the passage of Texas Senate Bill 11 (2005). This law is enforceable to only those buildings constructed after 2005; again, if this law applied to all school buildings in Texas, a tremendous amount of renovation would be required to meet the current standards.

As other states began to assess public school building conditions and allocating resources to bring facilities up to adequate standards, some legislators in Texas realized that they also should consider addressing new laws and funding for these improvements. Senator Eddie Lucio wrote Comptroller Strayhorn and asked if she could do a comprehensive study on school facilities in Texas (Texas Comptroller's Office, 2006). On October 16, 2006, Texas Comptroller Carole Keeton Strayhorn and the Texas Comptroller's Office published the results of the facilities study. A total of 309 school districts and charter schools representing a cross-section of districts from across the state, and 48% of the state's student population completed the survey (Texas Comptroller's Office, 2006). Results showed that school instructional facilities are on average 34.5 years old, well past the laws that define a current adequate facility. Districts with an economically disadvantaged student population of 80% or more reported the oldest average age of facilities (41 years), whereas districts with an economically disadvantaged student population of less than 30% reported the newest facilities (20 years old). Of the 309 districts reporting, 5.78% of the instructional facilities were reported as poor or needing replacing, with many others rating their buildings in fair condition (Texas Comptroller's Office, 2006). This study did not take into account specific adequacy standards, such as indoor air quality, lighting, acoustical control, and secondary science labs, but it did provide a baseline for the instructional facilities' general condition. To get a better picture of whether or not school facilities meet adequacy standards in all areas, a more specific appraisal instrument that local school districts can use to evaluate their buildings would have to be developed.

Inadequate Buildings' Effect on Student Performance and Attendance

The condition of school facilities is an increasingly important issue that is a concern around the nation. The American Society of Civil Engineers (as cited in Hopkins, 1998) gave U.S. schools an "F" grade in its infrastructure report card, worse than roads, bridges, mass transit, and every other category of investment.

Over the past three decades there has been a high level of interest from educational researchers regarding the influence the school physical environment has upon student achievement and attendance. Earthman (2004) stated, "There is sufficient research to state without equivocation that the building in which students spends a good deal of their time learning does in fact influence how well they learn" (p. 15). Numerous studies, as cited in Earthman, have indicated that students in inadequate facilities (those that lack appropriate HVAC system, have poor lighting, are old, are noisy, or lack functional furniture) perform less well than students in adequate facilities. In an all-encompassing report in 2004, Earthman found,

> With research conducted in four different states and two major cities the research findings give ample guidance as to what needs to be done to insure a healthy and productive physical environment for all students to permit them to learn to the limit of their capacities rather than hinder them in the acquisition of knowledge and skills (Edwards, 1991; Cash, 1993; Earthman et al, 1996; Hines, 1996; Lanham, 1999; Lewis, 2000). …Each researcher found a significant difference in the achievement scores of students in poor buildings (inadequate) and in good buildings (adequate). The difference these researchers found ranged from 3 percentile rank scores to 17 percentile rank scores. …In almost every report, the differences were statistically significant. (p. 18)

The conditions necessary to address when considering a building adequate or inadequate are health and safety, age of the building, human comfort, indoor air quality, lighting, acoustical control, and secondary science laboratories. This section of the literature review looks at each condition individually.

Health and safety first in determining adequate school facilities. With the recent rise in violence in school buildings and the subsequent emphasis on making such buildings safe, it is critical to address facility design related to student health and safety first. Most principals likely would state their belief that the first order of importance is the health and safety of the students in their buildings. There is not a lot of research in this area of school-building adequacy, but it is obviously an important topic to the Texas Legislature, exemplified by the formation of the Texas School Safety Center and the passage of Texas Senate Bill 11 in 2005. The Texas School Safety Center (2007) was created to serve as a central location for school safety information and to provide schools with information including research, training, and technical assistance to reduce youth violence and promote safety in the state. The Texas School Safety Center is charged to conduct safety training that includes development of a positive school safety course for law enforcement officials, assistance for districts in developing a multihazard emergency operations plan, development of security criteria for instructional facilities, and a model safety and security audit procedure for the state. While Texas Senate Bill 11 mandated that the district is responsible for the security audit at least once every 3 years, and that the school district report the results of the audit to the school board, the new law did not appropriate any additional funding to help districts with the cost of the audit, report, and subsequent repair of unsafe conditions determined in the report.

Age of the building as related to adequacy of the instructional facility. A fair amount of research has been conducted in the last 30 years investigating the relationship between student achievement and building age. The age of the building may not in and of itself be a direct negative factor in student achievement, but the elements the building does not have provides a direct relationship to student achievement. For instance, an older building may lack proper HVAC, proper lights, and proper amounts of space. Older buildings also may have some elements that are detrimental to the students' health, like asbestos, lead pipes, and mold. McGuffey (1982) reviewed seven studies and in all cases determined that the building was significant as a detrimental factor to student achievement and behavior. Garrett (1981) studied the impact of school age on student achievement in Georgia. He determined that students taught in nonmodern school facilities would achieve significantly less than those taught in modernized schools. Bowers and Burkett (1988) conducted a study that investigated the possible relationship of building age and student achievement, health, and attendance. The study looked at two elementary schools in the same district with essentially the same type of staff and students in each building; the only difference was that one building was recently opened and very modern and the other was constructed in 1939. Bowers and Burkett found that the students in the modern building scored significantly higher in reading, listening, language, and arithmetic than those in the older building. They also found that attendance was better in the new buildings, discipline was needed less frequently, and the health of the staff and students was better in the new building. Phillips (1997) found significant differences in the reading and arithmetic scores between students in new buildings than those in old buildings. O'Neill (1999) found that building age had the strongest relationship with student achievement when investigating areas such as learning space and exterior elements. Stevenson (2001), in a study conducted in North Carolina, determined that school age had significant effects on middle school pre-ACT performance. A study by Mendell and Heath (2003) also found a significant relationship between school age and student achievement.

Human Comfort—Appropriate Temperatures as Related to Adequate Facilities

Studies have found a significant, positive correlation between student achievement and temperatures falling within the human comfort zone. Chan (1980) studied the effect of four building components on student achievement: (a) HVAC,

(b) carpeting, (c) lighting, and (d) windows. Chan found that HVAC had a greater influence on student achievement than the other elements studied.

Lanham (1999) investigated the relationship between school building condition and student achievement on the elementary level. Besides HVAC, he looked into ceiling type, site size, connection to a network, room structure, overall maintenance, floor type, and sweeping and mopping frequency. Of all the building factors examined, HVAC was the variable that had the most significant impact on student achievement scores. Findings of these studies suggest that adequate school facilities must have proper HVAC equipment to maximize student achievement.

Appropriate air quality as related to adequate facilities. Indoor air quality is one of the biggest, and potentially most expensive, facility concerns facing school administrators today. According to the U.S. General Accounting Office (1995) report, *School Facilities: The Condition of America's Schools*, 1 in 5 schools in the United States has problems with indoor air quality. Most of these schools also listed the HVAC system as less than adequate, thus relating the two problems. Schools require especially good ventilation, because children breathe a greater volume of air in proportion to their body weight than do adults (Kennedy, 2003). The U.S. Environmental Protection Agency (2000) estimated that more than 10 million days are lost each school year by students because of asthma attacks due to poor indoor air quality. Smedje and Norback (1999) studied the relationship between school environments and incidents of asthma in 39 randomly selected schools. They accumulated data for 2 years in approximately 100 classrooms on the amount of dust on the floors and furniture. Their report showed a higher incident of doctor-diagnosed asthma in students attending schools with high counts of dust on floors and furniture. Rosen and Richardson (1999) found a relationship between poor air quality and absenteeism. They found that reducing the number of particles in the air, and so improving air quality, resulted in reduced child absence.

These reports are clear in stating that adequate schools need proper ventilation systems that would remove dust and stale air, thus creating an environment that would be conducive to high student achievement and low rates of absenteeism. In addition to air quality, adequate lighting can affect student learning,

Lighting in adequate school facilities. There is a sizable amount of literature relating to lighting in the classroom. Nicklas and Bailey (1996) investigated the relationship of elementary and junior high school student performance and natural daylighting in the facilities. Their study included three elementary schools and one junior high designed around a daylit prototype. The daylit schools were constructed to maximize daylighting through the use of south-facing roof monitors that allowed controlled sunlight to enter into all major occupied spaces within the schools. The performance from these four schools was compared to the other schools in the county. Students in daylit schools outperformed those in nondaylit schools by 5–14%. When the student achievement results from being in daylit schools for a number of years was compared with that of students in nondaylit facilities, the average increase of performance was 14%.

A similar study examined the effect of daylighting on student performance (Heschone Mahone Group, 1999). The study was focused on the use of skylighting in the classroom as a way to isolate daylight as an illumination source. Over 2000 classrooms in three states were used to gather data. Students' scores on standardized achievement test were used to make the comparison between students in daylit and nondaylit facilities. Data indicated that students in classrooms with the most daylight performed 20% better on mathematics test and 26% better on reading test than did students in nondaylit schools. The Heschone Mahone Group study was broad in scope and included all grade levels.

Another case study of schools with daylit classrooms was conducted to determine the relationship between daylit schools and selected student variables, one variable being student attendance rate (Plympton, Conway, & Epstein, 2000). The classrooms in these schools had direct exposure to sunlight through various design features. In all six of the elementary schools used in the study the student attendance was better than the student attendance in the nondaylit schools. The findings from previous research are clear: Schools with adequate lighting have increased academic performance and better attendance.

Proper acoustics in adequate school facilities. Research has indicated that having the ability to hear clearly in the classroom is vital for student learning and teacher performance. In a general review, Lemasters (1997) reported that researchers have found a significant relationship between noise levels and student achievement. Lowe (1990) interviewed state teachers of the year to determine which aspects of the physical environment affected their teaching the most. These teachers pointed to the availability and quality of classroom equipment and furnishings as well as acoustics and climate control as the most important environmental factors. Evans and Maxwell (1997) investigated the results of noise on 110 students in the first and second grades in two New York City public schools. One school was in the flight pattern of an airport, and the other was located in a quiet neighborhood with no flight pattern overhead. Students in the school located in the flight pattern scored 20% lower on reading tests than students in the quiet school.

Instructional practices in poor acoustical environments may require teachers to reconsider some of their delivery methods. Anderson (2001) noted that in noisy classrooms, instructions must be repeated, and group discussions can be ineffective if the students cannot hear each other's voices. Lecture-style instruction results in a 6- to 9-decibel drop in the level of the teacher's voice from the front of the classroom to the back of the room (Siebein, Gold, Siebien, & Ermann, 2000). Siebein et al. went on to suggest that alternative methods such as small-group instruction or special desk arrangements can improve this rate.

In a paper entitled "Guidelines for Classroom Acoustics in new Construction," the Acoustical Society of America (1997) stated that many children, and especially those with hearing or learning disabilities, are being deprived of a clear communication channel in educational environments because of inferior classroom acoustics. Poor classroom communication acts as a barrier to learning, stunting intellectual growth, lowering self-esteem, and serving to diminish the potential for the child to grow into a productive citizen (Acoustical Society of America, 1997).

Clear evidence from the studies cited above points to the fact that higher levels of noise, both inside and outside the classroom, seriously can hinder students from achieving at their level of potential. The noise distractions in classrooms results in low performance year after year by students attending these schools. Just as high levels of noise can hinder learning, inadequate specialized rooms also can hinder learning. Science laboratories are an example of a specialized learning space that must be adequate to meet the learning needs of all students.

Science laboratories and equipment. Although researchers have determined that certain facility conditions can have a direct effect on student performance, few have focused on specific facilities for learning. Not a lot of research specifically has compared scores of schools with adequate science facilities and those without adequate science facilities. Hines (1996) investigated high school science facilities as part of his study on the relationship between school building condition and student achievement. The principals of the schools in the study rated the condition of two items: the science equipment and the furniture. Hines then compared the science equipment assessment with the scores on the science section of the achievement test. Hines found a difference of 8 percentile points on the first item and 1 percentile point on the second item, favoring the students in the schools where the science equipment was new and in good working order. Cash (1993) also found a significant difference in science achievement scores between students in buildings rated as poor and those rated as adequate.

Because of advances in science and the lack of a recent report on science laboratories, the National Research Council undertook extensive research of high school science laboratories (Singer, Hilton, Schweingruber, 2005). Singer et al. outlined the “pressing need for improvements in laboratory teaching” (p. 5). Singer et al. further stated, “Direct observation and manipulation of many aspects of the material world require adequate laboratory facilities, including space for teacher demonstration, student laboratory activities, student discussion, and space for supplies” (p. 7). Their report also addressed the condition of laboratory facilities in schools with a high population of poor and minority students. Singer et al. reported,

> Schools with higher concentration of non-Asian minorities and schools with higher concentration of poor students are less likely to have adequate laboratory facilities than other schools. In addition to less adequate laboratory space, schools with higher concentration of poor or minority students and rural schools often have lower budgets for laboratory equipment and supplies than other schools. These disparities in facilities and supplies may contribute to the problem that students in schools with high concentrations of non-Asian minority students spend less time in laboratory instruction than students in other schools. (p. 8)

The most recent report by the National Center for Education Statistics (NCES) conducted in the fall of 2005 and reported in January 2007, showed that far fewer schools have science laboratories than gymnasiums (NCES, 2007). The NCES report showed that “schools often had dedicated rooms or facilities to support a particular subject area: 83 percent had a gymnasium to support physical education, 81 percent had one or more music rooms, 70 percent had one or more art rooms, and 48 percent had one or more science labs" (p. 10). The NCES report also seemed to support Singer et al.'s (2005) findings by showing that dedicated science lab facilities were more common in large schools than small schools (70% vs. 40%) and in schools with the lowest poverty concentration than in schools with the highest poverty concentration (51% vs. 37%).

Collectively, these reports have shown a need for better science facilities, especially in small schools and those with high percentage of poor students and minority students. These findings reinforce the need for further investigation of the facilities in Texas high schools. With increased rigor and number of science course students must complete to graduate, the question is whether current facilities will handle this new requirement.

Texas School Facilities and Academic Achievement

Three recent research projects addressed school facilities and academic achievement specifically in Texas. All three research projects shared some similarity with this dissertation, but none of the three covered specifically high school facilities and academic achievement.

The first of the three, a dissertation completed by Lair in 2003, studied the effect school facilities have on student achievement as measured by the TAAS in a high-performing, high-poverty school district in Texas. Her study contained a presentation of the information and data findings from the Ysleta Independent School District and its decision in 1994 to include facilities as a component of its student achievement initiative. Twenty-nine schools were randomly selected, and leaders were asked to complete a survey, followed by interviews with key district administrators. Lair's study indicated that facilities must be a priority for school administrators, especially the superintendent. When asked if the members of their school community believe that the conditions and availability of educational facilities affect the level of academic performance, 93% percent of principals responded that it does (Lair, 2003). The vast majority of comments made by the principals in the interviews pertained to their belief that the condition of the school does make a difference in the achievement of students at their school. Age of the school building was also addressed in the study. Lair detailed the correlation between building age and academic achievement:

> In four out of the six multiple regression analyses conducted, the age of the building accounted for the greatest percentage of variance in the TAAS scores and was the first variable entering the equation. When trying to predict the achievement as measured by the TAAS test for all students, building age accounted for 42.5 percent of the variability in the scores. The study suggests that out of all the reasons why a student would receive a particular TAAS score, building age explained 42.5 percent of those reasons. (p. 177)

Lair also showed that when trying to predict the achievement of disadvantaged students and Hispanic students, building age and maintenance taken together are significant predictors of achievement.

The second of the three recent research dissertations (Hughes, 2005) determined if a relationship existed between facility design variables and student achievement as demonstrated on the TAKS. The study took place in a large, urban school district in north Texas. Using the Design Assessment Scale for Elementary Schools, two educators evaluated 21 elementary schools during the summer of 2005

(Hughes, 2005). To measure student achievement, Hughes obtained fifth-grade reading, math, and science scores on the 2003–2004 TAKS from the TEA. All design variables in Hughes's study did have a statistically significant correlation with student reading, math, and science scores. The research also showed that the smaller population of the schools studied performed at a higher level supporting small school initiatives. One surprise was that the study indicated that daylighting had a negative correlation in all subject areas. Hughes summarized his findings:

> Reviewing all the design variables across the two ratings, there were a total of 22 correlations. Of the 22 correlations, there were 15 positive correlations in reading and 14 positive correlations in math. The results in science were much lower. In fact, there were only a total of eight positive correlations. Reading and math achievements appear to be influenced more by building design variables. (p. 61)

One factor that Hughes did not report on, or take into consideration is that the fifth-grade science test was first given in the year he conducted his study, and the results of the test might or might not have been influenced by the correlations to the building conditions.

The last of the three recent research dissertations studied middle school educational facilities and their impact on the learning environment as reported by middle school teachers, administrators, and architects (Monk, 2006). This case study, conducted in Humble Independent School District, presented the congruency between the perceived adequacy and quality of middle school facilities as reported on the survey for educators and the quality and adequacy as assessed by architects. In assessing the perceived impact of middle school facilities on the learning environment, 91% of the respondents indicated that the factors had a significant or moderate impact on the learning environment (Monk, 2006).

Recent Developments

In the states of New Mexico and Colorado, new state laws were passed to address educational facility standards and funding for improving the facilities. Educational facilities are individually examined by independent examiners for adequacy standards, and financial subsidies are distributed based on which facilities are most in need of improvement (Capital Outlay Bureau, 2008; Capitol Construction Grant Program, 2008). The New Mexico Public School Capitol Outlay Act (as cited by Capital Outlay Bureau, 2008) states,

> A new Funding mechanism for all districts was established to ensure that through a standards-based process, which includes the physical condition and capacity, educational suitability and technology infrastructure of all public school facilities in New Mexico meet an adequate level statewide. This process uses a statewide assessment database which ranks the condition of every school building relative to the statewide adequacy standards. The schools with the greatest facility needs will be addressed first according to the New Mexico Condition Index (NMCI). The database will operate as an objective prioritizing and ranking tool to assist the Public School Capitol Outlay Council (PSCOC) in allocating funds to school districts. (p. 3)

Similarly, the Colorado Department of Education recently upgraded its facility standards to assist all districts in meeting certain standards. The Colorado Department of Education's Capitol Construction Grant Program (2008) established facility standards and safety priorities as a result of Colorado Senate Bill 07-041. This bill required the Colorado Department of Education to (a) create an advisory committee for public school construction, (b) establish facility and safety priorities to be guidelines when assessing school facilities and to evaluate Capitol Construction Grant applications, and (c) conduct an assessment of school facilities and building condition of schools in small, rural districts in Colorado.

Summary

The fact that there is not one true definition of adequacy is a problem in addressing adequacy of school facilities. This review demonstrates multiple definitions of adequacy, with none acknowledging the other. The Supreme Court of Texas, commissioner of education (*Neeley v. West Orange-Cove*, 2005), Texas Education Code (2005), ADA (2001), Texas Accessibility Standards (TDLR, 2007), Texas Senate Bill 11 (2005), and the Texas School Safety Center (2007) all have valid definitions that need to be taken into consideration when one working definition is formed.

The literature also showed that inadequate buildings do affect student learning and outcomes to some extent. Organizations outside education, like the American Society of Civil Engineers (as cited in Hopkins, 1998), have rated school buildings inadequate as well as a number of researchers in education.

Science laboratories are a specific concern. Two studies (Cash, 1993; Hines, 1996) stated that inadequate labs and equipment had a detrimental effect on student outcomes, and two other recent studies (NCES, 2007; Singer et al., 2005) discussed the importance of improving science facilities, especially in poor districts or those with high percentages of minority students. All of the recent studies in Texas (Hughes, 2005; Lair, 2003; Monk, 2006) showed a correlation between facility conditions and academic achievement. These three studies were mainly conducted in elementary and middle schools, and none of the three specifically addressed high schools, where the most rigorous academic standards are currently being imposed.

The culmination of research in health and safety, age of buildings, appropriate temperatures, appropriate air quality, appropriate lighting, and proper acoustics shows a correlation between inadequate facilities and student outcomes. The piece of the puzzle that is missing is the following: What is the condition of the high school facilities in Texas when studied in a more comprehensive manner, and how does the condition of the current high school facilities effect student achievement? Texas is a large, diverse state with large concentrations of poor communities and areas with high levels of minority students. If all students have the right to a general diffusion of knowledge, as the Texas Supreme Court stated in *Neeley v. West Orange-Cove* (2005), then more research is needed in this area. This research is further justified by one key statement made by the Texas Supreme Court ruling when addressing facility needs: “We agree that such evidence is necessary and lacking” (*Neeley v. West Orange-Cove,* 2005, p. 73). It does not appear prudent to look at academic achievement at a state level and determine that everything is fine, when records show specific schools in economically disadvantaged areas are performing poorly and have poor facilities. An overgeneralization like this would be no different than looking at the batting average of all major league baseball players and stating that everyone bats very well (although in general pitchers have horrible batting averages, and fielders have great batting averages). The citizens of Texas deserve to know on a school-by-school basis the adequacy of the learning facility and its impact on student achievement.

CHAPTER 3

METHODOLOGY

Introduction to Chapter

This study used a quantitative methodology with an ex post facto design specifically to examine correlations between school building conditions and student performance on the state standardized test. Ex post facto is an "approach in which one looks at conditions that have already occurred and then collects data to investigate a possible relationship between these conditions and subsequent characteristics or behaviors" (Leedy & Ormrod, 2005, p. 108). This chapter includes the research design, the participants of the study, the instrument used to gather data, procedures for data collection, and the data analysis process.

The purpose of this study was to determine what impact inadequate high school facilities have on students' ability to learn the state-mandated curriculum in Texas and to perform at an acceptable or better rating on the state standardized test. This study examined the relationship between the high school building condition and age as compared to the academic achievement of students who completed the TAKS in science, math, and English language arts. The assessment of the school building condition came from the recent facility assessment completed in October 2006 by the Texas Comptroller's Office, in which a building could receive a rating of excellent, good, fair, poor, or needs replacing. The documentation of the school building age also came from the Texas Comptroller's Office (2006) facility assessment. The

TAKS scores in science, math and English language arts came from the TEA AEIS from testing completed in the spring of 2006.

Research Questions and Hypotheses

The following three research questions guided the research process:

1. What is the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

2. What is the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

3. What is the relationship between building age and condition of public high schools in Texas and graduation rate?

Further, the following three null hypotheses were tested:

1. There will be no significant relationship between the building condition of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building.

2. There will be no significant relationship between the building age of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building.

3. There will be no significant relationship between building age and condition of public high schools in Texas and graduation rate.

Research Design

This quantitative study utilized an ex post facto design to examine the relationship between the high school facilities and the standardized test scores. As stated by Leedy (1974), while considered under the heading of experimentation, this method has little that is experimental about it. Mouly (as cited in Leedy, 1974), stated,

> A relatively questionable quasi-experimental design is the ex post facto experiment, in which a particular characteristic of a given group is investigated with a view to identify its antecedents. This is experiment in reverse: instead of taking groups that are equivalent and exposing them to different treatment with a view to promoting differences to be measured, the ex post facto experiment begins with a given effect and seeks the experimental factors that brought it about. (p. 155)

This is a method of experiment that "can provide an alternative means by which a researcher can investigate the extent to which specific independent variables may possibly affect the dependent variables of interest" (Leedy & Ormrod, 2005, p. 232). Sometimes also referred to as after the fact, these experiments have a posttest-only, control design, where the control group is formed after the fact and after the variable of interest has had its effect (Krathwohl, 1993).

This methodology is very suitable because this study examined if the conditions of the school building had an effect on student achievement scores after the students received their education in their particular high school with its particular condition. After-the fact design is a design wherein the intervention was not under the experimenter's control and "the control group is formed after the fact, which is after the variables of interest have had their effect" (Krathwohl, 1993, p. 514). The researcher arranges the data to make comparisons that will allow inferences to be drawn about the relationship between variables (Krathwohl, 1993).

The strength of ex post facto research methodology is that it allows the researcher to focus on the data that are available in records and, with a wide enough sample, to determine cause and effect of a particular variable. This method allows researchers to examine phenomena as they exist in the world and to try to understand their consequences (Krathwohl, 1993). However, the limitations of this design include a restriction to the data that are available in records, which does not always allow the researcher to get the full picture of the circumstances at the time. There is also a problem with authentication of data, which is ensuring that the data really represent what they are supposed to and do so consistently over the time period studied. As Krathwohl stated, “The after-the-fact approach has the same problems as history in showing causation, such as problems in determining precedence of cause, inability to manipulate treatment, and inability to assign individuals to groups randomly” (p. 514).

The design of the ex post facto methodology was best laid out by Leedy’s (1974) methodologies of research study. Leedy stated that if we were to represent ex post facto research, it might conform to the following description (see the figure):

> The entry of the sketch is at the far right-hand side. Here is where the researcher encounters the observed fact (O). That observed fact originated from a much larger area, which is the realm of the Origin of the Phenomenon. From this point the researcher must formulate his entire hypothesis and aim his research effort. The middle arrow line represents the direction of the research effort, and the two outside lines represent other possible directions. Because of the disparity between the size of the of the observed instance and the expanse of the possibility out of which it may have arisen, it is always

> possible that the direction of the research effort in ex post facto may lead to nowhere. (p. 156)

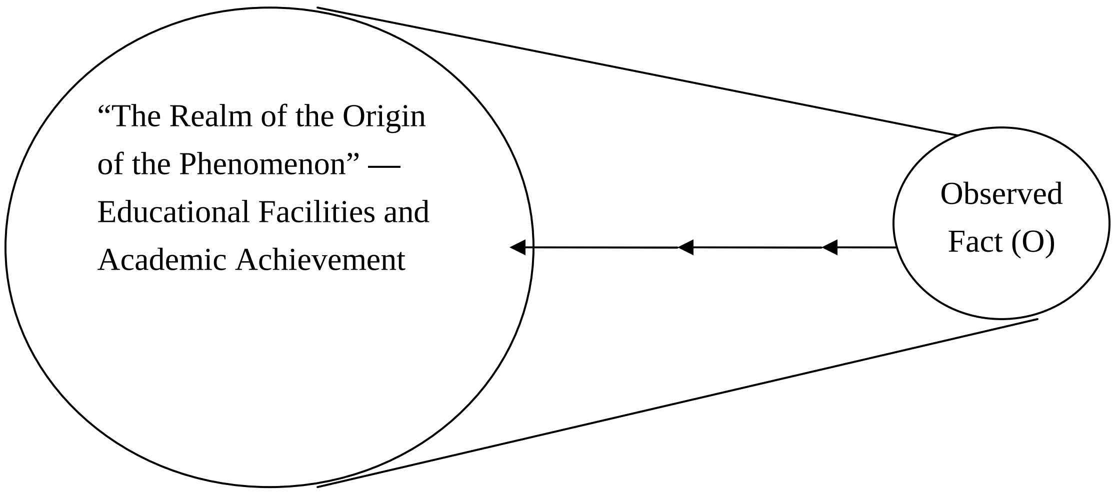

Figure. Ex post facto research design.

It is important in quantitative studies to identify the dependent and independent variables of the research. In this study the standardized test scores in English language arts, science, and mathematics for the 2006 TAKS, Grades 9–11, represented the dependent variable. These scores were examined as the outcome of learning in particular schools. The independent variable was represented by the building age and condition. The age and condition of the building served as the treatment, or precursor in this instance, to the dependent variable or outcome.

Sample Selection

Approaches to sampling typically fall into two major categories: probability sampling and nonprobability sampling (Leedy & Ormrod, 2005). In probability sampling, Leedy and Ormrod noted, “the researcher can specify in advance that each segment of the population will be represented in the sample; this is the distinguishing mark that sets it apart from nonprobability sampling” (p. 199). In nonprobability sampling, the researcher has no way of guaranteeing that each element of the population will be represented in the sample (Leedy & Ormrod, 2005). The sampling method to select participants was predetermined by the superintendents who chose to participate in the Texas Comptroller’s Office (2006) facility survey, and therefore would fall into the nonprobability sampling category. Specifically, the method of sampling that was used would be categorized as convenience sampling.

Convenience sampling makes no pretense of identifying a representative subset of a population (Leedy & Ormrod, 2005). In this research study, it cannot be assumed that an equal number of large, medium, and small high schools are represented. It also cannot be assumed that equal numbers of wealthy and poor school districts are represented. The Texas Comptroller’s Office (2006) report provided the following thorough and complete explanation of how the survey originated and how the participants were informed:

> During the 2005 Texas Legislature, Senator Lucio introduced Senate Bill (S.B.) 939, which would have required a thorough study to determine the current and future needs of school districts across the state. This language was rolled into the larger House Bill (H.B.) 2 for school finance reform, which ultimately failed during the regular and special session.
>
> On January 10, 2006, Senator Lucio requested that the Comptroller conduct this study using agency resources. The Comptroller accepted the senator’s request for assistance, but because of agency resources are limited, a voluntary survey, similar to the one done by the Comptroller’s office in 1997, was the only practical way to accumulate the needed data. Senator Lucio agreed and requested that the Comptroller report her findings to the Legislature on or before December 1, 2006.

Comptroller's staff members gathered together a group of representatives from TASA [Texas Association of School Administrators], TASB [Texas Association of School Boards], TASBO [Texas Association of School Business Officers], TEA, RESCs [Regional Education Service Centers], and individuals with facility expertise to develop a survey instrument that would gather the information requested by Senator Lucio but would not burden districts. From the start, it was clear that no matter how skillfully the survey instrument and its instructions were prepared, the effort required by district administrators in completing the survey would be considerable.

Once the group developed a draft survey, instructions and a copy of Senator Lucio's request to the Comptroller were saved to CD's and distributed to volunteer "test" districts at the 2006 TASBO convention. Volunteers were asked to test the survey by attempting to compile the requested information and to provide feedback with concerns and suggestions for improvement. Comptrollers' staff members responded to comments and concerns before finalizing the survey. On May 1, 2006, the Comptrollers announced the survey by letter to 1,229 school districts, including charter schools and directed them to the online survey questionnaire. Responses were initially requested by June 30, 2006, however, in late June it became apparent that an extension would be needed and the Comptroller extended the due date to July 31, 2006. The survey was left on-line for two weeks following the due date to allow districts to submit additional data.

The survey was administered in two parts. The online questionnaire primarily requested projected enrollment growth and information about energy management programs used by the districts, while a more complex facility inventory was submitted separately via e-mail in an Excel spreadsheet format. From May 1 through August 15, the survey was available online on the Comptroller's *Windows on State Government* Web site at <www.window.state.tx.us/survey/facilities/>. A template for the spreadsheet was available online at <www.window.state.tx.us/survey/facilities/ survey.xls>.

During a meeting with executive directors of the RESC's in early May 2006, attendees discussed the need for training. Following the meeting, the Comptroller staff developed a Power Point Training presentation and held the first training session May 19, 2006, in Region 11, Fort Worth, where the session was taped and made available to anyone who was not able to attend a live training session. In all, about 500 individuals participated in 18 instructor-led training sessions held at 16 of the state's 20 RESCs.

At the end of June, when overall participation was low and certain categories of districts had lower-than-average response rates, Copmptroller staff members called districts in those categories and encouraged them to complete and return the questionnaire at their earliest convenience. In all,

> Comptrollers staff members initiated more than 500 phone calls to districts requesting their participation and offering assistance. (pp. 1-2)

Participants were self-selected by expressing voluntary participation in the online survey. All school districts had the opportunity to participate on the online survey, and all districts were informed about the opportunity through mailed letters. In an unofficial manner, the statewide Web site frequently visited by superintendents, Texasisd.com (n.d.), also posted information and encouraged participation.

Overall, 309 school districts and charter schools responded to the survey. Six responses included only the online portion of the survey, which dealt with enrollment projections and energy management. One response included only the inventory spreadsheet. The 309 responding districts represent about 28.4% of the state's 1,037 school districts and about 7.3% percent of its charter schools. The survey reported a total of 5,125 campuses or sites containing 324 million permanent square feet (Texas Comptroller's Office, 2006). The selection criteria for this study only included the public high schools. The private schools' data were excluded as well as the public junior high and public elementary data.

The individuals completing the survey were assigned to groups broken out by the TEA categories in an effort to provide more detailed facility information by district type and geographic area (Texas Comptroller's Office, 2006). The six selected TEA categories used for further analysis were (a) enrollment, (b) district type, (c) property wealth, (d) RESC, (e) student change, and (f) economically disadvantaged students (Texas Comptroller's Office, 2006).

Data Collection and Procedures

The instrument for collecting data was developed by staff members of the Texas Comptroller's Office with the input from a group of representatives from Texas Association of School Administrators, Texas Association of School Boards, TASBO, TEA, RESCs, and individuals with facility expertise (Texas Comptroller's Office, 2006). This instrument was an existing document and therefore falls into the existing category. Once a draft survey was developed it was distributed at the 2006 TASBO conference to volunteers for testing. After receiving comments and concerns, the Texas Comptroller's Office staff finalized the survey and posted it from May 1 through August 15, 2006. The survey was available on the Comptroller's Web site. The survey appeared in an Excel spreadsheet with attached instructions (see the appendix).

Reliability refers to the extent to which research findings can be replicated (Merriam, 2002). Since this research utilized the ex post facto methodology and after-the-fact data were collected and examined, the reliability of this study is very high. Reliability also can refer to the reliability of the instrument used to collect data. It was assumed that the data collected were accurate, measured accurately, and represented the true nature of what the data were purported to represent.

According to Merriam (2002), to determine internal validity the researcher asks, "How congruent are one's findings with reality?" (p. 25). The answer lies in what the definition of reality is. The results of the test were assumed to provide a true picture of what is occurring in high schools today and the test was assumed to be valid.

Being an ex post facto experiment, no treatment was offered or delivered. This study analyzed past data to draw any correlation between the age and condition of facilities and the results of the campus-wide test results on the state standardized tests. As mentioned previously, the age and condition of the building served as the independent variable (treatment) and were analyzed using regression in an analytical statistical model.

Prior to data retrieval, an Institutional Review Board approval for exemptions was secured. Four specific steps were followed in retrieving data to complete this study:

1. The data sets that were compiled and utilized by the Texas Comptroller's Office (2006) were requested using an open records request.

2. These data were transferred manually from the Microsoft Excel program to SPSS for further data analysis.

3. Statewide standardized TAKS scores from the selected high schools that were studied in the Texas Comptroller's Office report were imported into the SPSS database being developed.

4. The data were analyzed using an analysis of variance (ANOVA) and a regression model.

Data Analysis

As previously mentioned, this study utilized ANOVA and a regression model to perform the quantitative statistical analysis of the data. Three separate ANOVA were utilized to analyze the data of building condition as compared to mathematic test scores, science test scores, and English language arts test scores. Three separate regression models also were utilized to analyze the data of building age as compared to mathematic test scores, science test scores, and English language arts test scores. The ANOVA was used on the building-condition tests because categorical variables were analyzed. The regression model was used on the building-age tests because two continuous variables (the age and the test scores) were analyzed.

Summary

The purpose of this chapter was to provide a detailed description of the design and procedures that were used to conduct this study. This quantitative study used an ex post facto design to examine the relationship between high school facilities and standardized test scores. The purpose of this study was to determine what impact inadequate high school facilities have on students' ability to learn the state-mandated curriculum and perform at an acceptable level or higher on the state standardized test. Chapter 4 of this dissertation reports on the research findings of the study as outlined in this chapter. Findings are discussed further in chapter 5.

CHAPTER 4

ANALYSIS OF DATA

The purpose of this study was to determine what affect high school facilities' condition and age have on students' academic achievement in Texas and on their ability to perform at an acceptable or better rating on standardized test. This study examined the relationship between the high school building condition and age as compared to the academic achievement of students who completed the TAKS in science, mathematics, and English language arts. This study also examined the relationship between high school facility age and condition as compared to graduation rate of the schools. The study asked the following three questions:

1. What is the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

2. What is the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

3. What is the relationship between building age and condition of public high schools in Texas and graduation rate?

School facilities were assessed by campus-level principals utilizing an instrument developed and tested by the Texas Comptroller's Office (2006). Student performance data for the 2006 school year were merged from the TEA data set to the corresponding school in the Texas Comptroller's Office study. This study utilized ANOVA to perform the quantitative, statistical analysis of the data.

Of the 5,125 campuses that were reported on the Texas Comptroller's Office (2006) report, 416 were public high schools. The TEA (2006) reported a total of 1,687 high school campuses in 2006; the 416 campuses reported in this study represent 25% of all high schools in Texas. Of these 416 high school campuses, 98 reported being in excellent condition (23.5%), 173 in good condition (41.5%), 119 in fair condition (29%), 18 in poor condition (4%), and 8 needed replacing (2%). According to the Texas Comptroller's Office report, 59 (14%) of these campuses were built before 1950, 139 (33%) were built between 1950 and 1969, 111 (27%) were built between 1970 and 1989, and 107 (26%) were built from 1990 to 2006.

Student achievement scores in science, mathematics, and English language arts, as measured by the TAKS, were used as the dependent variable. Graduation rate was also used as a dependent variable. School building condition and school building age were used as the independent variables.

The accepted level of significance for rejecting or retaining a null hypothesis was established at .05. The three null hypotheses addressed in this study are stated below:

1. There will be no significant relationship between the building condition of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building.

2. There will be no significant relationship between the building age of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores in that building.

3. There will be no significant relationship between building age and condition of public high schools in Texas and graduation rate.

Results for Hypothesis 1

Hypothesis 1 was examined using ANOVA. Student achievement in science, mathematics, and English language arts was examined as related to building condition. Originally, data from the Texas Comptroller's Office (2006) on building condition were broken into five possible categories: excellent, good, fair, poor, and needing replacing. Because sample size for poor and needing replacing ratings did not meet a minimum standard for statistical relevance, these two categories were merged into a rating of fair to form the lowest group. Building Rating1 represents buildings in needs-replacing, poor, or fair condition; Building Rating 2 represents buildings in good condition; and Building Rating 3 represents buildings in excellent condition.

The results of the analysis revealed that a relationship between the building condition and science achievement scores was significant between Building Ratings 1 and 3 and also between Building Ratings 2 and 3 but was not significant between Building Ratings 1 and 2 (see Table 1). In other words, there was a significant difference in student TAKS science scores between those in buildings in the worst condition (Building Rating 1) and those in buildings in excellent condition (Building Rating 3); the students in the buildings in excellent condition clearly outperformed those students in buildings in fair condition, poor condition, or needs-replacing condition. There was a significant difference in science scores between students in buildings in good condition (Building Rating 2) and those in buildings in excellent condition (Building Rating 3); students in the buildings in excellent condition clearly outperformed those students in buildings in good condition.

Similarly, the results of the analysis revealed that a relationship between the building condition and both mathematics achievement scores and English language arts achievement scores was significant only between Building Ratings 1 and 3 and between Building Ratings 2 and 3 but was not significant between Building Ratings 1 and 2 (Table 1).

Table 1

ANOVA of Effect of Building Rating on Student Achievement Scores, 2006 Texas Assessment of Knowledge and Skills

	Scores by building rating				Difference in % point		
Subject	1	2	3	Total	1-2	1-3	2-3
Science	61.8	62.6	71.0	64.3	-0.8	-9.2*	-8.3*
Math	58.6	61.4	68.4	62.1	-2.9	-9.8*	-7.0*
English language arts	84.2	85.8	88.9	86.0	-1.7	-4.8*	-3.1*

Note. Building Rating 1 = needs-replacing, poor, or fair condition; Building Rating 2 = good condition; Building Rating 3 = excellent condition. Scores are the percentage of students passing the subject.
*$p < .05$

Again, in both math and English language arts, the students in the buildings in excellent condition clearly outperformed the students in the buildings in fair condition, poor condition, or needs-replacing condition. The students in the buildings in excellent condition also outperformed the students in the buildings in good condition.

Null Hypothesis 1 was that there would be no significant relationship between the building condition of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores of students in that building. This null hypothesis was rejected.

Results for Hypothesis 2

Hypothesis 2 was examined using ANOVA. Student achievement in science, mathematics, and English language arts on the TAKS was examined as related to building age. Building Age 1 represents buildings 16 years old or newer, Building Age 2 represents buildings 17–35 years old, Building Age 3 represents buildings 36–48 years old, and Building Age 4 represents buildings at least 49 years old.

The results of the analysis revealed that the relationship between building age and science achievement scores was significant only between Building Ages 1 and 4 and Building Ages 2 and 4 (see Table 2). In other words, there was a significant difference in student TAKS science scores between those in the oldest buildings (Building Age 4, at least 49 years old) and those in buildings of aged 35 years or less. The students in the newest buildings outperformed the students in the oldest buildings by almost 10 percentage points.

The results of the analysis revealed that the relationship between building age and mathematics achievement scores was significant only between Building Ages 1 and 4, Building Ages 2 and 3, and Building Ages 2 and 4 (Table 2). In other words, there was a significant difference in mathematics scores between students in the oldest buildings and the newest buildings, with the students in the newest buildings clearly outperforming those in the oldest buildings. There was a significant difference in mathematics scores between students in buildings 17–35 years old and those students in buildings 36–48 years old. There was a significant difference in mathematics scores between students in buildings 17–35 years old and students in the oldest buildings (at least 49 years old), with the students in the newer buildings clearly outperforming the students in the oldest buildings.

Table 2

ANOVA of Effect of Building Age on Student Achievement Scores, 2006 Texas Assessment of Knowledge and Skills

	Scores by building age					Diff. in % points					
Subject	1	2	3	4	Total	1-2	1-3	1-4	2-3	2-4	3-4
Science	67.3	68.4	63.5	58.0	64.3	-1.2	3.8	9.3*	4.9	10.5*	5.5
Math	64.7	66.9	60.6	56.0	62.1	-2.2	4.1	8.6*	6.3*	10.9*	4.6
English language arts	87.4	88.4	85.8	82.3	86.0	-1.1	1.5	5.1*	2.6	6.2*	3.5*

Note. Building Age 1 = 0–16 years old; Building Age 2 = 17–35 years old; Building Age 3 = 36–48 years old; Building Age 4 = buildings 49+ years old. Scores are the percentage of students passing the subject.
*$p < .05$

Finally, the results of this analysis revealed that the relationship between the building age and English language arts achievement scores was significant only between Building Ages 1 and 4 Building Ages 2 and 4, and Building Ages 3 and 4. In other words, there was a significant difference in English language arts scores between students in the oldest buildings (at least 49 years old) and students in newer buildings.

Null Hypothesis 2 was that there would be no significant relationship between the building age of public high schools in Texas and the 2006 science, mathematics, and English language arts TAKS scores in that building. This null hypothesis was rejected.

Results for Hypothesis 3

Hypothesis 3 was examined using ANOVA as well. Student graduation rate was examined as related to building condition and building age. The results of the analysis revealed that the relationship between building condition and graduation rate was significant between Building Ratings 1 and 3 and also between Building Ratings 2 and 3 (Table 3). In other words, a significant difference in graduation rate was found between students in buildings in fair or worse condition and those students in buildings in good condition, with the students in the buildings in excellent condition graduating at a higher rate than those in fair, poor, or needs-replacing condition.

Table 3

ANOVA of Effect of Building Rating on Graduation Rate

	Graduation rate by building rating				Difference in % points		
Graduation rate	1	2	3	Total	1-2	1-3	2-3
All students	89.1	90.4	93.5	90.7	-1.3	-4.3*	-3.0*

Note. Building Rating 1 = needs-replacing, poor, or fair condition; Building Rating 2 = good condition; Building Rating 3 = excellent condition.
*$p < .05$

The results also showed that the relationship between building age and graduation rate was significant between Building Ages 1 and 4 and between Building Ages 2 and 4 (see Table 4). In other words, a significant difference in graduation rate was found between students in buildings aged 49 or more years and those students in buildings less than 35 years old, with the students in the newer buildings graduating at a higher rate than those in the older buildings.

Table 4

Graduation Rate by Building Age

	Graduation rate by building age					Difference in % points					
Graduation rate	1	2	3	4	Total	1-2	1-3	1-4	2-3	2-4	3-4
All students	91.6	93.2	90.5	87.5	90.7	-1.6	1.0	4.1*	2.7	5.7*	3.0

Note. Building Age 1 = 0–16 years old; Building Age 2 = 17–35 years old; Building Age 3 = 36–48 years old; Building Age 4 = buildings 49+ years old.
*$p < .05$

Null Hypothesis 3 was that there would be no significant relationship between building age and condition of public high schools in Texas and graduation rate. This null hypothesis was rejected.

CHAPTER 5

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

This chapter includes a summary of findings, discussion, conclusions, and recommendations for practice, and recommendations for further inquiry. The purpose of this study was to determine what affect high school facilities' condition and age has on students' academic achievement in Texas and their ability to perform at an acceptable or better rating on a standardized test. This study examined the relationship between the high school building condition and age as compared to the academic achievement of students who completed the TAKS in science, mathematics, and English language arts. This study also examined the relationship between a high school facility's age and condition and student graduation rate. This study sampled high schools whose data were present in the Texas Comptroller's Office (2006) report on facility condition and analyzed TAKS data. The instrument utilized was developed and tested by the Texas Comptroller's Office.

Summary

Of the 5,125 campuses that were reported on the Texas Comptroller's Office (2006) report, 416 were public high schools. The TEA (2006) reported a total of 1,687 high school campuses in 2006; the 416 campuses reported in this study represent 25% of all high schools in Texas. The total student population in these 416 campuses was 532,393, which is 43.5% of the total high school students reported by the TEA to be enrolled in 2006.

Of the 416 high school campuses present in the Texas Comptroller's Office (2006) report on public school facilities, 98 reported being in excellent condition (23.5%), 173 in good condition (41.5%), 119 in fair condition (29%), 18 in poor condition (4%), and 8 needed replacing (2%). In terms of age, 59 (14%) of these campuses were built before 1950, 139 (33%) were built between 1950 and 1969, 111 (27%) were built between 1970 and 1989, and 107 (26%) were built from 1990 to 2006.

The following three research questions guided the research process:

1. What is the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

2. What is the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the TAKS?

3. What is the relationship between building age and condition of public high schools in Texas and graduation rate?

Findings

Results showed 18 specific findings:

1. A statistical significant difference was observed in science TAKS scores between high schools rated in need of replacing, poor, or fair and high schools in

excellent condition. Students who attended schools in excellent condition passed the science TAKS test at a higher rate than those attending schools in poor, fair, or needs-replacing condition.

2. A statistical significant difference was observed in science TAKS scores between high schools rated in good condition and high schools in excellent condition. Students who attended schools in excellent condition passed the science TAKS test at a higher rate than those attending schools in good condition.

3. A statistical significant difference was observed in mathematics TAKS scores between high schools rated in need of replacing, poor, or fair and high schools in excellent condition. Students who attended schools in excellent condition passed the math TAKS test at a higher rate than those attending schools in poor, fair, or needs-replacing condition.

4. A statistical significant difference was observed in mathematics TAKS scores between high schools rated in good condition and high schools in excellent condition. Students who attended schools in excellent condition passed the math TAKS test at a higher rate than those attending schools in good condition.

5. A statistical significant difference was observed in English language arts TAKS scores between high schools rated in need of replacing, poor, or fair and high schools in excellent condition. Students who attended schools in excellent condition passed the English language arts TAKS test at a higher rate than those attending schools in poor, fair, or needs-replacing condition.

6. A statistical significant difference was observed in English language arts TAKS scores between high schools rated in good condition and high schools in excellent condition. Students who attended schools in excellent condition passed the English language arts TAKS test at a higher rate than those attending schools in good condition.

7. A statistical significant difference was observed in science TAKS scores between high schools that were no older than 16 years old and high schools that were over 49 years old. Students who attended newer high schools passed the science TAKS test at a higher rate than those who attended schools older than 49 years old.

8. A statistical significant difference was observed in science TAKS scores between high schools 17–35 years old and high schools over 49 years old. Students who attended newer high schools passed the science TAKS test at a higher rate than those who attended schools older than 49 years old.

9. A statistical significant difference was observed in mathematics TAKS scores between high schools no older than 16 years and high schools over 49 years old. Students who attended school in newer high schools passed the math TAKS test at a higher rate than those who attended schools older than 49 years old.

10. A statistical significant difference was observed in mathematics TAKS scores between high schools 17–35 years old and high schools 36–48 years old. Students who attended school in newer high schools passed the math TAKS test at a higher rate than those who attended schools older than 49 years old.

11. A statistical significant difference was observed in mathematics TAKS scores between high schools 17–35 years old and high schools over 49 years old. Students who attended school in newer high schools passed the math TAKS test at a higher rate than those who attended schools older than 49 years old.

12. A statistical significant difference was observed in English language arts TAKS scores between high schools no older than 16 years and high schools over 49 years old. Students who attended school in newer high schools passed the English language arts TAKS test at a higher rate than those who attended schools older than 49 years old.

13. A statistical significant difference was observed in English language arts TAKS scores between high schools 17–35 years old and high schools over 49 years old. Students who attended newer high schools passed the English language arts TAKS test at a higher rate than those who attended schools older than 49 years old.

14. A statistical significant difference was observed in English language arts TAKS scores between high schools 36–48 years old and high schools over 49 years old. Students who attended newer high schools passed the English language arts TAKS test at a higher rate than those who attended schools older than 49 years old.

15. A statistical significant difference was observed in graduation rates between high schools rated in need of replacing, poor, or fair and high schools in excellent condition. Students who attended schools in excellent condition graduated at a higher rate than those who attended school in buildings in poor, fair, or needs-replacing condition.

16. A statistical significant difference was observed in graduation rates between high schools rated in good condition and high schools in excellent condition. Students who attended schools in excellent condition graduated at a higher rate than those who attended school in buildings in good condition.

17. A statistical significant difference was observed in graduation rates between high schools no older than 16 years old and high schools over 49 years old. Students who attended newer high schools graduated at a higher rate than those who attended schools older than 49 years old.

18. A statistical significant difference was observed in graduation rates between high schools 17–35 years old and high schools over 49 years old. Students who attended school in newer high schools graduated at a higher rate than those who attended schools older than 49 years old.

Discussion and Conclusions

This study confirmed that Texas is no different than the other states when it comes to building age and condition and their impact on student performance; students in older buildings and buildings in worse condition perform at a lower rate than those in new buildings and buildings in better condition. The results of this quantitative study support the results from other quantitative studies performed in other states and also support the results of previous qualitative studies of similar interest in Texas, most notably Lair’s (2003), study of Anthony Trujillo and Ysleta ISD.

Anthony Trujillo, after being hired as superintendent of Ysleta ISD in the spring of 1994, immediately started an initiative to improve the school buildings (Lair, 2003). Trujillo wanted to show that the district could change the schools and thereby change student achievement; he proved to be right, as Ysleta became the first recognized urban school district in Texas (Lair, 2003). According to Lair, Trujillo's theory was that the environment surrounding people has a great deal to do with their attitudes.

This study showed that while age of buildings showed statistical significance in students' success on the TAKS test, the building condition also showed statistical significance in student performance. While we cannot control the act of ageing, we, as superintendents, can control the condition the building is maintained. This study clearly shows that maintaining buildings in good or excellent condition does have an effect on the students' success on standardized test, like the TAKS. School districts need to keep pace with renovations and modern construction to provide the atmosphere that teachers and students need for high academic achievement, but as Trujillo (as cited in Lair, 2003) pointed out, "it's just part of the larger picture." Schools are a symbol of the community and can be a point of pride. They are the first symbol of the importance of education to the community and help set the attitudes and feelings of the students, teachers, parents, and community members. Parents want to know that their children have a chance at success, a hope of the American dream—that no matter whom you are and what your income level is, you can succeed in this great country of ours.

If it is indeed the principal's job to focus on learning and teaching, then it squarely falls on the superintendent to make sure that there are proper facilities for this to occur. In this roll, superintendents must make sure that buildings are properly assessed for conditions that make up an ideal learning environment, they must maintain proper maintenance schedules for all buildings, they must recognize when a building needs to be renovated or replaced, and they need to present regular updates to the school board. It is also the duty of the superintendent to foster positive relationships with state and federal legislators so as to communicate the facility needs of the district and work to find an equitable funding solution. Superintendents and legislative leaders need to strive to provide equal facilities for all students.

Another issue raised in Lair's (2003) research on facilities was advantages for students who attend elaborate facilities versus those who attend schools whose facilities are substandard. Lair stated that students in districts like Yselta often miss out on opportunities because of the equity afforded by the lack of funding. A district official explained:

> We have two soccer teams that advanced above our area here. They went to bi-district, then regional games, and then they were in the area playoffs for the State 5A tournament. They played in Coppell. Both of our high schools lost one to nothing. The difference was it was the first time that our kids had ever played on Astroturf. The question is—should the state tell us not to spend our money on Astroturf when our kids need to go and compete against kids that have it and knowing that on that level of competition, college scholarships are derived from success in those kinds of competitions. Where is the equity in that? When we talk about access and equity issues for children across Texas, you are talking about facilities. (As cited in Lair, 2003, p. 100)

This is but one example where a student who attends an adequate facility would have an advantage over a student who attended school in an inadequate facility. Whether you agree with the example or not, it cannot be denied that students who attend affluent schools have advantages. These advantages present themselves not only in extracurricular areas, but also in academic areas. Specifically, if a student attends school in a facility that has modern science laboratories, does that student have an advantage on SAT exams, scholarships, and attending college to major in science? Although this study did not look at SAT or ACT scores in correlation to building age and condition, it did show that students in newer buildings and those in better condition outperform students attending older and more run-down schools on the science portion of the TAKS test.

With the adoption of the No Child Left Behind Act of 2001 (2002), the Recommended Graduation Plan (TEA, 1998), and the proposed College Readiness Standards (Texas Higher Education Coordination Board, 2008), the bar for education attainment has been set very high. If schools are to help each student achieve at the highest possible level and develop students who can compete in a global market, they will need adequate facilities to insure a proper environment for all students to succeed. This study clearly showed that adequate facilities do make a difference in student performance and student graduation rate, just as noted in Cervantes (1999). Cervantes contended, “If schools are to prepare students for global competition, then we must consider the examination of issues which impact learning and the conditions of the learning environments” (p. 66). Cervantes further noted that in improving the learning environment, decision makers must take into consideration factors such as appropriate furniture, equipment, room and building temperatures, and the overall aesthetics of the building. This list could be updated to include lighting, space, and proper equipment and infrastructure.

Earthman (2004) stated, “There is sufficient research to state without equivocation that the building in which students spend a good deal of their time learning does in fact influence how well they learn” (p. 15). Numerous studies, as cited by Earthman, have indicated that students in inadequate facilities (those that lack appropriate HVAC systems, have poor lighting, are old, are noisy, or lack functional furniture) perform less well than students in adequate facilities; this study confirms these findings. The results of this study clearly show that both the age of a high school facility and the building condition of a high school facility contribute to the academic performance of students on standardized test, namely the TAKS. The results of this study also indicate that there can be a relationship between the age and condition of a high school building and the graduation rate in a high school.

Most recently, the infusion of rigorous state accountability plans and the No Child Left Behind Act of 2001 (2002) have made school leaders question the resources and conditions necessary for all students to learn at high levels. Many in the education profession argue, according to Schrag (2003), “If the states are making schools and students accountable, then surely the states have a reciprocal duty to make certain that the students have an opportunity to learn” (p.6).To continue to make strong academic and learning gains in Texas, the state legislature needs to examine both the amount of financing to improve educational facilities and how decisions are made to determine which districts are subsidized for improving their facilities. Superintendents of Texas schools must work with legislators to insure that proper funding is allotted to improve school buildings to meet the higher academic requirements. Recently, in New Mexico and Colorado, new laws were passed to improve educational facility assessment and funding for needed improvements. Educational facilities are now individually examined by independent examiners for adequacy standards, and financial subsidies are distributed based on which facilities are most in need of improvement (Capital Outlay Bureau, 2008; Capitol Construction Grant Program, 2008). The New Mexico Public School Capitol Outlay Act (as cited by Capital Outlay Bureau, 2008) states,

> A new Funding mechanism for all districts was established to ensure that through a standards-based process, which includes the physical condition and capacity, educational suitability and technology infrastructure of all public school facilities in New Mexico meet an adequate level statewide. This process uses a statewide assessment database which ranks the condition of every school building relative to the statewide adequacy standards. The schools with the greatest facility needs will be addressed first according to the New Mexico Condition Index (NMCI). The database will operate as an objective prioritizing and ranking tool to assist the Public School Capitol Outlay Council (PSCOC) in allocating funds to school districts. (p. 3)

Similarly, the Colorado Department of Education recently upgraded its facility standards to assist all districts in meeting certain standards. The Colorado Department of Education's Capitol Construction Grant Program (2008) established facility standards and safety priorities as a result of Colorado Senate Bill 07-041. This bill required the Colorado Department of Education to (a) create an advisory committee for public school construction, (b) establish facility and safety priorities to be guidelines when assessing school facilities and to evaluate Capitol Construction Grant applications, and (c) conduct an assessment of school facilities and building condition of schools in small, rural districts in Colorado.

Texas could develop similar guidelines as those developed in New Mexico and Colorado, based on the codes and laws on “adequacy.” Once these standards were set, each campus leader or an independent examiner could be responsible for evaluating campus buildings and reporting back to the appropriate state office. Once the reports were received, the state could determine the cost to improve all buildings to an adequate level and then begin the process of funding such an endeavor so as to provide adequate learning facilities for all schoolchildren in Texas. To get a better picture of whether school facilities meet adequate standards in all areas, a more specific appraisal instrument would have to be developed. This study looked only at a general building quality rating that did not take into account specific adequacy standards, such as indoor air quality, lighting, acoustical control, and secondary science labs; a study of this magnitude would be helpful in properly assessing all school facilities.

In Texas, facilities account for a substantial amount of the local investment in education, and they should provide the most efficient and effective learning environment possible. Providing school facilities that are safe and support quality learning conditions must be addressed in Texas as well as in the rest of the United States so that all students, regardless of where they live or how much money their parents make, have an equal chance to receive a good education. The most disturbing finding in the Texas Comptroller’s Office (2006) report is that districts with an economically disadvantaged student population of less than 20% reported the highest percentage of facilities in good or excellent condition, whereas districts with an economically disadvantaged student population of 80% or more reported the lowest percentage of instructional facilities in good or excellent condition. This trend must be reversed to level the proverbial playing field and provide an opportunity for all students in Texas to receive an adequate education. Again, this study supported these statements found in the Texas Comptrollers' Office report.

Compounding the problem of school buildings in poor condition is the fact that graduation requirements for recommended and distinguished levels have added more rigorous courses that will require good instructional facilities. Chapter 74 revisions in the Texas Administrative Code (2007) direct school districts to require four credits of mathematics and science instead of the previous three credits. These dictates, especially in science, will require schools to have more science labs that are properly equipped in order to fully cover all TEKS objectives.

Schrag (2003) eloquently stated,

> There's incontrovertible logic, ethical, fiscal, and legal, in the tight two-way link between standards and adequate resources. If a state demands that schools and students be accountable—for meeting state standards, for passing exit exams and other test—the state must be held equally accountable for providing the wherewithal to enable them to do it. That means calculations to determine the cost of those resources. The most mundane entrepreneur asks the same question: How much will it cost to produce each unit? (p. 277)

If the state of Texas wishes to continue to increase rigor and relevance of academic accomplishment, the state must provide the wherewithal for the districts to meet these challenges. Citizens must reinvest in the infrastructure of Texas for the prosperity of the future of the state.

Recommendations for Improved Practices

If we are to continue to strive to improve student performance and improve the education process we must have adequate facilities to provide the amenities and atmosphere necessary for student success. The following four recommendations are provided for possible improvements to aging and deteriorating facilities and to assist superintendents make the best possible decisions concerning facility improvements:

1. It is essential that superintendents concentrate on maintaining facilities to the best level possible. Make sure that preventative maintenance is completed, and not just repairs.

2. School administrators, including superintendents also should insure that buildings are kept clean and neat, which will help in the overall maintenance and aesthetics of the building.

3. All educators in leadership positions, school board members and legislators should work together to fund all necessary improvements to facilities to insure the high levels of academic gain mandated by state officials.

4. State officials, educational leaders and industry executives should develop a system for properly assessing buildings and repairing those in the worst condition first.

Recommendations for Further Inquiry

This study investigated three research questions: (a) the relationship between the building condition of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by the Texas Assessment of Knowledge and Skills (TAKS); (b) the relationship between the building age of public high schools in Texas and student achievement scores in science, mathematics, and English language arts as measured by TAKS; and (c) the relationship between building age and condition of public high schools in Texas and graduation rate. Statistically significant findings showed a relationship between excellent condition of a school, as compared to schools in lesser condition, and student TAKS scores in science, math, and English language arts scores. Age of the school also had a significant relationship: Schools over 49 years old had a significant impact on student TAKS scores in science, math, and English language arts. Similar findings showed a negative correlation between schools over 49 years old and graduation rate. Schools in excellent condition had a positive correlation to student graduation rate.

While this study showed that older buildings and those buildings in poor condition have an adverse affect on student performance, it is still not clear if this is due directly to the facility conditions or how students feel about the facility condition. Thus, further inquires should study the human aspect of how teachers and students feel about attending school in buildings that are old and/or in poor condition. Additionally, further inquires also should study other academic measures that were not included in this study; for instance, this study did not take into consideration social studies scores, SAT scores, ACT scores, or scores in other grade levels than high school. Further inquires could also study the intangible effects of older buildings or those in poor condition. These effects include, but are not limited to, loss of student enrollment, inability to attract highly qualified teachers, and inability to attract new business to increase the local tax base. Others could investigate specific adequacy standards, such as indoor air quality, lighting, acoustical control, and secondary science labs and impact on achievement on standardized tests. Similarly, further research should focus on elementary schools and middle schools to determine the impact of facility condition on student achievement on standardized tests. Adequacy and equity of facility funding in Texas have yet to address financing the improvements of school facilities and the relationship between teacher retention and school building age and condition.

Postscript

This study clearly shows that students who attend older high schools or those in worse condition do not perform as well as those who attend in newer and better condition schools. Although school condition has improved from the time of *Brown vs. Board of Education* in 1954, we still have room for improvement until complete equity in school facilities is obtained. In 1928, Lyndon Johnson, a college senior, was assigned to be the principal of Cotulla, Texas. He stated “I was determined to improve the lives of those poor little kids. I saw hunger in their eyes and pain in their bodies. Those brown bodies had so little and needed so much” (as cited in Goodwin, 1976, p. 66). President Johnson went on to sign the Elementary and Secondary Education Act of 1965 to begin the process of providing an equal opportunity for all children. In his remarks that day Johnson stated,

> Somehow you never forget what poverty and hatred can do when you see the scars on the hopeful face of a young child. I never thought then, in 1928, that I would be standing here in 1965. It never occurred to me in my fondest dreams that I might have the chance to help the sons and daughters of those students and to help people like them all over this country. But now I do have that chance—I'll let you in on a secret—I mean to use it. . . . I do not want to be the President who built empires, or sought grandeur, or extended domination. I want to be the President who educated young children . . . who helped feed the hungry . . . who helped the poor to find their own way and who protected the right of every citizen to vote in every election. . . . God will not favor everything we do. It is rather our duty to divine His will. But I can not help believing that He truly understands and that He really favors the undertaking that we began tonight. (As cited in Goodwin, 1976, p. 230)

Hopefully this study, and subsequent additional facility studies, will help materialize the solution to early concerns by then President Johnson. It is now the duty of all involved in the education process, from the single parent to the President of the United States, to work together to fix inadequacy issues that still exist today in our education system and to provide an equal opportunity for all of the children to succeed in our great nation.

APPENDIX

SCHOOL FACILITIES SURVEY

County District No.:	← (ENTER ISD # WITH DASH, i.e., 001-902)
District Name	

1	2	3	4	5
Facility Name	Primary Use (I,A,S,W,E,R,N,D,O)	Student Enroll-ment Fall Snap-shot 2005	Type of Campus (N,E,I,H,M)	Year Built
Sample El	I	432	E	1975
6	7	8	9	10
Year Last Renovated	Student Capacity of Permanent Facility	Permanent Building Square Footage	No. of Portables	Square Footage of Portables
1998	450	11,000	6	4,000

Facility Inventory Instructions (Click on X to go to Data Entry Column in Inventory Spreadsheet)

General Instructions: When completing this spreadsheet, it is important to separate instructional facilities from all others, since much of the analysis that will be performed on this data will be done *on a per-pupil basis*. Please do not leave any fields blank; rather, indicate zeros, N/A (not applicable), or 9999 for columns requesting a year that is unknown.

For purposes of this survey, information about any single building is not as important as the total capacity and condition of a campus or site, which may be made up of multiple buildings. Therefore, we ask that when there are multiple buildings that make up a single campus or site, please summarize all information for all buildings within a primary use category (Column #2) on one line. For example, if nine of the ten buildings that make up a given high school campus are used for instructional purposes (Column #2: I=Instruction), all of the square footage, student enrollment, capacity estimates, etc. for those nine buildings should be summarized on one line. The remaining building that, for illustrative purposes serves as a bus barn, would be entered on a separate line (Column #2: S=Support Services). A campus may also house multiple programs with separate campus identification numbers, such as a Pregnant Teen Program, an Alternative Education program and the like. If the programs co-exist in one facility, then information for the facility would be entered only once under the name of the campus, showing the unduplicated student enrollment in all programs.

NOTE: Some of the information requested in this spreadsheet may be available through your insurance company, in the company's annual facility assessment of values or insurable properties document, and/or some may be captured for financial reporting purposes as a result of GASB 34 requirements.

1) Facility/Campus Name – Provide the name your district uses when referring to this facility, campus or cluster of buildings. If the facility is leased, and ownership of the property does not automatically revert to the district at the end of the lease agreement, add the word LEASED after the name of the facility. (i.e., Sanchez Elementary LEASED).

2) Primary Use – *Only designate one "primary use" for each facility.* When a facility is used for multiple purposes, the "primary use" is the purpose for which the majority of the facility space is used for more than 50% of the time. Select *one, most appropriate* answer from the following: I = Instruction (gymnasiums, cafeterias and libraries associated with a specified campus are considered to be part of an instructional facility); A = Administrative; S= Support Services (i.e., bus barns, print shops, etc.); W = Warehouse and Storage; E = Extracurricular or Sports (use only if classes are not held in this facility during more than 50 percent of the day); R = Residence for Staff; N = Not in Current Use; D = Abandoned and may be candidate for demolition; O = Other.

3) Student Enrollment Fall 2005 Snapshot – For non-instructional facilities, enter "N/A". If the response to #2 Primary Use was "I" indicate total enrollment on this campus as it was reported to TEA for the Fall 2005 SNAPSHOT submission. If

multiple programs or campuses co-exist in a facility, please indicate the total enrollment for all programs or campuses at this facility.

4) Type of Campus – For non-instructional facilities, enter "N" for not applicable. If the response to #2 Primary Use was "I", select the most appropriate answer based on the grade levels served on this campus. If the grade levels served fall into two categories, select the grade category that best describes the majority of students on that campus. For example, if a campus serves students in grade 3 through 6, and 6th graders represent only 25% of the student body on that campus, you would select "E" because the majority of students served fall into that category. However, if the campus serves students from Pre-K through grade 8, the most appropriate answer would be "M". The categories are defined as follows: E=Elementary (Early Childhood through grade 5); I=Intermediate (grades 6 through 8); H=High School (grades 9 through 12); and M=Mixed/multi-grade (groupings that encompass multiple categories, such as K-8 or K-12).

5) Year Built – Provide the date when the main facility was first constructed. When multiple buildings exist on the same campus, enter the date when the oldest building was constructed. *If the year built is unknown, enter 9999.*

6) Year Last Renovated – Renovations do not include general maintenance and repairs, but rather would include space additions, space modifications or other structural enhancements that are needed to expand capacity or improve the efficiency or functionality of the facility. In the case of campuses with multiple buildings, please provide the date when the last renovations on this campus occurred. If the campus has never been renovated, please enter the year built for the date of last renovation. *If the year of last renovation is unknown, enter 9999.*

7) Student Capacity of Permanent Facility – *If this is a non-instructional facility, enter N/A.* For instructional facilities, please provide the total current student capacity for all habitable permanent facilities on this campus or at this location. DO NOT INCLUDE THE CAPACITY OF PORTABLES, TEMPORARY OR NON-PERMANENT MODULAR FACILITIES IN THIS NUMBER (See #9 and 10 below). Provide your best estimate of the total number of students this facility could house, without creating overcrowded, unsafe or unsanitary conditions. Remember to account for the state-mandated 22 to 1 class sizes when calculating the student capacity of kindergarten through 4th grade classrooms. Also, specialized classrooms such as science labs, art rooms, music rooms, special education classrooms,

vocational rooms, computer labs, etc., should be included when calculating the student capacity of middle school and high school facilities, but the specialized classrooms should not be included when calculating the student capacity of elementary school facilities. For purposes of consistency from district to district when calculating student capacity, use the space and minimum square foot requirements found in the Texas Education Agency's School Facilities Standards, §61.1036 TAC (the Standards can be downloaded from: http://www.tea.state.tx.us/school.finance/facilities/standards.pdf).

8) Permanent Building Square Footage – As described in #7 above, please provide the total square footage for all habitable permanent facilities on this campus or at this location. DO NOT INCLUDE THE SQUARE FOOTAGE OF PORTABLES, TEMPORARY OR NON-PERMANENT MODULAR FACILITIES IN THIS NUMBER (See #10 below).

9) Number of Portables – please provide the number of portable, temporary or non-permanent modular buildings used at this site, which are specifically designed and constructed to be moved from one location to another as necessary. If there are one or more modular buildings used at this site which were constructed to serve as permanent facilities, please include the capacity and square footage of these modular buildings in #7 and #8 above. If there are no portables on this site, please enter zero rather than leaving the field blank.

10) Square Footage of Portables – Calculate the total habitable square footage of all habitable portable, temporary or non-permanent modular buildings identified in #9 for this campus or at this location.

11) Permanent Building Condition – The information requested here is the condition of the facility, as it exists today. When assigning a condition to the permanent facility, the following descriptors should be used: E = Excellent, no major repairs are needed; G = Good, some repairs may be beneficial but the facility is structurally and educationally sound; F = Fair, major repairs are needed, but the building's condition does not impair student learning or staff/student safety; P = Poor, the condition of the facility impairs student learning and staff/student safety; N = Needs Replacement, needed repairs are extensive and the cost to make the facility safe and structurally and educationally sound exceeds the cost of replacement.

12) Dollar Amount of Current Maintenance Needs – When determining outstanding maintenance needs, maintenance is defined as scheduled, periodic work

on facilities to keep them in good working order by preventing their deterioration. This should include both current planned and deferred maintenance, such as the repair or replacement of major infrastructure systems like roofs, air conditioners and the like. The dollar amount of maintenance needs should also include maintenance that is scheduled and budgeted for during the summer months, but has not yet been started.

13) Dollar Amount of #12 Needs Budgeted for FY 2006 – Of the amount of maintenance needs identified in #12 above, indicate the dollar amount that is already budgeted, and expected to be completed this fiscal year. Do not include the dollar amount of contingency budgets for unexpected or emergency repairs or renovations, if dollars have not been specifically designated for the needs identified in #12 above.

14) Year Major Renovations Are Anticipated – When in the future do you feel that major renovations will be needed to insure that this facility meets enrollment/capacity needs and/or remains useable and safe. Major renovations are defined as space additions, space modifications or other structural enhancements that are needed to expand capacity or improve the efficiency or functionality of the facility. If major renovation is scheduled in the coming year, please enter 2006 for the anticipated date. *If the year when major renovation cannot be anticipated, enter 9999.*

15) Year Building Should Be Replaced – Enter the year when you believe that the facility will have reached its useful life and require replacement. If you do not think that this facility will be replaced, because of, for example, its historic significance, please enter "N/A". If the facility is leased, and ownership of the property does not automatically revert to the district at the end of the lease agreement, enter the letter L and the year that the lease expires. (i.e., for a lease expiring in 2010, enter L2010). *If the year when the building should be replaced cannot be anticipated, enter 9999.*

Should you need assistance, please feel free to contact the Local Government Assistance Division by phone at 1-800-531-5441, extension 3-4679 or via email at: facility.survey@cpa.state.tx.us.

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VITA

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