# FROM BLOCK TO TRADITIONAL SCHEDULE: THE IMPACT ON ACADEMIC ACHIEVEMENT, ATTENDANCE RATES, AND DROPOUT RATES

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The purpose of this study was to examine the impact of school schedule on student achievement and attendance of ninth and tenth grade students in metropolitan area Texas high schools (*n* = 22) and campus dropout rates. High schools that were analyzed in this study made a transition from A/B block scheduling in the 2003-04 school year to a traditional school schedule in the 2004-05 school year. Academic achievement, attendance rates and dropout rates were gathered through the archived files of the Texas Agency through the Academic Indicator of Excellence System (AEIS). Academic achievement was measured by the Texas Assessment of Knowledge and Skills (TAKS) Reading/Language Arts and Mathematics standardized tests.

This study compared the mean scores of ninth grader student achievement, attendance, and dropout rates from the 2003-04 school year to the mean scores of the tenth graders from the same schools from the 2004-05 school year, after the schools converted from an A/B block schedule to a traditional class schedule. Each independent variable was divided into four subgroups; campus mean results, minority student results, limited English proficient (LEP) student results, and low-socioeconomic student results. Students under the A/B block scored significantly higher in reading achievement than when they were instructed the following year under a traditional schedule. Paired sample *t*-tests were conducted to analyze the data for each subgroup, and showed there was a statistically significance in reading / language arts student achievement scores for all subgroups. Statistical significance was determined with a

ninety five percent confidence level ($p < 0.05$). Statistical analysis revealed varied results in mean scores for math academic achievement and attendance rates, but no statistical significant difference. Comparison of data showed a slight increase in mean scores for dropout rates in traditional schedule, however the results were not significant.

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# CHAPTER 1

## INTRODUCTION

In 1983, The National Commission on Excellence in Education released the report, *A Nation at Risk.* In this report the commission described American schools as academically falling behind schools of other industrialized nations, and the commission called for schools in America to make changes to be more competitive. The report by the National Commission on Excellence in Education (NCEE) examined the quality of public schools in America and their report contained several recommendations for improvement in public schools. One area of public education the commission studied was the use of time in American schools. The commission called for better organization of the traditional school day and school times, and recommended the school day is rethought and recreated to meet the needs of the various student learners within the school systems.

During certain periods in history of schools in America, time has been a factor and presented as a possible solution to resolve educational concerns of that particular time. In the early 1900s, the issue was that of an unskilled workforce and the solution was time, in the form of increasing the amount of time students would spend in school. Anderson (1984) explained that during the 1930s, the educational issue became the interest or the needs of the individual, and then the time between World War II and the 1960s, the public was pressuring schools to provide better and more service to the citizens. Huyvaert (1987) describes that the solution for education or the choice of educational reform was time, more specifically “extend the school day, week, and year” (p. 7). Canady (1995) asserted that during the 1960s to the 1980s, the issue of time in

schools became the mechanism for change for the purpose of addressing concerns for better instruction by the schools.

Why is time such an important concept found in the literature on change reform for American schools? Anderson (1984) reflects upon this issue:

> For the entire twentieth century schooling has been defined in terms of time. In the USA, for example, Carnegie units, largely time-based entities, are used to certify high school graduates. More pragmatically, class periods have been based on the allocation of fixed amounts of time; so many minutes are allocated to reading, mathematics, and other academic and non-academic subjects. Since students enter schools and classrooms differing in the knowledge, skills, or abilities they posses, under these fixed-time conditions these differences are transformed into differences in student achievement. (p. 1)

Huff (1995) affirms the concept of time as being the unchanged structure in our schools and that schools must restructure the learning environment to meet the needs of our youth, and not rely on the educational time structure developed by our past.

In 1985, Fisher and Berliner published a book, *Perspectives on Instructional Time*, and within this book they continued the discussion of time in schools. Fisher and Berliner define time to be a variable when one is studying teaching or studying the effects of teaching. They discuss the notion of altering the school day and further examines how this is one area or variable over which school policy makers have control. They noted that this factor can directly affect teaching, which in turn can affect the outcome of schooling (Fisher & Berliner, 1985). Fisher and Berliner do not directly mention block scheduling or examine the details of various scheduling alternatives, but rather explain how time effects learning. They pose the problem of managing time in schools to school policy makers and submit that this is one such strategy in the restructuring efforts of schools and in reforming schools in America.

Eleven years after the report, *A Nation at Risk* (1983), another national

commission gave their report on the quality of schools in America, but more specifically on the use of time in public schools throughout the United States. The National Education Commission on Time and Learning (1994) released their report, *Prisoners of Time*, and within this report they state: “Fixing the design flaw requires changes in how we organize teaching so that all students are given the time necessary to succeed to high levels, something that is not possible in the existing [school] system” (p.31).

In the literature the reoccurring message of addressing changing the basic school day has created such scheduling changes to incorporate more innovative school days, such as; block scheduling, alternative scheduling, trimester scheduling, and other various types of non-traditional scheduling. The traditional and rigid school schedule had begun to become subject to scrutiny and the focus of new research. The concern of the public today and the pressure of schools for students to perform satisfactorily on mandated standardized tests resulted in efforts to alter the concept of time and schedules in the secondary schools.

In *Dimensions of Time and the Challenge of School Reform*, Gándara (2002) describes that there has been an increase to curriculum and what is mandated to be taught in schools. This has forced schools to reevaluate their limited resources and to realize that time is the critical and most important aspect that schools can reconfigure to meet these higher demands. Block scheduling is being adopted by many school throughout the United States as the mechanism to bring about change in student performance. Lare, Jablonski, and Salvaterra (2002) describe the magnitude of this new reform movement as by stating: “Block scheduling maybe the most significant reform strategy in secondary education in the last half of the 20$^{th}$ century” (p. 54).

As of 1996, according to Canady and Rettig, over 50% of secondary public schools in the United States utilize some form of block scheduling, and more schools were looking at implementing block. What is block scheduling? In an online booklet by the Northwest Regional Educational Laboratory (1997) it is defined as, “in its simplest definition, block scheduling is any schedule format with fewer but longer classes than traditional schedules permit” (p.1).

Educators and schools are looking at the evidence and evaluations of the effectiveness of block scheduling and whether or not block scheduling has a positive effect on student achievement. Data supporting block scheduling as an effective educational tool for improving student achievement explains that block scheduling creates more time within the instructional setting (Queen, 1999). With this lengthened class time, teachers have the opportunity to implement various instructional methods that would not be possible in the time constraints of classes set in the day of a seven period traditional high school schedule (Irmsher, 1996). In another study, Gullatt (2006) conducted literature research on studies, from 1990 to 2006, involving block scheduling and concluded that teachers have the opportunity to incorporate a wider variety of teaching methods due to the increased class time.

Another benefit of block scheduling is that there is a decrease in the number of times students will transition from one class to another. This is due to the fact that block scheduling includes 4 - 5 scheduled classes per day as opposed to the seven periods a day daily schedule. This means that students in block scheduling will switch classes four times per day under block scheduling. Students under a traditional, seven periods a day schedule will switch classes three more times each day. This extra time switching

from class to class is a total of 15 minutes per day, one hour and 15 minutes per week, or 45 more additional classroom hours per year (Boarman & Kirkpatrick, 1995).

Under A/B block scheduling, language arts and mathematics can be double blocked, meaning they meet each day of the school year, even if other classes only meet every other day. This requires additional teachers in the area of language arts and mathematics as well as additional classroom space, and thus a greater amount of money to implement block scheduling where certain classes are double blocked. The purpose of school reform, such as implementing block scheduling, should be to increase student achievement and learning. However, with many states having limited budgets for schools, including tax limitations for increasing budgets, there have become reasons to evaluate programs on a budgetary level, not just on the level of student achievement. Some school districts have been forced to reconfigure the secondary school schedule to accommodate budgetary needs, and therefore move away from the more costly block (Wilson, J. E. & Associates, LLC, 2004).

## Statement of the Problem

This study compared student performance of Texas high school students, from the major populated metropolitan areas in the state of Texas, who were educated in an A/B block schedule in 2004 and then in 2005 were educated under a traditional seven periods a day school schedule. Statistical analysis was conducted to determine if there were any significant differences on student academic achievement on standardized state tests and in the areas of student attendance and student dropout rates. The study compared ninth grade students instructed under the A/B block scheduling, to their tenth

grade year when these students were instructed under a traditional schedule. Campus-wide pass rate means were compared as were the pass rates for the subgroups; minority students, limited English proficient students, and low socio-economic students.

## Purpose of the Study

This study compares student performance of Texas high school students, from the major populated metropolitan areas in the state of Texas, who were educated in an A/B block schedule to student performance of students educated in a traditional seven periods a day school schedule. Student performance in reading and mathematics from the Texas Assessment of Knowledge and Skills (TAKS) test, student dropout rates, and student attendance rates from the school years 2003-2004 and 2004-2005 are examined and compared. The study looks at students who had been on a form of a block schedule for several years and then during the school year 2004-2005, these students were placed back into a traditional school schedule due to either budgetary constraints or to dissatisfaction with block scheduling.

The purpose of this study is to determine any significant differences in student performances, student dropout rates, and student attendance rates since students entered the traditional seven period schedule, compared to students who remained on the block schedule.

## Hypotheses

Null Hypothesis 1*:* For the campus and subgroup populations there is no statistically significant difference between the Reading / English Language Arts TAKS

achievement mean scores for the ninth graders instructed under A/B block scheduling to the Reading / English Language Arts TAKS achievement mean scores for the tenth graders, in the same schools, instructed under a traditional class schedule.

Null Hypothesis 2*:* For the campus and subgroup populations there is no statistically significant difference between the mathematic TAKS achievement mean scores of the ninth graders instructed under A/B block scheduling and the mathematics TAKS achievement mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

Null Hypothesis 3*:* For the campus and subgroup populations there is no statistically significant difference in the attendance rates mean scores of the ninth graders instructed under A/B block scheduling to the attendance rates mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

Null Hypothesis 4*:* For the campus and subgroup populations there is no statistically significant difference in the drop-out mean scores of the ninth graders instructed under A/B block scheduling to the drop-out mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

## Limitations

Possible limitations of this study were that other factors than the variables being studied may influence student achievement, attendance and/or dropouts. These factors might include the level of staff development at different school campuses, the different culture in regards to school expectations at different campuses, and differences with individual teacher's attitude towards classroom instruction. The fact that high schools

switch from a form of block scheduling to a traditional schedule because of financial constraints, may not be the only factor that influences the independent variables being studied and analyzed.

Included in the possibility of limitations is human error or the possible mistakes of district personnel collecting and inputting data into the Public Education Information Management System (PEIMS) computer data system. The study is also limited to measuring student achievement by only two means, one being achievement on the reading assessment of the Texas Assessment of Knowledge and Skills test and the other being the mathematics achievement on the Texas Assessment of Knowledge and Skills test.

## Definition of Terms

The following terms and definitions are describes as operational definitions to support this study.

- A/B block (alternating day) schedule: A scheduling method where students attended 90-minute classes alternating every other day, and the days of the week are alternated into A days and into B days. Where half of the courses are taken on A days and the other half of the courses are taken on B days, and a credit course will last the entire school year.
- Accelerated (4 x 4) block schedule: A scheduling method, used in schools, where most students attended four 90-minute classes every day and students attended these four blocks per semester to where the full credited course will end at the conclusion of the semester, rather than an entire school year.

- Academic Excellence Indicator System (AEIS): The Academic Excellence Indicator System is a report on every school campus in the state of Texas, where information is presented on the performance of the students on each campus and on the districts in Texas. The AEIS report is by the Texas Education Agency and presented in annually in the fall about the previous years' results and includes the following performance indicators:
    - o Dropout rates
    - o Attendance rates
    - o The results from the Texas Assessment of Knowledge and skills (TAKS) by grade level and subject
- Annual dropout rate: When a student is absent from school without excuse or approval from the school and does not enroll or return the following year in the fall semester, the student is identified as a dropout. To determine the annual dropout rate of a school, the number of students that are identified as dropouts are divided by the number of students in attendance or enrolled.
- Attendance rate: Is based on student attendance for the campus, where the total days the students of the campus were present are divided by the total days the students were enrolled for a particular year.
- Limited English proficient (LEP):Texas students identified by the Language Proficient Assessment Committee that meet specific criteria set by the state that identify them as limited proficiency in the English language. These students are learning English as a second language and speak a language other than English in the home.
- Modified block: Is a form of block scheduling, but has been altered from the main forms of block scheduling to meet the individual campus needs. For example,

modified A/B block schedules may have double blocked classes every day at the end or the beginning of the day to accommodate electives courses, rather than meeting every other day.

- Public Education Information Management System (PEIMS): This record is used by the Texas Education Agency (TEA), in compliance with the Texas Education Code (TEC), for the purpose of collecting basic organization data about Texas school districts, schools, and students, such as; attendance, student demographics, school information, discipline, financial expenditures, personnel statistics and other organizational information.

- Socio-economic status (SES): A definition by the state of Texas Education Agency, describing a student population group where the students and/or their families are determined to be in an at-risk factor of low income or poverty; economically disadvantaged. This is a subgroup under the Academic and Excellence Indicator System through the Texas Education Agency.

- Texas Assessment of Knowledge and Skills (TAKS): An assessment test that measures student performance with the Texas statewide curriculum in Reading at Grades 3-9, English and Language Arts in Grades 10 and 11, and in Mathematics at Grades 3-11.

- Traditional schedule: A scheduling method, used in schools, where students attend seven to eight classes of 45-50 minutes in length each school day, and these classes are a year in length for one credited unit. To where the school year begins in the fall (late summer) and concludes at the end of spring or the beginning of the summer. In a traditional schedule, teachers will tend to teach six to seven classes per

day and only have one conference period per school day.

- Trimester schedule: A scheduling method in which students attend classes where semesters are divided into thirds, three nine week periods. Traditional year long classes are completed in two-thirds, or 18 weeks a year.

## Significance of the Study

Based on several studies on the effectiveness of education, Algozzine, Jenkins, and Queen (2003) describe that there is a tremendous amount of pressure by the business community, politicians at all levels, and by educational researchers for educational policy makers to create significant changes in public schools. In 1981, T.H. Bell, the Secretary of Education, decided to create a commission to address the overwhelming public concern and perception of the public education system of America. This commission was to determine the problems that need to be addressed and resolved if public education was to be an example of excellence in educating our youth (National Commission on Excellence in Education, 1983). The Commission's publication, *A Nation at Risk: The Imperative for Educational Reform*, contained practical recommendations for the purpose of improving education. One such recommendation focused on time and the fact that American high school students spend much less time on school work and on core subjects than schools in other industrialized nations.

Thomas' (2001) states: "There is great deal of controversy surrounding the use of block scheduling, and many schools are jumping on the block-scheduling bandwagon" (p. 74). Schools and school districts are utilizing school schedule as a technique or as

an attempt at school reform to incorporate changes to assist with increasing student achievement. According to Zhang (2001), the qualitative and quantitative research on scheduling types is mixed and does not overwhelmingly support one form of school scheduling over another. Zepeda and Mayers (2006) compiled fifty eight experimental studies done on high school block scheduling from the years 1985 to 2006. Their analysis of these studies showed similar results and conclusions to what Zhang describes. They found that grade point averages slightly increases and attitudes of teachers, administrators, and students were more positive towards a form of block schedule. On the other hand the results from the analysis of these fifty eight empirical studies found attendance rates and standardized test scores were mixed in sometimes supporting the use of block schedules, sometimes supporting the use of traditional schedules, and other times not supporting significantly one schedule or another.

As required by the Texas Education Code, the Texas High School Project (THSP) is to improve instruction in science and math in high schools to help with efforts to reduce dropout rates of students in Texas high schools. This project states that portions of this improvement should include the option of flexible school day schedules and programs. In the report, The 2006 Comprehensive Annual Report on Texas Public Schools, it describes the THSP and calculated that dropout rates for students in Texas for Grades 7 through 12 for the class of 2005 was estimated to be a population of 18,290 students (TEA, 2006). This large number of students in secondary school has not completed the requirements for high school graduation, nor do they meet the minimum requirements for earning a General Education Diploma (GED). These numbers are an important set of data to study to determine the effects of scheduling on

student success and how the scheduling determines the dropout rates among these Texas high school students.

Looking at the number of districts in the United States including the state of Texas, utilizing forms of block scheduling, this study will add to the body of research concerning the impact types of school schedules have on high school student achievement, attendance rates, and dropout rates. It will determine if any significant difference has occurred in these areas and will describe past relevant studies and articles related to block scheduling.

## Organization of the Study

This dissertation is presented in five chapters. Chapter 1 contains the introduction to the problem, the purpose of the study, a descriptive of variables and method of data collection, the significance of the study, the limitations of this study, and the definitions associated within this study. Chapter 2 contains a review of the literature on block scheduling and relevant research on block scheduling that either supports or contradicts the support for block scheduling. The methodology, procedures, and participants involved are found in Chapter 3. Chapter 4 contains results of the data collected from this study, and Chapter 5 analyzed and summarized the results of the study, and reported the researcher's recommendations for further research.

# CHAPTER 2

## REVIEW OF RELATED LITERATURE

The federal Public Law 107-110, better known as the No Child Left Behind Act (NCLB) of 2001, has forced states and schools to be accountable to “close the achievement gap with accountability, flexibility, and choice, so that no child is left behind” (p. 1425). The NCLB requires schools to measure student success and achievement through the usage of state academic tests and assessments, but does not require schools to abide be required implementations of mandated programs. Rather, this law allows states and local schools control over program development and implementation to address meeting the needs of their students for the purpose of obtaining an aligned curriculum instruction with state assessments.

One such area the NCLB dictates schools address is providing students “services that increase the amount of quality of instructional time” (p.1440) and increase efficient use of school time for learning. With this NCLB there were more demands for increased time for teaching, but additional monies were not included to assist with any changes for schools. Merely adding school days to the year is not the most efficient method of using school money to address increasing time spent on learning. Metzer (2003) found that when California decided to increase the number of school days for students enrolled in Grades 6, 7, and 8, it was estimated to cost $ 1 hundred million. Therefore, there is a need for schools to look at how the time in schools is being utilized and look at the best researched supported practices on school time.

This chapter explores the research and literature associated with block scheduling found in books, education journals, on-line publications, dissertations, and

published studies. The chapter is organized into the following sections: questioning the traditional schedule, beginnings of alternative scheduling, designs of block scheduling, growth of block scheduling, benefits of block scheduling, disadvantages of block scheduling, cost of block scheduling, and summary.

The term traditional schedule corresponds to the concept that the school day schedule is a tradition that has been followed for a lengthy period of time. The traditional schedule for secondary schools is usually seven to eight classes per day, where each class is 45 minutes in length. Each subject course starts at the beginning of the fall semester and the course is over at the end of the spring semester, this is known as one academic school year. In a policy research on scheduling by the Texas Education Agency Office (1999), it described the use of traditional schedules in schools as follows: “The most widely used form of scheduling in the U.S. is the single-period daily schedule. Under this schedule students attend six, seven, or eight classes each day throughout the school year” (p. 3). This report also concluded that traditional scheduling has been the major type of scheduling for public schools the past 150 years.

The development of the traditional schedule is based on the Carnegie system, where each subject course has been hourly calculated in units of time (Carnegie units) to where time spent in class is in relation to learning the subject material (Edwards, 1995). This was traced back to the time America was developing the standards of industrialization in the workplace and where the specific amount of clock hours is a direct correlation to the output or production, as is the case in credit hours earned for time spent learning a subject in a particular credited course in high school (Kruse & Kruse, 1995). Huyvaert (1998) defines the Carnegie unit standard as “a standard unit

consisting of regular attendance in a course that meet one class period per day, five days per week, [and] thirty-six weeks per year" (p. 33). Queen (2000) describes how deeply embedded educational traditions have become in the American education system where generation after generation of citizens have been a part of these educational traditions from high schools that utilize the practice of completing a approved number of Carnegie units.

Hammack (2004) details the history and development of the comprehensive high school in America and how these past strategies for organizing and managing public high schools go as far back as the turn of the 20th century, and how these strategies are still determining the way high schools in America are structured and run today. One concept is the ideology that subjects should be taught the same way for every student in that particular subject course and hold strong to the concepts of classes being traditional in time and in content, no matter background of the student, current conditions, or future educational goals (Hammack, 2004).

For many rural schools, during the 1800s, the school calendar was not as rigid as it is today. Due to the winters, road conditions, and the need of the children to help with farming in the spring, the rural schools were opened during the summer months, opposite of what the school year appears like today (Huyvaert, 1998). Canady and Rettig (1995) describe that high schools before the 1900's were flexible in their schedules, in that urban high schools offered courses based on various lengths of days, rather than meeting consistently five days per week each week.

The National Educational Association, in 1893, created and sanctioned a committee, the Committee of Ten, to ascertain the function of the high school and to

create a uniform measurable set of standards for secondary schools. Huyvaert (1998) states that in the Committee of Ten's final report, the committee included "the recommendation of subjects to be taught how many semesters on each subject, and when the subject should be taken"(p. 96), and the length of allotted time for each of these recommended subjects for high schools in America. Canady and Rettig (1995) declare that the recommendations from the Committee of Ten's report are the factors that have shaped the traditional high school schedule, and that these recommendations have not changed but in few small ways since the report were published.

## Questioning the Traditional Schedule

During the 1960s proposals were made to the traditional high school schedule of seven classes, all similar in length of time, be reconfigured into a schedule in which classes varied in time. This form of scheduling began as an experimental set of scheduling ideals based on instructional needs of students and developed into the concept that was known as flexible classes (Queen, 2000). Flexible modular scheduling is a schedule utilized by schools, based not on the Carnegie Unit, but rather on the needs of each student, more of an individualized plan. Huyvaert (1998) defines the flexible modular scheduling as a schedule that will change as the need of the student changes, or based on the instructional strategies that are needed to present or demonstrate the needed material and activities.

Over twenty years ago, beginning in 1981, a committee was formed by the Secretary of Education, to research and determine the quality of education in America and to research and then calculate recommendations for the purpose of improving the

education system within the United States. The National Commission on Excellence in Education, in 1983, released the report entitled *A Nation at Risk: The Imperative for Educational Reform*, which suggested a vast and dramatic change in American education as well as described the education system in America as lacking compared to other modern nations of the world. One of the commission's recommendations was on time, and the commission stated the following recommendation in regards to time in schools (1983):

> The time available for learning should be expanded through better classroom management and organization of the school day. If necessary, additional time should be found to meet the special needs of slow learners, the gifted, and others who need more instructional diversity than can be accommodated during a conventional school day or school year. (p. 4)

The commission's report challenged the embedded traditional schedule and way of structuring the school day and became a catalyst in starting a reform movement to change and improve schools.

Cannady and Rettig (1995) describe that in the 1980s, changes brought about by pressures created from the report *A Nation at Risk*, increased graduation requirements for most of the states high schools. With increased graduation requirements brought about the need to increase credited courses in core subjects, therefore forcing students to drop or not take fine art courses or vocational courses. Some schools adjusted to these additional needs by added time to the school day to allow for electives, and many school systems just added additional periods within the school day and not increasing the length of the school day. Cannady and Rettig (1995) stated that, "As a result of these actions, class periods in many high schools became shorter, and the school day became even more hectic and fragmented for both teachers and students" (p. 7).

Fisher and Berliner (1985) researched time as a variable in studying the effectiveness of teaching and learning, and how decisions by education policy makers affect time in schools and more particular in learning. In their research discussion they stated: “The impact of allocating time in alternative ways is important for school personnel because it is one of the few variables over which they can exercise discretionary control” (p. 7). Their research on time in schools added to the literature supporting the need for a change in school structure. This work paved the foundation for a pathway for suggesting block scheduling in high school.

In 1994, *Prisoners of Time*, by the National Educational Committee on Time and Learning (NECTL), was published and was a comprehensive review of the relationship of time and learning in American schools. The committee’s title is in related to the overall concept behind the report and that they determined learning to be limited by time, to where the schools are not changing effectively with the revolutionary times in our society and of the world. In the report, the commission suggested eight major recommendations to the nation’s schools and out of eight, five pertained directly to the use of time and the structure of the school day:

- Reinvent schools around learning, not time
- Fix the design flaw. Use time in new and different ways
- Establish an academic day
- Give teachers the time they need
- Develop local action plans to transform schools (NECTL, 1994)

Time is the design flaw in American schools, according to the NECTL committee, and time should not be the factor that is limiting learning in our schools. Time should

become a primary factor supporting learning. The NECTL committee describes the issue of American schools not being as successful as modern foreign schools due mainly to the lack of time American students spend on core academics. The NECTL committee further describes the issue of time and learning: “The way time is used in schools may be the most significant structural barrier to student learning” (p.21).

These reports and researchers have analyzed the traditional school schedule and the use of Carnegie units for course credits, and therefore created interest in other ways schools can schedule to meet their students’ needs. Huyvaert (1998) commented about the traditional Carnegie unit based schedule, "Those who favor altering the high school day often cite the intractable nature of the Carnegie Unit as one of the greatest barriers to change" (p. 86).

## Beginnings of Alternative Scheduling

Public schools have been pressured to create changes for the purpose of a better educated population and to create more competent workers in America. This pressure has come from the business and political leaders and as well as researchers who have studied numerous years worth of research on achievements of public schools (Algozzine, Jenkins, and Queen, 2003). McCreary and Hausman (2001) state that school reformers have been searching for several decades for a way to increase student outcomes, and that the most common approach in recent years has been the school day and how time is structured within schools. Therefore time has become a catalyst, mostly in secondary schools, as a reform strategy to correct the problem of

declining student achievement and to rectify the ineffective models of the past school systems.

In 1959, the Trump Plan, by J. Lloyd Trump, was developed for the purpose of restructuring the fixed school day into a more flexible formatted schedule that utilized varying lengths of times for various instructional strategies and techniques. Trump is credited with the development of the flexible modular schedule that was used in schools throughout the 1960s and 1970s. Canady and Rettig (1995) define flexible modular scheduling as: “a schedule based upon the time needs of individual subjects and different instructional strategies, where some classes might have short meetings of one module of 20 minutes, while other subjects might convene for longer classes of 40, 60, 80, or 100 minutes” (p.13). Huyvaert (1998) defines flexible modular scheduling and also gives the reasoning for the breakdown of time in different lengths of time as, “teachers work together to diagnose the needs of the students, and based on the diagnosis, determine the most appropriate instructional modules for each student” (p. 85). It was estimated that approximately 15% of the public high schools in America implemented the modular type of scheduling during its apex, but eventually schools returned to the more traditional schedule mainly due to the issues with student discipline (Canady & Rettig, 1995). Viadero (2001) acknowledged that many schools began looking in a new direction to meet the need of the mandated additional graduation requirements. Rather than adding more classes per day, secondary schools re-evaluated the school day and started investing in block scheduling, so students could take more classes over the school year and therefore make it easier to meet the higher graduation mandates.

In 1972, the National Commission on the Reform of Secondary Education was formed for the purpose of conducting an exhaustive examination of public high schools in America, and then providing these findings to the American public. In addition, the commission was to provide a data driven and factual analysis of the secondary schools and how the schools needed to be altered in order to properly educate secondary students in American public high schools. In the commission's report, recommendation 19 focused on the flexibility and differing time "hourly, daily, weekly, yearly" (Huyvaert, 1998, p. 102) in schools to meet the needs of individuals.

Benvenino (1999) describes the reform of looking at time use and structure in schools as one of the most important changes and challenges to the traditional form of education in the past twenty years. The implementation of block scheduling or extended block scheduling by secondary schools is compared to being a revolutionary step for the public schools in America and allows secondary schools to arrange and utilize more appropriate and innovating teaching techniques to meet the many student needs (Benvenino, 1999).

In 1998, Lybbert explained that the public and educational conversations, arguments supporting the implementation of forms of block scheduling are rapidly gaining momentum as the major element in the reform movement. Researchers maintain that this innovation will increase student success through reorganizing secondary schools.

## Designs of Block Scheduling

The descriptive term *block scheduling* refers to an overall practice in school

scheduling where a section of the school day is reorganized differently than as with a traditional schedule (Texas Education Agency, 1999). Queen (2003) describes block scheduling as courses that are 90 minutes in length each day and only held for one semester, instead of the traditional length of 50 minutes per day for the entire year. In block scheduling for secondary schools, each semester there are four to five courses and these courses last for only one semester to gain credit for a usually full year under the traditional schedule. Hottenstein (1998) from a journal on restructuring school scheduling, wrote: “The three most popular scheduling models in America are the: 4 x 4 semester, alternating-day block, and the trimester” (p.15).

*4 x 4 Block Schedule*

Lybbert (1998) calls the basic block scheduling the accelerated (4 x 4) block schedule, and details it as, “the 4 x 4 approach is organized around four 90 minute classes that are repeated every day until the end of the semester…a full year course were completed in a semester” (p.7). Research shows that block scheduling is not the only form of alternative schedule for secondary schools; however there are a few major designs that are basically common in description and in practice today. Edwards (1995) believes that the 4 x4, or four-period, semester block day is the avenue for high schools to be competitive in the modern world, because this type of schedule is efficient and at the same time flexible. He further describes that the key to successful school change is a flexible schedule and that this is necessary to educate all students. Lybbert (1998) states that with the 4 x 4 block schedule students will only focus on four academic areas

each semester, rather than eight, and at the end of the semester the course is over and then the next semester were the start of four more courses.

*Alternate Day or A/B Block Schedules*

A second form of alternative scheduling widely know as alternative block or A/B block requires eight classes per semester, but rather than students taking all eight classes per day, 4 classes would be on one day and the other 4 would be on the next day. This pattern is repeated and there is an alternating schedule of Classes 1 through 4 the first day and then Classes 5 through 8 on the next day, to where there is an alternating effect of one day being called A-day and the next day being called B-day, then these days would alternate throughout the semester or school year (Lybbert, 1998). Under the alternating block schedule students would be able to earn one more credit per year than under the traditional schedule and with classes that need to meet every day, such as band, athletics, math, then they can become double blocked classes. Short (1995) gives an example of a high school senior student being able to take core classes on A-days and then being able to work as an intern in their area of study or in their area of future career goals on the B-days. This type of schedule, Short (1995) describes, allows the student to meet the increasing requirements for core subjects toward graduation, while also achieving work related experience.

*Trimester or Quarter Schedules*

In a 1999 research publication by the Office of Policy and Research within the Texas Education Agency, two forms of alternative schedule are described. These are

known as intensive or reconfigured school year secondary scheduling. Under these forms the school year is broken into smaller portions and courses are on a more concentrated level of instruction; some examples are the trimester, and quarter-on / quarter-off block schedule, and the year-round form of scheduling. Under the trimester system the school year is divided into three equal sections of the school year, usually 12 weeks in length for each trimester, and a year's worth of subjects course can be accomplished in two trimesters. With the quarter-on / quarter-off block schedule, the year is divided into four equal sections of the school year, usually nine weeks in length for a quarter, and under this form of scheduling a full years course can be completed in two quarters. The year round school or reconfigured block scheduling allows schools to make two long terms, one in the fall and one in the spring but also has two smaller terms of a few weeks in length that are usually used for electives or students needing remedial work (Texas Education Agency, 1999).

*Hybrid Block Scheduling*

Hottenstein (1998) defined hybrid block scheduling as, "each one of the core [block] scheduling models can be modified into multiple variations called hybrids" (p. 15). Kenney (2003) equates the hybrid block schedule to the mixing of longer and shorter periods of time to better address the issues related to some formats of classes that work better with lengthier amounts of time, and other classes, that work well with shorter lengths of time. Hybrid schedules can be formatted to meet the needs of individual campuses or even grade levels. Boarman and Kirkpatrick (1995) report on the success of how a large suburban high school in Maryland uses the hybrid schedule.

Prior to this schedule, other attempts at other school scheduling formats had occurred such as the zero period, double periods, and the A/B schedule. The hybrid schedule in this school is used to benefit the classes that clearly need the longer modules of class time and how these varied times are beneficial to the instruction of the 6,000 students in the high school. Short (1995) reveals how a high school has developed a hybrid schedule, where students have the option of three long periods each day and one shorter period per school day. With this type of hybrid block schedule students can meet each day, in the shorter class time, for classes such as music, athletics, band and other electives that require meeting every day and not taking time away from the core or required courses.

## Growth of Block Scheduling

Alternative scheduling has many different varieties, and the research shows that this trend increased over the past few decades. O'Neal (1995) studied high school scheduling in the state of Virginia from 1990 to 1995 and found that there was a dramatic growth in the alternative forms of scheduling among Virginia's high schools. The results showed that in 1990 fewer than 5% of the high schools in Virginia were using some form of alternative or block scheduling, but by 1995 46% of the 290 Virginia high schools were using a type of alternative schedule as opposed to the traditional high school schedule. One report in Texas showed that there was a dramatic increase in the use of block scheduling among its high schools from 1992 to 1995. In 1992 the report stated that 4% of high schools in Texas had implemented a form of block scheduling and only a few years later, in 1995 40% of high schools were using a type of block scheduling.

Some literature shows that block scheduling has been increasing in usage throughout the United States' high schools. There are predictions of even more use of this trend in restructuring and reforming the use of time in secondary schools. Queen (2000) made a prediction that with in a few years that 75% of high schools in America would be employ a form of alternative schedule to meet the demands of the public of increasing student achievement. In regards to block scheduling in American schools, Kennedy (2003) wrote: "Whole school reform at this level doesn't often occur at this magnitude and pace without the federal government mandating it or without solid evidence that makes it almost a dereliction of responsibility not to move in that direction" (p. 21).

## Benefits of Block Scheduling

### *Student Achievement*

The literature depicts a growing concern about the quality of education and describes how high schools are implementing forms of block scheduling in rapidly growing numbers to address the concern. With the longer class time in block schedules, teachers have the opportunity to meet the needs of students in their classroom through the use of varied teaching strategies and innovative methods, as opposed to the traditional schedule where time limits these methods (Algozzine, Jenkins, & Queen, 2003).

Hodges (2002) assessment of block scheduling on rural middle school students' achievement in mathematics, reading, and writing from 1999 to 2001 showed a significant difference favoring block scheduling in the mathematics achievement scores.

In another study on middle school students, DiRocco (1999) studied the effects on student achievement of an alternating day block schedule to the previous years of students' achievement on a traditional formatted school schedule. What DiRocco found was that after controlling for gender, teacher effect, and academic ability, the alternate day scheduling had a positive affect on the students' course averages in the areas of social studies, reading, science, and mathematics (DiRocco, 1997). Not only did student achievement in the subject areas improve for students after converting to an alternative day block schedule, the students' grade point averages also increased as compared to those educated within the traditional schedule in these particular middle schools.

The use of alternate day block scheduling on middle school student performance in reading comprehension was assessed by Bush (2003). One area of reading comprehension proved to be significant when the variable of gender was statistically analyzed. The average results revealed that female middle school students scored higher than male students in the area of reading comprehension. Research provides evidence that middle school students' level of achievement does increase in certain areas, commonly in math and overall grade point averages.

Evans, Tokavceyk, Rice, and McCroy (2002) examined student outcomes of grades, failure rates, and achievement tests scores of students being instructed under block scheduling in high school. Seven major positive outcomes were associated with the use of block scheduling in high school, two of which were in the area of student grades and grade averages. Conclusions found that the percentage of students receiving a single D or F for a final course grade decreased by 7% and it was also determined that there was a significant decrease in the number of multiple failures

among students. In regards to other academic achievement associated with the study the data showed that students scored 14 points higher on and average combined Stanford Achievement Test (SAT) score compared to when students were instructed during a traditional form of high school scheduling.

Benefits of increased student performance and reduced failures were reported as a result of a study done in Texas high schools using a form of block scheduling (Lybbert, 1998). The flexibility with offering classes and advantages of available instructional time during extended classes is credited by Lybbert (1998) for the increase in student achievement and student performance in these Texas high schools. With a traditional 45 minute class, teachers lose valuable instructional time taking care of administrative bureaucratic tasks such as taking role, making announcements, and other routine procedures. With block scheduling, there is more time for instruction, because these administrative tasks take up much less of the percentage of the total time of the actual subject class.

Bevevino (1999) states that the design and structure of block scheduling is providing more time for student – teacher interactions. With this opportunity of extended instructional time comes the opportunity to structure questions with a greater in-depth scope that will create classroom discussions of higher thinking, while at the same time allowing teachers to interact with all students in the classroom. This is due to the extended class times in the core subjects and thus allowing the opportunity of improvement in the core subject areas (Bevevino, 1999). McCreary and Hausman (2001) studied the effects of student achievement scores on the SAT 9 who were instructed on block and trimester schedules and they found that the total science scores

on the SAT 9 were significantly higher than those not on the block or trimester schedule. These results suggest that students are benefiting from science classes due to the longer time of instruction and the implementation of teaching techniques and methods of more in-depth questions and discussions associated with hands-on lab experiments. Andrews (2003) studied the effects of block scheduling on student achievement on standardized test and concluded through the results of the study that there was a higher student performance on the Connecticut Academic Performance Test in the area of science for students on A/B block scheduling.

In a study at Millard High School in Delta, Utah, researchers Tan, Callahan, Hatch, Jordan, Eastman, and Burnam (2002), examined the effects of switching a high school to block scheduling from a traditional school schedule on Stanford Achievement Test (SAT) scores. Their study found in the first year the high school converted to the block scheduling the SAT scores declined. In the second year, the SAT scores for the students at Millard high school increased significantly above previously recorded scores under traditional scheduling. An additional benefit, Tan et al. (2002) discovered from their study when a high school changes to block scheduling was that the students were spending less time in the halls transitioning from one class to another and more time in the class, helping to decrease discipline concerns between classes.

The results of these recent studies are summarized in Table 1.

Table 1

*Summary of Studies: Benefits of Block Scheduling on Student Achievement*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Andrews (2003) | Connecticut high schools | Increase in science scores on state standardized tests. |
| Bush (2003) | One Middle School | Females scored higher in reading comprehension under alternate day scheduling. |
| DiRocco (1999) | Two Middle Schools | Alternate day schedule had a positive effect on course averages for Science, Math, Social Studies, and Reading. |
| Evans et al. (2002) | Three New Jersey school districts | Single and multiple failure rates decreased and SAT scores increased. |
| Hodges (1999-2001) | Rural high school | Significant difference in students Math scores. |
| Lybbert (1998) | Texas high schools | Decrease in failure rates. |
| McCreary & Hausman (2001) | 4,900 Utah students from 2 high schools | Significant higher science scores on the SAT 9. |
| Tan et al. (2002) | Millard high school students | SAT scores increase significantly after two years. |

*Discipline*

In three New Jersey school districts that implemented a new school scheduling format of a 4 x 4 block schedule during the 1997-1998 school year, data was compiled and surveys were administered to determine if any significant outcomes were the result of the schedule change from the traditional scheduled day to the 4 x 4 block schedule. The results showed a significant decrease in discipline associated with student behavior problems within the classrooms, and teacher surveys provided input that teachers were able to spend more than half of their classroom instruction on other teaching strategies

than lecture, therefore keeping students more involved throughout the classroom lessons (Evans, Tokavczyk, Rice, & McCury, 2002).

As described by Queen (2003), advantages of block scheduling include classrooms where more effective teaching is accomplished through means of varied teaching methods and that there are fewer student discipline problems within the class. This allows more time can be spent on learning and teaching rather than redirecting student behaviors. What Queen (2003) discovered was that “70% of teachers go beyond the lecture approach and use interactive instruction practice” (p.5). In accordance with block scheduling courses being less per semester or per day than with the traditional schedule, teachers will also have more academic time interacting with students in the class due to the decrease in the number of times they are required to do organizing tasks such as attendance, reports cards, class preparation, and other required or mandated chores.

One other study showed that there was a decrease in discipline problems when schools were on a form of block scheduling, due to students having fewer class changes each day and less time unsupervised transitioning from one class to another (Bevevino, 1999). Under block schedules where there are four classes per day, students would be changing classes only three times per day, whereas under the traditional schedule students would be in transition from classes a total six or seven times per day. The block schedule model decreases the opportunity of unsupervised students in the hall, thus decreasing student discipline problems. In addition to less unsupervised time, Benevino (1999) discovered that teachers tended to know their students better since they had fewer students per semester than under the traditional

schedule. He also found students were more focused on school work due to the lesser load of classes per semester for studying and the relaxed schedule provided under block scheduling.

Table 2

*Summary of Studies: Benefits of Block Scheduling on Student Discipline*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Bevevino (1999) | Secondary teachers and students | Decrease in time of unsupervised students and decrease in student discipline problems. |
| Evans et al. (2002) | Three New Jersey school districts | Decrease in student discipline problems. |
| Queen (2003) | West Mecklenburg High School students | Decrease in the number of student suspensions significantly after two years. |

Besides a more relaxed and encouraging environment for learning associated with block scheduling, Queen (2003) discovered a positive aspect in relation to suspensions and expelling of students with the use of block scheduling by schools. In a study of the effects of West Mecklenburg High School converting to a 4 x 4 block scheduling format, it was documented that there was a decrease in the total number of in-school suspensions and out of school suspensions. When there is a decrease in suspensions, there are fewer times students are removed from the classroom. In addition to the number of suspensions decreasing as a benefit, Queen (2003) stated the following about the positive approach to expelling a student within a block style schedule, “Administrators can expel a student for one semester on a 4 x 4 block schedule without putting the student behind a full year” (p.6). A similar topic was previously pointed out by O’Neil (1995) where if a student had failed a fall semester course in a block scheduling format, than the student could retake the course in the

spring semester without the consequence of falling behind in level classification. This is reflected in Table 2.

*Attendance*

A high school in Orlando, Florida began a restructuring of the school schedule when the school implemented block scheduling in the fall of 1993. Buchman (1995) compiled data on attendance, discipline, and grades from the school after the first year of the implemented of the new block schedule. The results showed an increase in the average daily attendance from 89.03% before the implementation of the block schedule to an average daily attendance of 91.23% after the conclusion of the first year under the block schedule.

Table 3

*Summary of Studies: Benefits of Block Scheduling on Student Attendance*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Buchman (1995) | An Orlando, Florida high school | An increase in average daily attendance. |
| Evans et al. (2002) | Three New Jersey school districts | An increase of 1.7% average daily attendance. |
| Robbins, Gregory, & Henderson (2000) | Secondary students | Better student attendance. |

Buchman (1995) had also studied the daily attendance results of on another high school in Orlando, Florida and found that attendance rose to 90.24% under the block schedule, up from 88.32% under the traditional schedule the year previous to the implementation of the block schedule. Both Quenn (2003) and Lybbert (1998) have both researched and studied the effects of block scheduling and they conclude that student attendance does improve when schools utilize block scheduling formats. Evans et al.

(2002) found that block scheduling accounted for an increase in average daily attendance from 92.4% to 94.1% in the schools they studied. Another research by Robbins, Gregory, and Herndon (2000) found that many schools that use block scheduling report better student attendance.

*Additional Benefits of Block Scheduling*

High schools are looking for innovative reform strategies that will improve student achievement and some of the research has shown that block scheduling is a working solution. However, there is more to high schools and results of test scores needed to evaluate a new program or method to see if it is successful or not. The literature supporting block scheduling goes beyond the standardized test scores and student grade averages.

What are the perceptions and opinions of the teachers, students, and parents in regards to block scheduling? Teachers appear to be in favor of teaching on the block schedule and actually prefer the block schedule. In a qualitative study by O'Neil (1995) teacher input was in favor of block scheduling and the teacher preferred teaching in block scheduling over teaching in a traditional scheduling system. The study revealed that both teachers and students like the longer classes and that the results of academic achievement are the same with the block or traditional schedule. In a block schedule teachers would not teach more than three classes per day, compared to teaching seven classes per day in a traditional schedule, and that teachers would also be spending less time on preparing for classes each day.

With a decrease in classes per day also creates less students being seen by

teachers each day. Teachers on a traditional schedule see up to 150 students per day, but with block scheduling teachers work with on the average 80 students per day (O'Neil, 1995). With this decrease in students per day being seen by the teacher, the opportunity to increase the amount of time teachers could spend with students is greater, and as students and teachers begin to spend more time together, the overall climate of the school improves. Queen (2003) further discussed this issue about the advantages of block scheduling and how teachers have more time to prepare for classes and planning, therefore improving teaching strategies in the classroom. McCreary and Hausman (2001) determined that teachers were developing more innovative and individualized instruction through the extra time for planning and collaboration with other teachers that is available to them due to the structure of block scheduling. Teachers' planning periods each day are now extended to double the time compared to a traditional schedule, and this extra time is utilized to pursue creative instructional methods.

Evans et al. (2002) used interviews and focus groups of both parents and teachers to gather their input about a high school that had converted to block scheduling. Some points of their study are as follows:

- Student interviews and focus groups
  - Greater opportunities to take a variety of courses
  - Fewer classes to focus on and more concentrated assignments and homework
- Parent interviews and focus groups
  - In general, parents agreed that their children were more productive
  - In general, their children were being held to higher expectations for learning (p. 321)

Another positive aspect of benefit of block scheduling is the additional classes that can

be offered each year due to adding one more credited course per year. In a traditional schedule there are typically seven 50 minute courses per day which allows a student to earn seven credits per year, but in a block schedule there are typically four classes per day which allows a student to earn eight credits per year. This advantage allows schools to offer students more courses, such as an additional elective or an additional AP course. McCreary and Hausman (2001) found in their study that students enrolled in more electives when they were attending school where there was an A/B block schedule or a trimester form of schedule compared to students attending schools with traditional schedules. Lybbert (1998) explains the addition of advanced courses as a significant benefit for schools in helping them meet the increased standards in recent years and the increase pressure to enroll more students in AP courses.

A look at the effects of block scheduling on attendance was done by Evans, Tokavczyk, Rica, & McCroy (2002) and the results showed an increase in attendance when high schools switched to block scheduling. Their study revealed that the average daily student attendance increased from 92.4% under traditional scheduling to 94.1% under the aspect of block scheduling. Through the study of high schools in Texas under block scheduling, Lybbert (1998) discovered that there was better student attendance with high schools making use of block scheduling.

## Disadvantages of Block Scheduling

### *Student Achievement*

Drummond (2001) did a comparative analysis of students' academic achievement to study the impact of secondary schools using traditional scheduling

compared to secondary schools using block scheduling. The study was conducted using junior and senior South Carolina high school students, where 700 were instructed under a traditional type of school schedule and 460 students were instructed under a form of block schedule. Exit examination scores were used to compare the data between the two types of scheduling. No significant difference was discovered in reading or mathematics exit scores of the block scheduled students and the traditional scheduled students. This was further broken down to compare the data according to race, gender, and socio-economic status, but no significant difference was found in reading or math scores with these variables (Drummond, 2001).

Another study by Bottge, Gugerty, Serlin, and Moon (2003) details similar results as found by the comparative analysis from Drummond. The study by this group compiled grade point averages and American College Test (ACT) scores from students with disabilities attending schools on block scheduling and from students with disabilities attending schools on a traditional schedule. No significant differences resulted from the data analysis between the two types of schedules in regards to students with disabilities. Results of the study discovered that there were few differences in instructional strategies utilized by both teachers in the block scheduled classes and the teachers in the traditional form of classes. Basic instruction was still being focused around teacher lecturing even with the extended time and opportunity to provide varied and more in-depth instruction.

Queen (2003) is one of the significant reformers in the area of implementing and supporting block scheduling; however he does not say that the single most destructive issue to block scheduling is the overuse and practice of the teaching method of lecturing

and even predicts that 30% of teachers in block scheduled classes are still mainly using the lecture method. Queen (2000) describes this problem due to a growing number of teachers not using adequate pacing in the classroom and still uses teacher-directed lecture and discussions and not other forms of proven successful strategies. This problem is further exacerbated due to the ineffectiveness of principals to properly evaluate classrooms instructional strategies. Further studies examine the time use in schools after implementation of block scheduling. One such study was conducted by Bush and Johnstone (2000), where they examined three high schools in Irving, Texas to review how classroom time was being utilized after the three high schools had converted to forms of block scheduling. Through randomly visiting 48 classrooms, their observations revealed teacher lecturing and students primarily listening as the focus of class instruction, with the remainder of the time spent by students doing seatwork.

O'Neil (1995) also made observations of classrooms using the block form of scheduling and also concluded a preponderance of teachers still teaching by means of lecturing and not taking opportunity for innovative instructional strategies to benefit the students. Students would be sitting for the entire block period of 90 minutes, first listening to lecture and then still remaining in their seats completing seatwork and even homework during the class time parameters, not unlike the dominant form of strategies used in traditional schedule classroom settings. Bevevino, Snodgrass, Adams, and Dengel (1999) describe the necessity for training: "If the school district does not invest in the time and effort to educate their teachers, and if they don't give teachers time and training, how can these teachers hope to be effective?" (p.3).

Over 38,000 high school seniors from Iowa and Illinois were of the population

studied by Hachmann, Hecht, Harmston, Pliska & Ziomeck (2001) to determine the effect different types of scheduling had on student achievement scores. The ACT composite scores were compiled and analyzed, and findings from this study show that scheduling types in high schools do not predict student achievement. If the results do not show any gains by converting to a block scheduling system, then taking the time, energy, and personnel to make the switch are factors to consider especially when funding for schools or funding for innovations.

Findings revealed by Lawrence and McPherson (2000) in a comparative study between block and traditional scheduling on the effects of student achievement, show that students on the traditional schedule did better than the students on a block style of scheduling. The results showed that traditional scheduled students scoring consistently much higher on the mean scores in Algebra, Biology, English, and United States History final exams than block scheduled students. The population of this study deserves notice due to the pressure on education to increase minority academic achievement. In this study 51.4% of the student populations over the four year study were African American students and that 41.6% of the students study were Caucasians. McCreary and Hausman's (2001) study also revealed statistical evidence where 2,400 students on a traditional schedule from a high school in a large urban area of Utah, performed significantly better academically than 2,500 students from a high school in the same urban area that were on a block schedule. The data indicated students taught with in the framework of the traditional schedule had significantly higher total math scores on the SAT 9 than the students taught under the structure of block scheduling and trimester scheduling. They further concluded through the results of their study that

higher grade point averages were obtained by traditional scheduled students than those students in a trimester or block schedule.

With a similar conclusion, Dexler, Tai, and Sadler (2006) completed a four-year study on students taking first semester introductory science college courses where they compared grade averages. The study took student surveys from 54 university and colleges from over 30 different states in the United States to determine which form of high school scheduling freshman college science students were educated under in high school; 4 x 4 block, A/B block, or a traditional schedule. Then the study compared grade averages in introductory college biology, chemistry, and physic courses over a four year period. They concluded that there was not much variance in grades between the various students from the different forms of high school scheduling, but they did note that students coming from a traditional schedule high school earned higher grades in introductory college science courses.

Table 4

*Summary of Studies: Disadvantages of Block Scheduling on Student Achievement*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Bottge, Gugerty, Serlin, & Moon (2003) | Disabled high school students | No significant differences in grade averages & ACT scores. |
| Budh & Johnstone | Three Irving, Texas high schools | No advantages in instructional strategies under block scheduling. |
| Dexler, Tai, & Sadler (2006) | First year college students | Students from traditional schedules had higher grades in college science courses. |
| Drummond (2001) | 1,160 South Carolina high school juniors and seniors | No significant difference in reading and math exit scores. |

*(table continues)*

Table 4 *(continued)*.

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Hachmann, Hecht, Harmston, Pliska & Ziomeck (2001) | 38,000 high school students from Iowa and Illinois | No significant differences in ACT composite scores. |
| Lawrence & McPherson (2001) | Minority high school students | Higher final exam scores for traditional school students. |
| McCreary & Hausman (2001) | 4,900 Utah students from two different high schools | Higher math SAT 9 scores and higher grade point averages for traditional scheduling. |

*Discipline*

Safe schools and bullying are current topics of concern for parents, students, politicians and for educators during class instructional time and within the other aspects of the schools. When programs are implemented that may alter these variables it becomes of greater concern and need for study of the effects changes will have on student behavior. Most of the research details the positive effects of block scheduling on student behavior in the schools, but there is a study that contradicts this research supporting block scheduling.

Evans et al. (2002) discovered that students voiced concerns about the inabilities of teachers to adequately implement lessons and activities to keep the students actively engaged for the longer periods of times associated with the classes under block scheduling. The problems of converting to a 90 minute timeframe lesson when teachers had been trained on the 45 minute lesson format tend to be exaggerated when training for staff on new teaching strategies and methodologies are not presented or expected. They discussed this as when a substitute teacher was needed for the class, and how

the typical scenario for a class with a substitute would be seat work for the students. This means that student would be expected to sit the entire 90 minutes without making any disturbances and also expected to sit quietly and complete the assignment. Further complications occur when students would finish the seat work tasks prior to the ending of course.

Conclusions about out of school suspensions depicted that the number of students actually suspended under the new form of scheduling, block scheduling, versus the number of suspensions under traditional scheduling were the same, at 2.1% per month. Gordon (1997) investigated high schools that utilized traditional scheduling and schools that utilized block scheduling in Missouri, during the 1995-1996 school year, and how the types of schedules influenced student behaviors and discipline. The analysis of variance showed that there was no statistically significant difference between schools under block scheduling and schools under traditional scheduling in the mean number of discipline referrals.

Table 5

*Summary of Studies: Disadvantages of Block Scheduling on Student Discipline*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Evans et al. (2002) | Three New Jersey school districts | Suspensions were the same for both traditional and block school scheduling. |
| Gordon (1997) | High schools in Missouri | No significant differences in discipline referrals. |

*Attendance*

Webb (2000) hypothesized that there were to be no significant differences in the study of comparing attendance rates of students under block schedules, accelerated schedules, and traditional school schedules. The population of this study was formed from ninety high schools in Texas, where in each category of schedule type there were sample populations of thirty high schools. The ANOVA results for the comparison of the study between the student attendances revealed a *p*-value of 0.07 indicating that there was no statistically difference between the three various schedules. Webb (2000) additionally found that results of the study showed no statistically difference in dropout rates among students in the block schedule, accelerated schedule, and traditional schedule. In a study of seventh and eighth grade student attendance, Dirocco (1997) discovered that there was no supporting evidence that students on block scheduling would have better attendance than those students in a traditional schedule. The difference in seventh graders between the groups being studied showed a non-significant *p*-value of 0.399 and the difference in eighth graders between the groups also showed a non-significant *p*-value ($p = 0.701$). Dirocco's study supports the research showing block schedule does not have an impact on improving student attendance.

Mowen and Mowen (2004) detail another disadvantage of block scheduling under the block scheduling format. They argue that when a student is absent under a block schedule, the student is missing a greater amount of class time than a student missing one day under the traditional schedule. In addition to the lost time due to the absence, if the student is taking classes under an alternating block schedule, the

student missing one day, will not be in those classes for three days. This prolonged period of time may increase the loss of student retention of the material and also create a longer period of time for the student to make up the missed class time or missed school work. With an absence under block scheduling, Evans et al. (2003) found that students have more difficulty getting on track with the other students, even more so when it is an extended absence.

Table 6

*Summary of Studies: Disadvantages of Block Scheduling on Student Attendance*

| Researcher & Year(s) | Subjects | Findings |
|---|---|---|
| Dirocco (1997) | Seventh & eighth grade students | No supporting evidence for better or worse attendance. |
| Mowen & Mowen (2004) | Two middle schools | Found absences under block scheduling means more time from instruction. |
| Webb (2000) | Ninety high schools in Texas | No statistical significance for schedule type. |

*Additional Disadvantages of Block Scheduling*

Short (1995) conducted a four year study on block scheduling and found two issues that are addressed as being negative issues with schools using block scheduling. The first issue is the retention of information as related to courses that are one semester in length under the block format. A student might take the first year of a foreign language the fall semester of one year, but might not take the second course until the spring semester two years later. Short (1995) describes this as a negative as it pertains to student success in retention of the subject, and this can be true in other core subjects, such as mathematics, science, and English. The second negative issue with block scheduling is with students who transfer in or out of schools using block

scheduling. In areas where there is high mobility of students, different high schools using different forms of scheduling may create problems of earning required courses for graduation or grade level advancement. Boarman and Kirkpatrick (1995) affirm this issue as they compiled data on their own school campus schedule, testifying that their particular schedule is a varied form of a hybrid schedule different than the other high schools in their county and this would cause problems when students transfer in the middle of the academic year.

Kenney (2003) studied block schedule issues in the Esambia Independent School District, Florida, and concluded that the extra time associated in lengthier block format classes is used many times as busy time or study hall type of instruction, not in-depth or alternative teaching techniques that can benefit students. The Northwest Regional Educational Laboratory (1997) states that this is due to the importance of giving time and resources to teaching teachers how to teach during the longer segments of time associated with block scheduling. A four year study, by Stranger (2004), between school schedules and California high school academic performance, found that schools that are more likely to be innovative with implementing block scheduling tend to be schools located in higher wealth communities.

Block schedules may have the ability to offer more courses than the traditional schedule, however Viadero (2001) found that there was less student teacher interaction and some studies have shown the actual amount of teacher to student interaction to be thirty seven fewer class hours per year. In addition to lost instructional time for the students, Viadero also points out that there is also a disadvantage for those students taking AP courses in the fall under a 4 x 4 block schedule. The schools do not set the

AP exams; the exams are scheduled usually in May by the College Board, so the potential disadvantage for the students enrolled in the fall AP courses is the loss of material and proper preparation for these exams and possible loss of college credit.

## Cost of Block Scheduling

How does one evaluate the cost of learning or the cost of a good education? In education, one can calculate the cost per student, but this does not include the quality of the education, just merely how much it costs to educate one student. In recent years, states have had to change their methods of financing for education and create more equitable funding formulas. So when a new program or innovative method of reform is introduced, not only are the concerns for quality present, but also the concerns for the cost-effectiveness and cost-efficiency of the new methodology or program. Parrino (2003) describes the recent educational financial situation in America:

> For much of the 1990s, states were flush with money from a booming economy and a rapidly growing stock market. But an inevitable downturn, combined with the 9/11 terrorist attacks, has left a number of states with huge revenue shortfalls, and it has left school districts in financial distress with hard decisions to make. (p.1)

Parrino (2003) offers Oklahoma as an example of a state that has recently had to reduce it financial aid to education, where for the 2002–2003 school year the state aid in Oklahoma was reduced by 9% from the previous year's contributions. School districts would have less money to spend than the last year and many districts are unable to raise funds locally.

In Texas, school districts are limited in the amount of money they can raise locally with bonds and taxes. According the state statute, under the Texas Education

Code, Chapter 45, Subchapter A (Sec. 45.003), school districts or school boards, are allowed to levy taxes and collect taxes on property, but not to exceed more than $1.50 on $100 valuation of the property. However, the problem as with many states is that the districts are reaching the tax cap and are not able to raise additional monies. An example of a district documenting such financial limits, is found in a cost analysis done in 2004 on the New Braunfels Independent School District (NBISD). The cost analysis presented by Wilson (2004) found that the school district is nearly at the tax cap maximum and would only be able to reduce spending by cutting personnel cost, meaning reducing the staff due to not being able to increase the budget.

Are there any additional costs to implementing forms of block scheduling? According to Canady and Retting (1995) the answer is yes, in the form of staff development, in the areas of learning, developing, and planning teaching strategies within the block scheduled class time. Implementation of staff development for teachers in the areas of learning strategies for teaching in a block schedule is an essential aspect for success with block scheduling and academic achievement. As Evans et al. (2002) in their research discovered that students reported teachers were not adequately prepared for the new lengthy classes associated with block scheduling. However, to accomplish the needed training and staff development, additional days are needed by the school staff and this costs money to pay for teachers to work additional days. According to Lybbert (1998) the largest item of cost for school budgets is personnel costs, and adding to this expense is a concern with blocking especially with the limited financial resources available to districts. Fager (1997) recommends that teachers receive ample time for staff development on how to teach with in the time frame of block scheduling,

and that if schools or school districts can not provide this or do not have the means or funds for such staff development, then the school systems should not proceed with the change to block scheduling.

In a 4 x 4 block schedule there is a need to add additional staff to meet the demands of the additional units of classes needed in implementing this form of scheduling for schools. In a traditional schedule a teacher would have a conference period for 45 minutes once a day, but with a 4 x 4 block schedule, teachers would have 90 minutes of conference each day. The loss time for instruction results in the need to add additional staff members to the campus, and with salaries and benefits consisting of the major portion of a school district's budget, adding additional staff is not always a possibility. Districts that have moved into block scheduling have found that it is too costly to maintain the additional teachers and many have had to move back to the traditional form of scheduling due to monetary means.

Wilson's (2004) findings in the New Braunfels ISD cost analysis, state that block scheduling does require more teachers than under the traditional school schedule, and therefore recommended the elimination of the block schedule in the high schools. By eliminating the block schedule and returning to the traditional schedule, the district would require fewer teaching positions and would save an estimated $422,641 in the first fiscal year of the schedule change. In 2000, the Austin Independent School District's board, in Austin, Texas voted to return to a more traditional, seven-period day in their high schools and middle schools and move away from block scheduling. Trower (2000) reported that the superintendent's plan to move back to traditional scheduling was necessary to reduce the budget and will save the district $1.8 million a year.

Levesque (2005) also reported on another major metropolitan school district in the state of Texas that was moving from a block scheduling format to a more traditional schedule for their secondary schools. The school board had a majority to vote to eliminate block scheduling for the 2005-2006 school year for the purpose of saving money, almost $2 million for the Abilene Independent School District.

Lare (2002) studied the district spending of a small town, located in the western part of the United States, and discovered that staff has increased significantly over the past ten years, since moving to the block schedule. Lare (2002) states that although the student population has increased by 100 students, the teacher positions have increased by eleven positions, and "financial records indicated the district was spending more money on the high school since moving to the block scheduling, primarily in personnel costs" (p. 67). In conclusion of the financial study, the recommendation was to revert back to the traditional form of scheduling (seven-period day) and this would result in savings for the district. The three high schools in Cedar Creek ISD, Texas also opted to discard block scheduling to decrease personnel costs because of the district's $4.5 million deficit. They had determined that when a school goes to a block schedule, schools need to hire more teachers, and by eliminating the block schedule, the district was reassigning teachers for the next year, rather than adding staff (Kenney, 2003).

Performance review presented by Strayhorn (2003) of the Rockwall Independent School District, Texas, found that an estimated $1.2 million annually could be saved by converting from block scheduling to a traditional seven-period day schedule, where teachers would be teaching six periods per day. The reason Rockwall ISD was selected for the performance review, the state found that the district was among the top ten

school districts with the highest tax rate and the districts fund balance was lower than advised. In addition to the savings, the review discovered that the Rockwall ISD use of block scheduling "may have little impact on teaching effectiveness but it dramatically increases staffing costs because it requires more teachers" (p. 8). Plano Independent School District, a large district located in the suburb area of Dallas, also made the move from block scheduling to a traditional schedule in 2005-2006. The east area superintendent of the Plano ISD, Mr. Bailey, noted that, in 2004, the reason for the change was due to, "a lack of adequate funding for schools as the state level [due to the Robin Hood system of school finance] and the fact that Plano ISD has reached the $1.50 capacity to tax" (p. 1).

## Summary

Block scheduling has become a popular type of school reform for public schools and this can be demonstrated by the large number of schools participating in some form of block scheduling. The hope of block scheduling is a method of school change of structured time to increase student performance and academic achievement. The literature and research on block scheduling is neither strongly supportive nor not supportive statistically, however it is perceived as a possible solution to many educational concerns. Teachers, who have switched from a traditional type of format to a block style of scheduling, prefer the block schedule as the research has shown. Lybbert (1998) states: "Criticism of block scheduling rarely come from students or teachers who have participated in the change from a traditional to block schedule" (p. 12). However, schools are being forced to return to the traditional form of scheduling

due to the inability to raise additional funds or revenue to meet the personnel needs necessary to implement block scheduling.

This research offers information regarding the effects on student achievement in reading and mathematics, attendance rates, and dropout rates when schools moved away from the a/b block form of class scheduling in high schools and returned to the traditional form of class scheduling.

This study is unique compared to previous studies on school scheduling, as it looks at schools converting to a traditional schedule from block scheduling. Previous research on school scheduling looked at schools that converted to block scheduling and the effects the change had on student performance and teacher attitudes. In addition, other scheduling studies, prior to this study, compared one school or set of schools on a particular type of block schedule to other schools on a traditional schedule, comparing different groups of students. Studying schools that converted back to a traditional schedule is the focus of this study. The study results offer information as to how to change impacted campus achievement, and campus attendance and dropout rates.

# CHAPTER 3

# RESEARCH METHODOLOGY AND PROCEDURES

This chapter examines research methodology and the statistics to test the hypotheses posed within this school scheduling study. The chapter is organized into the following sections: (a) statement of the problem; (b) variables; (c) research questions; (d) participants of the study; (e) design of the study; (f) data collection; (g) data analysis; and (h) summary.

## Statement of the Problem

This study compared student performance of Texas high school students, from the major populated metropolitan areas in the state of Texas, who were educated in an A/B block schedule in 2004 and then in 2005 were educated under a traditional seven periods a day school schedule. Statistical analysis was conducted to determine if there were any significant differences on student academic achievement on standardized state tests and in the areas of student attendance and student dropout rates. The study compared ninth grade students instructed under the A/B block scheduling, to their tenth grade year when these students were instructed under a traditional schedule. Campus-wide pass rate means were compared as were the pass rates for the subgroups; minority students, limited English proficient students, and low socio-economic students.

## Variables

Independent variables for this study are the high school schedule type, and the control variables are the classification of the school location within large metropolitan

areas within the state of Texas, the grade levels of the schools, and the classification of the schools as a public school. The dependent variables for this study, or performance indicators evaluated, were student performance on the Reading/ELA and Mathematics Texas Assessment of Knowledge and Skills (TAKS) tests, attendance rates, and dropout rates for students that are enrolled in the studied high schools in Grade 9 for the 2003-2004 school year and in Grade 10 for the 2004-2005 school year.

## Null Hypotheses

The null hypotheses are related to the impact of school schedule types (A/B Block compared to traditional) on student academics and performance. The null hypothesis used in this study is a non-directional null hypothesis that tests for differences between the group means. Carroll and Carroll (2002) state using a non-directional null hypothesis means the that these hypothesis will not suggest which way the result will differ in mean scores, but rather that if there is a difference in mean scores of the dependent variables it is not predetermined to predict towards which group. Through the comparisons between the two groups, traditional school schedule and A/B block schedule, four null hypotheses will guide the research.

1. *Null Hypothesis 1:* For the campus and subgroup populations there is no statistically significant difference in the Reading / English Language Arts TAKS achievement mean scores for the ninth graders instructed under A/B block scheduling to the Reading / English Language Arts TAKS achievement mean scores for the tenth graders, in the same schools, instructed under a traditional class schedule.

2. *Null Hypothesis 2:* For the campus and subgroup populations there is no statistically significant difference in the mathematic TAKS achievement mean scores of the ninth graders instructed under A/B block scheduling to the mathematics TAKS achievement mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

3. *Null Hypothesis 3*: For the campus and subgroup populations there is no statistically significant difference in the attendance rates mean scores of the ninth graders instructed under A/B block scheduling to the attendance rates mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

4. *Null Hypothesis 4:* For the campus and subgroup populations there is no statistically significant difference in the drop-out mean scores of the ninth graders instructed under A/B block scheduling to the drop-out mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

## Participants

The population for this study was drawn from the public high schools located in the major metropolitan areas of Texas. The metropolitan areas are located in the counties of Dallas, Collin, Tarrant, Bexar, Travis, Harris, and El Paso. The study included students in Grade 9 enrolled during the 2003-2004 school year and students enrolled in Grade 10 during the 2004-2005 school year. The schools studied were classified as high schools in the 2003-2004 school year that used the A/B block scheduling of classes, then in the 2004-2005 school year reverted to a traditional format schedule of classes.

A list of schools were compiled of all regular instruction public high schools from the counties of the metropolitan areas of Texas by use of the Texas Public Schools District and School Directory found on the Texas Education Agency webpage (TEA, 2006). A school list was compiled onto a spreadsheet format for the purpose of storing and organizing the data collected for each Texas public high school. Information was gathered through the Internet and each school's Internet Webpage information, on what type of schedule each school used for the 2003-2004, 2004-2005, and 2005-2006

school years. Next, school administrators and office personnel were individually called by the researcher to verify the previously obtained information and to research what schedule the school used the previous school years. This information was compiled and stored onto a spreadsheet organized by county, school district, and high school (see Appendix).

Out of the schools compiled for the sample that converted from the A/B block schedule to a traditional schedule, nineteen of the schools were on a true six or seven period traditional schedule. Each of these nineteen schools implemented between a 50 and 60 minute class for each period with lunch times worked into the day. Three of the schools used in the sample were scheduling classes with a traditional schedule but with some modifications. Two high schools scheduled the majority of the week on a traditional seven periods per day, but one to two days per week were scheduled like a block, 90 minute class schedule. One high school still incorporated the seven period, fifty minutes per class traditional schedule every day of the week, but chose to add tutoring times before and after school each day.

From the list a sample of public high schools meeting the criteria for the study was taken from these metropolitan areas of Texas. These samples included public high schools that used a traditional school schedule for the 2004-2005 school year after utilizing the A/B block scheduling for the prior 2003-2004 school year (see Appendix B). The participants studied were students in Grade 9 and the data is from the campuses when these students were instructed under an A/B block schedule. The next year, these students were in Grade 10 at the same campuses, therefore the majority of the students were the same. However, the mobility rates of these campuses range from 8% to 35%

for the students in Grade 9 and in Grade 10. Thusly, this represents that campus results are of 65% to 92% of the same students for both years, the 2003-2004 school year and the 2004-2005 school year. Utilizing schools with the majority of the same set of students, will better ensure the results of the data and be a good representative of how scheduling effects campuses in the areas of achievement results, attendance rates, and dropout rates.

Campus results were further divided into four categories or student populations to study; campus-wide results, minority students, limited English proficient students (LEP), and students classified as low socio-economic status (SES) by the state of Texas. In this study, the African American and Hispanic students, as defined by the state, were grouped into one group, the minority subgroup. From the 22 high schools depicted in this study, not all the schools had enough students populations in the categories of African American and Hispanic to be officially counted or recorded by the state's Academic Excellence Indicator System reports. This made it necessary to combine the students from both ethnicity groups into the one minority group for this study. Another reason for creating the one minority group from the African American and Hispanic ethnicity groups, was for the purpose of keeping a large enough sample group to run the paired sampled *t*-test statistical analysis in order to meet the requirements stated in the null hypothesis.

## Design of the Study

The study utilized campus data derived from PEIMS (campus information) from the 2003-2004, 2004-2005 and the 2005-2006 AEIS reports for each high school in the

study. 2005-2006 AIES reports have information about attendance for the 2004-2005 academic year, since attendance is reported on by the state one academic year later. The design of the research was quantitative, and a causal-comparative study to analyze if there are any differences between the independent variables, traditional scheduling and block scheduling. Gall, Gall, and Borg (2003) state that a causal-comparative design is advantageous in that it allows researchers to study the cause and effect between groups, especially when it is difficult or not plausible for researchers to manipulate the experimental conditions (p. 298). This study will attempt to show if there is a relationship between the schedule type (A/B block and traditional) and the variables studied, and if there were any differences among campus results, minority students, limited English proficient students, and low socio-economic students.

## Data Collection

To obtain the information that will address the hypotheses, the student data were collected through the TEA and the AEIS reports for each public high school identified in the study. The data collected will contain the following: the school-wide mean score, the passing rate for student achievement on the TAKS test in reading / English language arts and Math, and mean scores for student absenteeism, and student dropout rates for the high schools included within the study.

Identification of students will not be identifiable by either name of the student or student identification numbers, but the student information used in the study were reported as a campus-wide mean average on performance tests and are reported for the grade levels ninth grade and tenth grade. Data used for the achievement scores is

the passing rate for the TAKS test as detailed on the AEIS campus reports. The dependent variables, attendance rates and dropout rates, are reported as campus-wide mean percentages by academic year. Students in the high schools studied are required by the state of Texas to b taught the same state mandated Texas Essential Knowledge and Skills (TEKS) curriculum. Additionally, these Texas high schools are also required to test student mastery of the TEKS curriculum through the administration of the TAKS test.

*Texas Assessment of Knowledge and Skills (TAKS)*

The data to measure the student achievement in this study were compiled from the Texas Assessment of Knowledge of Skills (TAKS) test results. The TAKS test is a criterion-referenced assessment and the primary state-mandated assessment for students in Texas public schools for Grades 3 through 11. Both the experimental group and the sample group of high school students were given the TAKS tests. These TAKS tests were administered in reading and mathematics to ninth graders during spring 2004 and the language arts and mathematics to tenth graders in spring 2005. Many factors can alter test scores and make it difficult for comparing student performance scores from one year to the next, but the TAKS test items, such as the multiple choice questions, are equated through the use of the Rasch partial-credit model which establishes scaling and allows for the across year comparisons of these scores to be plausible (TEA, 2003).

Further steps are taken by the Texas Education Agency's assessment division to ensure the tests reliability of the TAKS tests scores. The use of the statistical Kuder-

Richardson Formula 20 is used each year of the TAKS administration for the purpose of test reliability and the internal consistency. Internal consistency ranges are acceptable at or between the 0.80 and 0.90 ranges. The TAKS test reliability scores are from 0.83 to 0.94 and are in the acceptable range.

*Academic Excellence Indicator System*

The Academic Excellence Indicator System (AEIS) reports give annual information on every school in the state of Texas and include performance data of each school. The AEIS is a report on every school campus in the state of Texas, where information is presented on the performance of the students on each campus and on the districts in Texas. The AEIS report is by the Texas Education Agency and presented in annually in the fall about the previous years' results. The information is collected by the state's education department through the Public Education Information Management System (PEIMS) from all the public schools in the state of Texas. Student performance is the concept behind the AEIS school reports and is the standard measurement for school accountability (TEA, nod.)

These reports include extensive information on school finances, attendance rates, student demographics, school staff, results of standardized tests, and annual dropout rates. The reported section on standardized tests are disaggregated by sex, ethnicity, low socio-economic status, enrolled grade level, by subject tests, and other categories.

This study looked for differences in academic performances, attendance rates, and drop out rates in campus-wide mean results as well as three subgroups for the

schools studied; minority students, limited English proficient students, and low socio-economic status students. The minority group was composed of both African American students and Hispanic students in one group, and the limited English proficient and low socio-economic students were comprised by the groups defined by the state and reported in the AEIS campus reports.

## Data Analysis

An analysis was conducted for the purpose of a completing a comparative study of high school students under two different types of class schedule formats. Hinton, Brownlow, McMurray, and Cozens (2004) explain that research tends to be comparing two samples or two groups and to determine if, from the experiment or treatment, that there results a difference in the performances. They further express that the *t*-test is a statistical tool that allows the researcher to determine and detect any differences in performance. The use of Inferential statistics is for the purpose of drawing conclusions and making inferences from the statistical data, according to Carroll and Carroll (2002), the *t*-test is an inferential statistic that is found to be "pragmatic and applicable in educational setting" (p. 71).

Schedule type for these high schools were the independent variable with two groups; Texas high schools under A/B block schedule for the 2004-2005 school year and the same Texas high schools under traditional scheduling the following academic school year. Each grouping of high schools studied meeting this study's criteria were greater than fifteen campuses per group ($n > 15$), but less than thirty ($n < 30$). Therefore, with this range of group numbers and in accordance with Gall, Gall, & Borg

(2003) recommendations, it is more appropriate and advised for researchers to use the *t*-test. The dependent variables were categorized into four groups; academic achievement as determined by results on the Texas Assessment of Knowledge and Skills (TAKS) test in reading and mathematics, in addition the attendance percentages, and the drop-out rates for these campuses.

The statistical measure incorporated for comparing the variables in this study was *t*-tests. The *t*-tests were utilized to make comparisons between the two groups, by looking for differences between the mean scores of these two groups of high school students over the two school years for the same students. Carroll and Carroll (2002) state: “because the *t*-test is a parametric statistic, it is powerful, and if there is a difference, even slight ones, the *t*-test will uncover them” (p. 81). They further maintain that many schools and researchers find the *t*-test is useful for making data-driven decisions, especially in the area of comparing student performance factors such as standardized test scores.

The statistical analysis, paired sampled *t*-tests, used in this study were classified as dependent *t*-tests, and the study compared the two means of the various groups in each of the dependent variables (Field & Hole, 2003). Under the four independent variables, four *t*-tests were conducted for the campus-results and four for each of the subgroups of the participants; minority students, limited English proficient students, and low socio-economic students. This resulted in a total of 16 *t*-tests to compare the differences high schools for the 2003-2004 school year to the 2004-2005 school year performances.

Table 7

*Chart for* t-*Test Study*

| Dependent Variable | 2003-2004 Mean Results | 2004-2005 Mean Results | *N* |
|---|---|---|---|
| Reading/ELA TAKS percentage passing rate scores | campus | campus | 22 |
| | minority | minority | 22 |
| | LEP | LEP | 19 |
| | low SES | low SES | 22 |
| Mathematic TAKS percentage passing rate scores | campus | campus | 22 |
| | minority | minority | 22 |
| | LEP | LEP | 19 |
| | low SES | low SES | 22 |
| Attendance rates | campus | campus | 22 |
| | minority | minority | 22 |
| | LEP | LEP | 19 |
| | low SES | low SES | 22 |
| Dropout rates | campus | campus | 22 |
| | minority | minority | 22 |
| | LEP | LEP | 19 |
| | low SES | low SES | 22 |

*Note.* LEP = limited English proficient; low SES = low socio-economic status

## Summary

This chapter provided an overview of the problem or the study to be conducted, the design of the research, data collecting techniques, and the statistical measures to be utilized in the data analysis. Student academic achievement from two student groups were compared to determine if there is statistical significance between the experimental groups of high school students compared to the control group of high school students. In addition to comparing academic achievement, this study will also statistically measure for differences between the experimental group and the control in dropout rates and attendance rates. The experimental group consists of high school students who were taught under a block schedule and then as tenth graders they were instructed under a traditional schedule. The control groups are comprised of the same grade level students who were taught under a block schedule format. Initial investigations were conducted to determine if there were sufficient numbers of high schools to comprise both groups and to support statistical analysis of the data. The results of the data analysis and findings are reported in Chapter 4.

# CHAPTER 4

# PRESENTATION AND ANALYSIS OF DATA

Chapter 4 presents the results of this study that investigated the relationship between high school schedule types on student performance among Texas public high schools. High schools studied used block scheduling in 2004 then converted to a more traditional seven-period class day in 2005. The research considered if the type of high school schedule was related to the measured dependent variables. The four dependent variables utilized and measured in this study include student attendance rates, student dropout rates, and mean pass rate achievement scores on the Texas Assessment of Knowledge and Skills (TAKS) test in mathematics and reading / language arts as reported in the Academic Excellence Indicator System (AEIS) state reports.

Data was collected from campus AEIS summaries reporting general student performances for the dependent variables. The data was further identified into subpopulations for minority student population, limited English proficient student populations, and students classified as economically disadvantaged. The *t*-tests from the Statistical Package for Social Sciences (SPSS) were utilized to determine statistical significance and if there is a relationship between high school schedule type and the measured dependent variables.

## Hypotheses Analysis

Four hypothesis were developed to determine the effects of school schedule type on pass rate scores on standardized tests in the areas of reading and mathematics and on student attendance and student dropout rates. Each hypothesis was derived to detail

the participants that were studied and the years they were studied. Achievement scores are percentage pass rate scores derived from school performance indicators.

*Hypothesis 1*

> There is not a statistically significant difference in reading TAKS achievement scores between students in a traditional schedule and students in an A/B block schedule. A dependent sample *t*-test was conducted to determine if there was a significant difference in reading TAKS achievement campus scores comparing the results from 2004 to the results from 2005. In addition to campus results, three subpopulations were studied as part of a Hypothesis 1 to reveal if there were statistically significant differences in student achievement between the two independent variables of school schedule.

Table 8 details the *t*-test analysis results for the campus report comparing ninth grade Reading/ELA TAKS scores from 2004 to tenth grade Reading/ELA TAKS scores from 2005. The results depict a decrease in mean scores on campus reading TAKS scores from the results of the ninth graders from 2004 compared to the results of the tenth graders from the 2005 TAKS results.

Table 8

*Reading/ELA TAKS for Campus* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | Cread04 | 6.862 | 21 | <0.001 |
| 0.7909 | Mean | | | | |
| 0.1034 | SD | | | | |
| 22 | N | Cread05 | | | |
| 0.6186 | Mean | | | | |
| 0.1341 | SD | | | | |

*Note.* cread04 – 2004 campus TAKS Reading/ELA results for ninth graders; cread05 – 2005 campus TAKS Reading/ELA results for tenth graders

There is a statistically significant difference in TAKS campus scores between ninth grade Reading/ELA 2004 TAKS campus results compared to the 2005 TAKS tenth grade Reading/ELA campus results. The data in Table 8 reflects a 95% analysis confidence rating of the statistical *t*-test results.

Table 9 reports there is a decrease in mean scores on minority reading TAKS results from the results of the ninth grade minority students from 2004 compared to the results of the tenth grade minority students from the 2005 TAKS results.

Table 9

*Reading/ELA TAKS for Minority Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | mread04 | 6.643 | 21 | <0.001 |
| 0.7714 | Mean | | | | |
| 0.0941 | SD | | | | |
| 22 | N | mread05 | | | |
| 0.6014 | Mean | | | | |
| 0.1374 | SD | | | | |

*Note.* mread04 – 2004 minority TAKS Reading/ELA results for ninth graders; mread05 – 2005 minority TAKS Reading/ELA results for tenth graders

There is a statistically significant difference in TAKS campus scores between ninth grade Reading/ELA 2004 TAKS minority student results compared to the 2005 TAKS tenth grade Reading/ELA minority student results. The data in Table 9 reflects a 95% analysis confidence rating of the statistical *t*-test results.

Table 10 reports there is a decrease in mean scores on reading / ELA TAKS results from the scores of ninth grade limited English proficient (LEP) students from

2004 compared to the results of the tenth grade limited English proficient (LEP) students from the 2005 TAKS results.

Table 10

*Reading/ELA TAKS for Limited English Proficient Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 19 | N | lepread04 | 5.382 | 18 | <0.001 |
| 0.3726 | Mean | | | | |
| 0.1234 | SD | | | | |
| 19 | N | lepread05 | | | |
| 0.1832 | Mean | | | | |
| 0.1191 | SD | | | | |

*Note.* lepread04 – 2004 limited English proficient TAKS Reading/ELA results for ninth graders; lepread05 – 2005 limited English proficient TAKS Reading/ELA results for tenth graders

There is a statistically significant difference in TAKS campus scores between ninth grade Reading/ELA 2004 TAKS limited English proficient (LEP) student results compared to the 2005 TAKS tenth grade Reading/ELA limited English proficient (LEP) student results. The statistical data in Table 10 reflects a 95% analysis confidence rating of the statistical *t*-test results.

Table 11 details the *t*-test analysis results for the campus report comparing ninth grade economically disadvantaged student Reading/ELA TAKS scores from 2004 to tenth grade economically disadvantaged student Reading/ELA TAKS scores from 2005. The results depict a decrease in mean scores on reading TAKS results from the results of the ninth graders from 2004 compared to the results of the tenth graders from the 2005 TAKS results.

Table 11

*Reading/ELA TAKS for Low Socio-economic Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | sesread04 | 6.809 | 21 | <0.001 |
| 0. 7495 | Mean | | | | |
| 0. 0953 | SD | | | | |
| 22 | N | sesread05 | | | |
| 0. 5905 | Mean | | | | |
| 0. 1400 | SD | | | | |

*Note.* sesread04 – 2004 low socio-economic TAKS Reading/ELA results for ninth graders; sesread05 – 2005 low socio-economic TAKS Reading/ELA results for tenth graders

There is a statistically significant difference in TAKS campus scores between ninth grade Reading/ELA 2004 TAKS economically disadvantaged student results compared to the 2005 TAKS tenth grade Reading/ELA economically disadvantaged student results. The data in Table 11 reflects a 95% analysis confidence rating of the statistical *t*-test results.

*Hypothesis 2*

> There is not a statistically significant difference in mathematic TAKS achievement scores between students in a traditional schedule and students in an A/B block schedule. A dependent samples *t*-test was conducted to determine if the was a significant difference in math TAKS achievement campus scores comparing the results from 2004 to the results from 2005. In addition to campus results three subpopulations were studied as part of Hypothesis 2 to decide if there were statistically significant differences in student achievement between the two independent variables of school schedule.

Table 12 reports the *t*-test analysis results for the campus report comparing ninth grade campus results math TAKS scores from 2004 to tenth grade campus results math TAKS scores from 2005. The results from the data in Table 12 depict there is a slight

increase in the mean score on the mathematics results comparing the ninth grade 2004 campus TAKS math campus results to the tenth grade 2005 math TAKS campus results.

Table 12

*Math TAKS for Campus* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | cmath04 | -1.441 | 21 | 0.164 |
| 0. 5059 | Mean | | | | |
| 0. 1953 | SD | | | | |
| 22 | N | cmath05 | | | |
| 0. 5245 | Mean | | | | |
| 0. 1826 | SD | | | | |

*Note.* cmath04 – 2004 campus TAKS math results for ninth graders; cmath05 – 2005 campus TAKS math results for tenth graders

There is no statistically significant difference between ninth grade math TAKS campus 2004 scores of schools under the A/B block scheduling format and the tenth grade math TAKS campus 2005 scores where students were instructed under the traditional scheduling format.

Table 13 reports the results of the *t*-tests analysis on the compared data of math TAKS scores for minority students, where the group is composed of two ethnicity groups, African American and Hispanic, as detailed and reported by the state on the AEIS campus reports. There is a small increase in mean scores on math TAKS results from the results of the minority ninth graders from 2004 compared to the results of the tenth graders from the 2005 TAKS results.

Table 13

*Math TAKS for Minority Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | mmath04 | -1.363 21 | | 0.187 |
| 0. 4518 | Mean | | | | |
| 0. 1692 | SD | | | | |
| 22 | N | mmath05 | | | |
| 0. 4723 | Mean | | | | |
| 0. 1550 | SD | | | | |

*Note.* mmath04 – 2004 minority TAKS math results for ninth graders; mmath05 – 2005 minority TAKS math results for tenth graders

There is no statistically significant difference between the ninth grade math TAKS campus 2004 scores and the tenth grade math TAKS campus 2005 scores.

Table 14 shows a decrease in mean scores on math TAKS results from the results of the LEP ninth graders from 2004 compared to the results of the tenth graders from the 2005 TAKS results.

Table 14

*Math TAKS for Limited English Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 19 | N | lepmath04 | 0. 795 | 18 | 0.437 |
| 0. 2242 | Mean | | | | |
| 0. 1815 | SD | | | | |
| 19 | N | lepmath05 | | | |
| 0. 2053 | Mean | | | | |
| 0. 1680 | SD | | | | |

*Note.* lepmath04 – 2004 limited English proficient TAKS math results for ninth graders; lepmath05 – 2005 limited English proficient TAKS math results for tenth graders

There is no statistically significant difference between the ninth grade math TAKS lep student 2004 scores and the tenth grade math TAKS lep student 2005 scores.

Table 15 reports an increase in mean scores on math TAKS results from the results of the economically disadvantaged ninth grade students from the 2004 compared to the results of the tenth graders from the 2005 TAKS results.

Table 15

*Math TAKS for Economically Disadvantaged Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | sesmath04 | -1.136 | 21 | 0.269 |
| 0. 4505 | Mean | | | | |
| 0. 1677 | SD | | | | |
| 22 | N | sesmath05 | | | |
| 0. 4673 | Mean | | | | |
| 0. 1546 | SD | | | | |

*Note.* sesmath04 – 2004 low socio-economic TAKS math results for ninth graders; sesmath05 – 2005 low socio-economic TAKS math results for tenth graders

There is no statistically significant difference between economically disadvantaged ninth grade TAKS 2004 scores and the tenth grade math TAKS campus 2005 scores.

*Hypothesis 3*

> There is not a statistically significant difference in attendance rates between students in a traditional schedule and students in an A/B block schedule. An independent samples *t*-test was conducted to determine if there was a significant difference in attendance rates for campus scores comparing the results from 2004 to the results from 2005. Three subpopulations were studied, in addition to campus group results, as part of Hypothesis 3 to determine if there were statistically significant differences in student attendance rates between the two independent variables of school schedule.

Table 16 results depicts an increase in the standard mean scores comparing the 2003-2004 campus attendance rates for all students on the campuses to the 2004-2005 campus attendance rates for all students on the high school campuses participating in this study.

Table 16

*Attendance Rates for Campus* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | catt04 | -1.347 | 21 | 0.192 |
| 0. 9320 | Mean | | | | |
| 0. 0195 | SD | | | | |
| 22 | N | catt05 | | | |
| 0. 9341 | Mean | | | | |
| 0. 0210 | SD | | | | |

*Note.* catt04 – 2004 campus attendance results for ninth graders; catt05 – 2005 campus attendance results for tenth graders

There is no statistically significant difference between the campus attendance percentages for all students from 2004 of schools using the block schedule to the 2005 attendance percentages for all students of schools that reverted back to a more traditional school day schedule.

Table 17 details the *t*-test analysis results for minority students comparing ninth grade attendance rates from 2004 to the tenth grade attendance rates from 2005. The results reports a slight increase in mean scores of attendance rates of the minority students from 2004 compared to the attendance rates of the minority students from 2005.

Table 17

*Attendance Rates for Minority Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | matt04 | -0.551 | 21 | 0.587 |
| 0. 9293 | Mean | | | | |
| 0. 0178 | SD | | | | |
| 22 | N | matt05 | | | |
| 0. 9306 | Mean | | | | |
| 0. 0221 | SD | | | | |

*Note.* matt04 – 2004 minority attendance results for ninth graders; matt05 – 2005 minority attendance results for tenth graders

There is no statistically significant difference between the minority student attendance percentages from 2004 schools using the block schedule to the 2005 minority student attendance percentages of schools that reverted back to a traditional school schedule.

Table 18 reports a miniscule increase in mean scores on attendance rates from the results of the limited English proficient (LEP) students from 2004 compared to the results of the limited English proficient (LEP) students from 2005.

Table 18

*Attendance Rates for Limited English Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 21 | N | lepatt04 | 0.039 | 20 | 0.970 |
| 0. 9298 | Mean | | | | |
| 0. 0173 | SD | | | | |
| 21 | N | lepatt05 | | | |
| 0. 9297 | Mean | | | | |
| 0. 0174 | SD | | | | |

*Note.* lepatt04 – 2004 limited English-proficient attendance results for ninth graders; lepatt05 – 2005 limited English-proficient attendance results for tenth graders

There is no statistically significant difference between the LEP student attendance percentages from 2004 of schools using the block schedule to the LEP student 2005 attendance percentages of schools that reverted back to a more traditional school day schedule.

Table 19 reports a slight but not significant decrease in mean scores on economically disadvantaged (low SES) students from 2004 compared to the results of the economically disadvantaged (low SES) students from 2005.

Table 19

*Attendance Rates for Economically Disadvantaged Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | sesatt04 | 0.943 | 21 | 0.356 |
| 0. 9312 | Mean | | | | |
| 0. 0163 | SD | | | | |
| 22 | N | sesatt05 | | | |
| 0. 8920 | Mean | | | | |
| 0. 1971 | SD | | | | |

*Note.* sesatt04 – 2004 low socio-economic attendance results for ninth graders; sesatt05 – 2005 low socio-economic attendance results for tenth graders

There is no statistically significant difference between the economically disadvantaged student attendance rates from 2004 to the 2005 economically disadvantaged student's attendance rates.

*Hypothesis 4*

There is not a statistically significant difference in dropout rates between students in a traditional schedule and students in an A/B block

schedule. An independent samples *t*-test was conducted to determine if there was a significant difference in dropout campus rates comparing the results from 2004 to the results from 2005. Three subpopulations were studied as part of Hypothesis 4, to decide if there were statistically significant differences in student dropout rates between the two independent variables of school schedule.

Table 20 reports there was an increase in the standard mean campus results from the 2003-2004 campus dropout rates compared to the 2004-2005 campus dropout rates.

Table 20

*Dropout Rates for Campus* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | cdo04 | -1.560 | 21 | 0.134 |
| 0. 0527 | Mean | | | | |
| 0. 0328 | SD | | | | |
| 22 | N | cdo05 | | | |
| 0. 0641 | Mean | | | | |
| 0. 0560 | SD | | | | |

*Note.* cdo04 – 2004 campus dropout results for ninth graders; cdo05 – 2005 campus dropout results for tenth graders

A small increase did occur, but there is no statistically significant difference between the campus dropout percentages from 2004 of schools using the block schedule to the 2005 dropout percentages of schools' that reverted back to a more traditional school day schedule.

Table 21 reports there was an increase in the standard mean from the 2004 minority student dropout rates compared to the 2005 minority student dropout rates.

Table 21

*Dropout Rates for Minority Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | mdo04 | -1.243 | 21 | 0.228 |
| 0. 0603 | Mean | | | | |
| 0. 0326 | SD | | | | |
| 22 | N | mdo05 | | | |
| 0. 0710 | Mean | | | | |
| 0. 0554 | SD | | | | |

*Note.* mdo04 – 2004 minority dropout results for ninth graders; mdo05 – 2005 minority dropout results for tenth graders

There is no statistically significant difference between the minority student dropout percentages from 2004 of schools using the block schedule to the 2005 minority student dropout percentages of schools that reverted back to a more traditional schedule.

Table 22 reports there was an increase in the standard mean from the 2004 limited English proficient (LEP) students dropout rates compared to the 2005 limited English proficient (LEP) students dropout rates.

Table 22

*Dropout Rates for Limited English Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 19 | N | lepdo04 | -0.384 | 18 | 0.705 |
| 0. 1767 | Mean | | | | |
| 0. 0980 | SD | | | | |
| 19 | N | lepdo05 | | | |
| 0. 8670 | Mean | | | | |
| 0. 1301 | SD | | | | |

*Note.* lepdo04 – 2004 limited English proficient dropout results for ninth graders; lepdo05 – 2005 limited English proficient dropout results for tenth graders

There is no statistically significant difference between the limited English proficient (LEP) students' dropout percentages from 2004 of schools using the block schedule to the 2005 limited English proficient (LEP) students' attendance percentages of schools that reverted back to a more traditional school day schedule.

Table 23 reports a decrease in mean scores on dropout rates from the economically disadvantaged (low SES) students from 2004 compared to the dropout rates of the economically disadvantaged (low SES) students from 2005.

Table 23

*Dropout Rates for Economically Disadvantage Students* t-*Test Results*

| | | Group | *t* | *df* | *p* |
|---|---|---|---|---|---|
| 22 | N | sesdo04 | -1.136 | 21 | 0.269 |
| 0. 0610 | Mean | | | | |
| 0. 0337 | SD | | | | |
| 22 | N | sesdo05 | | | |
| 0. 0655 | Mean | | | | |
| 0. 0501 | SD | | | | |

*Note.* sesdo04 – 2004 low socio-economic dropout results for ninth graders; sesdo05 – 2005 low socio-economic dropout results for tenth graders

There is no statistically significant difference between the economically disadvantaged student dropout percentages from 2004 of schools using the block schedule to the 2005 economically disadvantaged student dropout percentages of schools that reverted back to a more traditional school day schedule.

## Summary of Results

Chapter 4 presents an analysis of the data in TAKS Reading/ELA scores, TAKS

Math scores, attendance rates, and dropouts rates, in the schools that used a form of A/B block scheduling in 2004 to the same schools when then reverted to a more traditional high school schedule in 2005. Out of the four hypotheses, the main group studied was campus results and then three subgroups were studied; minority students, limited English proficient students, and low socio-economic students.

Upon further investigation, I reviewed changes the schools made or created in the subject areas of Reading and English after converting schedules. Each school was contacted to investigate what changes did take place from the instruction in 2003-2004 under the A/B block scheduling to the 2004-2005 school year where students were instructed under a traditional schedule. Four of the schools went from double blocking the subjects English and Reading under the A/B block to daily 50 minute instructional time for these subjects. Three schools made no specific change in the subjects, except in the schedule, but after three years on a traditional schedule, the schools have converted back to a form of block scheduling. There were 4 out of the 22 schools studied that switched from 400 minutes per two weeks for each subject under block scheduling to 500 minutes per two weeks for each subject under a traditional schedule. Six of the schools were unable to report specific or any changes that may have occurred in the conversion of school schedule types. Lastly, 5 out of the 22 schools reported losing time each week where students were allowed to silently read during instructional time.

Through use of *t*-tests it was determined that there was a statistically significant difference in reading achievement scores between students in an A/B block schedule and students in a traditional schedule as detailed in Hypothesis 1. Schools using the

A/B block showed a higher mean score in 2004 then schools in 2005 under a traditional schedule in the campus group in the area of TAKS Reading/ELA results. In addition to the campus results showing a decrease in scores from 2004 to 2005, each of the three subgroups; minority, LEP, economically disadvantaged, data showed a decrease in mean scores in Reading/ELA from 2004 to 2005. The campus and three subgroup results yielded a *p*-value of less than 0.001, meeting the required statistical value for significance. Therefore schools in the major metropolitan areas of Texas researched in this studied had better TAKS Reading/ELA scores under the A/B block schedule than during the next year with a traditional schedule.

This research found that there were no significant differences in mean scores for TAKS Math scores, attendance rates, and dropout rates in the area of campus results, or any of the three subgroups studied. Schedule type did not have a significant effect on the scores for the high schools studied in this research for math achievement scores, attendance rates, and dropout rates for the Texas high schools researched in this study.

# CHAPTER 5

# DISCUSSION, IMPLICATIONS, AND SUMMARY

This final chapter of the study presents the statement of the problem, restates the methodology used in this study, and includes the null hypotheses and findings. Next the discussion of the research is presented. Finally, implications of the study and recommendations for further research, and the summary are included.

## Statement of the Problem

This study compared student performance of Texas high school students, from the major populated metropolitan areas in the state of Texas, who were educated in an A/B block schedule in 2004 and then in 2005 were educated under a traditional seven periods a day school schedule. Statistical analysis was conducted to determine if there were any significant differences on student academic achievement on standardized state tests and in the areas of student attendance and student dropout rates. The study compared ninth grade students instructed under the A/B block scheduling, to their tenth grade year when these students were instructed under a traditional schedule. Campus-wide pass rate means were compared as were the pass rates for the subgroups; minority students, limited English proficient students, and low socio-economic students

## Review of the Methodology

The purpose of the study was to conduct and complete a comparative analysis of two groups of high schools under two different types of schedules. According to Hinton, Brownlow, McMurray, and Cozens (2004) research reports the comparison of two

groups or samples for the purpose of determining if there was a difference in the groups' performance. This study examined high schools in the metropolitan areas of Texas that utilized the A/B block scheduling in 2003-2004 school year and then made a conversion to a traditional scheduling in the 2004-2005 school year.

In this study the independent variable was the high school schedule type and for the subjects, the same schools were used from one year to the next. The type of *t*-test used for this study was a dependent means or paired-samples *t*-test. Carroll and Carroll (2002) describe *t*-tests to be suitable for use in educational studies and especially in the area of comparing standardized test scores.

The dependent variable categories were reading academic achievement, math academic achievement, attendance performance rates, and dropout rates. Separate paired-sample *t*-tests were conducted for campus results and each of the subgroups. In addition to campus results being studied for each school three subgroups were included as dependent variables; minority student performance, limited English proficient (LEP) student performance, and low-socioeconomic (SES) student performance. Mean scores were collected for each campus and for each group from the Texas Education Agencies report cards found on the Academic Excellence Indicator System report.

## Null Hypotheses and Findings

This study was a comparison of academic and other performances of students in their ninth grade year to the academic performances of their tenth grade year where the schools had made a change in how they scheduled classes for the students. Data for this study was collected through the Texas Education Agency (TEA)

and reported in the Academic Excellence Indicator System (AEIS) reports. To accomplish this task of comparing these performances on the dependent variable of school schedules on the independent variables, a statistical analysis was employed.

Four null hypotheses were addressed for this study:

> *Null Hypothesis 1:* For the campus and subgroup populations there is no statistically significant difference in the on the Reading / English Language Arts TAKS achievement mean scores for the ninth graders instructed under A/B block scheduling to the Reading / English Language Arts TAKS achievement mean scores for the tenth graders, in the same schools, instructed under a traditional class schedule.

The analysis of the data from the study revealed there is a significance statistical difference comparing language arts TAKS achievement scores. High school mean scores under the traditional school schedule performed lower than high school mean scores under the A/B block schedule in all subgroup populations and in the campus results. Therefore the Null Hypothesis 1 was rejected for all subgroups studied and for the campus scores studied.

> *Null Hypothesis 2*: For the campus and subgroup populations there is no statistically significant difference in the mathematic TAKS achievement mean scores of the ninth graders instructed under A/B block scheduling to the mathematics TAKS achievement mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

The comparison of data showed a slight increase in mean scores for schools under traditional schedules in the campus results and in the minority and low SES subgroups, but showed a slight decrease in mean scores for the LEP subgroup. The analysis of the data from the study revealed that there was no statistical significance in Math TAKS achievement between school scores under the A/B block format compared to schools scores under a traditional schedule across all subgroups and campus results. Therefore the Null Hypothesis 2 was accepted.

*Null Hypothesis 3:* For the campus and subgroup populations there is no statistically significant difference in the attendance rates mean scores of the ninth graders instructed under A/B block scheduling to the attendance rates mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

A comparison of the data revealed that there was a slight increase in mean scores in the area of attendance for the campus group and the minority subgroup, but a decrease in mean scores for the subgroup low SES. While the LEP subgroup showed no gains in mean scores from one year to the next. These results from the study concluded that there were no statistical significance in attendance for any group or subgroup, therefore the Null Hypothesis 3 was accepted.

*Null Hypothesis 4:* For the campus and subgroup populations there is no statistically significant difference in the drop-out mean scores of the ninth graders instructed under A/B block scheduling to the drop-out mean scores of the tenth graders, in the same schools, instructed under a traditional class schedule.

A comparison of the mean scores for dropouts revealed that in all the subgroups and in the campus group there was a slight increase, but it also revealed that there were no statistical significances from one year under the A/B block schedule to the next year under the traditional schedule.

## Discussion of the Results

With the federal public law known as the No Child Left Behind Act (NCLB) school districts and schools have been forced to look at strategies and policies that could improve the academic performance of students. One strategy local districts and schools have control over is school schedule. McCreary and Hausman (2001) describe that the most common approach, in recent years, by school reformers to increase student outcome has been how the school day and time within schools are structured. Bevenino

(1999) described schools looking at time structure of classes and school days as one of the most important changes in school in recent times, thus a number of secondary schools have been moving to block scheduling. Large numbers of secondary schools have changed to a form or alternate schedule, other than the traditional school schedule, and much of the research conducts comparisons of schools and students that have made the move from traditional schedules to a form of block schedule. This study was designed to study schools that have reverted back to the traditional schedule from an alternate day schedule and how the change has impacted student performance in the areas of attendance and dropouts and student achievement in the areas of math and reading.

This study revealed the following findings in the four identified areas: Reading/ELA TAKS, Math TAKS, attendance rates, and dropout rates.

*Reading/ELA TAKS*

The research revealed a decrease in reading achievement when schools moved from an alternative day block schedule to a traditional school day schedule. This decrease in mean reading achievement scores was a statistically significant decrease. Bush (2003) did a study comparing student reading comprehension scores and the use of alternate day block scheduling. The results showed to be significant and that student achievement did increase with the implementation of alternate day scheduling. Bush's study supports the findings of this present study that students' achievement reading is better under alternative day block scheduling. Evans, Tokavceyk, Rice, and McCroy (2002) examined high school student achievement and their outcomes showed a

significant increase in reading averages in SAT scores where students were instructed under block scheduling. Their research also revealed that the students they studied had higher grade averages, in subject areas such as reading, than those students educated under a more traditional schedule. Another study supporting block scheduling on reading achievement was by DiRocco (1997) where middle school students were assessed in several academic subjects and the was a statistical significant for students instructed under alternative day scheduling.

*Mathematics TAKS*

In a different study comparing high school students and the impact of secondary schools using a traditional schedule and secondary schools using block scheduling, Drummond (2001) found no statistical significant differences in reading or math scores. Another study showing no significant differences in student achievement scores was done by Hachmann, Hecht, Harmston, Pliska & Ziomeck (2001), where they studied over 38,000 student ACT scores. Their study compared student scores to determine the affect of different types of school scheduling on these achievement scores and they found no affect or differences. Findings from McCreary and Hausman (2001) revealed evidence that 2400 students instructed under a traditional school schedule performed significantly higher than equal amounts of students instructed under a block schedule in the area of math on the SAT 9. In this present study, the campus group and the subgroups for minority students and low SES students all showed a slight increase in mean math TAKS achievement scores, but not a significant increase. For the samples in this study, statistically, schedule type had no affect on school performance in the area

of percent pass on the math TAKS. However, Hodges (2003) assessed rural middle school student achievement scores from schools on block scheduling and compared them to similar students on traditional schedule and found that there was a significant difference in mathematics scores favoring block scheduling.

*Attendance Rates*

With regard to attendance, this study did not show any significant results, but the results did show variances among the groups. With the campus and minority groups there were slight gains for the students under traditional schedules and with the low socio-economic group there was a slight decrease in mean scores, with no gains in mean scores for the LEP students. Webb (2000) did a study of 90 Texas high schools and compared the effects of three schedule types on attendance and found that there were also no significant results between student attendance and schedule type. In a different study by Buchman (1995), the results were different in regards to the effects of school schedule on attendance. The research was conducted on a high school in Florida that converted from traditional schedule to block scheduling and the results showed an increase in daily student attendance after the school switched to block scheduling. Queen (2003), Lybbert (1998), and Evans, Tokavczyk, Rice and McCury (2002) all conducted studies that revealed evidence of improvement of student attendance under block scheduling.

*Dropout Rates*

In all groups, for this present study, the results all showed an increase in dropout

rates mean scores. This represents a negative affect of traditional schedule on student dropout rates, but hese are small differences and not statistically significant for the schools within this study . A study by Webb (2000) also found no statistical difference in dropout rates when comparing students on a block schedule, accelerated schedule, and a traditional schedule.

## Implications

The findings of this study showed that out of the 16 paired-sample *t*-tests conducted, 10 of the results depicted a negative impact on student performance when moving from the A/B block school schedule to the traditional school schedule. The results are true for the participants in this study, and in only one area were the results of statistical importance. In the area of Reading/Language Arts TAKS mean results there was a statistically significant result representing a negative impact from moving to a traditional schedule. Consequences of decreased Reading/Language Arts scores for students is not acceptable in this era of high stakes for ratings based on student academic performances. The implication from the findings would be to take this under consideration when schools were contemplating moving to a traditional schedule or even making changes in class schedules and how the change may affect student performance. One single study will not provide an all-inclusive evidence of the effects of moving from block scheduling to traditional scheduling, however; Investigation on how students perform at one grade level on the TAKS and the type of instruction given during classes, should remain relatively the same when making schedule changes. This

information may help with the reading achievement scores for all students and student groups.

Another implication derived from the findings of this study is that for the LEP and low-socioeconomic subgroups, in three of the four variables negative results were reported when the schools moved from the A/B block schedule to the traditional schedule. Results for these groups showed a small change, but they were not statistically significant. More schools and different analysis would be needed to determine the effect size. These groups of students are already in at-risk situations and before making any class or school schedule changes, considerations should be reviewed and plans made to ensure their success during transition of school schedules.

Dropout results from this study also showed a negative result for campus results and all the three subgroups when the transition was made to a traditional schedule. The results were not statistically significant therefore there may not be a need for discussion or consideration if a change was being proposed in school schedule. However, with dropout rates and schools being expected to account for all students, implications from this study suggest serious consideration should be taken when looking at altering school schedules. Schools in Texas are accountable for their dropout students and the schools AEIS ratings can be lowered if the schools do not properly account for their dropout students or if their dropout rates increase to a significant level.

A final implication resulting from the findings of the study is to consider schools and improving mathematic scores. The research found that with three of the four groups, (campus results, minority subgroup, and low-socioeconomic subgroup) mean scores made slight gains when the high schools moved to a traditional schedule.

Finally, the scores were not statistically significant in the academic math score comparison results, and that too should be taken under consideration by school decision makers when looking at possible high school schedule changes.

## Recommendations for Further Research

This study included high schools in Texas, located in the major metropolitan areas that were on an A/B block form of scheduling in 2003-2004 and then in the 2004-2005 school year converted to a traditional form of scheduling. In the present study, the focus was on urban schools and the effects the schedule type had on these schools and on student performance during a two year period.

The findings of such a study lead to several suggestions for future research. First, accentuate a need to look further into the effects schedule type has on student achievement; therefore further studies regarding the effects of scheduling type on student achievement are necessary. In these studies, researchers would benefit from studying longitudinal investigations to discover if these results are sustainable as the high schools continue using the traditional schedule.

Second, a follow-up study to see how these Texas high schools have been performing to present time would be informative. It would also be beneficial to look more closely at individual scores rather than campuses at a whole to get a more detailed finding of the effects of schedule type on the individual over time in addition to looking at campus and group results. This study focused on two academic areas, reading and mathematics, of a state standardized assessment. Academic achievement for students in other subject areas such as, science, social studies, AP courses, and foreign

languages should be dependent variables in future studies. In addition to these subjects, more than just standardized tests should be considered to get a different perspective of the effects of school schedule.

Third, the findings represent a set of schools compared from one year to the next year where the independent variable was manipulated or changed and only two types of schedules were studied as the independent variables. In future studies, several schedule formats or programs for schools should be studied to determine if it is the traditional schedule that is making or not making the differences, or is the type of schedule the school is reverting from that might be making or not making the differences.

Fourth, further research focusing on individual student achievement scores should be investigated, rather than a wider spectrum of researching groups of students and the campuses pass rate on state mandated achievement tests. This analysis should include student populations such as all ethnicity groups, special education, mobile students, honor students, gifted and talented students, students who participate in certain extra-curricular groups, and any pertinent groups school decision makers and administration need to be cognizant of when making major changes to secondary schools.

Lastly, one aspect that was mentioned in this study, but was not part of the statistical analysis, was the need to research the expenses of education for students under block scheduling versus students with traditional scheduling.

## Summary

The intent of this study was to add to the educational research and expand the knowledge of study in the area of school scheduling and the effects it has on student achievement. This study is not an answer to the question of which schedule type is better, but rather adds to the knowledge base of understanding the effects of switching school schedules and the effects it has on high schools. The study found that student achievement on Reading/ELA scores decreased significantly when moving from an A/B block schedule to a traditional school schedule, but did not have any significance in the areas of math scores, attendance rates, or dropout rates. Data from this study would support high schools not making the switch to traditional schedules if they were utilizing A/B block scheduling. This study has attempted to supply information and research educational leaders can be better equipped to make data-based decisions and understand the process for seeking answers when it comes to making decisions on changing or not changing school schedules.

# APPENDIX A

## LIST OF PUBLIC HIGH SCHOOL SCHEDULE TYPES

## LOCATED IN THE FIVE MAJOR METROPOLITAN COUNTIES OF TEXAS

Public High Schools Located in Bexar County, Texas.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Bexar | Alamo Heights ISD | Alamo Heights HS | Traditional | Traditional | Traditional |
| Bexar | Edgewood ISD | Memorial HS | Traditional | Traditional | Traditional |
| Bexar | Harlandale ISD | McCollum HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Brackenridge HS | Traditional | Traditional | Traditional |
| Bexar | San Antonio ISD | Burbank HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Edison HS | Traditional | Traditional | Traditional |
| Bexar | San Antonio ISD | Fox Technical HS | Traditional | Traditional | Traditional |
| Bexar | San Antonio ISD | Highlands HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Houston HS | Traditional | Traditional | Traditional |
| Bexar | San Antonio ISD | Jefferson HS | Block | Traditional | Traditional |
| Bexar | North East ISD | Churchill HS | Block | Block | Block |
| Bexar | North East ISD | Roosevelt HS | Block - A/B | Block - A/B | Block - A/B |
| Bexar | North East ISD | Churchill HS | Block | Block | Block |
| Bexar | North East ISD | Roosevelt HS | Block - A/B | Block - A/B | Block - A/B |
| Bexar | North East ISD | Reagan HS | Block | Block | Block |
| Bexar | North East ISD | Internationl sch America | Block - A/B | Block - A/B | Block - A/B |
| Bexar | East Central ISD | East Central HS | Traditional | Traditional | Traditional |
| Bexar | Southwest ISD | Southwest HS | Block | Traditional | Traditional |
| Bexar | Lackland ISD | V.A. Stacey jr/sr HS | Block - A/B | Block - A/B | Block - A/B |
| Bexar | Ft Sam Houston ISD | R. G. Cole Jr/Sr HS | Traditional | Traditional | Traditional |
| Bexar | Northside ISD | Holmes HS | Block | Block | Traditional |
| Bexar | Northside ISD | Jay HS | Block | Block | Traditional |
| Bexar | Northside ISD | Marshall HS | Block | Block | Traditional |
| Bexar | Northside ISD | Tom Clark HS | Block | Block | Traditional |
| Bexar | Northside ISD | Health Careers HS | Block | Block | Traditional |
| Bexar | Northside ISD | William Taft HS | Block | Block | Traditional |
| Bexar | Northside ISD | S.Day O'Connor HS | Block | Block | Traditional |
| Bexar | Northside ISD | Warren HS | Block | Block | Traditional |
| Bexar | Northside ISD | Stevens HS | Block | Block | Traditional |
| Bexar | Judson ISD | Jusdon HS | Block | Block | Block |
| Bexar | Judson ISD | K. Wagner HS | Block | Block | Block |
| Bexar | Southside ISD | Southside HS | Traditional | Traditional | Traditional |

Public High Schools Located in Dallas County, Texas.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Dallas Car- | FarBranch | RL Turner HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Newman Smith HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Creekview HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Ranchview HS Block | | Traditional | Traditional |
| Dallas | Cedar Hill ISD | Cedar Hill HS Block | | Traditional | Traditional |
| Dallas | Cedar Hill ISD | Ninth Gr. Center | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Bryan Adams HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Dallas ISD | W H Adams HS | Traditional Traditi | onal Traditional | |
| Dallas | Dallas ISD | A Maceo Smith HS Traditional | | Traditional Traditional | |
| Dallas | Dallas ISD | Moises Molina HS | Traditional | Traditional | Block - A/B |
| Dallas | Dallas ISD | Hillcrest HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Thomas Jefferson HS Traditional | | Traditional Traditional | |
| Dallas | Dallas ISD | J.F. Kimball HS Traditional | | Traditional Traditional | |
| Dallas | Dallas ISD | Lincoln HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Dallas ISD | L G Pinkston HS | Traditional Traditi | onal Traditional | |
| Dallas | Dallas ISD | Roosevelt HS Block | | Traditional | Traditional |
| Dallas | Dallas ISD | W W Samuel HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Seagoville HS | Traditional Traditi | onal Traditional | |
| Dallas | Dallas ISD | South Oak Cliff HS | Block | Block | Traditional |
| Dallas | Dallas ISD | H Grady Spruce HS Traditional | | Traditional Traditional | |
| Dallas | Dallas ISD | Sunset HS | Traditional Traditi | onal Traditional | |
| Dallas | Dallas ISD | W T White HS | Traditional Traditi | onal Traditional | |
| Dallas | Dallas ISD | Woodrow Wilson HS Traditional | | Traditional Traditional | |
| Dallas | Dallas ISD | David W. Carter HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | North Dallas HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Skyline HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Dallas ISD | School Science & Engineering | Block - 4x4 | Block - 4x4 | Block - 4x4 |
| Dallas | Dallas ISD | James Madison HS | Block | Block | Block |
| Dallas | Dallas ISD | School. Business & Management | Block | Block | Block - A/B |
| Dallas | Dallas ISD | Booker T. Washington | Block | Block | Block - A/B |
| Dallas | Dallas ISD | Schl. Health Profess. | Block | Block | Block - A/B |
| Dallas Dallas | ISD | Schl.Educat.&SocServ | Block - 4x4 | Block - 4x4 | Block - 4x4 |
| Dallas | Dallas ISD | Schl. Talented & Gifted | Block - A/B | Block - A/B | Block - A/B |
| Dallas | DeSoto ISD | DeSoto HS | Block | Block | Traditional |
| Dallas | DeSoto ISD | DHS Freshman Campus | Block | Block | Traditional |

Public High Schools Located in Dallas County, Texas continued.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Dallas | Duncanville ISD | Duncanville HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Garland ISD | Garland HS | Block - 4x4 | Block - 4x4 | Block - 4x4 |
| Dallas | Garland ISD | S. Garland HS | Block - 4x4 | Block - 4x4 | Block - 4x4 |
| Dallas | Garland ISD | N. Garland HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Garland ISD | Lakeview CentennialHS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Garland ISD | Naaman Forest HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Garland ISD | Rowlett HS | Block - Mod. | Block - Mod. | Block - Mod. |
| Dallas | Garland ISD | Sachse HS | Block - Mod. | Block - Mod. | Block - Mod. |
| Dallas Gran | dPrairieISD | GrandPrairie HS Traditional | | Traditional Traditional | |
| Dallas | GrandPrairieISD | S. Grand Prairie HS | Block - Mod. | Block - Mod. | Block - Mod. |
| Dallas | HighlandParkISD | Highland Park HS Traditional | | Traditional Traditional | |
| Dallas | Irving ISD | Irving HS | Traditional Traditional | Traditional | |
| Dallas | Irving ISD | MacArthur HS | Traditional Traditional | Traditional | |
| Dallas | Irving ISD | Nimitz HS | Traditional Traditional | Traditional | |
| Dallas | Irving ISD | The Academy HS | n/a | Block - A/B | Block - A/B |
| Dallas | Lancaster ISD | Lancaster HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Mesquite ISD | Mesquite HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Mesquite ISD | North Mesquite HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Mesquite ISD | West Mesquite HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Mesquite ISD | Poteet HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Mesquite ISD | Horn HS | Block - A/B | Block - A/B | Block - A/B |
| Dallas | Richardson ISD | Lake Highlands HS Traditional | | Traditional Traditional | |
| Dallas | Richardson ISD | Lake Highlands freshm Traditiona | | Traditional Traditional | |
| Dallas | Richardson ISD | Richardson HS | Traditional Traditi | onal Traditional | |
| Dallas | Richardson ISD | Pearce HS | Traditional Traditi | onal Traditional | |
| Dallas | Richardson ISD | Berkner HS | Traditional Traditi | onal Traditional | |
| Dallas | Coppell ISD | Coppell HS | Traditional Traditional | Traditional | |

Public High Schools Located in El Paso County, Texas.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| El Paso | Clint ISD | Clint HS | Traditional Traditional | Traditional | Traditional |
| El Paso | Clint ISD | Mt View HS Traditional | | Traditional | Traditional |
| El Paso | Clint ISD | Horizon HS | Traditional Traditional | Traditional | Traditional |
| El Paso | El Paso ISD | Andress HS | Block | Block | Block |
| El Paso | El Paso ISD | Austin HS | Traditional | Block | Block |
| El Paso | El Paso ISD | Bowie HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | Burgess HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | Coronado HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | El Paso HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | Jefferson HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | Franklin HS Traditional | | Traditional | Traditional |
| El Paso | El Paso ISD | Silva Health Mngmt | Block | Block | Block |
| El Paso | El Paso ISD | Chapin HS | Block | Block | Block |
| El Paso | Fabens ISD | Fabens HS | Traditional Traditional | Traditional | Traditional |
| El Paso | San Elizario ISD | San Elizario HS | Traditional | Traditional | Traditional |
| El Paso | Ysletea ISD | Bel Air HS | Block - 4x4 | Block - 4x4 | Block - A/B |
| El Paso | Ysletea ISD | Eastwood HS Traditional | | Traditional | Traditional |
| El Paso | Ysletea ISD | Ysleta HS | Block - A/B | Block - A/B | Block - A/B |
| El Paso | Ysletea ISD | Riverside HS | Block | Block | Block |
| El Paso | Anthony ISD | Anthony HS Block | | Traditional | Traditional |
| El Paso | Canutillo ISD | Canutillo HS | Block - A/B | Block - A/B | Block - A/B |
| El Paso | Tornillo ISD | Tornillo HS Traditional | | Traditional | Traditional |
| El Paso | Socorro ISD | Socorro HS | Block - A/B | Block - A/B | Block - A/B |
| El Paso | Socorro ISD | Montwood HS | Block | Block | Block |
| El Paso | Socorro ISD | Americas HS | Block | Block | Block |

Public High Schools Located in Harris County, Texas.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Harris | Aldine ISD | Aldine HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Carver HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | McArthur HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Eisenhower HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Nimitz HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Aldine 9th gr HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | McArthur 9th HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Eisenhower 9th HS | Block - A/B | Block - A/B | Traditional |
| Harris | Aldine ISD | Nimitz 9th HS | Block - A/B | Block - A/B | Traditional |
| Harris | Alief ISD | Hastings HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Alief ISD | Elsik HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Alief ISD | Taylor HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Alief ISD | Kerr HS | Block - A/B | Block - A/B | Block - A/B |
| Harris Channelvie | ISD | Channelview HS | Block - A/B | Block - A/B | Traditional |
| Harris Crosb | y ISD | Crosby HS | Traditional Traditional | | Traditional |
| Harris C | ypress-Fairbanks | Cy-Fair HS | Traditional Traditi | | onal Traditional |
| Harris C | ypress-Fairbanks | Jersey Village HS Traditional | | Traditional Traditional | |
| Harris C | ypress-Fairbanks | Cypress Creek HS Traditional | | Traditional Traditional | |
| Harris C | ypress-Fairbanks | Langham Creek HS Traditional | | Traditional Traditional | |
| Harris C | ypress-Fairbanks | Cypress Falls HS Traditional | | Traditional Traditional | |
| Harris C | ypress-Fairbanks | Cypress Springs HS Traditional | | Traditional Traditional | |
| Harris | Cypress-Fairbanks | Cypress Ridge HS Traditional | | Traditional Traditional | |
| Harris C | ypress-Fairbanks | Cypress Woods HS Traditional | | Traditional Traditional | |
| Harris | Deep Park ISD | Deer Park North HS | Block - Mod | Block - Mod | Block - Mod |
| Harris | Deep Park ISD | Deer Park South HS | Block - Mod | Block - Mod | Block - Mod |
| Harris | North Forest ISD | Smiley HS | Traditional Traditi | | onal Traditional |
| Harris | North Forest ISD | Forest Brook HS Traditional | | Traditional Traditional | |
| Harris | Galena Park ISD | Galena Park HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Galena Park ISD | North Shore HS 9-10 | Block - A/B | Block - A/B | Block - A/B |
| Harris | Galena Park ISD | North Shore HS 11-12 | Block - A/B | Block - A/B | Block - A/B |
| Harris | Goose Creek ISD | Lee HS | Traditional Traditional | | Traditional |
| Harris | Goose Creek ISD | Sterling HS | Traditional Traditi | | onal Traditional |

Public High Schools Located in Harris County, Texas continued.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Harris | Houston ISD | Austin HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Bellair HS | Traditional Traditi | onal Traditional | |
| Harris | Houston ISD | Davis HS | Block - A/B | Block - A/B | Block - A/B |
| Harris Houston | ISD | Furr HS | Traditional Traditi | onal Traditional | |
| Harris | Houston ISD | Sam Houston HS | | | Traditional |
| Harris | Houston ISD | Jones HS | Traditional Traditi | onal Traditional | |
| Harris | Houston ISD | Kashmere HS | Traditional Traditi | onal Traditional | |
| Harris | Houston ISD | Lamar HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Lee HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Madison HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Milby HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Reagan HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Sterling HS | Traditional Traditi | onal Traditional | |
| Harris | Houston ISD | Waltrip HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Washington HS | | | ? |
| Harris | Houston ISD | Westbury HS | Traditional | Traditional | Block - Mod |
| Harris | Houston ISD | Wheatley HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Worthing HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Yates HS | Block - A/B | Block - A/B | Block - A/B |
| Harris Houston | ISD | Sharpstown HS Block | | Traditional | Traditional |
| Harris | Houston ISD | Scarborough HS | Block | Block | Block - A/B |
| Harris | Houston ISD | Perfor & Vis Arts HS | Block | Block | Block - A/B |
| Harris | Houston ISD | Debakey HS: Health Pr | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Chavez HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Houston ISD | Barbara Jordan HS | Block | Block | Block - A/B |
| Harris | Houston ISD | Law Enf-CrmJst HS | Block 4x4 | Block | Block - A/B |
| Harris | Houston ISD | Westside HS Block | | Traditional | Traditional |
| Harris | Houston ISD | Middle College Tech | Block | Block | Block |
| Harris | Houston ISD | Eastwood Academy | Block | Block | Block |
| Harris | Houston ISD | Carnegie VanguardHS Block | | Traditional | Traditional |
| Harris | Houston ISD | Challenge Early ColHS | Block | Block | Block |
| Harris | Houston ISD | Empwrmnt Col PrepHS | n/a | n/a | new school |
| Harris | Humble ISD | Humble HS | Block | Block - A/B | Block - A/B |
| Harris | Humble ISD | Kingwood HS | Block - Modified | Block - Modified | Block - Modified |

Public High Schools Located in Harris County, Texas continued.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Harris | Katy ISD | Katy HS | Traditional Traditi | onal Traditional | |
| Harris Kat | y ISD | Taylor HS | Traditional Traditi | onal Traditional | |
| Harris | Katy ISD | Mayde Creek HS | Traditional Traditi | onal Traditional | |
| Harris | Katy ISD | Cinco Ranch HS | Traditional Traditi | onal Traditional | |
| Harris | Katy ISD | Morton Ranch HS | Traditional Traditi | onal Traditional | |
| Harris | Katy ISD | Seven Lakes HS | Traditional Traditi | onal Traditional | |
| Harris | Klein ISD | Klein HS | Traditional Traditi | onal Traditional | |
| Harris | Klein ISD | Klein Forest HS Traditional | | Traditional Traditional | |
| Harris | Klein ISD | Klein Oak HS | Traditional Traditi | onal Traditional | |
| Harris | Klein ISD | Klein Collins HS | Traditional Traditi | onal Traditional | |
| Harris | LaPorte ISD | La Porte HS | Block | Block | Block |
| Harris | Pasadena ISD | Pasadena HS | Block | Block | Block |
| Harris | Pasadena ISD | Sam Rayburn HS | Traditional Traditi | onal Traditional | |
| Harris | Pasadena ISD | South Houston HS Traditional | | Traditional Traditional | |
| Harris | Pasadena ISD | Dobie HS | Traditional Traditi | onal Traditional | |
| Harris | Pasadena ISD | Pasadena Memor.HS | Traditional Traditi | onal Traditional | |
| Harris | Spring ISD | Spring HS | Traditional Traditi | onal Traditional | |
| Harris | Spring ISD | Westfield HS | Traditional Traditi | onal Traditional | |
| Harris | Spring ISD | Andy Dekaney HS | n/a | n/a | n/a |
| Harris | Spring Branch ISD | Memorial HS Traditional | | Traditional Traditional | |
| Harris | Spring Branch ISD | Spring Woods HS | Block | Block | Block - Modified |
| Harris | Spring Branch ISD | Northbrook HS | Block - Modified | Block - Modified | Block - Modified |
| Harris | Spring Branch ISD | Stratford HS | Block - A/B | Block - A/B | Block - A/B |
| Harris | Tomball ISD | Tomball HS | Traditional Traditi | onal Traditional | |
| Harris | Sheldon ISD | C E King HS | Block - Modified | Block - Modified | Block - Modified |
| Harris | Huffman ISD | Hargrave HS | Traditional Traditi | onal Traditional | |

Public High Schools Located in Travis County, Texas.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Travis | Austin ISD | Austin HS | | | |
| Travis | Austin ISD | Johnston HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Austin ISD | Lanier HS | Traditional | Traditional | Traditional |
| Travis | Austin ISD | McCallum HS | | | |
| Travis | Austin ISD | Reagan HS | (they did not know) | Traditional | Traditional |
| Travis | Austin ISD | Travis HS | Traditional | Traditional | Traditional |
| Travis | Austin ISD | Crockett HS | Traditional | Traditional | Traditional |
| Travis | Austin ISD | Anderson HS | Traditional | Traditional | Traditional |
| Travis | Austin ISD | Johnson HS | | | |
| Travis | Austin ISD | Bowie HS | Traditional | Traditional | Traditional |
| Travis | Austin ISD | Akins HS | Traditional | Traditional | Traditional |
| Travis | Pflugerville ISD | Pflugerville HS | Block | Traditional | Traditional |
| Travis | Pflugerville ISD | John B. Coannally HS | Block | Traditional | Traditional |
| Travis | Pflugerville ISD | Hendricks HS | Traditional | Traditional | Traditional |
| Travis | Manor ISD | Manor HS | Traditional | Traditional | Traditional |
| Travis | Eanes ISD | Westlake HS | Traditional | Traditional | Traditional |
| Travis | Del Valle ISD | Del Valle HS | Traditional | Traditional | Traditional |
| Travis | Lago Vista ISD | Lago Vista HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Lake Travis ISD | Lake Travis HS | Block - 4x4 | Block - 4x4 | Block - A/B |
| Travis | Leander ISD | Cedar Park HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Leander ISD | Leander HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Leander ISD | Vista Ridge HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Round Rock ISD | McNeil HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Round Rock ISD | Westwood HS | Block - A/B | Block - A/B | Block - A/B |
| Travis | Round Rock ISD | Round Rock HS | | | |
| Travis | Round Rock ISD | Story Point HS | | | |
| Travis | Elgin ISD | Elgin HS | Block - 4x4 | Block - A/B | Traditional |
| Travis | Dripping Springs ISD | Dripping Springs HS | Traditional | Traditional | Traditional |
| Travis | Hays CISD | Jack C. Hays HS | Traditional | Traditional | Traditional |
| Travis | Hays CISD | Lehan HS | | Traditional | Traditional |
| Travis | Marble Falls ISD | Marble Falls HS | Block - 4x4 | Block - 4x4 | Block - 4x4 |

# APPENDIX B

## LIST OF PUBLIC HIGH SCHOOL SCHEDULE

## LOCATED IN THE FIVE MAJOR METROPOLITAN COUNTIES OF TEXAS:

## INITIALLY MEETING THE CRITERIA FOR THIS STUDY

Public High Schools Meeting Initial Criteria for Experimental Group.

| | | | Schedule Type | | |
|---|---|---|---|---|---|
| County | District | High School | 2003-2004 | 2004-2005 | 2005-2006 |
| Bexar | Harlandale ISD | McCollum HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Burbank HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Highlands HS | Block | Traditional | Traditional |
| Bexar | San Antonio ISD | Jefferson HS | Block | Traditional | Traditional |
| Bexar | Southwest ISD | Southwest HS | Block | Traditional | Traditional |
| Dallas Car- | FarBranch | RL Turner HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Newman Smith HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Creekview HS Block | | Traditional | Traditional |
| Dallas Car- | FarBranch | Ranchview HS Block | | Traditional | Traditional |
| Dallas | Cedar Hill ISD | Cedar Hill HS Block | | Traditional | Traditional |
| Dallas | Cedar Hill ISD | Ninth Gr. Center | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Hillcrest HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | Roosevelt HS Block | | Traditional | Traditional |
| Dallas | Dallas ISD | W W Samuel HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | David W. Carter HS | Block | Traditional | Traditional |
| Dallas | Dallas ISD | North Dalls HS | Block | Traditional | Traditional |
| El Paso | Anthony ISD | Anthony HS Block | | Traditional | Traditional |
| Harris Houston | ISD | Sharpstown HS Block | | Traditional | Traditional |
| Harris | Houston ISD | Westside HS Block | | Traditional | Traditional |
| Harris | Houston ISD | Carnegie VanguardHS Block | | Traditional | Traditional |
| Travis | Pflugerville ISD | Pflugerville HS | Block | Traditional | Traditional |
| Travis | Pflugerville ISD | John B. Coannally HS | Block | Traditional | Traditional |

# REFERENCES


Algozzine, B., Jenkins, E., & Queen, A. (2003). To block or not to block: That's not the question. *Journal of Educational Research, 95*, 196-202.

Anderson, L. W. (1984). *Time and school learning*. New York: St. Martin's Press.

Andrews, S. (2003). The effect of block scheduling on student achievement on standardized tests. *Dissertation Abstracts International*, *64* (01), 100, (UMI No. 3078587).

Bevevino, M. M., Snodgrass, D. M., Adams, K. M., Dengel, J. A. (1999). *An educator's guide to block scheduling: Decision making, curriculum design, and lesson planning strategies.* Boston: Allyn and Bacon.

Boarman, G. L., & Kirkpatrick, B. S. (1995). The hybrid schedule: Scheduling to the curriculum. *National Association of Secondary School Principals, 79(*571*)*, 43-52

Bottge, B.A., Gugerty, J.J., Serlin, R.C., & Moon, K. S. (2003). Block and traditional schedules: Effects on students with and without disabilities in high school. *ASSP Bulletin*, *87*(636), 2-14.

Buchman, D. C., King, B. B., & Ryan, S. (1995). Block scheduling: A means to improve school climate. *NASSP*, *79*, 5-16.

Bush, H. D. (2003). The effect of alternate-day block scheduling on reading comprehension of middle school students. *Dissertation Abstracts International*, *64*(06), 2026(UMI No. 3090998).

Bush, J. M., Johnstone, W. G. (2000). *An observation evaluation of high school A/B block classes: Variety or monotony?* Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

Canady, R. L., & Rettig, M. D. (1995). *Block scheduling: A catalyst for change in high schools*. Princeton, New Jersey: Eye on Education.

Canady, R. L., & Rettig, M. D. (1996). All around the block: The benefits and challenges of a non-traditional school schedule. *School Administrator, 53,* 8-14.

Carroll, S., & Carroll, D. (2002). *Statistics made simple for school leaders: Data driven decision making*. Lanham, MD: Scarecrow Press, Inc.

Dexter, K. M., Tai, R. H., & Sadler, P. M. (2006). Traditional and block scheduling for college science preparation: A comparison of college science success of students who report different high school scheduling. *High School Journal*, *89*(4), 22-33.

DiRocco, M. D. (1997). Effects of alternating day block scheduling on student academic performance, attendance, and discipline. *Dissertation Abstracts International*, *58* (12) 4539, (UMI No. 9817462).

DiRocco, M. D. (1999). How an alternating-day schedule empowers teachers. *Educational Leadership*, *56*, 82-84.

Drummond, P. A. (2001). A comparative analysis of students' academic achievement under block and traditional scheduling. *Dissertation Abstracts International*, *63* (02) 548, (UMI No. 3043667).

Edwards, C.M. (1995a). The 4 x 4 plan. *Educational Leadership, 53(*3*)*, 16-19.

Edwards, C.M. (1995b). Virginia's 4 x 4 high schools: High school, college, and more. *National Association of Secondary School Principals, 79(*19*)*, 23-41.

Evans, W., Tokarczyk, J., Rice, S., & McCray, A. (2002). Block scheduling: An evaluation of outcomes and impact. *Clearing House, 75*, 319-323.

Fager (1997, February). *Scheduling alternatives: Options for student success*. Northwest Regional Educational Laboratory. Retrieved September 19, 2005, from www.nwrel.org/request/feb97/index.html

Field, A., & Hole, G. (2003). *How to design and report experiments*. Thousand Oaks, CA: Sage Publications.

Fisher, C.W., & Berliner, D.C. (1985). *Perspectives on instructional time*. New York, NY: Longman.

Gandara, P. (2002). *The dimensions of time and challenges of school reform.* Albany, NY: University of New York Press.

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). *Educational research: An introduction* (7th ed.). Boston, MA: Allyn and Bacon Pearson.

Gordon, W. D. (1997). Block scheduling and selected student variables. *Dissertation*. *Abstracts International, 59* (07), 2267. (UMI No. 9841199).

Gullatt, D. E. (2006). Block scheduling: The effects on curriculum and student productivity, *National Association of Secondary School Principals, 90*(3), 250-265.

Hackmann, D. G., Hecht, J. E., Harmston, M. T., Pliska, A., & Ziomek, R. L. (2001). *Secondary school scheduling models: How do types of models compare to the ACT scores?* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.

Hammack, F. M., (2004). *The comprehensive high school today*. New York, NY: Teachers College Press.

Hinton, P., Brownlow, C., McMurray, I, & Cozens, B. (2004). *SPSS explained*. New York, NY: Routledge Inc.

Hodges, G. L. (2002). Comparison of selected academic achievement, attendance, and discipline referrals for students under block and traditional scheduling. *Dissertation Abstracts International*, *64* (01) 35. (UMI No. 3078441).

Hottenstein, D. S. (1998). *Intensive scheduling: Restructuring America's secondary schools through time management*. Thousand Oaks, CA: Corwin Press, Inc.

Huff, A. L. (1995). Flexible block scheduling: It works for us! *National Association of Secondary School Principals, 79* (571), 19-21.

Huyvaert, S. H. (1998). *Time is of the essence: Learning in schools*. Needham Heights, MA: Allyn & Bacon.

Irmsher, K. (1996). *Block scheduling*. University of Oregon, OR: Clearinghouse on Educational Policy Management.. (ERIC documentation reproduction Service No. ED393156).

Kenney, L. C. (2003). Back from the block – or not? *Te School Administrator, 60*(9)*,* 21-25.

Kruse, C. A., & Kruse, G. D. (1995). The master schedule and learning: Improving the quality of education. *National Association of Secondary School Principals, 79*(571), 1-8.

Lare, D., Jablonski, A. M., & Salvaterra, M. (2002). Block scheduling: Is it cost-effective? *National Association of Secondary School Principals, 86*, 54-71.

Lawrence, W., & McPherson, D. (2000). A comparative study of block scheduling and traditional scheduling on academic achievement. *Journal of Instructional Psychology*, *27*,178-182.

Levesque (2005, March 1). Abilene independent school district ends high school ninety minute schedule. *Abilene Reporter News*. Retrieved September 18, 2005 from http://reporter-news.com/abil/cda/article

Lybbert, B. (1998).*Transforming learning with block scheduling: A guide for principals.* Thousand Oaks, CA: Corwin Press, Inc.

McCreary, J., & Hausman, C. (2001). *Differences in student outcomes between block, semester, and trimester schedules*. University of Utah, UT. (ERIC Documentation Reproduction Service No. 457590).

Metzker, B. (2003). *Time and learning*. University of Oregon, OR. (ERIC Documentation Reproduction Service No. ED474260).

Mowen, G. G., & Mowen, C. (2004). To block-schedule or not? *Education Digest*, *69*, 50-58.

National Commission on Excellence in Education (NCEE). (1983). *A nation at risk*: *The imperative for educational reform.* Washington, DC.

National Education Commission on Time and Learning [NECTL]. (1994). *Prisoners of time*. Washington, DC.

No Child Left Behind Act of 2001 (NCLB) Public Law No. 107-110, 115 Stat. 1425. (2002). Retrieved February 13, 2007, from http://www.ed.gov/policy/elsec/guid/states/index.heml#nclb

O'Neal, J. (1995). Finding time to learn. *Educational Leadership, 53*(3*)*, 11-15.

Parrino, F. M. (2003). Budgeting in hard times. *American School Board Journal, 190*(5*)*, 22-24.

Plano Independent School District (2004, September 24). Grades 9-12 to begin 2005-06 year with uniform 7-period day. *Plano Independent School District News*. Retrieved September 18, 2005, from http://www.pisd.edu/news/

Queen, J. A. (2000). Block scheduling revisited. *Phi Delta Kappa*, *82*, 214-222.

Queen, J. A. (2003). *The block scheduling handbook.* Thousand Oaks, CA: Corwin Press.

Robbins, P., Gregory, G., & Herndon, L. E. (2000). *Thinking inside the block schedule*. Thousand Oaks, CA. Corwin Press, Inc.

Short, L. T., & Thayer, Y. (1995). What can we expect to see in the next generation of block scheduling? *NASSP*, *79*, 53-62.

Stranger, R. H. (2004). A study of high school schedules and standardized testing performance. *Dissertation Abstracts International*, *65* (04), 1335, (UMI 3130280).

Strayhorn, C. K. (2003, May 23). Transmittal letter: Performance review of the Rockwall Independent School District. Message presented to Governor Rick Perry, archived at: http://www.window.state.tx.us/tspr/rockwall/

Tan, S., Callahan, J., Hatch, J., Jordan, T., Eastmond, N., & Burnham, B. (2002). *An evaluation of Millard high school block schedule*. Department of Instructional Technology, University of Utah. (ERIC Documentation Reproduction Service No. ED477714).

Texas Education Agency [TEA]. (1999). *Block scheduling in Texas public high school.* Policy Research Report #13. Austin, TX.

Texas Education Agency, Pearson Educational Measurement, Harcourt Educational Measurement, and BETA, Inc. (2003). *Technical digest for the academic year 2003-2004*. Retrieved January 4, 2007, from http://www.tea.state.tx.us/student.assessment/resources/techdig04/

Texas Education Agency. (n.d.). *Overview of the Academic Excellence Indicator System*. Retrieved September 28, 2006, from http://www.tea.state.tx.us/prefreport/aeis/

Texas Education Agency. (2006). *Texas public schools district and school directory*. Retrieved March 3, 2006, from http://askted.tea.state.tx.us/org-bin/menus/public_schools.pl

Texas Education Agency. (2006). *2006 comprehensive annual report on Texas public schools: A report to the 80th Legislature from the Texas Education Agency*. Retrieved February 20, 2006, from http://www.tea.state.tx.us

Texas Education Code, Acts 2006, 79th Legislature, third congressional session. § 45.003, School district funds, subchapter A, tax bonds and maintenance taxes (2006).

Thomas, C. (2001). What is wrong with block scheduling? *National Association of Secondary School Principals, 85(*628*)*, 74-77.

Trower, T. (2000, April 26). Board agrees to change Austin class schedules. *Austin American Statesman*. Retrieved September 13, 2005, from http://www.austin360.com

Trump, J. L. (1960). *Images of the future and guide to better school*. Chicago, Illinois. Rand McNally.

Viadero, D. (2001). Changing times. *Education Week, 21*(5*)*, 38-41.

Webb, J. C. (2000). A comparison analysis of alternating block schedules, accelerated block schedules, and traditional seven period schedules on school performance factors. *Dissertation Abstracts International*, *61* (08) 3019, (UMI No. 9982147).

Wilson, J. E., & Associates, LLC. (2004, March 1). *New Braunfels Independent School District cost reduction analysis*. Report presented at the New Braunfels Independent School District March 1, 2004 School Board Meeting.

York, D. S. (2004). The relationship between block scheduling and student performance: A study of traditional, block-four, block-three-by-five, and block-eight school schedules in Indiana. *Dissertation Abstracts international*, 65 (08) 2889, (UMI No. 3141521).

Zepeda, S. J., & Mayers, S. M. (2006). An analysis of research on block scheduling. *Review of Educational Research*. *76*(1), 137-170.

Zhang, G. (2001). *Academic performance differences between students in block and traditionally scheduled high schools*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.