IMPACT OF MIDDLE SCHOOL SCHEDULING STRUCTURE ON STUDENT ACHIEVEMENT IN MATH AND SCIENCE, AS DEFINED BY AEIS INDICATORS, ON SELECTED DEMOGRAPHIC STUDENT GROUPS IN URBAN TEXAS MIDDLE SCHOOLS

A Dissertation

by

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ABSTRACT

Middle school students in the United States are not performing as well as their international peers on standardized math and science exams, and in Texas middle school students' performance in math and science is not on par with other subjects. Additionally, the achievement gap between White and both African American and Hispanic students is greatest in math and science. The purpose of this study was to further extend the research on how the type of schedule used by a campus can improve learning outcomes for students in math and science. This quantitative analysis used MANOVA to examine how schedule structure influences math and science performance while factoring in teacher experience and minority student population, and a logistic regression explored the predictive value of schedule types on ratings under the Texas accountability system. Schools in the study came from Texas school districts with more than 50,000 total students.

The first research question examined the influence of schedule type on math and science achievement school-wide when accounting for the factors of minority student population and teacher experience. There was a statistically significant interaction at the $p < .05$ level for schedule type and teacher experience in both math and science, but the only of the three variables that was significant in isolation was the campus percentage of students of color. The second research question probed the effect of schedule structure on math and science performance by ethnicity and found no significant interactions. The third and final question explored schedule structure and whether or not schedule can serve as a predictor of a school's accountability rating. Using a logistic regression, the results showed predictive value in the equation. However, an examination of the correlation matrix showed total campus minority student population to be the primary predictor of accountability rating rather than schedule type.

Recommendations from the study include using schedule type as only one factor of many for school improvement efforts, and that only schools with experienced, high-quality teaching staffs should consider employing a Block schedule over a more efficient Traditional schedule.

DEDICATION

This work is dedicated to my family. To Emerson, thank you for the unbridled joy you bring to my world. This project has taken most of your lifetime, but you have never stopped telling me that it would be cool for me to finish, and that you would call me “Dr. Dad”. To Dean, thank you for being the young man you have become. No one makes me want to be a better man every day more than you do. You inspire me, and I am so proud of you. Finally, to Cayce: you always stand by me, and your faith in me has never wavered. Everything good I have is because of you, and no amount of thanks will ever be enough. It is amazing how, at the end of writing so many words, there are none at my disposal to describe what you mean to me.

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CHAPTER I

INTRODUCTION

When compared to other industrialized nations, United States public schools appear to be lagging behind the competition in mathematics and science achievement, as measured by standardized achievement exams. Two major international studies measuring global rankings in mathematics and science support this assertion: the Trends in International Mathematics and Science Study (TIMSS), and the Program for International Student Achievement (PISA), which is run by the Paris-based Organization for Economic Cooperation and Development (OECD). In both of these assessments, United States schools trail far behind the leaders, particularly the developed Asian countries. In the 2007 TIMSS, the United States 8th grade students ranked 9th and 12th in math and science, respectively. The United States' national means for both tests were not significantly above the mean of the entire population, which includes 48 countries at various stages of development (National Center for Education Statistics, 2007). For the 2009 iteration of the PISA, U.S. schools ranked 17th of 34 countries in science and 25th of 34 in mathematics. In addition to the low rankings, over half of the countries in math had a mean that was not only higher than the United States average, but also higher at a rate that was statistically significant. That same standard, when applied for science, is 12 nations (Hechinger, 2010).

One area in which the need for improvement and innovation has been well-documented is in education for young adolescents (Rolland, 2012; Duchesne, Rattelle, &

Roy, 2012). Since the beginning of the Middle School movement in the 1960s, the concept of specific structures and pedagogy for students in the middle grades has spread rapidly, and today an overwhelming majority of schools for adolescents have adopted some form of the concept of the middle school (Rettig & Canady, 2000). Using Wiggins and McTighe's (2001) concept of *Backward Design*, Ruth Curran Neild's work on 9th grade completion, in which successful graduation from high school is largely dependent upon on-time completion of ninth grade, found a correlation among middle school standardized test scores and ninth grade success (Neild, 2009).

As a key element of the overall structure of the organization, Canady and Rettig state, "Within the school schedule resides power: the power to address problems, the power to facilitate the successful implementation of programs, and the power to institutionalize effective instructional practices" (p. xvii). *Turning Points 2000* first called for flexible blocks of time (Jackson & Davis, 2000), and the Carnegie Institute's recommendations on scheduling in the middle school, calling for a Block schedule over a traditional six or seven-period day, has placed educators squarely into philosophical camps (Galvan Garza, 2001). Within today's accountability-driven public schools, it is necessary to research the academic benefits of examining the structural frame of schools; namely, various types of schedules, with an emphasis on serving those students most at-risk. Therefore, this study will examine the impact of the type of bell schedule being used in urban middle schools on math and science achievement.

Problem Statement

International exams are not the only examples of adolescent students struggling in math and science. When looking at data from state-wide standardized examinations, which are based not on international standards but on locally-developed curriculum, middle school results among students in Texas mirror the concerns existing at a national level through the TIMSS and PISA data. By both Federal and State standards, as evidenced in data collected and reported annually by the Texas Education Agency, middle school students throughout Texas are not performing as well in math and science as they are in other subject areas, and as a result schools have been struggling to meet the accountability demands placed on them by the No Child Left Behind Act of 2001 (United States Department of Education, 2010). A 1998 report from the Southern Regional Education Board (SREB) refers to middle schools as, "The weak link in American education", stating that as many as half of all 8th graders achieve below basic levels in mathematics (Rettig & Canady, 2000). Not only do U.S. students exhibit some struggles in math and science when compared to their international peers (Duncan, 2010), but Texas students in the middle grades are struggling in math and science when compared to other tested subjects. Using state-wide data from 2010, Texas students taking the Texas Assessment of Knowledge and Skills (TAKS) in mathematics and science across all grades passed the test at a considerably lower rate than they did in Reading, Writing, and Social Studies (Table 1). The results by grade level (Table 2) reflect similar results, particularly in 8th grade, which was the population used for the previously mentioned TIMSS and PISA examinations.

Table 1:

Percentage of Texas students passing 2010 TAKS by subject

Subject Tested	Percent of Students Passing (Grades 3-11)
Math	84%
Reading/Language Arts	90%
Science	83%
Social Studies	95%
Writing	93%

Table 2: Percentage of Texas students passing TAKS by subject and grade level, 2010

	Math	Reading	Science	Social Studies	Writing
6^{th} Grade	83%	86%	N/A	N/A	N/A
7^{th} Grade	82%	86%	N/A	N/A	95%
8^{th} Grade	81%	91%	78%	95%	N/A

Within the campus-wide and grade-level data, and across all subjects and grade levels, an achievement gap exists between White students and both Hispanic and African American students in all subjects, with the most pronounced gaps existing in mathematics and science (Table 3). Similar gaps also exist for students identified as being from low socio-economic status when compared to the total population. An examination of the TEA State Accountability Data for 2009-2010 reveals achievement gaps across all subject areas, with White students outperforming Hispanic, African American, and Economically Disadvantaged students in every subject. As Table 3 reflects, the achievement gaps (by percentage difference) appear to be far more pronounced in math and science than in any other subject (Texas Education Agency, 2010) .

Table 3:

Achievement gaps between White students and select demographic groups on 2010 state-wide TAKS testing (grades 3-11)

	White % Passing	Gap – African American	Gap - Hispanic	Gap – Econ. Disadvantaged
Social Studies	98%	5%	4%	5%
Writing	96%	5%	4%	5%
Reading	96%	9%	9%	10%
Math	**91%**	**17%**	**10%**	**12%**
Science	**92%**	**17%**	**14%**	**16%**

Because of the challenges related to achievement gaps in math and science, schools with larger percentages of Hispanic and African American students and a large population of students identified as being of low socio-economic status have more difficulty meeting both Federal and State accountability ratings, and the resulting sanctions and collateral effects against those schools often exacerbate the problems. Schools with the demographic characteristics of high minority and at-risk populations often exist in urban settings (Lippman, Burns, & McArthur, 1996). One of the challenges facing schools in this situation is teacher quality. King Rice (2010) explored the value-added impact of teacher experience in high-poverty schools, which have a larger percentage of inexperienced teachers. She found that, while there is less overall value-added from teachers in high poverty schools, there is greater within-school variability, particularly at the bottom of the curve. This speaks to the individual differences in teacher quality.

Intent of the Study and Research Questions

Recognizing the organizational implications of student demographics and the level of teacher experience, the intent of this study is to explore the extent to which different types of schedule structures are leading to improved academic outcomes for middle school students in mathematics and science. The secondary purpose is to examine the effect of schedule type on campus ratings under the State of Texas accountability ratings system. The study examines the following research questions:

I. What is the impact of the structure of the bell schedule on campus-wide achievement in mathematics and science among middle schools in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

II. What impact does the structure of the bell schedule have on math and science achievement by ethnicity among students in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

III. To what degree is the type of bell schedule being used in middle schools in Texas's largest school districts a predictor of State accountability ratings?

Assumptions and Limitations

The researcher assumes validity and reliability of data collected and reported by the Texas Education Agency, including the reliability and validity of state mandated standardized tests. An assumption also exists that scheduling information provided by school districts to the researcher accurately reflects the type of schedule employed by each campus.

The study addresses two broad middle school scheduling concepts: Block and Traditional schedules. Among these groups exists numerous variations, whether a six or seven-period traditional day or variations on the block, including modified and accelerated blocks. The study does not allow for comparison of the effectiveness of different schedule variations within each of the two broad groups. Two other factors addressed in the study also carry with them limitations. While teacher experience (measured in years of teaching) is explored as a factor, it is examined only as an average at the campus and state level and does not include individual differences in experience levels. Similarly, student ethnicity is only addressed at the campus level, rather than at the individual student level.

Use of a single, standardized test provides only a snapshot of data for each of the 200 qualifying campus. This same problem exists within the accountability systems used both in Texas and at the Federal level, with results being based on one test given on one day, rather than classroom observations or multiple measures of student learning.

The researcher acknowledges that the use of campus-wide data, even within demographic groups, provides more broad a perspective than the use of individual student data. The individual differences within each campus, from culture and climate, to discipline management strategies, to how teachers are recruited, retained, and evaluated, are also not taken into account.

Operational Definitions

Academic Excellence Indicator System (AEIS): The AEIS serves as the compilation of academic, demographic, and financial information for campuses, districts, Educational Service Center regions, or the state. It is from the information compiled in these reports that state and federal ratings are given.

Accountability Rating: In Texas during the 2009-2010 school year, each school and/or school district is given one of four ratings based on results from the AEIS, these are, in order from best to worst: Exemplary, Recognized, Academically Acceptable, and Academically Unacceptable. Schools with an Academically Unacceptable rating are subject to sanctions ranging from monitoring and reporting requirements to school closure, based on a variety of factors.

Adequate Yearly Progress (AYP): This is the federal accountability system from the *No Child Left Behind* legislation. Schools in this study are subject to both state and AYP accountability ratings.

Texas Assessment of Knowledge and Skills (TAKS): A series criterion referenced tests, the TAKS provides the basis for the academic portion of both the state and federal accountability system. Students in grades 3-11 must take the tests, with the subjects tested dependent on grade level.

Percent Passing: The AEIS reports student achievement in terms of percent passing, which is the percentage of students meeting or exceeding the minimum standard for the TAKS in a given subject and grade level. The minimum percent passing for the different accountability ratings varies by subject and grade level.

Minority Student Population: This is the percentage of non-White students per campus, district, or state, as defined by the TEA and AEIS data.

Low Socio-Economic Status: This is a qualifying demographic group for the state accountability rating. In Texas, low-SES is defined by students who receive free or reduced-price school meals.

Teacher Experience: In Texas, teacher experience refers to the total number of creditable years of service in education. Teacher experience is reported in the AEIS as a numerical average by campus, district, or state, depending on the report.

Selected Middle Schools: These are the qualifying schools for this study, and they represent schools with a grade 6-8 configuration from the 17 Texas school districts with an enrollment of at least 50,000 students.

Middle School Concept: This is the broad collection of recommendations from *Turning Points: Preparing American Youth for the 21st Century* (1989). The seven broad categories from this study represent the basis of organization of the modern middle school and have served as the catalyst for continuing research on middle grades education. The Carnegie Council on Academic Development revised the recommendations in *Turning Points 2000: Educating Adolescents in the 21st Century* (Jackson & Davis, 2000).

Block Schedule: This refers to the scheduling model in which students attend fewer classes per day for an extended period of time. There exist multiple derivations of Block scheduling, but for purposes of the study they have all been combined into a single category.

Traditional Schedule: Also referred to as “Single-period schedules” (Canady R. L., 1996), a Traditional schedule refers to a structure in which a student attends between six and eight classes every day. In a Traditional schedule, the student receives instruction in the entire breadth of the curriculum each day.

Significance Statement

The improvement of student achievement in math and science across all students groups, with a particular eye on Hispanic, African-American, and low socio-economic populations, can be analyzed and studied through a variety of different lenses. What this study will attempt to do is provide the, “predictive implications” of configuring an organization (Miller, Friesen, & Mintzberg, 1984); in this case, a public middle school in a large, Texas school district. Examining a school’s master schedule within the context of other organizational factors, including teacher experience and student ethnicity, will have a direct impact on student outcomes in middle school, and, therefore, high school graduation rates, as the success in eighth grade directly impacts ninth grade success and the chance of a student graduating on time from high school (Neild, 2009).

Speaking to the relevance and new knowledge created through this particular study, there has been research done comparing middle school campus performance based on type of schedule (Galvan Garza, 2001). However, there is no study to account for any variance among the make-ups of the schools. In 1999, the Texas Education Agency published a policy research report about Block scheduling in high schools. Their research findings indicated that school schedules, "Do not systematically explain or account for variation in overall high school student performance. When school context is taken to account, other factors…appear to matter more than the particular length of the class periods" (Texas Education Agency Office of Policy Planning and Research, Division of Research and Evaluation, 1999). Expanding on the assumptions in the TEA report, this study will contextualize types of schools to see the impact a schedule type may have given the demographic makeup of the school and the experience of the teaching staff. Regarding the use of the Texas Assessment of Knowledge and Skills (TAKS), studies (Hartt, 1997) have examined high school schedules in Texas and the impact on standardized test scores, but no such study exists regarding middle schools. This study can serve to change practice by allowing schools to make structural decisions based on data that most specifically matches a school's demographic make-up and the relative experience of the faculty.

Organization of Dissertation

This dissertation is divided into five chapters. Chapter I consists of an overview of the study, including an introduction, statement of the problems, statement of the purpose and the research questions to be addressed, assumptions and limitations of the study, a significance statement, and operational definitions. Chapter II consists of a comprehensive review of the literature relevant to the study, including characteristics of the middle school, student achievement factors, middle school scheduling, and school accountability. Chapter III describes data sources and procedures for data collection and analysis, and Chapter IV is a presents the quantitative analysis of the data. Chapter V contains a summary of the results, as well as recommendations based on the study, recommendations for further research, and considerations for educational practitioners based on the results.

CHAPTER II

REVIEW OF THE LITERATURE

Overview

As “The maintenance of its structure and boundaries” (Kaufman, 1991, p. 18) remains an integral part of the development of any organization, and because, as Bolman and Deal state, an organization must create a, “Structural design that fits its circumstances” (Bolman & Deal, 1997, p. 49), the review of the literature focused on the organizational frameworks present in the schools being studied and why those structures exist.

The unique characteristics of the middle school were reviewed, as was the history of the middle school movement and current research on best practices for middle school success. Understanding that each school is unique, and that variables occur that may influence student achievement, the impact of the intervening factors of teacher experience, ethnic and socioeconomic make-up of a student body were reviewed. The types of schedule being considered were also addressed, including the conflicting research that currently exists regarding the overall effectiveness of one type of schedule over the other, potential cost and benefits by schedule type, and how a schedule might impact practice and pedagogy. Finally, the review of literature examined the current state of school accountability, as well as the history, current implications on campuses and school systems, and the future of school accountability from the local to federal levels. Literature reviewed included peer reviewed articles from professional journals, dissertations, books, data from State and Federal agencies, interviews, speeches, and other sources.

Bolman and Deal’s position on when it is necessary to reframe an organization certainly applies to middle schools based on the Southern Regional Education Board report, when they state that, within an organization, “Problems arise when the structure does not fit the situation. At that point, some form of reorganization is needed to remedy the mismatch.” (Bolman & Deal, 1997). Schools are large, open systems, requiring a, “Congruence mold of organizational behavior” (Nadler, Gerstein, & Shaw, 1992). The structure of the organization requires all of the pieces fitting together to maximize effectiveness, including the work, the people, and both the formal and informal structures of the organization. Lawrence and Lorsch, in their book Organization and Environment, state the need for organizations to structure themselves based on the level of environmental uncertainly and structural differentiation, and they also recognize that smaller departments within a larger organization may have to operate differently based on a variety of factors. Schools, then, must use this form of relational configuration, which means one type of configuration might not necessarily be best for all schools (Miller, Friesen, & Mintzberg, 1984).

The beauty of the public school as an organization is that it is self-sustaining: there will always be a steady supply of students needing to be educated. An organization needs both fuel and supplies to continue to exist, and without both, there can be no organization (Kaufman, 1991). Hammer and Champy (2001) refer to the “Three C’s” of an organization’s need for restructuring as customers, competition, and change. In schools, these three “C’s” interconnect with one another: the customers (students, parents, and community) have ever-changing expectations and value systems, and accountability systems and the availability of such information has increased the competition in schools, specifically from the rise of the charter school movement and legislative promotion of school voucher programs. Indeed, “Change has become pervasive and persistent; it is the norm.” (Hammer & Champy, p. 31). This statement rings true in public schools, and for this reason, organizational structures, i.e., the master schedule, must be evaluated for effectiveness.

One of the challenges in an organization, especially one as steeped in traditional models as a school, is to fall into a “Competency trap”, refusing to change even when a changing market (such as new curriculum standards or testing requirements) dictates such a necessity (Nadler, Gerstein, & Shaw, 1992). In Reengineering the Corporation, it is stated that classical structures of organizations often, “Stifle innovation and creativity”, and such structures can be counter-acted through a process orientation, breaking rules, and creatively using current technologies. If an organization fails to be successful, it is likely due to three root causes: differences of opinion, decisions that do not ensure outcomes, or the imperfect execution of decisions (Kaufman, 1991).

Changing an organization’s structure is complex in that it also requires changing the people involved in the organization. As Katzenbach and Smith would point out in The Wisdom of Teams, it is a performance challenge, such as working toward improving outcomes for students and a community, which builds a team. Changing the organizational structure includes changing how people view themselves as members of the organization, and the "disciplined action" of a working group gives rise to a team (p. 14). In fact, The Wisdom of Teams cites specific examples of schools achieving remarkable results by changing the structural frame, but also creating common performance goals within the new structure (p. 138). Combining performance goals and common purpose with the ability of an organization to be flexible maximizes the chances for successful outcomes within the organization. For schools, that means more students learning at higher levels, which is a stated platform for successful schools and a legislative agenda from the Oval Office. President Obama's 2011 State of the Union Address cited the need for "Investment" in education to fix a system that is not working. To that end, when discussing the "Race to the Top" grants available for all fifty states, President Obama stated, "If you show us the most innovative plans to improve teacher quality and student achievement, we'll show you the money" (Obama, 2011). This review of relevant literature provides the framework for flexibility in the organization through innovative use of scheduling to improve student outcomes.

History of Adolescent Education

In order to understand the unique challenges facing today's middle schools, it is important to understand the pioneers that led to current practices in adolescent education. Horace Mann, a pioneer for public education during the 19^{th} Century, articulated the need for a public school system as a social responsibility and societal necessity by stating, "If one class possesses all the wealth and the education, while the residue of society is ignorant and poor…the latter, in fact and in truth, will be the servile dependents and subjects of the former" (Baines, 2006). Indeed, support for public schools in America far precedes even Horace Mann. From the Colonial Period, legislation has existed to provide for public education in various forms. Beginning in 1642, Massachusetts implemented legislation to articulate what type of education should be provided by public expense, though this was limited to opportunities for college preparation. Federal involvement in education has roots as early as the "Ordinance of 1787", in which Congress encouraged public education and established the setting aside of territorial lands for the establishment of common schools. More than 80 years later, the Morrill Act, passed by Congress in 1862, provided grants throughout the country for the development of higher education institutions with an emphasis on technical and agricultural education. As the number and scope of colleges and universities in the United States exploded in the 1800s, there was an impact on the elementary and secondary schools. Elementary schools saw the need for something beyond basic literacy as career opportunities became more diverse, and the workforce demands called for a more diverse secondary education than simply college preparation, which led to, "A distinctively American institution, the free public high school" (Bunker, 1916, p. 11).

As the young nation experienced rapid growth and change, so changed the needs and demands placed on the public education movement, along with the accompanying challenges. In addressing the resistance of organizations to change, Bolman and Deal (1997) cite the desire of the organization to maintain a status quo, but also state that, "If the environment changes while the organization remains static, the structure gets more and more out of touch with the environment" (p. 93). The changing work force and educational demands meant efforts to reform the structure of schools. The rise of a middle level of education took hold in the 1890s with Charles W. Eliot, the President of Harvard University, suggesting an enrichment of the upper elementary school experience. He led a consortium called the Committee of Ten, which recommended shortening and revising the elementary curriculum. Concurrently, a separate Committee of Fifteen, made up of urban school leaders, was recommending starting some high school courses prior to the traditional upper grades (what would today be the equivalent of 9th grade). In 1899, after four years of study and immediately following the reports of the aforementioned committees, a Committee on College Entrance Requirements, formed by the National Education Association, recommended a six year high school program, meaning a 6-6 split of elementary and high school, rather than the traditional 8-4 model (Brimm, 1963). Additionally, the Commission on the Reorganization of Secondary Education from the Department of the Interior (1918) recommended a 6-6 model for schools and noted that the secondary piece could be divided into junior and senior high schools.

From the recommendations of the previous two decades of research came the rise of the junior high school movement during the second decade of the 20th Century. Thomas J. Briggs, who at the time was a professor of education at Columbia University, outlined the need for reorganizing to schools designed for adolescents in his book, *The Junior High School* (1920). Briggs outlines 11 criticisms of the traditional 8-4 structure of schools as it relates to the adolescent learner (students in grades 7-9). In some of the recommendations can be seen early tenets of the modern middle school movement. The criticisms included a lack of justification for the 8-4 school configuration that was, at that time, the norm. Briggs addressed the need to research new structures, citing the need to examine the potential benefits of segregating early adolescents. Cost was another criticism, as Briggs saw that students in 9^{th} grade do not require the expensive resources and classrooms that were present in a high school (Briggs points out that in 1917 a high school cost $520 per pupil to build, while an elementary cost $320 per pupil). Seeing the need for a true transition, Briggs stated that, "Elementary schools, in form and curriculum, do not adequately prepare students for life activities", and that the elementary did not provide adequate preparation for students to enter high school. From a progress monitoring perspective, Briggs saw a gap in the grammar schools' lacking a way to track progress (in this section Briggs calls for a form of standardized testing). Again stressing the differentiated needs of the young adolescent, Briggs called upon the need to create an opportunity for students in grades 7-9 to have the opportunity to learn from teachers of both sexes in a setting that was less juvenile than the elementary. The transition from grammar school to high school is too sharp, as noted by the 70% dropout rate for students in grades 7-9. Briggs also stated that the 8-4 structure does not provide for individual differences, including students' career pathway interests. Briggs' final criticism was perhaps the most poignant in the development of the middle school movement, as he claimed that neither the elementary school nor the high school provides adequate social-emotional learning for adolescents (Briggs, 1920).

Over the next 40 years, the junior high school became increasingly common. From 1920 – 1960, there was an exponential increase seen in both the number of junior high schools (Table 4) and the number of students enrolled in separate junior high schools (Table 5). This is representative of the movement from the 8-4 to the 6-6 configuration, with more movement to the 6-3-3 (Brimm, 1963).

Table 4:

Percent of public secondary schools by type, 1920 – 1959

	1919-1920	1951-1952	1958-1959
Combined Junior-Senior High Schools (6-6)	5.8%	36.2%	41.9%
Separate Junior-Senior High Schools	.4%	13.6%	20.6%
Senior High Schools (6-3-3)	.1%	4.3%	6.8%
Reorganized 4-Year High School (6-2-4)	.01%	3.1%	5.8%
Un-reorganized 4-Year Traditional (8-4)	93.7%	42.8%	24.9%
Total Number of Schools	**14,326**	**23,746**	**24,187**

Table 5:

Enrollments by Organizational Structure, 1920 - 1959

	1919-1920	1951-1952	1958-1959
Combined Junior-Senior High Schools (6-6)	13.8%	35.1%	32.0%
Separate Junior-Senior High Schools	1.9%	19.8%	24.9%
Senior High Schools (6-3-3)	.6%	11.3%	14.7%
Reorganized 4-Year High School (6-2-4)	.3%	8.6%	10.8%
Un-reorganized 4-Year Traditional (8-4)	83.4%	25.2%	17.6%
Total Number of Students	**1,999,106**	**7,688,919**	**11,044,119**

Once the framework of middle level education had taken root, the task at hand turned to specificity in pedagogy for effective teaching at the middle level. Former Harvard President James B. Conant became a champion of the need for specificity for adolescent learners. In prefacing his recommendations, Conant speaks first to the importance of having moved away from the 8-4 structure, then states, "I conclude that the place of grades 7, 8, and 9 in the organization of a school is of less importance than the program provided for adolescent youth" (Conant, 1960, p. 12). Conant provided 14 recommendations to local policy-makers. Upon examining Conant's recommendations, similarities can be seen between his and those of Briggs from 40 years earlier. Conant's recommendations include creating a more comprehensive curriculum, which is grounded in the understanding that all students must be reading on grade-level and includes physical education, art, music, home economics for girls, and industrial arts for boys, as well as Algebra and foreign language instruction for accelerated students. Conant emphasized the importance of extra-class activities, including student government, intramural sports, and other activities of the students' choosing based on interests. Conant spoke a great deal about the structural frame within the middle school, stressing block-time and departmentalization, with teachers being experts in a particular subject and students spending extra time with one particular teacher. Conant also saw the need for flexibility of scheduling (a 7-period day) to avoid conflicts between core subjects and elective classes, the importance of individualizing scheduling by challenging all pupils through ability grouped classrooms (3 levels), and using guidance counselors and student assessments for appropriate placement. Conant espoused meaningful homework

(1-2 hours per evening), an end to social promotion, increased elective options for 9th grade students, and a vertically aligned curriculum. Like Briggs before him, Conant addressed the need for facilities to meet the needs of the junior high students and a plan for adequate staff – 50 staff members per 1,000 students. The final recommendation from Conant was that there must be strong leadership from principals and adequate assistant principals who understand the adolescent (Conant, 1960). Several of Conant's recommendations speak directly to the structural framework of the school, including scheduling, staffing, coordination of curriculum, and levels of administrative support.

The pioneers previously mentioned gave rise to a growing movement of recommendations for the academic and socio-emotional development of the adolescent. In 1969, the Association for Supervision and Curriculum Development (ASCD) took the lead with the development of the Council on the Emerging Adolescent Learner. Having been tasked with developing recommendations for programs and pedagogy specifically designed for adolescent learners, the Council led to the ASCD's publishing of The Middle School We Need in 1975. This position paper included recommendations including team teaching, flexible uses of time in scheduling, differentiation and individualization, and an overarching need to design the school around the needs of the learner (Thompson S. C., 2004).

Continuing the development toward the modern middle school concept, the National Middle School Association (NMSA) published This We Believe in 1982 (with several revisions published since, most recently in 2010). This seminal work outlined characteristics for a developmentally responsive middle school, which included, first and foremost, selecting educators with a specific commitment to young adolescents and a shared vision of high expectations for all. Regarding curriculum and instruction, the recommendations were to create a positive school climate in which students felt both challenged by a rigorous curriculum and safe through use of differentiated classroom techniques designed for student success. The NMSA also recommended that every student have a designated adult advocate to help them navigate through the challenges of middle school, with wellness, health, and safety programs a part of those interactions. The challenges of middle school could also be better met through community partnerships, building an understanding that everyone must have a stake in adolescent development. Finally, the NMSA recommended an organization that was static only in its flexibility, matching the socio-emotional needs of its students (National Middle School Association, 2010).

The National Middle School Association is now known as the Association for Middle Level Education (AMLE), and the organization in 2010 added four more characteristics for successful middle level education, including leaders committed to the age group, an adult advocate for every student, an emphasis on family involvement, and an emphasis on community and business partnerships (Association for Middle Level Education, 2013).

Turning Points & Turning Points 2000

The publishing of A Nation at Risk (1983) brought rise to the current reform era in American public schools. The most comprehensive Middle School reform response to

A Nation at Risk came with the NMSA's publishing of Turning Points: Preparing American Youth for the 21st Century, which called for reform specifically designed for middle-level schools. The more recent Turning Points 2000, funded by the Carnegie Institute and drawing from the NMSA's recommendations, posits the need for positive adult relationships for middle school students, a full, rich curriculum, academic interdisciplinary teams, and flexible block scheduling (Jackson & Davis, 2000). The "Middle School Concept" movement as defined in the Turning Points and subsequent literature identifies the unique needs of the adolescent learner and what schools can do, both structurally and in practice, to best support student success.

The original recommendations from the first Turning Points report included dividing large schools into smaller communities (often referred to as teams) to increase the amount of individual attention available for students, a common set of standards for middle schools to promote metacognition, critical thinking, and problem solving strategies, use of cooperative learning to assist in the social development of adolescents, specific teacher preparation programs and professional development for working with middle school-aged students, a linking of education and the promotion of a comprehensive health program, with emphasis on the life sciences, for all middle school students, emphasizing the importance of building partnerships between school and family, and community partnerships with an emphasis on service learning.

Immediately following the publishing of the original Turning Points, the Carnegie Corporation participated in and funded an eight-year implementation study, which resulted in the recommendations found in Turning Points 2000 (Jackson & Davis, 2000). The research team at the Carnegie Institute first sought to establish the core values of a middle grades education. To do this, they used a backward design approach by creating the profile of a well-developed 15 year-old, which included good health, ethics, citizenship, reflective intellectualism, and a path to productive and meaningful work (Jackson & Davis, 2000, p. 22) While the primary function remains academic and intellectual growth, as well as the soft skills necessary in today's marketplace, there was a broader goal of, "Helping all students learn to use their minds well", which meant such things as healthy living habits, compassion and tolerance, and citizenship (Jackson & Davis, 2000, p. 11). One of the purposes of the establishment of priorities was to fight the false assertion that the efficacy of middle school teachers is low, with an emphasis only on helping middle grades students traverse the emotionally rough waters of adolescence. Also included in the core values is the notion of equity and the belief that any school with an achievement gap (one student group, based on ethnic or other demographic information, outperforming another group within the campus) is not a successful school.

Having established a vision, the Turning Points 2000 consortium then created seven principles for improving middle grades schools. These recommendations reflect the core values of the learner profile and include curriculum, instructional design, staffing, organization, governance, health and safety, and family and community involvement. The seven recommendations, explained in detail in the following section, weave themselves into an integrated system, creating a web around the goal of student success and the profile of a well-developed 15 year-old. This model was chosen to emphasize the equal importance of all seven recommendations and the notion that all must be done in order to move a school forward.

Curriculum and Assessment

Effective middle schools must understand both the essential elements of what must be taught and how those elements must be processed. The curriculum can and should be a mixture of integrated standards across content areas and standards specific to a discipline, such as math or history. By asking essential questions about what students should know and be able to do, teachers can use Wiggins and McTighe's theory of Backward Design to effectively plan for all students. Standards must be relevant to the students and developmentally appropriate, as well as easy to understand and assess. Understanding that there are also State and federally mandated standards, middle schools face the challenge of bundling the students' knowledge. Using many of Marzano's strategies, specifically summarizing and identifying similarities and differences, can assist in this process (Marzano, Pickering, & Pollock, 2001). Assessments should be authentic measures of what students are expected to know, beyond the paper and pencil exam, and the assessments should drive the instructional design.

Instructional Design

The planning of instruction entails identifying what students should know and be able to do, understanding how the standards will be assessed, and designing instruction in a way that will prepare students to do well on the assessment instrument, while also emphasizing overarching student goals of ethical development, metacognitive skills, and development of skills necessary to become a productive adult citizen (Wiggins &

McTighe, 2001). Instruction must mesh with the curriculum and assessments as previously described, as well as the individual student's needs and interests. In the book How People Learn, there is an emphasis placed on both how much a teacher knows about the subject matter and how much a teacher knows about both the students being served and instructional best practices (Bransford, Brown, & Cocking, 1999).

A significant portion of the Turning Points 2000 recommendations focused on the grouping of students, recommending the heterogeneous grouping of students in classrooms. While the factory model had long been used, the Committee points out that, "Schools are not factories", citing real world examples of tracking leading to over-representation of minority and poor students in lower level classes. Additionally, Turning Points 2000 posits that tracking, "Reinforces inaccurate, and ultimately damaging, assumptions about intelligence" (p. 66). This position has most recently been reinforced by Carol Dweck's work, comparing a limited, fixed mindset, with someone who believes they can always grow and develop from their current standing (Dweck, 2008).

Once heterogeneously grouped, middle school classrooms must be designed to meet the unique needs of the adolescent learner. This means use of a constructivist approach, in which teachers anchor the learning in real-life situations and the learner makes connections and constructs the learning, rather than the teacher (Campbell, Faulkner, & Pridham, 2011). This is often referred to as "applied learning", and the term implies activity related to the content. Student efficacy rises in an applied learning classroom due to the increased relevance and the more hands on approach to learning (p.

22), and the rise in student efficacy leads to increased academic resilience, creating students more able to sustain motivation and performance in school despite any factors which might otherwise have impeded their performance (Martin & Marsh, 2006).

Finally, differentiated instruction must be used within the heterogeneous classroom to promote the individualized learning needs of the students. Differentiation is planning and delivery of content based on the readiness level of the individual learner, how the student learns best, and the interests of the learner. The three dimensions of differentiation are content, process, and product, which emphasize what the learner is expected to know or do, what activities will be used, and what evidence of learning will be produced by the student (Tomlinson, 1999). In a 1995 case study, Tomlinson acknowledges the difficulties of differentiating when time is not flexible, and that administrative and accountability demands sometimes impede the process of creating a differentiated learning environment (Tomlinson, 1995). However, there is evidence to support that a differentiated middle school classroom produces significantly better results on standardized tests, due in part to students' increased approval for their classroom activities (Mastropieri, et al., 2006). While factors such as language acquisition may force some ability grouping, schools should continue to work toward heterogeneity as much as possible (Alpert & Bechar, 2008).

Staffing

Just as there are specific recommendations for middle level classrooms, so, too, exist recommendations for the pre-service training, induction, mentoring, and professional development requirements of the middle school teacher. The National

Middle School Association, the National Council for the Accreditation of Teacher Education, and the National Association of State Directors of Teacher Education and Certification all recommended specific standards and certifications for middle school educators. Turning Points 2000 also recommended the certification of middle school teachers in more than one subject. In Texas, the state in which this study takes place, middle school teachers have the opportunity to earn certification as a “Generalist” for grades 4-8, allowing the teacher to teach in any of the four content areas of language arts, math, science, and social studies. Certification requirements include passing an examination focusing on both content knowledge and an understanding of the unique needs of the middle level learner (State Board for Educator Certification).

Mentoring is also an integral part of the Turning Points 2000 recommendations, including making sure new teachers pair themselves with experienced mentors, that the two have designated time within the work day to pair together, and that this is done under an umbrella of district support (pp. 106-107). First-year teachers make up nearly 20% of the public education work force, and a recent meta-analysis found that successful mentoring of these new teachers improved employee retention, increased student achievement, and led to a higher level of teacher performance (Desimore, Hochberg, Porter, Polikoff, Schwartz, & Johnson, 2014).

Finally, school-wide professional development should be results-driven and specific to reaching the middle level learner. The goal of professional development is not to improve teacher practice, but to improve student performance. Jackson and Davis recommend a full-time professional development facilitator for a middle school campus, whose job functions include coaching teachers, organizing site-based professional development, arranging peer observations, modeling practice in classrooms, and leading action research.

Organizing Relationships

Understanding the importance of the affective domain in the development of the adolescent learner, Turning Points 2000 recommends the use of an advisory program, teacher teaming, and common planning times to create structures for teachers to build relationships with students. Common components of all three of these initiatives include the idea that they must be defined and specific in order to be effective; otherwise they simply take away from time that could be used on instruction.

An advisory program meets at some regular, pre-determined interval within the school day, with the common purpose being for at least one adult at the school to have established a close relationship with every child within the school, as students unattached to schools tend to attend less and drop out more (Galassi, Gulledge, & Cox, 1997). Advisory programs can be primarily an advocacy group for students, the function can be primarily academic, the social aspects of middle school can be emphasized, or the advisory can serve a primarily administrative function. While a universally accepted idea, the advisory program frequently polarizes the campus. Effectiveness and efficacy within the programs vary widely (George, 1986). One of the greatest challenges can be in identifying and articulating the vision of the individual advisory program of a campus (Galassi, Gulledge, & Cox, 1997).

The organization of how students move among teachers within their individual schedules provides another means for meeting students' affective needs. As stated in This We Believe: Keys to Educating Young Adolescents, "A successful school for young adolescents is an inviting, supportive, and safe place…in such a school, human relations are paramount" (National Middle School Association, 2010, p. 33). For students, the ability to remain with a single core group of peers allows the students to develop a mutual respect, establish social and cultural norms, learn about being responsible for themselves and others, and bond with the school as a whole (Wallace, 2007). Additionally, moving in a team cohort allows students to better understand the negative behaviors typically associated with popularity in middle schools, such as being aggressive, snobby, or mean to peers. From that understanding, students tend to be more able to openly discuss these behaviors in a safe environment and learn tolerance and appreciation for one another (Kiefer & Ellerbrock, 2010). This benefit is increasingly significant as the schools increase in size.

Much like their students, teachers also benefit from being organized into teams. Effective team processes for teacher groups use a, "ternary model of interdependency", with an effective team blending the task processes (the goals), the team processes (how the team operates), and relationship processes (how the team members interact with one another) into a group that can perform the primary function of a school team, which is to improve educational outcomes for students (Main, 2012, p. 78). A study from the Center for Prevention Research and Development (CPRD) described an academically rigorous place, with a meaningful, relevant curriculum delivered through active and engaging, community-driven experiences for students that were positive, risk-free, and equal in student and teacher interaction as being the most important characteristics of an effective middle school classroom:

The CPRD study found that teams possessing both the structures and the capacity to coordinate their curriculum in collaborative, interdisciplinary teams were able to increase eight different effective classroom practices at a significant level, including meta-cognitive strategies, reading and writing processes, mathematical skills, authentic instruction, and collaborative processes (Flowers, Mertens, & Mulhall, 2000).

Turning Points 2000 provides recommendations for teams in multiple areas. Regarding student composition, each team should reflect a heterogeneous cross-section to avoid tracking. Teachers within the team should be given regularly scheduled collaborative time, with teachers having pre-defined roles within that time in order to maximize efficiency and buy-in. Teams should have a designated area in which to meet, and the classrooms of teachers in a team should have proximity. Most importantly, Turning Points 2000 recommends that all of the elements of effective teaming must be followed: if one element (time, roles, and student grouping) is not fully implemented, the team will be far less effective.

Democratic Governance

In Turning Points 2000, Jackson and Davis define a middle school with democratic governance as one in which can, "Give all stakeholders in the school – teachers, administrators, support staff, parents, students, and community members – a primary voice in planning and implementing school improvement efforts" (p. 146). At the middle school level, the principal should be involved in the leadership team, as should teacher-leaders, community leaders, parents, and students. Meetings should be open to all, with the team members being the ones who comment and advise to build efficacy. It is from these meetings that comprehensive school improvement plans arise, and the school establishes a shared vision and increased buy-in through the collaborative process. Through democratic governance, principals can lead their middle schools in prioritizing needs and resources. School systems have an obligation within this structure to create structures to maximize campus autonomy within the system. This is done through progress monitoring and clearly defined accountability measures.

In terms of the direct benefit of democratic governance on students, Goodman, et al (2011) examined the "alienation gap" in middle schools, in which students deliberately sabotage their educational experience. This "alienation gap" often serves as the antecedent to the "achievement gap" among and between ethnic and socioeconomic groups. Student participation in school decision-making reduces the effect of the "alienation gap"; taking a student's perspective seriously, or even changing a practice based on student input, enhances student efficacy. Educators express fear that this freedom of choice will transfer to power to the students in the classroom, but this is not the case, "if the implementation of the suggestion is co-opted by the teacher" (Goodman, Hoagland, Pierre-Toussaint, Rodriguez, & Sanabria, 2011, p. 377). Indeed, their results with urban middle schools demonstrated that even small shifts in authority toward students led to greater student responsibility and efficacy, as long as the commitment to the principles, processes and resources necessary is deep and thorough within the organization, including the training of teachers (Rudduck & Fielding, 2006).

Health and Safety

The previously mentioned tenets of the Turning Points 2000 comprise the components of the safe and healthy learning environment, including a rigorous curriculum, positive relationships, and student efficacy through governance. Beginning with Maslow's understanding of a hierarchy of needs which must be met (Maslow, 1943) school leaders understand the need to keep students safe so that they can learn. This begins with a comprehensive, democratically created classroom management and discipline plan. Turning Points 2000 describes an effective student management plan as being one that includes involving all participants in developing common expectations for all students' behaviors, clarifying the consequences of misbehavior, building a school climate in which all staff members, not just administrators, assume responsibility for maintaining or improving student discipline, specifying teacher and administrator roles in handling discipline problems, and increasing consistency and follow-through in implementing school-wide discipline policies (p. 171). Schools must also teach and promote positive interactions among different ethnic and socioeconomic student groups, which can be done through collaborative classroom strategies and student-led peer mediation or conflict resolution strategies.

Once the school has become a safer place, the emphasis can be on promoting a healthy lifestyle. Adolescence is the time period in which students become more at-risk of sexual activity and the use of drugs and/or alcohol. Use of or access to weapons, coupled with risk of depression and/or thoughts of suicide, also exists among at-risk middle school students. To tackle these problems, middle schools should participate in comprehensive health and physical education, including regular exercise. Schools should also provide access to health care and clinic services for students, as well as counselors and psychologists to meet the mental health demands of the school community (Jackson & Davis, 2000).

Recent examples in the literature demonstrate the power of comprehensive discipline, health and/or wellness programs for students. Access to gardening and nutrition information increased student consumption of vegetables in school lunches (Wang, et al., 2010). Another study showed increases in student achievement on criterion-based exams through a comprehensive school counseling program emphasizing emotional wellness (Sink, Akos, Turnbull, & Mvududu, 2008).

Parent and Community Involvement

A meta-analysis of research on parent and community involvement concludes, "A relationship between parent involvement and increased student achievement, enhanced self-esteem, improved behavior, and better student attendance" (Mapp, 1997). Turning Points 2000 also cites a number of studies linking parent involvement to higher grades, increased student performance and growth on standardized tests, an increase in graduation rates, better diagnostic management with fewer referrals and placements to special education, a more positive community perception of the school, and improved teacher morale (p. 196). Schools must organize time and resources to allow parents to get involved, whether through active participation, communication with staff, volunteering, learning at home, or participation in community partnerships.

Eisner (1988) describes the need for the intent of the organization to work in concert with the structure, lest the structure overwhelm the intent. Therefore, the intent of the middle school must serve as the driver of the structure of the bell schedule. As the structural frame of middle schools is examined, it must be done within the framework of the utilization of best practices of middle schools based on the recommendations of This We Believe, Turning Points, and, especially, Turning Points 2000.

Intervening Factors Impacting Campus Performance

In a 2010 speech given to the Organization for Economic Cooperation and Development, responding to a report that ranked the United States below average in math and science education among developed nations, Education Secretary Arne Duncan stated that, “Disadvantage leads more directly to poor educational performance in the United States than is the case in many other countries.” (Duncan, Secretary Arne Duncan's Remarks at OECD's Release of the Program for International Student Assessment (PISA) 2009 Results, 2010). Even with following the previously stated tenets of effective middle school practice, the composition of a campus does have an impact on school-wide performance. In studying the impact of schedule type on school performance and student achievement in selected middle schools, three different intervening factors were considered; teacher experience, percentage of African-American and Hispanic students, and percentage of students qualifying as low socio-economic status. The review of literature looks at how each of these demographic factors impacts the student achievement and overall campus performance.

Teacher Experience

High needs schools have a difficult time recruiting and retaining high-quality teachers (Murphy, DeArmond, & Guin, 2003), and the need for teachers in urban areas is increasing by two percent annually (Hussar, 2002). Schools operate in an era in which data and accountability appear to be more a part of the culture than ever before. One statistic presented in the Texas Academic Excellence Indicator System (AEIS), in addition to student achievement data on standardized tests by subject and grade-level, is the experience of the faculty for each campus, district, educational region, and for the state as a whole. This number represents the average years of creditable public school experience for the teachers within the population. The mission for researchers has been to explore the extent to which teacher experience impacts teacher quality, because, "Policy makers agree that teachers differ in terms of quality, and that quality matters for student achievement" (Cloftelter, Ladd, & Vigdor, 2007).

It is common practice in public education for experience to play a large role in personnel decisions; including salaries, transfer policies, and advancement. This implies an assumption that experience equates to increased effectiveness (King Rice, 2010). However, there exist conflicting reports regarding the truth behind that assumption. There are multiple studies (Clotfelter, Ladd, and Vigdor 2007a, 2007b; Harris and Sass 2007; Kane, Rockoff, and Staiger, 2006) asserting that brand new teachers do not match the effectiveness of those with experience, while Sharon Kukla-Acevedo (2009) cites multiple studies (Cooper and Cohn, 1997; Ehrenberg and Brewer, 1994; Ferguson and Ladd, 1996) that show no direct relationship between teacher experience and student achievement. As part of her research, Kukla-Acevedo acknowledged the difficulty in eliminating student-level factors when measuring teacher effectiveness. Chidolue, however, was able to control for the factor of socio-economic status of the students. Using an ex-post-facto design, Chidolue found a positive and significant correlation between teacher experience and student achievement (Chidolue, 1996).

Jennifer King Rice (2010) cites a report from Boyd, et al, in which teachers in New York City showed a non-linear relationship between experience and effectiveness, with marginal and sometimes diminishing returns after the first five years in the profession. Boyd's study also showed overlap among value-added scores for individual teachers in both math and reading, meaning that relative experience is not a guarantee of relative success, and that other factors affect teacher quality more than experience. Similar to the Boyd study, when approaching teacher effectiveness from a value added approach, Ladd (2008) found that, while teachers with 20 or more years of experience are more effective than new teachers, the results for those with two decades or more of teaching experience show to be statistically no more effective than teachers with five years of experience. Kukla-Acevedo, whose research focused jointly on expertise and qualifications, found that any positive effect of experience peaks after 14 years of experience in the field.

King Rice (2010) explored the specific, value-added impact of teacher experience in high-poverty schools, which have a larger percentage of inexperienced teachers. King Rice found that, while there is less overall value-added in high poverty schools, there is greater within-school variability, particularly at the bottom of the student achievement curve. This suggests that, given the environmental factors children of poverty face every day, (Evans, 2004), the teacher has an even greater impact on student outcomes, and an ineffective teacher has a deep and lasting negative impact on students, regardless of experience. When examining schools and school systems that have been able to close the aforementioned achievement gaps, varied instructional strategies, high expectations from teachers, and mentoring programs for new teachers have been among proven strategies, and quality teachers provide a key component to each of these (Williams, 2011).

In terms of innovative instructional practices, Ghaith and Yaghi examined both teacher effectiveness and teacher efficacy as related to instructional innovation (Ghaith & Yaghi, 1997). Drawing from Guskey's research, which showed that a teacher's sense of efficacy is more important than experience, and that efficacy also stabilizes during the middle years of a teacher's career, then declines as teachers stay in the profession longer, Ghaith and Yaghi examined teachers' use of a particular cooperative learning strategy. The researchers measured teachers' attitudes and perceptions of the strategy. Findings included negative efficacy and a perceived negative need for innovation from more experienced teachers. Not surprisingly, the more experienced teachers found the new instructional strategy to be less congruent with previous practices than did the newer teachers, which led to the reluctance to stay current with a new, research-based best practice.

Keeping with the theme of teacher preparation, Cloftelter, Ladd, and Vigdor (2007) examined both teacher experience and teacher credentials and their impact on student achievement. Their study showed that teacher effectiveness does have a large effect size when measured with overall student achievement. However, the research found that it was National Board Certification, more so than experience, which had the largest positive effect on student achievement. The effect size for years of experience was medium, but for national certification it was large. While these researchers admitted to not being able to account for the fact that teachers seeking national certification may be more motivated than others, it speaks to experience alone not being a guarantee of student success.

Another study categorized teachers as having low (1-6), medium (7-19) or high (20 or more) years of experience. The teachers were given a questionnaire regarding their frequency of use, preparedness and confidence in using alternative forms of assessment. Contrary to the Ghaith and Yaghi studies, which showed that younger teachers tend to be more innovative with instructional practices, there was a positive linear relationship between experience and scale scores in all three areas in this study. Teachers with experience had more confidence and a willingness to experiment with assessments. The researchers posit that this result speaks to the lack of teacher preparation programs in the area of creating assessments (Bol, Stephenson, O'Connell, & Nunnery, 1998).

Overall, the body of literature offers mixed findings on the impact of teacher experience on both teacher effectiveness and student outcomes. The one consistent finding was that urban schools and schools with high percentages of children of color or large At-Risk population schools have a more difficult time recruiting and retaining experienced educators.

Children of Color and Low-SES Students

In 1966, The Coleman Report, which was commissioned by the Federal government's new Department of Education, examined, primarily, the gap in academic achievement between White students and African American students. While the findings indicated a variety of factors that led to student success; including teacher quality, curriculum, and facilities, Coleman's research found the student's individual background to be the single greatest predictor of success (Coleman, 1966, p. 18). Research in the years since has focused on two different fronts, including achievement at the individual student level and the school-wide effect of having high or low percentages of socio-economically diverse students. However, it should be noted that research requirements for low socioeconomic status include such social factors as parent education level, neighborhood demographics, family structure, and parent employment (Selcuk, 2005), rather than household income alone.

The environmental factors consistent with many children of poverty cannot be ignored when factoring in student achievement. Research asserts that neighborhood crime and violence in the home may be more likely to occur in homes with low income. According to the U.S. Census Bureau, poor children are also more likely to live in homes where there has been a divorce, and parents tend to be more punitive and harsher when parenting in poor households. There is less extended family support in poor homes, and poor households tend to have a smaller social network and more limited organizational involvement within the community. As a result of the combination of these factors, children from low-income homes receive comparatively less cognitive enrichment at the home than do wealthier children. Statistics on library attendance and reading in the home also suggest that low-income students receive less stimulation and limited opportunities to learn beyond the school day (Evans, 2004). Among the factors that must be considered in examining low-SES students are the typical make-up and home environment and its possible impact on student achievement. Students from low-SES homes typically have families with less interest in schooling. This, more than even financial constraints, can limit a student's access to post-secondary options (Frempong, Ma, & Mensah, 2012). Caldas and Bankston (1997) draw on the Coleman Report, citing the, "Enduring effect of SES on school achievement," stating that the, "Input factors" outweigh the, "Process factors" of what the schools actually do for students. To that end, Willms and Raudenbush (1989) referred to Type A and Type B factors, with Type A factors being how the school might impact the student, and Type B factors comparing schools to one another based on composition. The Type B models can lead to peer effects, which can influence individual performance positively or negatively. Motivation can be a factor in peer effects, but there can also be hobbies, reading in the home, and interactions among peers that lead to performance. As schools have different compositions, teachers often respond differently; whether in terms of morale, commitment, expectations, or techniques. Schools can then respond to these changing demographics by changing the academic organization of the school itself (Harker & Tymms, 2004).

In Texas, as is the case throughout the nation, a student qualifies as low socioeconomic status (Low-SES) based on eligibility for free or reduced lunch (Texas House of Representatives). Students with household incomes at or below 130% of the poverty line meet the eligibility requirements for free lunch, while students between 131 and 185% of the poverty line have eligibility for reduced lunch (Selcuk, 2005). For contextual purposes, in 2009, the official poverty line for a household of four persons was $22,050 (U.S. Department of Health and Human Services). That means that, in order for a student in a household of four people to qualify as Low-SES, the household income would have to be $40,792.50 or lower. No other factors change student qualification from low-SES.

There have been multiple studies of the impact of socioeconomic status and academic achievement with mixed results. For example, Seyfried (1998) examined the grade point averages of African-American students and found a weak correlation with socio-economic status, while Sutton and Soderstrom (1999) examined school-wide data on achievement tests in Illinois and found a significant correlation between low-SES population and achievement. Another regression analysis found correlations between school make-up and achievement, with the strongest associations occurring in mathematics (Harker & Tymms, 2004). These examples outline the need to examine socio-economic status in multiple ways and through multiple factors.

Student Ethnicity

Many of the problems plaguing students of low socio-economic status manifest themselves again with minority populations, particularly Hispanic and African-American students. The achievement gap exists in urban, suburban, and rural areas, in both low and high-income areas, and across a variety of statistical measures, including grades, graduation rates, and standardized test scores (Lee, Ngoi, & Olszewski-Kubilius, 2004). The achievement gap is influenced by, "Three central Microsystems in which students are embedded: home, neighborhood, and school" (Grogan-Kaylor & Woolley, 2010). Data from the NAEP shows that, while the ethnic achievement gap narrowed during the 1980s and 1990s, the gap has remained statistically unchanged since the advent of No Child Left Behind, which was designed specifically to work on such a gap.

Causal factors for the achievement gap include: home language, parental involvement, cognitive ability, and socio-economic status, as well as school-based variables, including instructional strategies and teacher effectiveness (Williams, 2011). Realities of the family and social structures demonstrate some of the factors that lead to achievement gaps existing before students even start Kindergarten, then continuing and growing throughout school (Chapin, 2006). African American and Hispanic students tend to be more likely to attend poorly funded schools in neighborhoods with limited resources. Harvard sociologist Orlando Patterson points out that 72 percent of African American children and 53 percent of Hispanic children are born to unwed mothers, and that, "A large number of these children are denied the stability and comfort offered by having two parents in the home" (Salam & Sanandaji, 2011). According to the authors of Lessons from High-Performing Hispanic Schools, the repeated academic failing s of Hispanic students often lead to feelings of alienation and lowered self-esteem, which increase the likelihood of drug use, teen pregnancy, and gang activity among Hispanic teens (Reyes, Scribner, & Paredes Scribner, 1999). Similarly, African American students have often been, "Pathologized and viewed as a homogeneous group" with a constant struggle to overcome cultural norms that do not lend themselves to academic success." (Lynn, 2006). Students of color also appear to be more likely to have attendance problems at school, which creates a vicious cycle: the lack of attendance leads to poorer academic outcomes, which lowers self-esteem and causes a decline in attendance (Fisher, Frey, & Lapp, 2011).

In Texas, across all subjects and grade levels, an achievement gap exists between White students and both Hispanic and African American students in all subjects, with the most pronounced gaps existing in mathematics and science. Similar gaps also exist for students identified as being from low socio-economic status when compared to the total population. An examination of the TEA State Accountability Data for 2009-2010 reveals achievement gaps across all subject areas, with White students outperforming Hispanic, African American, and Economically Disadvantaged students in every subject.

The economic impact of the achievement gap in public schools is significant. An article in The National Review states that, "Broadly speaking, the American labor market can be divided into two pools, one consisting of whites and Asians, whose outcomes tend to resemble each other." The income gap between the two groups is even larger than the gap between a wealthy state like New York and a lower per capita state like West Virginia, and the per capita income of whites is 101% higher nationally than that of Hispanics. However, recent studies by economists Roland Fryer and James Heckman find that, when achievement on standardized test scores is equal, Hispanic and African American students earn the same amounts as their white counterparts and possess an equally likely chance of attending college. Therefore, the concerns specific to the achievement of low-SES students can be greatly reduced by focusing on the achievement gap that exists for Hispanic and African-American students. According to economists Reihan Salam and Tino Sanandaji, a gradual lowering of the skill level of the U.S. work force can be largely attributed to the achievement gap in public schools, with Asian and White students outperforming Hispanic and African American students, thereby creating a divided American labor market. In terms of GDP dollars, the economists suggest that eliminating the achievement gap and elevating the work force could add as much as two trillion dollars to the nation's Gross Domestic Product by the year 2050 (Salam & Sanandaji, 2011).

The body of work regarding what schools can do to close the achievement gap is extensive. Smaller class sizes, mentor programs, standards-based practices, and promoting a culture of high achievement and college readiness for all students remain among the most commonly used best practices (Williams, 2011). "Environmental expectations" impact student learning; when students are expected to succeed, there exists a greater likelihood to do so, and when the expectations lower, those lowered expectations will likely be met (Grogan-Kaylor & Woolley, 2010). Richard Nisbett (2011) suggests it is small interventions, not large ones, which will lead to closing the achievement gap. Nesbitt cites a study from the University of Texas in which African-American adolescents are assigned mentors. The control group is given lessons on the importance of making good choices regarding substance abuse, while the experimental group is given research on Carol Dweck's work on the growth mindset. The results were a significant increase in achievement scores among the experimental group relative to the control group, meaning that it is the focus on academic achievement that is more important than simply having a mentor relationship.

Successful schools with large Hispanic populations have used such practices as increased community involvement and collaborative programs, student advocacy groups, and "culturally responsive pedagogy", in which the Hispanic heritage of the students is embraced (Reyes, Scribner, & Paredes Scribner, 1999). A similar study for African American students found that looking at Critical Race Theory and a culturally-centered pedagogy will lead to greater academic achievement, even if social factors still serve as impediments (Lynn, 2006).

Math and Science Achievement

While research affirms the need to assist poor students and students of color in all subjects, especially when compared to their affluent, white peers, a more subject-specific examination shows needs to address two subject areas across the entire population of students. The results of the 2009 Program for International Student Assessment (PISA) and the 2007 Trends in International Mathematics and Science Study (TIMSS) show areas of concern when making global comparisons between students in the United States and those in other countries, with American students performing just below the international averages in both subjects. United States students in both math and science TIMSS tests had a ten percent rate of scoring “advanced”, which is the highest scoring band designation. While this was over the global averages of five and six percent, it lagged well behind the leaders, particularly Singapore and Japan, where upwards of 40% of students taking the tests scored in the advanced category (Institute of Education Sciences; National Center for Education Statistics). Upon further analysis, Huang (2009) points out that the size of dispersion was greater in the United States than in any other country, meaning results varied greatly from classroom to classroom. This kind of analysis has led the Obama administration, and Secretary Arne Duncan, toward more nationalized curriculum and standards, as is the practice in some more successful TIMSS countries (Duncan, 2010).

While results on the TIMSS were somewhat concerning, the PISA presented an even gloomier picture of our national ranking in math and science. For the 2009 iteration of the PISA, U.S. schools ranked 17th of 34 countries in science and 25th of 34 in mathematics. In addition to the low rankings, over half of the countries in math had a mean that was not only higher than the United States average, but also higher at a rate that was deemed statistically significant. That same standard of statistical significance, when used for science comparisons between American students and their global peers, is 12 nations (Hechinger, 2010). Overall, when combining results across tests, American students have a larger percentage of students scoring in the bottom ten percent than do other countries, but, as a product of the diversity and variability of our schools, also perform very well at the top end of the spectrum (National Center for Education Statistics, 2007).

However, the global examination results, when broken down by ethnicity, show the same achievement gaps previously mentioned. When measuring science literacy, White students performed at a level that was significantly above the international average, while students identified as Black and Hispanic both scored significantly below the average. When measured relative to the six levels of proficiency the PISA places students into (with 6 being the highest), White American students averaged a score in level 3, Hispanic students averaged level 2, and Black students averaged a score at level 1. These results mirrored the 2003 and 2000 PISA results (National Center for Education Statistics, 2007).

Regardless of the specific instrument being used, there is a body of evidence to indicate the gap in science achievement for Hispanic and African-American students. Additionally, such achievement gaps exist across all other subjects and grade levels. Similar evidence exists among students of low socio-economic status, due in part to the co-linearity between those two groups. As stated previously, the largest achievement gap among 8th grade students in science is between White and Black students, and that gap increases in high school. These achievement gaps exist in part to the correlation between reading levels and science achievement. One particular study showed that the predictors of race and socio-economic status accounted for 85% of the variance in science scores across a large, urban school district (Maerten-Rivera, Myers, Lee, & Penfield, 2010). In examining achievement through the lens of self-efficacy, both social persuasion and vicarious experiences impact achievement, and socio-economic status can impact this self-efficacy (Britner & Pajares, 2006). Even a school-wide improvement in science achievement might not necessarily eliminate the ethnic gaps, as they can exist even amidst improvement among all groups over a multi-year period (Johnson, Kahle, & Fargo, 2006).

In mathematics, the results mirror those of science. Urban students score an average of 30-40% lower than their suburban counterparts on the National Assessment of Educational Progress (NAEP), even amidst successful reform efforts. This achievement gap is due primarily to limited resources, lack of teacher quality in urban schools, and lack of opportunity (MacIver & MacIver, 2009). Students who do well in math at the middle school level have a greater ability to self-regulate, which comes from participating in engaging content which they enjoy (Cleary & Chen, 2009). This result speaks to a need for teachers of mathematics to emphasize content-driven professional development and the ability to help students be successful in the content over training about the needs of the learner (Telese, 2012) as a way to reduce the achievement gaps in mathematics.

The success of students in all subjects at the middle school level contributes to the ultimate goal of high school graduation. A nation-wide epidemic of students not being able to advance from 9th to 10th grade reflects the need for increased intervention at the middle school level (Wheelock & Miao, 2005). Ninth grade students repeat that grade more than any other, and ninth grade students tend to have lower attendance and achievement scores than any other high school grade. In urban settings, as many as 40%

of students repeat 9th grade, with fewer than 20% of those repeaters going on to graduate (McCallumore & Sparapani, 2010). It is because of these facts that what happens at the middle schools is so vitally important.

The Challenges of Large, Urban School Districts

Many of the challenges in math and science are magnified in a large, urban school system. Beginning with the work of Werner Hirsch (1968), who argued against the notions of economies of scale for students and school systems, research has suggested that large, urban school systems face challenges on a variety of levels, including those of the intervening factors previously discussed. Students from urban schools attend campuses with larger enrollments and fewer resources than their suburban and rural counterparts. More urban students live in poverty, come from single-parent homes, and live in homes without an adult who has attended or completed college. With higher mobility in urban schools and fewer role models in the home, more teacher time is spent on discipline, rather than high-quality instruction. As a result, students show themselves to be more likely to drop out of school, and graduates from urban schools seem more likely to face the challenge of unemployment than are those from suburban or rural schools (Lippman, Burns, & McArthur, 1996). Multiple iterations of the U.S. National Assessment of Educational Progress (NAEP) demonstrate that students in inner-city middle schools may be almost twice as likely to score below the proficiency level (Ruby, 2006), and student mobility and non-attendance impacts grade point averages across all subjects, including math and science (Parke & Kanyongo, 2012).

A 2001 study of standardized test scores in California attempted to control for student demographic factors to isolate performance by district size. The results showed a significant negative correlation between school district size and student achievement, with the most significant correlation occurring at the middle school level (Driscoll, Halcouissis, & Svorny, 2003).

Scheduling

As previously mentioned, one of the ways to improve outcomes in an organization is to examine the structure. Bolman and Deal (1997) describe the need for a structure to be built around a core process, creating a finished product from raw materials. In schools, much like Bolman and Deal's Harvard example, the output is somewhat ambiguous, so "Feedback is slow or absent: professors rarely learn much about what, if any, benefits students derived from their course in later years" (p. 51). The authors posit that this is the reason for the loose, decentralized structure at Harvard. Public schools share a core process with Harvard, yet work on very tight structures, often referred to as the master schedule. Canady and Rettig refer to the middle school as, "The organizational structure designed to teach children in what several writers referred to as the turbulent period of a child's life" (p. 3). The schedule is a major component of the structural frame of the middle school organization, and the evolution of adolescent education has shaped the structure of the modern middle school.

Speaking specifically to middle school schedules, Williamson discusses the challenge of trying to find the "ideal" schedule coming from the need to, "Shift from the implementation of prescribed "inputs" (schedule) to utilization of a variety of approaches to ensure critical "outputs" (learning) for early adolescent learners." (Williamson, 1998, p. 1). The body of middle school research, from James Conant to *Turning Points 2000,* advocates flexible units of time as the best way to schedule for students. However, Williamson acknowledges that, "Numerous factors affect a school's ability to construct a schedule: school size; the number of students and teachers; the number of teachers shared with other schools; class size requirements; capacity of the lunch room; grouping policies; contractual requirements; and starting and ending times all affect the school schedule" (pp. 16-17). These factors all impact the structural framework under which a school operates, and the variables the schedule impacts, "Have been treated with a great deal of permanence through our current scheduling practice." (Kruse & Kruse, 1995).

Historical Perspective on School Scheduling

As part of a follow-up to the previously mentioned work of both Briggs and Conant on the development of a middle level of education, Brimm (1963) addresses the concept of the "block of time" by stressing its importance as part of the transition from elementary to high school. In order to facilitate this block, there is a need to combine subjects into one teacher. According to a 1956 report by the National Association of Secondary School Principals, more than 70 percent of the schools with a Block schedule had achieved this by combining English with social studies. Another approach was the integrated language arts curriculum, which combined writing, reading, listening and speaking. Even with this integration, however, the Carnegie Standard unit, which ties course credit to seat time, has still created rigidity into school scheduling. Using the factory model of Frederick Taylor, schools for most of the last 100 years have used the Carnegie Standard, which equates mastery of a subject to the earning of "credit hours", working on the assumption that a certain amount of seat time must be required for mastery. Using the Carnegie Standard compels the school to allot equal time to each core subject area (Kruse & Kruse, 1995).

In 1995, the National Education Commission on Time and Learning released Prisoners of Time, a report on the need to re-examine the construction of the public school day in America. Beginning with a realization that high school students in other industrial democracies might spend twice as much time in core academic instruction (language arts, math, science, and social studies) as their American peers, Prisoners of Time suggests more time on task as being the key element to achievement in core subject areas (Kane C. M., 1994). This aligns with Walberg's research on the correlation between the time students are engaged in learning and the amount of learning that actually takes place (Walberg, 1988).

Current Scheduling Configurations

The structural frame of public schools in the United States creates a rigidity of schedule that Prisoners of Time likens to the Greek myth of Procrustes, who forced travelers to his inn to conform their body perfectly to his bed, rather than allowing the traveler to find their own comfortable position for a good night's sleep (Kane C. M., 1994). Even amidst the organizational constraints, there exist opportunities to use different scheduling formats, and as many as 30 variables can serve as factors in the decisions related to choosing the type of schedule to use, from district mandates, to school size, to community input (Kussin, 2008). Even in schools that have successful implemented middle school schedules to meet the needs of struggling learners, it has not been done without students either having to have less time in other subjects, having to lose elective courses, or having to work on an extended day due to the organizational conventions that exist (Sara Prewett, 2012).

The Traditional schedule uses Carnegie Units. In this model, the periods of time are of equal length for each subject taught. Typically, schools will have 7-8 periods of equal length in order to meet the instructional requirements for the educational institution. However, these periods do not necessarily need to meet every day. A schedule in which classes meet less often and for longer periods is a Block schedule. Canady and Rettig (1996) describe four basic models of Block scheduling, all of which can be modified based on the needs of the school. In the first, schools would run alternate day schedules, with longer course periods meeting every other day (commonly called an "A/B Block" schedule). The second is an accelerated block, in which courses meet every day for an extended period of time, but the course meets for only one semester, rather than all year. A third option, the Tri-mester, accelerates even further on the accelerated block, finishing a traditional 180-day Carnegie Unit course in only 60 days. The fourth and final pure variation of Block scheduling includes altering the configuration of the school year to allow for variations on all of the aforementioned schedules.

It is important to note that a Block schedule, including all of those described previously, does not necessarily mean more instructional minutes; rather the schedules change the organization of those minutes. A block might be 90 minutes of science instruction every other day, with a Traditional schedule providing 45 daily minutes of science instruction. This example provides the same net number of minutes of instruction. This distinction is relevant due to the overwhelming body of research that correlates academic performance to increasing the total number of instructional minutes afforded a class in a Double Block which meets daily for 90 minutes for the duration of the school year (Hattie, 2009).

The Impact of Scheduling on Student Achievement

Since the inception of the idea of Block scheduling, much research has been done on the merits of Block scheduling versus a Traditional schedule. There exists within this research a pattern of mixed results, with some studies indicating time as a major factor in performance, while others see instructional strategies and curricular alignment as being the key elements to academic success (Galvan Garza, 2001). One of the strongest arguments for the Block schedule is that it allows for more cross-curricular planning and strengths of association (Rettig & Canady, 2000) due to the number of instructional transitions that can be planned within a single, 90 minute lesson. While Block scheduling in schools is commonly debated, a 1999 report by the Texas Education Agency found that, "Available data on high school schedules used in Texas public education do *not* systematically explain or account for variation in overall high school student performance (Texas Education Agency Office of Policy Planning and Research

Division of Research and Evaluation, 1999). To date, the Texas Education Agency has performed no such study on middle schools. However, in spite of the mixed research results, schools continue moving increasingly toward Block scheduling as a common practice. Zepeda and Mayers (2006), in their review of research showing mixed effects of Block scheduling over Traditional models, admit that the rapid growth is not consistent with the quantitative research, but that the qualitative, perceptual data supports Block scheduling. Consistent with the tenets and recommendations of the National Middle School Association, campuses have seen recent success, regardless of student factors, by emphasizing flexibility and individualization over a particular schedule structure (White, 2014).

Scheduling and Cost

A final factor which must be examined is that of cost. As the 82nd Texas Legislature convened in Austin in 2011, Governor Rick Perry stated that budget cuts would be made, "Across the board", and he cited public education and elementary class size limits among those cuts on the table (Hoppe, 2011). With schools bracing for the worst and reducing staff, the cost of different middle school schedules must be taken into account, as scheduling models impact total staff required, class sizes, and, potentially, a school system's financial viability. With state funding for education in Texas failing to keep up with growth demands, school systems face the challenge of needing to run as efficiently as possible, and the cost of various organizational structures becomes increasingly important.

Block scheduling, by its nature, increases the amount of planning time for teachers, which reduces the number of students the teacher can see and increases the number of staff members needed. For example, in the state of Texas, the Texas Education Code (21.404) mandates a minimum of 450 minutes every 10 days which must be dedicated to teacher planning (Texas State Legislature, 2013). A Block schedule doubles the amount of non-teaching time, with teachers having 900 minutes every 10 days of non-teaching time. Studies on the cost effectiveness of Block scheduling have shown an increase in personnel in order to meet the demands of the Block schedule (Lare, Jablonski, & Salvaterra, 2002). For example, if a math teacher with an average class size of 25 students taught in a Traditional schedule, with seven teaching periods and one non-teaching period, the teacher would have 175 students. With the same class size in an A/B Block, the teacher would only be able to teach six classes, for a total of 150 students. Based on this example, the Block schedule would increase personnel costs by 14% over a Traditional schedule.

School Accountability

While the results of efforts to close the racial and socio-economic achievement gaps have been mixed, the increased awareness of the need to reach specific groups of students is a direct result of the increased accountability measures placed on schools. As the movement toward a middle level of education began early in the 20th Century, an attempt was made to base the effectiveness of schools of various structural frameworks solely on test scores, but Briggs (1920) acknowledged, “It must be obvious…that academic success depends on many factors besides the organization of an independent intermediate school; consequently we may expect wide variation in results" (p. 312). When discussing the challenges of the junior high, or of schools in general, Brimm (1963) states, "There is probably more dissatisfaction with the methods of evaluating and reporting pupil progress than with any other area of education today" (p. 61). While these quotes affirm the need to review accountability practices and the implications of accountability systems, a review of the current and historical trends in accountability suggest greater emphasis on school ratings than ever before.

School Accountability in Texas

From the Gilmer-Aiken law in 1949, through the passing of House Bill 72, Texas has its own rich legislative history on accountability (Kuehlem). Recent federal involvement came to the fore in 1983, when President Ronald Reagan called for an increase in standards and accountability at the national level, after the National Commission on Educational Excellence produced A Nation at Risk: The Imperative for Educational Reform (Causey-Bush, 2005). The publishing of A Nation at Risk (1983) brought rise to the current era of standardized accountability in American public schools. Recommendations for increased rigor and standards at the high school level implied a need to prepare by changing practices and expectations in primary and middle schools. The No Child Left Behind Act of 2002 introduced federal accountability as part of a reauthorization of the Elementary and Secondary Education Act of 1965, and the current Obama administration reauthorized No Child Left Behind, touting college readiness, equity, and federal funding based on innovations from states and local districts (United States Department of Education, 2010).

School accountability ratings, widely published annually, provide the public with a quick-glance method of determining the quality of a school, and the results impact everything from federal and state funding to area home values (Kane, Staiger, & Samms, 2003). For the 2009-2010 school year, public schools in Texas were judged using both the federal Adequate Yearly Progress (AYP) measures and the Texas Education Agency's Academic Excellence Indicator System (AEIS).

In Texas, assessment-based accountability began with the Texas Legislature passing a law, Senate Bill 1, requiring the Texas Education Agency (TEA) to administer a series of criterion-referenced tests. The TEA responded with the Texas Assessment of Basic Skills (TABS). While no statewide curriculum existed at the time, the TABS provided the forerunner to today's accountability system (Texas Education Agency Student Assessment Division, 2002). House Bill 264, introduced in 1981 and implemented in the 1984-1985 school year, established a list of standards for every subject in the core curriculum. Shortly thereafter, H. Ross Perot led a commission that eventually developed HB 72, leading to the development of the standardized Texas Educational Assessment of Minimum Skills (TEAMS), as well as a mandate that all 11th grade students in Texas public schools pass the standardized test as a requirement for graduation (Causey-Bush, 2005).

The Academic Excellence Indicator System (AEIS) and the corresponding campus ratings that come with it began the advent of the Texas Assessment of Academic

Skills (TAAS) in 1990. Unlike its Texas predecessors, the TEAMS and, prior to that, the Texas Assessment of Basic Skills (TABS), the TAAS was designed to go beyond minimum skills, stressing higher-order thinking and testing all aspects of the "essential elements," which was the state-wide curriculum.

The TAAS was administered between 1990 and 2002. While there was not much fundamental change to the test during its existence, the State Board of Education (SBOE) implemented a new state-wide curriculum, the Texas Essential Knowledge and Skills (TEKS), beginning in the 1998-1999 school year. The TEKS were specifically incorporated into the TAAS, but critics noted that the alignment was not true, with the test written at a level below the standards in the curriculum. This gave rise to the more rigorous, criterion-based Texas Assessment of Knowledge and Skills (TAKS) (Causey-Bush, 2005). The TAKS created a triangulation among curriculum, instruction and assessment, including higher-order questions and a variety of formats, including multiple choice, short answer, and essays. The TAKS also provided multiple cut points for scores, beyond simply designating students as pass/fail. Much like the federal NCLB Act, the Texas Education Agency created standards for TAKS that would gradually increase over time in a phase-in process (Texas Education Agency Student Assessment Division, 2002).

The TAKS also allowed for specific assessments for special education and Limited English Proficient (LEP) students, with allowable exemptions based on certain qualifications. However, as part of the reauthorization of the Individuals with Disabilities in Education Act (IDEA) in 2004, exemptions for special education students were disallowed. Beginning in the 2007-2008 school year, alternative assessments were replaced with the TAKS (Accommodated), TAKS-Modified, and TAKS-Alternative exams. Results of the TAKS (Accommodated) exam were included in the State AEIS rating, while the TAKS-Modified and TAKS-Alternative results were included in federal accountability AYP ratings, provided no more than three percent of the student population for a district were given one of those two tests (Texas Education Agency Department of Assessment, Accountability,and Data Quality Division of Performance Reporting, 2010).

For the 2009-2010 school year, each campus in Texas could earn one of four different accountability ratings: Academically Acceptable, Recognized, Exemplary, and Academically Unacceptable. Ratings are based on TAKS scores, student attendance, completion rate, and dropout rate. The total number of TAKS indicators for an accountability rating can vary depending on grade-levels served and the demographic make-up of the campus. Campus ratings are based on the lowest score on an individual indicator. For example, if a school's TAKS scores, dropout rate, and completion rate would merit a campus rating of Exemplary, but the attendance rate would qualify only for a rating of Academically Acceptable, then the campus accountability rating would be Academically Acceptable (Texas Education Agency Department of Assessment, Accountability,and Data Quality Division of Performance Reporting, 2010) .

The three caveats to the ratings rule include the exceptions policy, Required Improvement, and the Texas Projection Measure (TPM). Exceptions allow a campus to raise its rating by one level. Schools could earn between one and five exceptions, based on the number of TAKS-based accountability categories used by the campus. However, only one exception could be used if a campus was trying to move from Recognized to Exemplary. In order to use an exception, the score being considered must have been within the “floor standard”, or five percentage points of the minimum standard to achieve the higher rating. This allowed the most diverse campuses more opportunities to achieve Academically Acceptable, Recognized or Exemplary status.

Unlike the exception policy, The Required Improvement (RI) provision could not be used to help a campus move from Recognized to Exemplary, but RI could be used for completion rate and annual dropout rate. If a school had scored below the minimum for a higher rating, but the improvement from the previous year had placed the campus on track to meet the minimum two years later, the Required Improvement provision could be invoked. No limits exist on the number of times Required Improvement may be used.

Figure 1 - Required Improvement Sample Calculation

Example: For 2010, a high school campus has performance above the Academically Acceptable standard in all areas except for their Economically Disadvantaged student group in TAKS mathematics; only 54% met the standard. Their performance in 2009 for the same group and subject was 44%.

First calculate their *actual change:*

$$54 – 44 = 10$$

Next calculate the *Required Improvement:*

$$(60-44) / 2 = 8$$

Then compare the two numbers to see if the *actual change* is greater than or equal to the *Required Improvement:*

$$10>8$$

Result: the campus meets Required Improvement, the its rating is

(Texas Education Agency Department of Assessment, Accountability,and Data Quality Division of Performance Reporting, p. 24).

The final caveat, the Texas Projection Measure (TPM), used longitudinal data on the individual student to create a projection about future results. Use of TPM could allow a campus to move up one rating, with the exception being from Recognized to Exemplary. Because of the inflated ratings created by TPM, Education Commissioner Robert Scott abandoned the use of the provision following the 2009-2010 school year (Reeves, 2011). For purposes of this research, schools were rated without the use of TPM.

For all campuses, the student group All Students will be used as an indicator. Other student demographic groups include African American, White, Hispanic, and Economically Disadvantaged. Information on students, from race to program enrollment to socio-economic status, is submitted from campuses to the TEA through the Public Education Information Management System (PEIMS), which is a subsidiary of the TEA and has its own accountability system. For a demographic group to meet minimum size requirements, there must be at least 30 students in the demographic group, and the group must represent ten percent or more of the student population. However, if the demographic group contains 50 or more students, the group will count for accountability purposes, regardless of whether or not the group meets the 10% floor (Texas Education Agency Department of Assessment, Accountability,and Data Quality Division of Performance Reporting, 2010).

Middle schools give TAKS in the following subjects and grades: math, grades 6-8; reading, grades 6-8; science, grade 8; social studies, grade 8; and writing, grade 7. For accountability purposes, the rating is based on the combined scores of students taking TAKS and TAKS (Accommodated), and for tests with multiple grade levels, the campus rating is determined by the aggregate score of all grades tested. For example, at the middle school level, the aggregate math scores of grades 6-8 will be used in calculating a rating, rather than one individual grade. To qualify as Exemplary, the passing rate for a subject, within a demographic group, must be at least 90%, rounded to a whole number. The standard for Recognized is 80%, and for Academically Acceptable the floor is 70%. In an attempt to mitigate achievement gaps among the four tested subjects, the Texas Education Agency's accountability system allows for lower standards in mathematics and science, relative to the other tested subjects. For example, in the 2009-10 school year, the passing standard for the 8th Grade Mathematics TAKS was 58% (29 of 50 questions), and the passing rate on science was 66%, while the 8th Grade Reading exam required 35 correct responses out of 48 questions (73%) to pass. However, even with unbalanced minimum standards, the passing rate in reading was still higher than in math and science by at least 10% (Texas Education Agency, 2010).

NCLB

State accountability systems were joined by an increased Federal presence when the No Child Left Behind passed as part of the reauthorization of the Elementary and Secondary Education Act of 2001. A bipartisan bill, NCLB passed in the House of Representatives 381-41 and in the Senate 87-10. One of the principal reasons for the bipartisan support was the legislation's emphasis on high standards and improved education for all students, with an emphasis on closing the aforementioned achievement gaps between White students and students of color. Under the law, each year, an increasing percentage of students are required to demonstrate proficiency on math and reading assessments, with all students expected to be proficient by 2014, regardless of race, socioeconomic status, home language, or the presence of a learning disability or impediment (Hursh, 2007), a provision that has since been altered but carries the same principles (Texas Education Agency Division of Assessment and Accountability, 2013). It is important to note that accountability results under NCLB are reported by student subgroups separated by race, home language, placement in special education, and socioeconomic status (Fusarelli, 2004)

The results of the No Child Left Behind Act include an unmasking of campus data that changed perceptions of some campuses. Schools which were thought to be performing at a high level were suddenly considered unsuccessful because of the requirement that each subgroup meets the minimum requirements. This has caused school leaders to look more closely at each student's performance and appropriate resources to help students with the greatest need (Fusarelli, 2004). In Texas, a study from Texas A&M University showed that overall school performance has improved because of the emphasis on closing achievement gaps, which was a part of Texas's State Accountability system prior to the NCLB legislation (Scheurich, Skrla, & Johnson, 2000).

The No Child Left Behind Act is not without its critics. Most schools that have faced sanctions under NCLB have been urban schools with larger proportions of the African-American, Hispanic and poor students the law was designed to help. With questions about the validity and reliability of standardized tests, some question the accuracy of the data being collected. Additionally, the standard for meeting "Adequate Yearly Progress" (AYP) is a threshold score, rather than a growth measure. The implications of this include the fact that schools can be providing growth for students but be considered failing, while others might be allowing for some regression of students, still remain above the threshold, and be considered successful. Emphasis on the standardized tests, it is argued, is also forcing teachers to narrow the scope of their curriculum, in contrast to the known best practice of bringing relevant experiences into the classroom. A case study of Houston schools showed that emphasis on the standardized test over sound instructional practices actually caused a regression in students' writing skills. Finally, NCLB has reduced students to numerators and denominators. Hattie (2009) shows the negative effect of retention on students, but 9th grade retention in urban schools increased after the passing of NCLB to avoid students being in the Federal accountability reporting for 10th grade (Hursh, 2007).

Schools with larger minority and low socio-economic student populations have more difficulty meeting both Federal and State accountability ratings, and the resulting sanctions against those schools often exacerbates the problems. The Texas Education Agency categorizes school districts by size, with the largest group being primarily urban school districts with 50,000 students or more. Demographically, this collection of 17 school districts has both the largest population of Hispanic, African-American and low-SES students and the lowest achievement scores across all subjects when compared to any other size category (Texas Education Agency, 2010).

When looking at the 200 grade 6-8 middle schools in Texas's largest 17 school districts, ratings on the top and bottom ends of the State accountability system have strong correlations to student population. There were 31 schools in that sample receiving the Academically Unacceptable rating, which is the lowest rating Texas gives a campus. Of those 31 schools, 29 of them have both minority and socio-economically disadvantaged populations of greater than 50% of the student body, and all 31 schools have minority populations of greater than 50 percent. On the other end of the spectrum, thirteen of these schools received the highest ranking, Exemplary, from the TEA. All of these schools have a White student population exceeding 50% and socio-economically disadvantaged populations of less than 50 percent, with the exception of four magnet schools, all of which have student selection criteria.

At the Federal level, using the same set of campuses, 28 schools failed to meet the federal AYP standards. Of those 28 schools, all but three had higher than average Hispanic and/or African-American populations, and all but three also had a large population of low-SES students (Texas Education Agency, 2010). When examining the State-wide AYP data, the link can also be found between schools with high At-Risk populations and failure to meet Federal standards. Of the 368 schools in Texas failing to meet AYP for 2009-10, 298 of them (71%) are Title I campuses, meaning they receive Federal funds for having a high needs population. In addition, 254 of the 368 schools failed to meet the AYP standard due to mathematics performance, while only 156 missed the target for reading performance. There is an overlap within that group of 100 schools, which missed AYP for both math and reading performance (Texas Education Agency, 2010).

The Future of School Accountability

Beginning in the 2012-2013 school year, a new Texas state accountability system, based on the more rigorous State of Texas Advanced Academic Readiness (STAAR) exams, as well as subject-specific end of course (EOC) exams at the high school level has further increased the stakes of accountability and combined the Federal and State systems into a single rating, with schools either earning a “Met Standard” or

"Improvement Required" rating (Texas Education Agency Division of Assessment and Accountability, 2013).

Summary of the Review of Literature

The purpose of this literature review was to examine the existing research across all aspects of student achievement in mathematics and science at the middle school level. Using the structural frame from Bolman and Deal's work, emphasis was placed on the structure of the master schedule. The history of the middle school movement in the United States, as well as the unique needs of the adolescent learner, were explored to make connections with the need to be specific in addressing middle school characteristics and needs. Finally, a summary of the current state of how student success is measured through legislation on school accountability provided the impetus for reviewing student demographic and teacher experience data, which is a part of the accountability summary, and literature, suggests those areas to be relevant causal factors for student achievement.

This review of relevant research and literature shows a need for further analysis and study on the impact of the master schedule on middle school achievement in math and science.

CHAPTER III

METHODOLOGY

This study was designed to measure the impact of schedule reform and schedule type on student achievement in mathematics and science among middle schools in the largest school systems in Texas. The study also investigated whether a particular type of schedule (Block or Traditional) served as an influencer of a school earning a Recognized or Exemplary rating through the Texas Academic Excellence Indicator System (AEIS). More specifically, this quantitative study investigated whether one type of scheduling structure was more beneficial for students in math and science than another when controlling for the variables of total minority student population and average years of teacher experience by campus. This study's purpose was to provide campus and district leaders with information and recommendations when determining a course of action with a master schedule.

Results for this study were obtained from campus results from the Texas Assessment of Knowledge and Skills (TAKS) for the 2009-2010 school year. The assessment results included students taking either the TAKS or TAKS-Accommodated test in math and science, both of which are criterion-based and represent the scope of the curriculum offered for the subjects in which the test was given. Students took the examination based on grade-level, with students in grades six through eight taking the mathematics portion of the TAKS, and students in grade eight taking the science examination. The following research questions guided the study:

I. What is the impact of the structure of the bell schedule on campus-wide achievement in mathematics and science among middle schools in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

II. What impact does the structure of the bell schedule have on math and science achievement by ethnicity among students in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

III. To what degree is the type of bell schedule being used in middle schools in Texas's largest school districts a predictor of State accountability ratings?

IV.

Data Source

Data for this experiment were collected from multiple sources. TAKS achievement data, campus demographic data, and campus accountability ratings were collected using the Academic Excellence Indicator System (AEIS) campus reports available online via the Texas Education Agency. Federal accountability ratings for campuses came from the District and Campus AYP Results Table, made available through the Texas Education Agency's website. The State AEIS report provided the information of averages of students of color, low socio-economic status students, and teacher experience used to categorize the campuses for analysis.

The information used to categorize schools by type of schedule came from open records requests made to each of the 15 school districts with qualifying campuses for the study. These requests were made between January and March, 2012. The researcher reviewed each schedule according to the standards set forth by Canady and Rettig (1996) to place schools into the groups of Block or Traditional schedule.

Drawing from the database of all public schools in Texas, a purposeful sampling technique was used to select the population of the study, using specifically a homogeneous group of schools that came from Texas school districts of at least 50,000 students. This sampling method was chosen over random or quota sampling due to the diversity among schools within the sample (to be explored in more detail later in this chapter), mitigating the possibility of a Type II error that can be present when a homogeneous sample does not accurately reflect the sample population (Bornstein, Jager, & Putnick, 2013). Using this homogeneous sampling technique will also help eliminate the “noise” associated with a random sampling technique, as all of the subjects in the sample will carry some similar characteristics (Bornstein, 2010). The population for this study consisted of qualifying middle schools from the largest school districts in Texas. The Texas Education Agency’s annual Snapshot Report for 2010 created nine different size categories for school districts and collected data for each category. The largest of these categories was districts with 50,000 or more students. A total of 17 districts, representing more than 1.3 million students (slightly more than 25% of the students in Texas) fell into this category. Included in this category were the following districts, listed alphabetically by the major metropolitan area which the district serves: Austin, TX – Austin ISD; Dallas/Fort Worth, TX – Arlington ISD, Dallas ISD, Fort Worth ISD, Garland ISD, Lewisville ISD, Plano ISD; El Paso, TX – El Paso ISD;

Houston, TX – Aldine ISD, Cypress-Fairbanks ISD, Fort Bend ISD, Houston ISD, Katy ISD, Pasadena ISD; San Antonio, TX – North East ISD, Northside ISD, and San Antonio ISD (Texas Education Agency, 2011). Web sites from each of the 17 school districts were used to generate a comprehensive list of middle schools eligible for consideration in the study.

Once the database of all middle schools in the largest 17 Texas school districts had been generated, the criteria were established for schools to qualify for inclusion in the study. The first of the two criteria was that the schools had to have a qualifying accountability rating from TEA, which meant the school had to have opened prior to August, 2009. The second criterion was a grade configuration of 6-8, which aligned with the recommendations of the Turning Points 2000 research referenced in Chapter II. Using these criteria, the final list included 200 campuses. The grade configuration criteria eliminated all campuses from Aldine, Arlington, and Pasadena ISDs, due to their use of a 7-8 grade configuration. There were schools from multiple districts eliminated because they had recently opened and had no 2010 AEIS data available.

Creating the Data Set

Having established campuses eligible for the study based on grade configuration, district size, and the school having an accountability rating for the 2009-2010 school year, data from the campuses were placed on a spreadsheet using Microsoft Excel 2000. The spreadsheet included campus name and district, as well as math and science TAKS passing rates as a percentage. This standardized test data (pulled from AEIS information) was recorded for the following groups as a percentage of those passing the

TAKS for 2009-2010: All students; African American students; Hispanic students; White students; Economically Disadvantaged students. The data represented campus totals, which included all students in grades 6-8 who took the TAKS for mathematics and all students in grade eight who took the science TAKS (science in grades six and seven is not tested using the TAKS).

School demographic data pulled from AEIS included the percentage and total number of students identified as Economically Disadvantaged, African American, Hispanic, and White, as well as the total number of students on campus among both the groups listed and any other demographic groups, i.e. Asian/Pacific Islander or Native American. Next, the average campus-wide teacher experience was pulled from the AEIS and added to the database. The state accountability rating, whether Exemplary, Recognized, Academically Acceptable, or Academically Unacceptable was the final piece pulled from the campus AEIS report. Campus federal accountability ratings were pulled using the Texas Education Agency's Final AYP 2010 Results by District Name report (Texas Education Agency, 2011). This information was added to the Excel 2000 spreadsheet, with schools categorized as either having met the AYP standard or having not met the standard.

Labeling the Data

Using the TEA State Accountability Summary Data, schools with a combined African American and Hispanic population greater than the state average of 62.6% were labeled as High Minority, while schools under that percentage were designated as Low Minority. Using the same report and state average, schools with an Economically

Disadvantaged population greater than the State average of 59.0% were labeled High Economically Disadvantaged population, while those below the average carried the label of Low Economically Disadvantaged. The category for Teacher Experience was also based on the averages from the state AEIS report. Schools with a teacher experience average exceeding 11.3 years were categorized as having High Teacher Experience, while those at or below the AEIS average were labeled Low Teacher Experience (Texas Education Agency, 2011).

For purposes of the analysis, the four different accountability ratings: Exemplary, Recognized, Academically Acceptable, and Academically Unacceptable needed to be reorganized into a dichotomous variable. Accountability ratings for schools are based on the single lowest score among up to 25 factors related to student achievement, student attendance, and participation in standardized tests. For each of the five tested subject areas, the threshold for the rating of Academically Acceptable in 70%, with the Recognized threshold of 80% and a 90% minimum for the rating of Exemplary. Schools exceeding the minimum standard by earning a rating of Recognized or Exemplary were placed in the High category, with schools failing to exceed the minimum by earning ratings of Academically Acceptable or Academically Unacceptable were placed in the Low category.

The final step in the creation of the database was to categorize each school by schedule type. In order to do this, open records requests were sent to each of the fifteen qualifying school districts, asking for the 2009-2010 bell schedules of each of the middle schools in the district. This information was obtained during the spring of 2012. Each schedule was analyzed and categorized into either Block or Traditional based on the descriptions from Canady and Rettig (1996). Schools with any characteristics of a Block schedule, including a modified Block, a 4x4 Block, or any of the derivatives, were categorized as having a Block schedule. Only schools that had the same daily schedule, with all classes meeting daily, were given the label of Traditional schedule.

Data Analyses

The analyses for this study were divided into four sections. In addition to the analysis of descriptive statistics for the sample population, separate analyses were conducted to provide insight into the impact of selected variables on school-wide achievement in math and science, to assess the differences in math and science scores by ethnicity based on schedule type, and to explore the significance of schedule type on school accountability rating. All analyses were done using the data set created in Excel 2000, and each independent analysis was run using the Statistical Package for the Social Sciences (SPSS, Version 22). All analyses were run with an alpha level of .05.

Descriptive Statistics

Initial analyses examined traditional descriptive and frequency data for all variables. Descriptive statistics for the 200 schools in the study were collected and analyzed, including mean scores and standard deviations for the sample population for math and science achievement among the demographic groups of All students, African American students, Hispanic students, and Economically Disadvantaged students. Descriptive statistics were also reported for the demographic information for the population by ethnicity, as well as the teacher experience and accountability rating information. The purpose of analyzing the descriptive statistics was to establish a baseline for further analysis and to examine where values fall in relation to a statistical center through a measure of central tendency (Janes, 1999). Frequency distributions created allowed the researcher the opportunity to test for normality, while information on the variance in TAKS scores were used in meeting the assumptions of later analyses (Coolidge, 2006).

Research Question I

To answer the first research question, which sought to explore the effect of the schedule structure on campus-wide student achievement in math and science, a 2 (Schedule Type) x 2 (Minority Population) x 2 (Teacher Experience) Multivariate Analysis of Variance (MANOVA) was used. The two dependent variables came from campus-wide TAKS passing percentages for all students in mathematics and science. Three categorical independent variables were examined for their significance on the dependent variables, as well as for the significance of their interactions with one another. The first two categories came from demographic data and included teacher experience by campus and the student minority population by campus. The third independent variable analyzed was the campus schedule type, which is categorical as Block or Traditional. Box's Test was used to test the assumption of linearity of covariance matrices. A statistically significant result of Box's Test ($p < .05$) would represent a violation of the assumptions of the MANOVA. For this analysis, the omnibus tests for the highest order procedure were used to examine significant simple main effects, as well as the main effects for factors not included in a significant interaction. After finding significant discovery of significant *p* values at the .05 level, univariate tests were conducted using the Bonferroni adjustment at an alpha of .025 for significance.

Research Question II

In order to answer the second research question, which seeks to investigate the effect of schedule type on math and science achievement by ethnicity, a one-factor, MANOVA was selected. The MANOVA consisted of two groups of campuses based on the schedule-type categories of Block and Traditional functioning as the independent variable, with the dependent variables being the aggregate TAKS passing rates of Hispanic students in mathematics, Hispanic students in science, African American students in mathematics, and African American students in science. Box's Test was used to satisfy assumptions of the MANOVA (seeking $p > .05$) and an appropriate F test was selected to search for significant interaction. For this analysis, the omnibus test was used to examine significant simple main effects. After discovery of significant *p* values at the .05 level, univariate tests were conducted using the Bonferroni adjustment at an alpha of .025 for significance.

Research Question III

The third and final research question examined the impact of the schedule type on state accountability ratings in Texas. For this question, a logistic regression analysis was performed, with the criterion variable as campus accountability ratings and predictor variables of teacher experience as a campus average, minority population as a percentage of the total campus population, and the categorical schedule types. Logistic regression was chosen because of the dichotomous nature of the criterion variable: campuses were categorized as having either exceeded or failed to exceed the minimum standard of the Academically Acceptable rating from the Texas Education Agency. The regression equation was written in order to examine the relationships of the predictor variables to the dependent variable, as well as the impact of each of the predictor variables on the equation (Menard, 2002). First, the null set was examined, and the Wald test was used to show a significant difference in population size for each of the two groups. Each of the IV were then examined for significance. The Nagelkerke R Square was used to consider the variability of the DV as a result of the IVs, and the Hosmer and Lemeshow Test was used to satisfy the assumption of linearity of the regression equation. Finally, the classification table was examined as a comparison to the null model, and a correlation matrix was used to examine the effect of variables on one another.

Conclusion

Analyses for the three research questions were based on the data set of campuses from AEIS reports and schedule information provided by campuses and districts. Table 6 depicts a summary of the analyses for each of the three research questions. Chapter IV of this study will include findings from the analyses described within this chapter.

Table 6:

Summary of Analyses for Study

Research Question	Analysis	Dependent Variable(s)	Independent Variable(s) & Levels	Alpha Level
1	Factorial MANOVA	Campus Math % Campus Sci. %	Schedule Type (2) Teacher Experience (2) Minority Population (2)	.05
2	One Factor MANOVA	Afr. Amer. Math % Hisp. Math % Afr. Amer. Sci. % Hisp. Sci. %	Schedule Type (2)	.05
3	Logistic Regression	Acct. Rating (Cat.)	Teacher Experience (2) Min. Pop. (Continuous) Schedule Type (2)	.05

CHAPTER IV

RESEARCH FINDINGS

This chapter presents analyses of data related to the research questions surrounding the problem statement that students in middle schools appear not to be performing to desired levels in math and science, both as a comparison with other core subject areas of English and social studies, and against peer groups from other developed countries on a global scale. Knowing the impact of structure on an organization's effectiveness, the purpose of this study was to explore the impact of the bell schedule on student performance on standardized tests in mathematics and science at schools representing the largest urban/suburban school districts in Texas, as well as the effect of the bell schedule on school accountability ratings under the Texas Education Agency's (TEA) Texas Academic Excellence Indicator System (AEIS). For this study, both school-wide scores from the Texas Assessment of Knowledge and Skills (TAKS) for mathematics and science and scores by demographic group were analyzed. The remaining data also came from campus and state AEIS reports, including student population by ethnicity and teacher experience by campus, measured by years in the profession. Categorical schedule data came directly from campuses, with schools classified as having either block or traditional schedules. The analysis of data begins with descriptive statistics on the sample population, followed by a series of quantitative analyses to address each of the three research questions individually.

Descriptive Statistics

An analysis of the aggregate data from the study reveals significant differences in student achievement in math and science when categorizing campuses using schedule type, teacher experience, and total minority population, with the variable of minority population being the only one producing robust differences separate and apart from the others. The 200 schools in the sample population come from the 17 largest school districts in Texas and represent the Texas Education Agency's largest classification of districts by size (those with 50,000 or more students). Table 7 represents a distribution of schools by school district. Aldine, Arlington and Pasadena ISDs have no schools in the study because their adolescent learners do not attend a grades 6-8 middle school.

Table 7:

Number of participant campuses by school district

School District	Total Number of Campuses
Houston ISD	34
Dallas ISD	21
Northside ISD	17
Cypress-Fairbanks ISD	15
Austin ISD	14
El Paso ISD	12
Fort Worth ISD	12
Katy ISD	12
Plano ISD	12
Fort Bend ISD	11
North East ISD	11
Lewisville ISD	10
San Antonio ISD	10
Garland ISD	9
Aldine ISD	0
Arlington ISD	0
Pasadena ISD	0

The demographics of the school districts in the sample (Table 8) include a population of more students of color than the state average, as well as more students labeled as Limited English Proficient (LEP), which means the primary language spoken in the home is not English. Teacher experience levels for the school districts in the sample show little change from state averages (Table 9). In total, the schools represented an enrollment of more than 125,000 students.

Table 8:

Comparison of student demographics (grades K-12) between all Texas students and the 17 school districts in the study for the 2009-2010 school year

	Districts in the Study	State
African American Students	18%	14%
Hispanic Students	55%	49%
White Students	21%	33%
Economically Disadvantaged Students	63%	59%
Limited English Proficient Students	23%	17%

Table 9:

Comparison of teacher experience between all Texas teachers and teachers in the 17 sample districts for the 2009-2010 school year

	Sample Districts	State
Average Teacher Experience (years)	11.2	11.3
Percent of Teachers with Fewer than 5 Years of Experience	37.3%	37.0%

Table 8 reflects the fact that the schools in the study are more diverse than the state averages, while Table 9 shows that teachers in the schools being study have less than average experience.

For the analyses being presented, the 200 campuses in the sample population were categorized based on three different factors: type of schedule being used, the experience of the teaching staff, and the percentage of students of color at each campus. All of the categorical information comes from 2010 AEIS reports. Campuses with any form of Block scheduling received the Block Schedule designation. Of the schools in the sample, 80 employ some form of Block schedule, with 120 using a Traditional schedule. Schools with a minority student population greater than the state average of 62.6% received the High Minority Population designation, while schools at or below the state average were classified as Low Minority Population. For this study, 118 schools have the High Minority Population designation, while 82 have been designated as Low Minority Population. Overall, the population of the sample includes 71.2% students of color. Regarding teacher experience, schools with an average staff experience greater than or equal to the state average of 11.3 years received the High Teacher Experience designation, and 63 of the 200 schools carry this designation. The remaining 137 schools have a campus staff averaging less than 11.3 years of experience and have been labeled as Low Teacher Experience.

Descriptive statistics for achievement of the total population of the students on the math and science portion of TAKS are given in Table 10. While there are 200 campuses in the study, the descriptive statistics may show fewer campuses, as not all schools met the minimum student size requirement per demographic group of at least 30 students, with the total number of students by ethnicity being required to make up 10% of the total student population if the school has fewer than 500 students. For purposes of masking individual student data, groups that fail to meet the minimum size requirement are not reported in the AEIS campus report (Texas Education Agency Department of Assessment, Accountability, and Data Quality, 2010).

Table 10:

Descriptive Statistics for Texas Assessment of Knowledge and Skills Performance

Subject	Demographic Group	Number of Campuses	Mean (% passing)	Standard Deviation
Math	All Students	200	81.49	11.25
Math	African American	196	75.33	13.41
Math	Hispanic	200	80.65	9.17
Science	All Students	200	75.59	13.92
Science	African American	186	70.10	14.54
Science	Hispanic	200	73.03	12.59

The remainder of this chapter presents data analyses for each of the three research questions introduced in this study, which are:

I. What is the impact of the structure of the bell schedule on campus-wide achievement in mathematics and science among middle schools in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

II. What impact does the structure of the bell schedule have on math and science achievement by ethnicity among students in Texas's largest school districts as measured by results on the TAKS?

III. To what degree is the type of bell schedule being used in middle schools in Texas's largest school districts a predictor of State accountability ratings?

Research Question I

To address the first research question, a factorial, Multivariate Analysis of Variance (MANOVA) was conducted "[to] determine whether the groups differ on more than one dependent variable" (Gall, Gall, & Borg, 2003, p. 309). The dependent variables for the MANOVA were campus-wide TAKS achievement in math and campus-wide TAKS achievement in science. The independent variables included teacher experience, schedule type, and minority student populations, with all three independent variables treated as dichotomous, categorical variables.

Before conducting the MANOVA, descriptive statistics were analyzed in math and science campus-wide TAKS achievement for each of the categories of schedule type, teacher experience, and minority student population. Table 11 depicts the mean and standard deviation of campus-wide percentage scores on the TAKS for math and science based on the type of schedule being used at the campuses.

Table 11:

Descriptive Statistics for Campus-Wide TAKS Achievement by Schedule Type

Subject	Category	N	Mean (% passing)	SD
Mathematics	Block	80	80.34	10.537
Mathematics	Traditional	120	82.26	11.687
Science	Block	80	73.37	13.566
Science	Traditional	120	77.08	14.009

The results from Table 11 show that, overall, passing percentages appear higher in both math and science in the schools using a Traditional schedule than they are in schools employing a Block schedule, with the schools in Traditional schedules scoring two percent higher than Block scheduled schools in math and almost four percent higher in science. There is also a larger variance of scores for the schools operating under a Traditional schedule than for schools employing the Block schedule. Students show themselves to be passing the math TAKS at a greater rate than science, and the variance in science scores exceeds those of math, which is an expected result considering differences in sample size, as students in grades 6-8 take the math test, while only 8^{th} grade students test in science.

Table 12 examines campus-wide TAKS performance in mathematics and science based on the category of teacher experience. Schools with an average teacher experience meeting or exceeding the state average of 11.3 years are in the High Experience category, while those with fewer than 11.3 years of average experience fall into the Low Experience category. Table 12 shows very little difference in passing rates based on the difference in teacher experience.

Table 12:

Descriptive Statistics for Campus-Wide TAKS Achievement by Teacher Experience

Subject	Category	N	Mean (% passing)	SD
Mathematics	Low Experience	137	81.32	10.601
Mathematics	High Experience	63	81.86	12.641
Science	Low Experience	137	75.18	13.663
Science	High Experience	63	76.51	14.527

The category of total minority student population and its descriptive statistics regarding TAKS achievement in math and science is represented by Table 13. Minority students include all non-White students and are categorized based on the state average minority population of 62.6%, with schools over that number in the High Minority category.

Table 13:

Descriptive Statistics for Campus-Wide TAKS Achievement by Minority Student Population Category

Subject	Category	N	Mean (% passing)	SD
Mathematics	Low Minority	82	90.39	5.910
Mathematics	High Minority	118	75.31	9.856
Science	Low Minority	82	86.74	7.093
Science	High Minority	118	67.85	12.124

Passing percentages appear noticeably higher for both math and science among the schools in the Low Minority category. Additionally, the variance in scores is lower among the schools with a smaller population of students of color.

With three, independent, dichotomous, independent variables, each of the 200 campuses in the study falls into one of eight distinct groups when using all three variables to categorize the schools. Table 14 provides a graphic representation of how many schools fall into each of the eight groups.

Table 14:

Number of Campuses (N) per Category Based on the Independent Variables of Schedule Type, Minority Population, and Teacher Experience

Schedule Type	Teacher Experience	Minority Population	N
Traditional	Low	Low	37
Traditional	Low	High	45
Traditional	High	Low	21
Traditional	High	High	17
Block	Low	Low	17
Block	Low	High	38
Block	High	Low	7
Block	High	High	18

The final groups of descriptive statistics related to the first research question depict the TAKS achievement by subject and categorical grouping. Table 15 provides the mean and standard deviation for each of the eight categorical groupings on the TAKS for mathematics, while Table 16 provides the identical information for the science TAKS.

Table 15:

Campus-Wide Mathematics TAKS Performance by Campus Category Based on Independent Variables

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Traditional	Low	Low	37	90.35	6.477
Traditional	Low	High	45	76.87	8.385
Traditional	High	Low	21	90.00	4.806
Traditional	High	High	17	69.35	14.508
Block	Low	Low	17	90.41	5.557
Block	Low	High	38	73.74	8.519
Block	High	Low	7	91.71	7.610
Block	High	High	18	80.33	7.507

Table 16:

Campus-Wide Science TAKS Performance by Campus Category Based on Independent Variables

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Traditional	Low	Low	37	87.27	7.563
Traditional	Low	High	45	69.38	11.580
Traditional	High	Low	21	85.86	6.077
Traditional	High	High	17	64.41	15.407
Block	Low	Low	17	86.12	7.347
Block	Low	High	38	65.37	10.333
Block	High	Low	7	88.14	7.819
Block	High	High	18	72.50	12.416

An analysis of the data in Table 15 and Table 16 shows the greatest difference in passing rates to be based on the category of Minority Population, with the schools with a lower than average percent of students of color performing at a higher passing rate than those with a higher percentage of non-White students.

Upon conducting the MANOVA for Research Question I, it was discovered that the model did not satisfy the assumption of homogeneity of covariance matrices using Box's Test, with $p < .05$. Because the group sizes in the test were different, there could not be an assumption of robustness because of the significance of Box's test (Field & Miles, 2010), so a covariance matrix was produced. The purpose of this matrix was to examine whether the largest variances and covariances came from the smallest samples (see Table 13 for group sizes), which would produce conservative probability values and therefore provide robustness to the significant findings (Tabachnick & Fidell, 2007). An examination of the covariance matrix found that there was not an inverse relationship between sample size and covariance, so the results could not be trusted. According to Field (2010), Box's test can be disregarded if sample sizes are equal, so a random sample generator was used to produce seven different samples for each of the eight campus categories listed in Tables 15 and 16, for a total of 56 test cases. Once the random sampling of cases had been conducted, the MANOVA and corresponding descriptive statistics were again produced.

An analysis of the descriptive statistics between the randomly sampled groups and the population for the study shows similarity of means, with the largest difference in means among the eight categories in both math and science being the science scores among schools with a Traditional schedule, low teacher experience, and a low minority population (69.38 for the population group in Table 15 and 75.00 for the sample). This was the only mean difference of greater than five points. Tables 17 and 18 show the descriptive statistics for the sample populations.

Table 17:

Campus-Wide Mathematics TAKS Performance by Campus Category Based on Independent Variables for Random Sample in MANOVA

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Traditional	Low	Low	7	87.00	9.832
Traditional	Low	High	7	78.86	7.777
Traditional	High	Low	7	90.71	2.628
Traditional	High	High	7	68.86	12.226
Block	Low	Low	7	87.57	3.952
Block	Low	High	7	74.14	3.976
Block	High	Low	7	91.71	7.610
Block	High	High	7	82.14	7.904

Table 18:

Campus-Wide Science TAKS Performance by Campus Category Based on Independent Variables for Random Sample in MANOVA

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Traditional	Low	Low	7	84.86	8.745
Traditional	Low	High	7	75.00	6.110
Traditional	High	Low	7	86.29	3.773
Traditional	High	High	7	60.29	12.645
Block	Low	Low	7	84.57	4.504
Block	Low	High	7	66.29	10.161
Block	High	Low	7	88.14	7.819
Block	High	High	7	76.86	12.415

Again, this test did not satisfy the assumption of homogeneity of covariance matrices; however robustness can be assumed using Pillai's Trace due to equality of sample sizes (Field & Miles, 2010).

Table 19 represents the results of the multivariate tests for the dependent variables of math and science campus-wide TAKS passing percentages and the independent, categorical variables of teacher experience, campus minority student population, and schedule type. Overall, the model shows statistically significant results at the .05 level for each of the three independent variables in at least one of the interactions. The largest interaction with significance at the .05 level was that of schedule type and teacher experience, and the interaction of the IV of minority population to the DV was also significant. However, only minority population has an observed power greater than the recommended minimum of .8 (Marzen, Hemmasi, & Lewis, 1985). The Pillai's Trace value of .151 means that roughly fifteen percent of the percentage of passing on math and science TAKS is a product of the interaction between schedule type and teacher experience. It should also be noted that the results of the MANOVA using all 200 schools in the population size were similar to those of the sample group, with the only difference in significant categories coming from the interaction of all three independent variables (.041 vs. .063), but with low power and Pillai's Trace values.

Table 19:

Results of Multivariate Tests Using Pillai's Trace

Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Observed Power
Intercept	.993	3232.722	2	47	.000	.993	1.000
Minority Pop.	.507	24.122	2	47	.000	.507	1.000
Schedule Type	.031	.763	2	47	.472	.031	.172
Teacher Exp.	.030	.719	2	47	.493	.030	.164
Min*Sched	.015	.368	2	47	.694	.015	.106
Min*TExp	.030	.721	2	47	.491	.030	.165
Sched*TExp	.151	4.180	2	47	.021	.151	.708
Min*Sched*Texp	.111	2.940	2	47	.063	.111	.546

significant at the p<0.05 level

As a follow-up to the significant interactions in the MANOVA, univariate results were examined at the $p < .025$ using the Bonferroni adjustment. Table 20 shows the results of those univariate tests, with the IV of minority population showing statistical significance with each of the DVs. The interaction of schedule type and teacher experience was significant with science achievement ($p = .024$) and math ($p = .004$). It should also be noted that the univariate analysis of all three IVs was significant at the .025 level for math achievement, though the MANOVA was not significant at the .05 level for the interaction of all three IVs.

Table 20:

Tests of Between-Subject Effects for Research Question One

Source	Dependent Variable	df	F	Sig.	Partial Eta Squared	Observed Power
MinCat	Math ALL	1	130.86	.000	.405	1.000
	Science ALL	1	123.50	.000	.391	1.000
Block*TExp	Math ALL	1	8.41	.004	.042	.823
	Science ALL	1	5.20	.024	.026	.621
Block*TExp*MinCat	Math ALL	1	5.25	.023	.027	.625
	Science ALL	1	1.62	.205	.008	.244

significant at the $p<0.025$ level

Research Question II

The second research question seeks to review whether schedule type alone, independent of any other factors, impacts math and science achievement on one particular ethnic group or another. Both the problem statement and the literature review connected to this research spoke to the need to address the struggles of students of color in math and science. To measure the significance of the structure of the schedule on student achievement by ethnicity in math and science, a one factor MANOVA was conducted. The dependent variables consisted of the percentage of Hispanic and African American students passing the TAKS in math and science, examining each subject separately. The independent, dichotomous, categorical variable was the type of schedule used by the campus (Block or Traditional). Table 21 represents the descriptive statistics related to this MANOVA. It should be noted that, while the population for the study is 200 campuses, only 186 campuses were used for this portion of the study. The fourteen campuses that did not meet minimum size requirements for either the African American demographic group, the Hispanic demographic group, or both were excluded from the analysis.

Table 21:

Descriptive Statistics for TAKS Achievement by Minority Ethnic Group and Schedule Type

Subject	Ethnicity	Schedule	Mean (% Passing)	SD	N
Math	Afr. Amer.	Block	76.16	12.736	113
		Traditional	74.99	13.187	73
	Hispanic	Block	81.37	9.349	113
		Traditional	80.59	8.633	73
Science	Afr. Amer.	Block	70.64	14.298	113
		Traditional	69.26	14.969	73
	Hispanic	Block	74.32	12.902	113
		Traditional	72.21	12.403	73

The data from Table 21 show that, across both subject tests and both ethnicities, there is little difference in the passing percentages and variance based on the type of schedule being used at the campus, though in all four instances the schools on a Block schedule have a higher passing percentage than the schools on a Traditional schedule.

The results of the MANOVA align with the descriptive data from Table 21. The *p* value of .580 from Box's Test of Equality of Covariance Matrices means that there is no statistical significance between the covariance matrices of the dependent variables. This satisfies the assumptions of the MANOVA and means that robustness of the results can be assumed. The researcher selected Pillai's Trace as the measure of tenability of results (Field & Miles, 2010). The Pillai's Trace value of .010 produced an F value of

.437, and a *p* value of .782 was the result for the canonical variable, which is not statistically significant. The partial eta squared of .010 reflects that one percent of the variability in scores among the dependent variables can be attributed to the type of schedule being used.

Research Question III

The final research question seeks to examine the impact of the type of schedule used in a middle school in one of Texas's largest urban districts on the accountability rating the school receives. As stated in Chapter II, schools under the accountability system used in 2010 could earn one of four ratings: Exemplary*;* Recognized*;* Academically Acceptable*;* and Academically Unacceptable. Schools were rated on up to 25 indicators, with the indicator corresponding to the lowest rating category serving as the basis for the campus rating. For purposes of this study, the campuses were divided into two categories: those exceeding the minimum standards and achieving a rating of Recognized or Exemplary, and those that were either at or below the minimum standard.

Because the dependent variable of school accountability rating was dichotomous, and because the three independent variables of teacher experience (dichotomous), minority student population (as a percentage of the total student population), and type of schedule being used (dichotomous) were a combination of categorical and continuous, a multinomial logistic regression analysis was performed (Field & Miles, 2010). The purpose of the logistic regression analysis was to examine the predictive value of each of the three independent variables on the dependent variable when controlling for the other independent variables. The complete data set of the results being reported can be found in appendix A.

In the sample of 200 campuses for the study, which is large enough to produce significant results, 65 of the 200 schools achieved the more desirable ratings category of Recognized or Exemplary for the 2009-2010 school year, while 135 campuses rated as Academically Acceptable (AA) or Academically Unacceptable (AU). Based on these numbers, the predictive classification accuracy of assuming schools rated in the AA/AU category without knowing any other information was 67.5 percent, and the Wald test confirms significance of the difference in population size with $p < .01$. Additionally, the exponentiated (B) value of .481 serves as an odds ratio, meaning that a school is 52% more likely to be classified as Academically Unacceptable or Academically Acceptable than they are Recognized or Exemplary. An examination of the *p* values in Table 22 for variables not in the equation shows that there is statistical significance at the .05 level for only one of the independent variables, "Minority Population." The overall *p* value of .000 for this data shows that there will be some predictive value in the model.

Table 22:

Variables Not in the Equation

Variable	Score	df	Sig.
Teacher Experience	2.494	1	.114
Minority Population	31.944	1	.000
Schedule Type	3.419	1	.064
Overall Statistics	41.472	3	.000

significant at the p<0.05 level

The Chi-square value of 42.945 in the omnibus test of model coefficients demonstrates statistical significance at the .001 level and confirms the predictive capacity of the regression equation. Additionally, the model summary shows a Nagelkerke R Square value of .270, which, on the scale of 0 to 1 used to calculate this particular value means that roughly 27 percent of the variability in the dependent variable (in this case, accountability rating), can be accounted for by the independent variables. The Hosmer and Lemeshow *p* value of .541 is not statistically significant, which also speaks to the regression model having predictive value and satisfying the assumption of linearity, and the small variation between observed and expected values aligns with the significance value from the test.

Table 23 shows the Classification Table from the regression model and shows a predictive value of 75 percent, which is greater than the 67.5 value from the null model in the population without the regression model in place, or without consideration of the independent variables of Teacher Experience, Minority Population and Schedule Type.

Table 23:

Classification Table Using the Regression Model

		Predicted Acct Rating Category		Percentage
		AU/AA	R/E	Correct
Step 1	AU/AA	120	15	88.9
	R/E	35	30	46.2
Overall Percentage				75.0

Based on the information in Table 23, the regression model was able to correctly predict schools in the accountability ratings of Academically Acceptable and Academically Unacceptable at a rate of 88.9 percent, correctly placing 120 of the 135 campuses in that category based on the model. The predictive model correctly placed 30 of the 65 campuses in the category of Recognized or Exemplary, for a rate of 46.2 percent. The overall accuracy for both categories was 150 of 200 campuses, for a predictability accuracy rate of 75 percent.

Table 24 provides the predictive value of each of the three independent variables in the model and shows both schedule type and minority population to be statistically significant predictors at the .05 level, with both a high minority population and a Block schedule being negatively associated with schools earning ratings in the top two categories of Recognized and Exemplary.

Table 24:

Variables in the Equation Using the Regression Equation

							95% C.I. for EXP(B)	
	B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
TExp	.081	.082	.963	1	.326	1.084	.923	1.274
MinPop	-.037	.007	30.331	1	.000	.964	.952	.977
BlockCat	-1.157	.370	9.761	1	.002	.315	.152	.650
Constant	1.562	1.076	2.108	1	.147	4.770		

significant at the $p<0.05$ level

Table 25:

Correlations Among Variables in Logistic Regression

		AcctRatCat	MinPop	TExp	BlockCat
AcctRatCat	Pearson Correlation	1	-.400**	.112	.131
	Sig. (2-tailed)		.000	.115	.065
	N	200	200	200	200
MinPop	Pearson Correlation	-.400**	1	-.138	.187**
	Sig. (2-tailed)	.000		.052	.008
	N	200	200	200	200
TExp	Pearson Correlation	.112	-.138	1	-.053
	Sig. (2-tailed)	.115	.052		.459
	N	200	200	200	200
BlockCat	Pearson Correlation	.131	.187**	-.053	1
	Sig. (2-tailed)	.065	.008	.459	
	N	200	200	200	200

**. Correlation is significant at the 0.01 level (2-tailed).

However, it should be noted that the correlations among the variables (Table 25) show statistically significant correlations at the .01 level between both Minority Population and Accountability Rating (a negative correlation between high minority populations and high accountability ratings) and Minority Population and Schedule Type, with high minority schools correlated to being on a Block schedule. The negative correlation between minority population and accountability rating far exceeds the positive correlation between minority population and schools being on a Block schedule. The implications of these correlations will be discussed in Chapter Five of the study.

For all three research questions in the study, campus-wide minority student population had statistical significance on TAKS performance in both math and science. The descriptive statistics from Table 3, as well as the descriptive statistics from the schools within this study (Table 13), showed the 82 campuses categorized as Low

Minority outpacing the 118 campuses categorized as High Minority by 15% in mathematics and 19% in science, when measured as a campus-wide percentage of students passing. As was stated in chapter one of this study and Table 3, the descriptive statistics from the schools in the study mirror results state-wide. Tables 26 and 27 show the descriptive statistics for math and science achievement for each of the eight categories schools can be classified into based on the three variables. In both math and science, the only consistent achievement result is that campuses with a high population of children of color are being out-performed by campuses with a lower minority student population.

Table 26: Rank by Independent Variables Campus Category on 2010 Campus-Wide Mathematics TAKS Performance

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Block	High	Low	7	91.71	7.610
Block	Low	Low	17	90.41	5.557
Traditional	Low	Low	37	90.35	6.477
Traditional	High	Low	21	90.00	4.806
Block	High	High	18	80.33	7.507
Traditional	Low	High	45	76.87	8.385
Block	Low	High	38	73.74	8.519
Traditional	High	High	17	69.35	14.508

Table 27: Rank by Independent Variables Campus Category on 2010 Campus-Wide Science TAKS Performance

Schedule Type	Teacher Experience	Minority Population	N	Mean (% passing)	SD
Block	High	Low	7	88.14	7.819
Traditional	Low	Low	37	87.27	7.563
Block	Low	Low	17	86.12	7.347
Traditional	High	Low	21	85.86	6.077
Block	High	High	18	72.50	12.416
Traditional	Low	High	45	69.38	11.580
Block	Low	High	38	65.37	10.333
Traditional	High	High	17	64.41	15.407

Summary

Chapter IV has provided data outputs for each of the three research questions in the study:

I. What is the impact of the structure of the bell schedule on campus-wide achievement in mathematics and science among middle schools in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

II. What impact does the structure of the bell schedule have on math and science achievement by ethnicity among students in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

III. To what degree is the type of bell schedule being used in middle schools in Texas's largest school districts a predictor of State accountability ratings?

Data analysis models were created and interpreted using both Gall, Borg, and Gall's Educational Research and Field and Miles's Discovering Statistics Using SAS. Chapter V of this study will provide results, recommendations, and conclusions from the data analyses discussed in this chapter.

CHAPTER V

DISCUSSION, FINDINGS, RECOMMENDATIONS, AND CONCLUSION

The final chapter examines the findings of this study, which uses student and campus achievement data from the Texas Academic Excellence Indicator System (AEIS) to examine the effect of changing the structural frame of a campus on student achievement in math and science. This chapter begins with a discussion of the findings from the analyses of the three research questions in the study, including implications of the findings of each of the questions related to the staffing and scheduling of schools. The chapter concludes with recommendations from the findings in the study, as well as recommendations for future research from the information gleaned in this study.

From the early work of Thomas Briggs when he states, “The junior high school will provide better for the needs of pupils due to individual differences” (1920, p. 70) through the research of Turning Points 2000 and the recommendations of the National Forum to Accelerate Middle-Grades Reform, there has been a need to focus on the adolescent learner. Whether internationally through the TIMSS and PISA data comparing United States students to their peers in other developed nations, nationally through the National Assessment of Educational Progress (NAEP) or at the state and local levels, data on standardized tests reveal a need to improve student outcomes for middle school in math and science (Hechinger, 2010; Institution of Educational Sciences; National Center for Education Statistics, 2009; Texas Education Agency, 2010). Beyond snapshot test results, Ruth Curran Neild’s research (2009) emphasizes the importance of a solid middle school foundation as a key toward ninth grade success and, ultimately, graduation from high school. Therefore, the purpose of this research was to expand on the body of knowledge aimed at improving outcomes in mathematics and science for middle school students.

Urban schools, which are the sample for this study, have demonstrated themselves to be large, open systems, and with that knowledge comes an understanding that school reform cannot happen without the involvement and commitment of multiple aspects and layers of the organization (Senge, 2000). However, there must be a singular mental model upon which the reform or improvement efforts may be built (Bolman & Deal, 1997). There is conflicting research regarding the effectiveness of one schedule type over the other (Galvan Garza, 2001; Hartt, 1997). A 1999 study by the Texas Education Agency acknowledged that school context, more than just the type of schedule being used, has a more significant impact on the success of students when measured quantitatively through graduation rates, attendance, and standardized test scores. The Texas Education Agency's report on Block scheduling in high schools also included a recommendation for including middle schools in future research (Texas Education Agency Office of Policy Planning and Research Division of Research and Evaluation, 1999). Drawing upon the conclusions of the Texas Education Agency's report on high school schedules, as well as works including Prisoners of Time (1994), Turning Points 2000 (1999) and the research of Canady and Rettig (1996), this study examined the impact of the structural frame (i.e. the master schedule) on student achievement in math and science.

In addition to the national and international findings previously mentioned, the achievement data in Tables 1-3 in this study show middle school students specifically in Texas to be struggling in math and science relative to other subjects, and that an achievement gap exists between white students and middle school students of color in these subjects. These tests are part of the graduation and grade promotion requirements for students, increasing the negative effects of poor performance. One of the best ways to counter achievement gaps is with great teaching, as teacher effectiveness has a profound impact on student learning outcomes (Hattie, 2009). Current research is mixed regarding the link between teacher experience and teacher effectiveness (Bol, Stephenson, O'Connell, et al, 1998; Kukla-Acevedo, 2009; King Rice, 2010). Therefore, among the desired outcomes of this study was to examine schedule structures while controlling for the factors of teacher experience and campus-wide student ethnicity.

Finally, the study sought to examine whether the structure of the bell schedule, when accounting for other variables, could serve as a predictor on schools' ability to meet the highest Texas state accountability ratings systems for schools, of which math and science achievement are two of the factors. Texas school accountability has long been in place, and in 2001, Congress passed the No Child Left Behind Act, which brought more emphasis than ever before on school accountability, including the introduction of Federal standards, with which state standards must align, that emphasize students meeting a passing standard on a one-shot test. This new accountability has served as the impetus for schools to examine all of their practices in an attempt to meet the rigors of accountability, including examining the master schedule (Ladd & Lauen, 2010).

The study sought to analyze the following research questions:

I. What is the impact of the structure of the bell schedule on campus-wide achievement in mathematics and science among middle schools in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

II. What impact does the structure of the bell schedule have on math and science achievement by ethnicity among students in Texas's largest school districts as measured by results on the Texas Assessment of Knowledge and Skills (TAKS)?

III. To what degree is the type of bell schedule being used in middle schools in Texas's largest school districts a predictor of State accountability ratings?

Schools selected for the study included 200 qualifying middle schools from the 17 Texas public school districts of 50,000 or more students, which represent the largest size category of school districts in the Texas AEIS snapshot data. These schools were all in at least their second year of operation, and all included a 6-8 grade configuration. The campuses represented the major metropolitan areas of Austin, Dallas/Ft. Worth, El Paso, Houston, and San Antonio.

Demographic data for each school in the study, including student ethnicity by percentage and average years of teaching experience, were gathered through the 2010

AEIS report, which is available online through the Texas Education Agency (TEA) website. The student achievement data for math and science was also derived from the AEIS report, shown as a percentage of students passing the TAKS. Information about the type of schedule being used by each campus came through public information requests to each of the 17 participating school districts, with an examination of the schedule using the frameworks established by Canady and Rettig placing each schedule into the categories of Block or Traditional schedules (Rettig & Canady, 2000).

The remainder of this chapter will discuss the findings of the study, as well as conclusions which can be drawn from the study that contribute to the study of schedules and their impact on student achievement. The chapter will end with recommendations from the study and implications for future research.

Findings

The findings of the analysis presented in this study show that an emphasis on the organizational structure of a school alone through manipulation of the current conventions of a middle school master schedule will not lead to improved student outcomes in mathematics or science. The findings support the Texas Education Agency (TEA) report on Texas high schools, issued in 1999, that recommended schools emphasize the contextual factors of their school communities and student populations when making scheduling decisions, rather than relying on a specific schedule type (Texas Education Agency Office of Policy Planning and Research, Division of Research and Evaluation, 1999). Separate studies done specifically with Texas public schools contradict these findings and draw the conclusion that schools should select one scheduling model over another (Hartt, 1997; Galvan Garza, 2001); however, neither of these studies factor in campus demographic information. It should also be noted that the two studies previously mentioned included some contradictory results, though they were not done on the same grade levels, with one at middle school and one at high school. This finding also supports prior research suggesting that multiple inputs and outputs, including both internal and external factors, should be considered when designing the campus master schedule (Williamson, 1998).

Use of the Block schedule has increased dramatically during the last thirty years, and at the trend toward block scheduling continues (Canady R. L., 1996), even with researchers acknowledging that there is no quantitative basis for the movement to Block scheduling (Zepeda & Mayers, 2006). The qualitative belief systems school leaders have toward Block schedule has led the model to increased use in schools with large At-Risk populations. This move toward Block schedules runs counter to the findings of this study, especially without consideration of other school factors.

While the findings of this study do not support schedule type as a predictor of positive learning outcomes for middle school students in math and science, the analysis did show the minority population of a campus, measured as the percentage of non-White students campus-wide, to be a leading indicator of standardized test results. For all three research questions in the study, minority student population was a significant influencer of math and science test scores, and results also indicate that varying the master schedule is doing nothing to correct the achievement gaps that exist between White students and students of color.

The results of the analyses support the research begun by University of Chicago sociologist James Coleman, who was among the first to acknowledge that the greatest predictors of student success were external factors, including ethnicity (Coleman, 1966), as well as subsequent research on the ethnicity achievement gap (Grogan-Kaylor & Woolley, 2010; Williams, 2011). In the overview of what makes a middle school successful, before even expanding on its seven recommendations, the National Middle School Association (NMSA) in Turning Points 2000 discuss the need to establish a core process upon which the school must be built, and for Turning Points 2000 that core process is the closing of the achievement gap (Jackson & Davis, 2000). One of the key tenets of the Turning Points 2000 recommendations is appropriately staffing a school, then following up with a comprehensive, locally developed professional development plan. Lynn (2006) discusses the need to have a culturally-centered pedagogy, which would serve as a key piece of teacher development. However, schools are lacking that culturally-centered training, which is one of the causal factors of the achievement gap. One of the reasons for this is the concept of mindset, which draws on the work of Carol Dweck. In one study, non-White students were counseled (non-academic) in two different paradigms, and the students counseled in a culturally-centered paradigm of high expectations scored higher on achievement tests than their peer group (Nisbett, 2011). Goodman, et al (2011) cite the "Alienation Gap" as the precursor to the achievement gap, and that schools are not successfully connecting to students at the affective domain, which is a key component of middle schools under the Turning Points 2000 recommendations. This study expands upon the research by demonstrating the influence of the percentage of students of color on school outcomes, even when controlling for other school factors. This finding demonstrates the need to consider minority student population, more so than master schedule, as an organizational factor for school improvement.

The research behind the achievement gap and the struggles of students of color often includes the need to improve teacher quality and development. However, the findings of this research reveals that the experience of a teaching staff does not equate to success on standardized in math or science when viewed in isolation. A review of the research on teacher experience and its effect on student achievement carries with it mixed results. Several studies showed teacher experience to be inconclusive due to the difficulty in controlling for other factors (Kukla-Acevedo, 2009), while one study, when controlling for student demographic factors, saw the experience of the teacher to have a significant effect (Chidolue, 1996). Looking at teachers newest to the profession, the level of teacher experience, particularly teachers in the first year and those in their first five years, impacts student achievement, but that effect is minimized after five years (King Rice, 2010). Guskey (1987) speaks to both teacher experience and the achievement gap in stressing efficacy over experience, but another longitudinal study found a linear relationship between teacher experience and teacher effectiveness up to 20 years of experience (Bol, Stephenson, O'Connell, & Nunnery, 1998). For this study, teacher experience was categorical by campus based on state averages and does not isolate for individual teacher experience. The findings of this study add to the literature in favor of using factors other than teacher experience when selecting new teachers and determining teacher effectiveness.

As previously stated, findings show individual factors of schedule type and teacher experience to have no influence on school-wide outcomes in math and science. However, there was a significant finding when combining factors. Schools with high minority student populations and experienced teaching staffs performed better in both math and science using a Block schedule than they did on a traditional model. This new finding connects to previous research and literature regarding instructional strategies, math and science curriculum, and the nature and needs of African-American and Hispanic learners. Canady and Rettig describe four models of teaching in the Block schedule that they say show effectiveness because, "Students are actively involved in the learning process, and the likelihood that knowledge will be retained is increased." (1996, p. 110). The four instructional models: concept development, concept attainment, synectics, and the memory model, all involve high levels and thinking and planning on the part of the teacher, and Canady and Rettig acknowledge the difficulty of both learning and effectively using these models to produce the positive outcomes for students. A previous study using standardized tests in Virginia found that students of color being taught on a Block schedule by experienced teachers did out-perform their peers under Traditional schedule models (Gill, 2011). In Texas, the TEA requires middle school science students to spend at least 40% of their instructional time in a lab setting, which is consistent with recommendation of experiential learning as a high leverage instructional strategy and would support the finding (Marzano, Pickering, & Pollock, 2001). Additionally, prior research correlates science achievement and reading achievement for students of color, which would support the use of block schedule (Maerten-Rivera, Myers, Lee, & Penfield, 2010). The teacher experience piece is supported in Tomlinson's research, which discusses the need to differentiate but the inherent difficulty in differentiation, particularly during an extended instructional period (Tomlinson, 1999).

The fifth and final finding from the study was that no link exists between schedule type and school accountability rating in Texas under the AEIS for schools in the study. Recall that, while the scope of this study was math and science, school accountability ratings include all core subjects, as well as student attendance and other non-academic factors (Texas Education Agency Department of Assessment, Accountability,and Data Quality Division of Performance Reporting, 2010). The analysis of the study found minority student population, rather than schedule type, to be the primary influencer of accountability rating. This finding stems from the third research question and reinforces the findings from the first two research questions and the supporting literature and speaks to the limitations of the master schedule as the sole factor for organizational improvement, particularly given the struggles of students of color and the nature of this study. Kaufman's Reengineering the Corporation discusses the concern over conventions of an organization stifling creativity. The use of Carnegie Units and traditional methods of testing derived from school accountability keep educational institutions from being able to maximize creativity in meeting the needs of

Hispanic and African-American students, who struggle in school compared to their white peers (Chapin, 2006). The National Middle School Association (NMSA) recommends flexibility of programs and delivery or instruction, with affective emphasis for adolescent learners (Jackson & Davis, 2000), and the results of this portion of the study reflect the challenges schools face in juxtaposing known best practices with the challenges of convention in an accountability driven system.

Recommendations

Bolman and Deal refer to the dangers of, "Subjecting radically different organizations to the same organizing principles", focusing instead on the core process of the organization, which for urban schools should be closing the achievement gap between White students and students of color. The results of this study speak to the work originated by Peter Senge (1990) depicting schools as large, open systems that cannot be given a single, silver bullet answer to achieving better results. Senge points out the flaw inherent from George Orwell's character, Boxer, who tries in the book Animal Farm to solve every situation in the same way. Additionally, Phil Schlechty (2005) describes innovations as being either "sustaining" or "disruptive", with an understanding that any change must be accompanied by the necessary supports and cultural changes. The importance of the structure of an organization is critical to success; however, given the unique characteristics of schools based on leadership style, community needs, the demographics of the students and staff, and perceptual and efficacious data, it is the recommendation of the researcher that schools consider many factors other than schedule, and that the use of a Block schedule be implemented only in the rarest of circumstances. Any decisions regarding schedule forms should be made only after locally developed data monitoring protocols for effectiveness specific to schedule structure have been established.

Cost and logistics of scheduling provide additional reasons the researcher recommends extreme caution for middle schools considering moving from a Traditional schedule to a Block schedule (Lare, Jablonski, & Salvaterra, 2002). In terms of personnel cost, every iteration of Block schedule in Rettig and Canady's Scheduling Strategies for Middle Schools (2000) require more personnel than does a Traditional model, as teachers in this model are required to have additional non-instructional periods. In fact, in a 1984 article, Block scheduling advocate Robert Canady even states that changes to a Block schedule without spending more money are only possible at the elementary level (Canady & Hotchkiss, 1984). Logistically, a Block schedule provides fewer opportunities to customize schedules for students' needs and interests. Rettig and Canady acknowledge the complexities of creating a Block schedule, and Steven Kussin (2008) discusses the need to avoid conflicts in creating a secondary school master schedule by avoiding situations that restrict student movement and maximizing flexibility within the organizational structure.

The body of research supporting the use of flexible scheduling practices for students based on individual need (Association for Middle Level Education, 2014; Carnegie Council on Academic Development, 1989; Jackson & Davis, 2000; National Middle School Association, 2010) overwhelms the conflicting research on the effectiveness of one schedule type over the other. Additionally, Hattie (2009) and Marzano, et al (2001) both recognize individual teacher effects as being most important in determining student achievement. Time on task does matter for student learning and outcomes (Hattie, 2009; Tomlinson, 1995), so within the recommended flexibility might come increased time to accelerate individual students in science or mathematics. This is not, however, a Block schedule, but rather a Traditional schedule model that might include an intervention or acceleration class that is structured to meet individual needs as an enhancement or supplement to the course that is covering the grade-level curriculum. Therefore, the researcher suggests use of a Traditional scheduling model that allows for flexible grouping of students and a clear instructional focus that is data driven (Lezotte & Snyder, 2011) as the structure framework to maximize outcomes for students in large, urban middle schools.

While the Traditional schedule is recommended over the Block schedule among traditional scheduling conventions, the study and related research speaks to the need to innovate within the organizational structure. Turning Points 2000 promotes the use of small learning communities, democratic governance by students, and flexible blocks of time (Jackson & Davis, 2000), and while advisory programs focusing on the affective elements of the adolescent learner can be difficult to schedule and effectively implement (George, 1986), the academic results for students can be significant, and the implementation of an advisory program at the middle school level is recommended.

The results of this study did reveal one area in which there is quantitative evidence supporting the use of a Block schedule over a Traditional schedule, and that is when the Block schedule is implemented on a campus where there is both a high population of students of color and a high level of teacher experience. Based on this finding, it is recommended that school leaders in high-minority schools do consider teacher experience in making hiring decisions, with particular emphasis being placed on monitoring the percentage of new to the profession teachers and teachers with less than five years of experience. Schools should also consider a modified block schedule (Williamson, 1998), which would allow the flexibility of teaching math and science in a Block schedule format while other subjects use a Traditional schedule.

As a final recommendation, emphasis should be placed on sound, research-based instructional best practices over schedule structure, whether using Block or Traditional schedule. In his meta-analyses, John Hattie ranks 138 different factors and their effect on student achievement. Of his top ten, six of these relate to teacher actions, while two represent student actions (both of which are driven by teachers) and two derive from school effects (Hattie, 2009). This speaks to Brophy's assertion that the individual teacher in the classroom profoundly impacts student outcomes beyond structural conventions (Brophy, 1988). Turning Points 2000 recommends emphasis on instructional design, curriculum, and assessment using a backward design process from Wiggins and McTighe (Jackson & Davis, 2000), and such a process, regardless of schedule structure, will positively impact all students.

Recommendations for Future Research

1. The exact study can be replicated using English/Language Arts and Social Studies.
2. The study examined both Hispanic and African American student populations. Table 9 shows African American students performing at an even lower success rate than Hispanic students. Further research should be conducted isolating just one group.
3. With the campus percentage of students of color being a statistically significant influencer of campus performance in the study, the ethnic distribution of teaching staff could be used as a factor to see if there are improved outcomes (Egalite, Kisida, & Winters, 2015).
4. Both the review of literature and the analyses of campus data revealed achievement gaps for students of low socio-economic status and a large degree of overlap between the children of color explored in the study and the low-SES student population. However, the populations are not exactly the same. Further studies could examine the influence of the master schedule on low-SES students.
5. All Block schedules were grouped together into one category. Separate studies can be done differentiation between schools using an A/B block, alternate block, modified block, or accelerated block to examine the effective of each specific type.
6. The database of schools in the study covered the spectrum of accountability ratings. Case studies can be performed on schools outperforming those in their

like demographic/teacher experience group to further research the contributing factors to the success.

7. Principal tenure at the campus could be substituted as one of the factors used in the study, as could per pupil spending by the school district.
8. Zepeda and Mayers (2006) cite increased use of Block scheduling in spite of a lack of quantitative evidence. Future research could include how principals' perceptions of scheduling strategies influence outcomes for students.
9. An analysis of instructional strategies used by teachers working in a Block or Traditional schedule could be analyzed for differences relative to achievement scores.
10. This study could be replicated using the new STAAR test instead of the TAKS.

Conclusion

The high demands of accountability, along with the ever-changing needs of students, certainly qualify urban middle schools as, "Organizations operating in rapidly changing, turbulent, and uncertain environments" that would, "Need much more complex and flexible structures." (Bolman & Deal, 1997, p. 58), and the master schedule can provide the means for those flexible structures. Indeed, the results of this study show that, under certain conditions, the kind of schedule being used does have a significant influence on student achievement in math and science at the middle school level. However, it is not the master schedule alone that must be explored. Student and staff demographics are factors worthy of consideration when designing instruction for students.

While the driver of this research was the master schedule of a middle school, the results supported a need to address student ethnicity with regard to academic achievement above all other factors, and the plight of the Hispanic and African-American student is still public education's greatest challenge. Every analysis within the study showed statistical significance where student ethnicity was a variable. The population of the United States is becoming increasingly diverse. According to the U.S. Census Bureau, 39% of the population will be from a minority race by 2020, and that number will be more than 50% by 2050. With that knowledge comes a need for schools to understand and address culture, including all of the norms and conventions of a people beyond the classroom, in order for students to experience success (Schall, 2010). A Nation at Risk, published in 1983, brought to the fore the achievement gap by ethnicity and its potential economic impact on a national level. This led to increased standards and, ultimately, the accountability era in which public schools currently operate. An analysis of various accountability reforms over the last 25 years found that increased expectations of rigor, standardization of time and curriculum, and increased resources for students with the greatest needs, lowers the achievement gap between white and non-White students. However, the study also found that the achievement gap increased in the 1990s as local and state accountability measures were replaced by federal systems (Harris & Herrington, 2006). Public education will have come a long way when the institution gets to the point where structure is more of a predictor of student success than is skin color.

Teacher experience can play a role in choosing the best type of schedule to be used in a middle school, and there is research to support experienced teachers as producing better outcomes for students (Chidolue, 1996). However, it is still the individual teacher regardless of experience, and that person's ability to connect with students, that has the greatest impact (Jackson & Davis, 2000), and experience and effectiveness do not always correlate. In his meta-analysis of effects on student growth, the majority of John Hattie's high-yield strategies are teacher effects, speaking to the power of the teacher in the classroom (Hattie, 2009). While the teacher is vital, effectiveness and experience do not always correlate. Rather than focusing on experience of teachers, school systems must have in place systems of evaluating, developing and retaining teachers for student growth. Effective teachers are more likely to stay at a campus then are ineffective ones, with the differences in these two groups exacerbated in high-minority schools (Ronfeldt, Loeb, & Wyckoff, 2013). Therefore, school leaders should be looking for effectiveness over experience with teachers and understand that those two characteristics can be exclusive of one another.

The focus of this research has been on improving academic outcomes for all middle school students, with a particular emphasis on those students who have traditionally struggled. While the quantitative analysis has provided a framework and recommendations for school leaders, it must be remembered that, in serving youth in schools in a way that can positively and profoundly make a difference in their lives, there must be a caring heart using the research-based best practices. In one of his final books, long-time Texas A&M professor John Hoyle, when describing the essential role of love, invokes the Greek word *agape*, which is an unselfish love given freely (Hoyle, 2002). Let us all remember the importance of love as a key element of the work done with children and the power of the teacher in the classroom and their ability to make a difference in the life of a child.

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APPENDIX

DATABASE OF SCHOOLS IN THE STUDY

District	School	Math All	Math AA	Math Hisp	Math ED	Sci All	Sci AA	Sci Hisp	Sci ED	SES Pop
Austin ISD	Bailey MS	90	83	86	79	92	91	90	82	30.8
Austin ISD	Bedichek MS	77	73	77	75	66	60	62	60	82.8
Austin ISD	Burnet MS	64	54	65	63	49	44	47	47	94.5
Austin ISD	Covington MS	83	56	83	79	68	58	60	61	64.5
Austin ISD	Fulmore MS	75	76	70	68	70	90	60	60	75.5
Austin ISD	Gorzycki MS	94	95	88	82	94	99	88	57	6.1
Austin ISD	Kealing MS	86	58	79	68	85	59	74	63	43.9
Austin ISD	Lamar MS	79	64	72	69	74	74	57	60	54.6
Austin ISD	Martin MS	67	55	68	66	54	65	53	52	94.8
Austin ISD	Murchison MS	94	83	86	82	85	50	69	59	23.8
Austin ISD	O. Henry MS	86	75	77	72	75	58	61	52	38.9
Austin ISD	Paredes MS	81	75	79	80	72	65	68	68	77.3
Austin ISD	Pearce MS	71	67	72	71	45	41	47	46	96.3
Austin ISD	Small MS	91	78	84	78	91	60	84	80	28.5
Cy-Fair ISD	Arnold MS	87	80	84	80	84	77	74	70	38.0
Cy-Fair ISD	Bleyl MS	86	72	82	77	84	69	74	70	41.9
Cy-Fair ISD	Campbell MS	88	80	85	84	96	90	97	95	54.7
Cy-Fair ISD	Cook MS	91	85	84	84	88	77	80	78	37.9
Cy-Fair ISD	Dean MS	78	67	78	77	76	71	71	74	74.5
Cy-Fair ISD	Goodson MS	95	90	91	88	93	82	89	88	13.3
Cy-Fair ISD	Hamilton MS	97	96	92	93	97	92	87	88	13.0
Cy-Fair ISD	Hopper MS	80	74	81	78	80	73	81	79	68.1
Cy-Fair ISD	Kahla MS	81	77	81	79	78	77	76	73	67.6
Cy-Fair ISD	Labay MS	90	86	85	84	87	86	78	77	43.4
Cy-Fair ISD	Smith MS	84	73	83	79	83	75	78	73	36.9
Cy-Fair ISD	Spillane MS	93	83	92	89	96	90	89	84	13.4
Cy-Fair ISD	Thornton MS	80	74	81	78	80	74	79	75	67.7
Cy-Fair ISD	Truitt MS	85	79	80	77	79	73	73	69	56.3
Cy-Fair ISD	Watkins MS	78	72	72	73	76	72	67	69	60.3
Dallas ISD	Anderson MS	66	60	76	66	57	56	60	57	92.7
Dallas ISD	Cary MS	66	56	67	66	49	62	47	49	90.8
Dallas ISD	Dade MS	66	64	76	66	52	53	48	55	89.9
Dallas ISD	Edison MLC	74	65	79	74	69	60	73	68	89.5
Dallas ISD	Florence MS	55	34	65	55	41	30	48	41	89.5
Dallas ISD	Franklin MS	72	64	71	69	65	68	59	63	72.8
Dallas ISD	Garcia MS	67	64	67	68	60	75	58	60	92.0
Dallas ISD	Gaston MS	77	67	78	77	80	79	78	79	89.1
Dallas ISD	Hill MS	60	48	63	58	65	46	66	60	86.0
Dallas ISD	Hood MS	70	57	73	70	66	61	66	65	96.3
Dallas ISD	Hulcy MS	53	48	66	53	48	45	59	49	89.9
Dallas ISD	Jackson MS	73	70	84	73	59	54	74	59	94.2

Min Pop	T Exp	AYP?	2009-10 Acct Rat	2009-10 Enrollment	2009-10 White	2009-10 Hispanic	2009-10 Afr. Amer.	2009-10 Low SES	Low SES	High Minority	Block	Traditional
49.6	11.1	Y	R	956	431	413	61	294	0	0		X
87.6	13.1	Y	AA	1,021	115	808	87	845	1	1	X	
93.2	10.6	Y	AU	960	50	760	134	907	1	1		X
68.2	14.0	Y	AU	951	274	572	77	613	1	1	X	
82.1	9.4	Y	AA	1,010	158	741	88	763	1	1		X
22.9	10.1	Y	R	834	574	172	19	51	0	0	X	
51.1	9.7	Y	AU	1,240	475	399	234	544	0	0	X	
57.6	13.1	Y	AA	663	256	300	82	362	0	0	X	
97.8	8.5	N	AU	677	5**	591	71	642	1	1	X	
29.1	12.1	Y	AA	1,244	767	300	62	296	0	0		X
49.9	9.0	Y	AU	1,004	481	406	95	391	0	0	X	
83.6	12.7	Y	AA	889	124	663	80	687	1	1	X	
98.0	8.6	Y	AU	457	5**	321	127	440	1	1	X	
37.9	12.4	Y	R	949	530	303	57	270	0	0		X
45.1	11.8	Y	AA	1,507	652	445	235	573	0	0		X
52.4	13.2	Y	AA	1,550	601	486	326	650	0	0		X
65.9	8.0	Y	AA	1,407	294	604	324	769	0	1		X
51.6	10.6	Y	AA	1,434	510	553	187	543	0	0		X
82.2	8.8	Y	AA	1,368	134	933	192	1,019	1	1		X
20.2	10.5	Y	R	1,667	1,120	304	133	221	0	0		X
18.9	11.3	Y	R	1,642	1,217	221	89	213	0	0		X
82.1	7.0	Y	AA	1,443	196	717	468	982	1	1		X
82.2	8.4	Y	AA	1,352	166	766	345	914	1	1		X
58.4	9.3	Y	AA	1,528	484	625	268	663	0	0		X
57.7	7.6	Y	AA	1,106	361	392	247	408	0	0		X
28.0	9.8	Y	R	1,704	1,148	312	165	228	0	0		X
82.8	8.3	Y	AA	1,200	165	678	315	812	1	1		X
67.9	10.9	Y	AA	1,365	258	679	249	769	0	1		X
69.1	9.9	Y	AA	1,284	279	701	186	774	0	0		X
99.8	15.6	Y	AA	464	0**	166	297	430	1	1		X
99.0	17.8	N	AU	490	3**	443	42**	445	1	1		X
99.8	11.0	Y	AU	473	0**	97	375	425	1	1		X
98.3	15.7	Y	AA	934	8**	604	314	836	1	1	X	
98.2	10.6	N	AU	1,141	19**	743	378	1,021	1	1	X	
87.1	11.9	N	AA	1,078	120	704	235	785	1	1		X
98.7	8.4	Y	AA	1,027	8**	968	45**	945	1	1	X	
92.0	9.1	Y	AA	1,058	69	839	134	943	1	1		X
89.8	12.4	Y	AU	865	44**	604	173	744	1	1		X
98.3	9.3	Y	AU	1,381	19**	1,077	281	1,330	1	1	X	
99.1	12.7	Y	AU	696	6**	191	499	626	1	1		X
99.7	10.0	Y	AA	343	1**	66	276	323	1	1		X

District	School	Math All	Math AA	Math Hisp	Math ED	Sci All	Sci AA	Sci Hisp	Sci ED	SES Pop
Dallas ISD	Lang MS	69	61	74	69	71	66	74	70	84.6
Dallas ISD	Long MS	68	54	64	63	55	69	47	49	73.4
Dallas ISD	Marsh MS	86	84	84	85	81	70	80	80	76.3
Dallas ISD	MedranoMS	72	75	72	72	62	***	62	62	96.0
Dallas ISD	Rusk MS	77	57	78	77	73	54	74	73	89.0
Dallas ISD	Seagoville MS	67	65	67	65	54	53	54	52	83.6
Dallas ISD	Storey MS	59	52	67	59	55	46	64	54	92.3
Dallas ISD	Walker MS	91	91	90	90	85	88	83	83	75.2
Dallas ISD	Zumwalt MS	65	60	76	65	65	58	78	65	95.9
El Paso ISD	Armendariz MS	74	***	74	74	63	***	63	61	88.9
El Paso ISD	Bassett MS	79	79	79	79	71	83	69	71	85.0
El Paso ISD	Canyon Hills MS	83	73	83	82	67	50	64	63	78.6
El Paso ISD	Guillen MS	79	***	79	80	67	***	67	67	97.0
El Paso ISD	Henderson MS	74	***	74	73	57	***	57	57	95.7
El Paso ISD	Lincoln MS	84	80	81	76	75	***	73	60	55.3
El Paso ISD	Magoffin MS	81	71	81	80	76	50	77	76	91.3
El Paso ISD	Morehead MS	77	78	75	70	76	***	73	67	67.3
El Paso ISD	Richardson MS	83	77	84	78	80	72	79	75	43.6
El Paso ISD	Ross MS	87	88	85	84	77	86	72	69	69.9
El Paso ISD	Terrace Hills MS	82	74	82	81	75	57	76	72	82.0
El Paso ISD	Wiggs MS	84	63	83	81	72	***	69	63	76.1
Fort Bend ISD	Baines MS	87	83	78	74	82	74	69	65	27.1
Fort Bend ISD	Crockett MS	86	80	83	81	83	78	76	80	33.4
Fort Bend ISD	Dulles MS	87	76	77	75	83	66	70	71	23.8
Fort Bend ISD	First Colony MS	97	90	94	93	92	74	89	87	13.2
Fort Bend ISD	Fort Settlement MS	100	98	100	100	96	83	97	96	6.0
Fort Bend ISD	Garcia MS	92	84	88	88	87	81	82	81	30.2
Fort Bend ISD	Hodges Bend MS	78	77	75	75	70	68	64	67	65.4
Fort Bend ISD	Lake Olympia MS	77	74	75	71	69	62	72	61	42.2
Fort Bend ISD	Quail Valley MS	89	79	86	74	83	77	81	74	26.3
Fort Bend ISD	Sartartia MS	98	92	99	95	96	85	95	80	7.6
Fort Bend ISD	Sugar Land MS	89	87	81	85	85	86	72	78	40.2
Ft. Worth ISD	Daggett MS	66	47	70	67	60	50	60	59	84.0
Ft. Worth ISD	Elder MS	74	97	73	73	63	100	61	61	87.2
Ft. Worth ISD	Forest Oak MS	58	50	62	58	55	39	63	55	83.9
Ft. Worth ISD	Handley MS	63	58	74	62	57	51	67	54	60.0
Ft. Worth ISD	James MS	65	59	62	62	62	58	57	57	80.1
Ft. Worth ISD	Kirkpatrick MS	73	60	74	72	61	56	61	60	92.8
Ft. Worth ISD	Meacham MS	65	50	66	66	57	***	57	56	90.8
Ft. Worth ISD	Meadowbrook MS	63	52	72	63	57	54	59	58	83.1
Ft. Worth ISD	Monnig MS	70	53	71	61	70	48	69	58	54.5

Min Pop	T Exp	AYP?	2009-10 Acct Rat	2009-10 Enrollment	2009-10 White	2009-10 Hispanic	2009-10 Afr. Amer.	2009-10 Low SES	Low SES	High Minority	Block	Traditional
96.8	9.9	Y	AA	1,367	21**	706	618	1,156	1	1	X	
82.9	9.0	Y	AU	1,062	167	789	91	780	1	1		X
90.3	10.7	Y	R	1,197	95	1,002	79	913	1	1		X
98.0	7.9	Y	AU	708	10**	669	25**	680	1	1		X
95.6	8.9	Y	AU	818	8**	682	100	728	1	1		X
75.4	11.8	Y	AU	1,023	248	539	232	855	1	1		X
99.4	8.8	Y	AU	784	3**	373	406	724	1	1	X	
86.5	11.4	Y	R	660	67	433	138	496	1	1		X
98.6	11.6	Y	AA	493	7**	133	353	473	1	1		X
98.6	10.9	Y	AA	791	11**	776	4**	703	1	1	X	
84.0	7.6	Y	AA	891	116	635	113	757	1	1	X	
87.3	10.1	Y	AA	883	100	711	60	694	1	1		X
99.7	12.8	Y	AA	891	1**	886	3**	864	1	1	X	
99.1	10.2	Y	AA	924	6**	913	3**	884	1	1	X	
81.7	10.8	Y	AA	1,103	186	894	7**	610	0	1	X	
95.2	9.7	Y	R	921	40**	839	38**	841	1	1	X	
86.6	10.3	Y	AA	950	117	796	27**	639	1	1	X	
65.4	11.1	Y	AA	801	175	458	146	349	0	0	X	
82.8	9.4	Y	AA	942	147	694	86	658	1	1		X
89.6	10.2	Y	AA	622	59	511	46**	510	1	1		X
92.7	13.3	Y	AA	870	53	798	9**	662	1	1		X
56.1	7.9	Y	AA	1,360	459	391	371	369	0	0	X	
61.5	7.3	Y	R	1,352	384	364	468	452	0	0	X	
39.5	11.9	Y	AA	1,342	414	213	317	319	0	0	X	
22.5	13.1	Y	AA	1,117	426	116	135	147	0	0	X	
12.0	12.4	Y	E	1,094	409	67	65	66	0	0	X	
46.3	11.0	Y	AA	1,360	251	274	356	411	0	1	X	
81.7	11.3	Y	AA	1,392	83	628	509	911	1	1	X	
85.7	11.4	Y	AA	1,335	107	284	860	564	0	1	X	
54.9	9.7	Y	AA	848	182	105	360	223	0	0	X	
17.4	8.9	Y	E	1,269	510	95	125	96	0	0	X	
47.4	11.5	Y	AA	1,412	349	425	244	567	0	0	X	
88.9	8.3	N	AA	381	28**	276	63	320	1	1		X
94.9	11.3	Y	AA	1,083	41**	999	41**	944	1	1	X	
95.7	7.7	N	AU	707	25**	418	259	593	1	1	X	
90.0	7.4	N	AA	638	49**	130	444	383	0	1	X	
89.0	10.9	N	AU	1,189	90	822	237	952	1	1		X
98.1	7.7	Y	AA	513	8**	478	25**	476	1	1	X	
97.6	12.6	N	AA	685	13**	651	18**	622	1	1	X	
93.7	7.8	N	AU	893	35**	447	389	742	1	1	X	
66.8	10.8	N	AU	657	212	228	211	358	0	0		X

District	School	Math All	Math AA	Math Hisp	Math ED	Sci All	Sci AA	Sci Hisp	Sci ED	SES Pop
Ft. Worth ISD	Morningside MS	67	58	80	67	66	59	80	65	87.0
Ft. Worth ISD	Riverside MS	70	67	70	70	63	57	65	64	89.3
Ft. Worth ISD	Stripling MS	80	81	78	79	69	70	63	63	74.1
Garland ISD	Bussey MS	75	75	75	73	68	74	65	64	80.4
Garland ISD	Coyle MS	86	77	83	80	85	70	76	74	34.6
Garland ISD	Houston MS	79	71	80	78	68	63	68	67	88.8
Garland ISD	Hudson MS	86	78	77	78	86	77	79	79	47.6
Garland ISD	Lyles MS	76	70	77	73	75	67	74	71	70.5
Garland ISD	O'Banion MS	83	78	84	82	68	65	66	66	82.6
Garland ISD	Schrade MS	87	82	80	81	86	83	79	80	36.7
Garland ISD	Sellers MS	85	76	84	83	89	84	86	88	78.9
Garland ISD	Webb MS	87	71	87	85	90	88	88	87	46.3
Houston ISD	Attucks MS	72	69	83	72	56	49	76	54	93.3
Houston ISD	Black MS	79	74	80	79	66	57	68	66	91.4
Houston ISD	Burbank MS	91	90	91	91	93	91	93	92	94.1
Houston ISD	Clifton MS	88	81	91	88	87	82	86	88	79.4
Houston ISD	Cullen MS	63	61	72	64	60	56	73	61	91.9
Houston ISD	Deady MS	76	81	76	77	50	50	50	50	91.8
Houston ISD	Dowling MS	70	63	73	70	61	64	59	62	80.6
Houston ISD	Edison MS	78	***	78	77	72	***	71	71	93.6
Houston ISD	Fleming MS	82	82	82	81	86	86	85	86	93.0
Houston ISD	Fondren MS	76	74	78	75	68	66	69	69	86.8
Houston ISD	Fonville MS	75	66	75	75	73	46	74	71	93.5
Houston ISD	Grady MS	84	80	80	81	74	76	63	68	54.6
Houston ISD	Gregory-Linclon MS	68	63	76	67	56	49	63	52	76.6
Houston ISD	Hamilton MS	82	81	80	79	84	88	82	82	75.8
Houston ISD	Hartman MS	83	79	85	84	76	69	79	78	87.4
Houston ISD	Henry MS	75	72	75	74	64	70	62	63	92.5
Houston ISD	Hogg MS	76	79	76	76	62	63	61	58	86.4
Houston ISD	Holland MS	72	65	75	72	71	68	73	71	87.2
Houston ISD	Jackson MS	88	64	89	89	78	63	78	77	94.5
Houston ISD	Johnston MS	91	90	88	88	90	93	82	87	61.2
Houston ISD	Key MS	38	33	49	38	36	34	38	37	90.2
Houston ISD	Long MS	75	66	76	76	61	47	60	62	95.6
Houston ISD	Marshall MS	80	71	80	79	56	53	56	54	88.3
Houston ISD	McReynolds MS	80	69	81	79	82	50	84	81	91.0
Houston ISD	Ortiz MS	78	71	78	77	71	63	71	70	90.7
Houston ISD	Pershing MS	91	86	88	85	85	77	77	72	44.6
Houston ISD	Revere MS	87	84	87	86	88	89	88	87	82.8
Houston ISD	Rice MS	91	91	89	88	88	86	88	86	57.0
Houston ISD	Ryan MS	69	68	75	67	75	79	54	73	95.3

Min Pop	T Exp	AYP?	2009-10 Acct Rat	2009-10 Enrollment	2009-10 White	2009-10 Hispanic	2009-10 Afr. Amer.	2009-10 Low SES	Low SES	High Minority	Block	Traditional
96.1	7.2	Y	AA	517	11**	196	301	450	1	1		X
91.0	7.8	Y	AA	946	58	814	47**	845	1	1	X	
83.9	7.1	Y	AA	521	73	337	100	386	1	1	X	
80.3	10.7	N	AA	806	108	527	120	648	1	1		X
44.5	10.3	N	AA	1,202	589	323	212	416	0	0		X
91.0	9.1	Y	AA	843	66	686	81	749	1	1		X
51.2	9.7	Y	AA	1,234	484	474	158	587	0	0		X
78.9	6.2	Y	AA	938	147	311	429	661	1	1		X
89.1	10.1	Y	AA	1,005	87	688	207	826	1	1		X
49.6	12.0	Y	R	1,321	596	385	271	485	0	0		X
79.3	9.6	Y	AA	848	111	488	185	669	1	1		X
44.2	11.0	Y	AA	1,275	464	319	245	590	0	0		X
99.0	12.0	Y	AA	581	1**	127	448	542	1	1	X	
91.6	6.8	Y	R	547	43**	376	125	500	1	1	X	
98.4	9.9	Y	E	1,214	12**	1,099	96	1,142	1	1	X	
89.6	12.4	Y	R	1,044	94	675	260	829	1	1	X	
99.3	9.0	Y	AA	639	3**	125	509	587	1	1	X	
99.0	12.5	Y	AA	975	6**	945	20**	895	1	1	X	
99.3	8.4	Y	AA	1,432	8**	870	552	1,154	1	1	X	
99.4	13.2	Y	R	843	3**	836	2**	789	1	1	X	
99.8	12.8	Y	R	528	0**	201	326	491	1	1	X	
93.0	9.9	N	R	737	10**	372	313	640	1	1	X	
98.1	10.9	Y	R	1,080	19**	1,002	57	1,010	1	1		X
66.9	8.7	Y	R	471	123	205	110	257	0	0	X	
95.0	15.0	Y	AA	354	14**	111	225	271	1	1	X	
88.4	13.4	Y	R	1,378	135	1,043	175	1,044	1	1	X	
98.9	13.1	Y	R	1,597	13**	1,094	485	1,395	1	1	X	
97.2	7.6	Y	AA	1,026	26**	923	74	949	1	1		X
96.9	8.7	Y	R	816	24**	730	60	705	1	1	X	
98.3	11.2	Y	R	771	11**	498	260	672	1	1	X	
98.7	11.8	Y	R	893	10**	858	23**	844	1	1	X	
80.0	13.1	Y	E	1,426	230	646	495	873	0	1	X	
98.0	14.5	N	AU	543	5**	145	387	490	1	1		X
94.7	9.2	Y	R	773	14**	657	75	739	1	1	X	
98.7	10.7	Y	AA	964	11**	866	86	851	1	1	X	
99.3	8.7	Y	R	602	3**	549	49**	548	1	1		X
92.2	5.3	Y	AA	979	13**	723	179	888	1	1	X	
67.2	11.2	Y	R	1,748	414	532	644	779	0	0	X	
89.1	12.8	Y	R	873	45**	488	290	723	1	1		X
87.9	12.2	Y	E	463	16**	218	189	264	0	1	X	
98.9	7.4	N	AA	364	3**	51	309	347	1	1	X	

District	School	Math All	Math AA	Math Hisp	Math ED	Sci All	Sci AA	Sci Hisp	Sci ED	SES Pop
Houston ISD	Sharpstown MS	80	78	79	80	65	71	63	67	89.3
Houston ISD	Stevenson MS	88	83	88	87	83	82	82	82	88.7
Houston ISD	Thomas MS	72	75	65	72	73	72	73	74	92.1
Houston ISD	Welch MS	75	73	78	75	60	57	63	59	84.5
Houston ISD	West Briar MS	88	80	85	81	80	64	74	69	46.9
Katy ISD	Beck JH	97	89	95	91	94	86	91	90	7.1
Katy ISD	Beckendorff JH	99	98	98	95	96	89	97	88	3.7
Katy ISD	Cardiff JH	84	81	81	80	75	76	68	70	59.6
Katy ISD	Cinco Ranch JH	96	92	93	88	95	86	96	75	10.8
Katy ISD	Katy JH	90	86	85	84	84	70	74	74	39.2
Katy ISD	Mayde Creek JH	84	73	82	81	82	72	80	77	53.3
Katy ISD	McDonald JH	92	83	93	90	91	87	88	89	59.6
Katy ISD	McMeans JH	98	93	95	93	96	90	92	88	11.3
Katy ISD	Memorial Pkwy JH	91	75	88	81	88	79	84	75	21.0
Katy ISD	Morton Ranch JH	84	76	81	80	79	71	75	73	55.1
Katy ISD	West Memorial JH	90	79	85	86	85	81	78	79	36.4
Katy ISD	WoodCreek JH	95	90	93	92	92	83	92	85	7.6
Lewisville ISD	Arbor Creek MS	94	91	88	89	89	79	83	77	15.1
Lewisville ISD	Briarhill MS	98	97	97	97	93	85	100	64	3.5
Lewisville ISD	Creek Valley MS	91	77	84	78	87	65	75	72	20.8
Lewisville ISD	DeLay MS	91	84	92	91	81	80	80	77	86.1
Lewisville ISD	Forestwood MS	99	100	100	100	98	***	88	100	4.8
Lewisville ISD	Griffin MS	87	71	83	83	87	81	81	85	35.2
Lewisville ISD	Huffines MS	95	90	92	91	86	72	82	78	38.4
Lewisville ISD	Lakeview MS	90	88	86	83	80	68	68	70	40.7
Lewisville ISD	McKamy MS	99	94	97	88	97	90	95	83	2.4
Lewisville ISD	Shadow Ridge MS	99	94	99	92	97	90	100	100	3.5
North East ISD	Bradley MS	93	88	91	87	89	79	82	76	20.2
North East ISD	Bush MS	97	93	97	95	97	93	96	95	12.2
North East ISD	Driscoll MS	90	82	87	83	83	63	78	69	35.2
North East ISD	Eisenhower MS	87	81	80	79	81	63	75	65	415.0
North East ISD	Harris MS	82	78	79	77	80	74	74	71	36.2
North East ISD	Jackson MS	85	77	84	81	76	75	71	65	60.9
North East ISD	Krueger MS	83	73	80	79	76	67	71	69	68.4
North East ISD	Lopez MS	98	95	97	92	95	87	92	79	9.1
North East ISD	Nimitz MS	82	70	81	80	69	64	68	68	84.3
North East ISD	Tejeda MS	98	97	96	94	95	89	93	90	11.4
North East ISD	White MS	79	76	78	76	60	59	57	57	75.7
Northside ISD	Connally MS	82	84	82	75	76	77	73	70	42.8
Northside ISD	Hector Garcia MS	93	96	89	81	91	86	86	73	12.1
Northside ISD	Hobby MS	88	70	84	83	86	54	83	74	48.8

Min Pop	T Exp	AYP?	2009-10 Acct Rat	2009-10 Enrollment	2009-10 White	2009-10 Hispanic	2009-10 Afr. Amer.	2009-10 Low SES	Low SES	High Minority	Block	Traditional
94.2	11.3	Y	R	728	10**	576	110	650	1	1	X	
95.3	11.7	Y	E	1,386	35**	1,278	43**	1,230	1	1	X	
98.6	8.4	N	AA	570	4**	140	442	525	1	1	X	
95.5	11.5	N	R	1,159	19**	401	706	979	1	1	X	
60.0	7.1	Y	R	1,310	415	425	361	614	0	0		X
16.9	10.4	Y	E	1,167	770	131	67	83	0	0		X
20.6	10.3	Y	E	1,516	869	249	63	56	0	0	X	
65.5	6.3	Y	AA	1,070	327	548	153	638	0	0		X
27.2	14.1	Y	R	1,080	662	214	80	117	0	0		X
47.2	10.9	Y	AA	1,197	609	447	119	469	0	0	X	
62.8	9.1	Y	AA	1,095	320	485	203	584	0	0	X	
73.5	11.6	Y	R	902	185	463	200	538	0	1		X
20.8	12.0	Y	R	1,214	697	185	68	137	0	0	X	
27.9	14.2	Y	AA	961	595	196	72	202	0	0		X
66.3	8.7	Y	AA	1,255	370	612	220	692	0	0		X
43.2	14.4	Y	AA	794	417	254	89	289	0	0		X
25.8	8.5	Y	E	1,227	780	205	112	93	0	0		X
24.7	13.9	Y	R	820	495	116	87	124	0	0	X	
10.4	12.9	Y	E	971	837	60	41**	34**	0	0		X
29.6	9.9	Y	R	673	258	88	111	140	0	1		X
85.1	10.0	Y	R	633	72	487	52	545	1	1	X	
10.9	13.2	Y	E	652	523	54	17**	31**	0	0		X
38.1	12.3	Y	R	673	380	197	59	237	0	0	X	
49.5	10.6	Y	R	936	421	314	150	359	0	0	X	
41.2	11.2	Y	R	819	436	250	88	333	0	0		X
8.5	11.4	Y	E	1,035	833	53	35**	25**	0	0	X	
10.8	10.9	Y	E	772	601	49**	35**	27**	0	0		X
40.5	11.8	Y	AA	1,245	702	453	51	251	0	0		X
40.2	11.0	Y	E	1,352	699	455	88	165	0	0	X	
54.5	13.3	Y	AA	1,026	433	472	87	361	0	0		X
58.2	12.7	Y	AA	1,155	441	583	89	479	0	0		X
56.9	11.0	Y	AA	1,380	548	636	149	500	0	0		X
77.0	9.8	Y	AA	841	180	605	43**	512	0	0		X
71.6	11.0	Y	AA	1,216	293	742	129	832	1	0		X
32.6	11.1	Y	E	1,124	653	322	45**	102	0	0		X
88.2	9.5	Y	AA	1,051	109	880	47**	865	1	1		X
40.0	10.5	Y	E	1,533	821	534	79	174	0	0		X
82.5	10.4	Y	AA	985	128	519	294	746	1	1		X
70.5	13.4	N	AA	1,020	268	656	63	437	0	0		X
42.0	8.7	Y	AA	1,293	665	485	58	157	0	0		X
60.2	13.8	Y	R	1,004	353	519	85	460	0	0		X

District	School	Math All	Math AA	Math Hisp	Math ED	Sci All	Sci AA	Sci Hisp	Sci ED	SES Pop
Northside ISD	Jefferson MS	91	87	89	88	89	87	85	80	38.6
Northside ISD	Jones MS	88	77	88	87	67	64	67	65	87.5
Northside ISD	Jordan MS	84	74	84	81	81	85	78	77	55.0
Northside ISD	Luna MS	86	85	84	79	83	88	77	73	35.7
Northside ISD	Neff MS	88	86	87	86	81	70	82	77	68.2
Northside ISD	Pease MS	83	83	82	82	63	60	62	59	73.1
Northside ISD	Rawlinson MS	92	87	90	85	91	79	89	82	31.1
Northside ISD	Rayburn MS	78	87	77	76	64	90	60	60	80.4
Northside ISD	Ross MS	80	94	79	78	67	73	65	65	82.1
Northside ISD	Rudder MS	80	77	77	73	74	64	72	64	55.0
Northside ISD	Stevenson MS	89	90	87	83	85	78	80	74	37.5
Northside ISD	Stinson MS	87	81	84	80	82	79	80	70	31.6
Northside ISD	Vale MS	82	83	80	78	77	83	73	69	47.0
Northside ISD	Zachry MS	91	92	89	89	80	79	76	71	57.5
Plano ISD	Armstrong MS	89	80	87	82	77	72	69	66	53.8
Plano ISD	Bowman MS	88	76	88	85	77	58	72	68	65.2
Plano ISD	Carpenter MS	90	80	85	85	83	59	71	73	46.2
Plano ISD	Frankford MS	93	80	81	84	93	85	78	84	24.8
Plano ISD	Haggard MS	97	90	94	89	93	79	87	94	14.5
Plano ISD	Hendrick MS	96	82	92	89	92	83	90	86	20.9
Plano ISD	Murphy MS	96	90	92	92	91	80	77	84	9.3
Plano ISD	Renner MS	95	84	89	90	90	70	79	69	11.9
Plano ISD	Rice MS	99	95	98	95	96	86	100	100	3.8
Plano ISD	Robinson MS	95	81	89	84	92	77	86	90	11.1
Plano ISD	Schimelpfenig MS	97	89	89	94	97	88	93	94	7.9
Plano ISD	Wilson MS	91	78	79	82	90	78	75	76	32.7
San Antonio ISD	Connell MS	67	60	67	67	55	***	55	54	92.2
San Antonio ISD	Davis MS	56	51	59	55	53	47	59	52	95.3
San Antonio ISD	Longfellow MS	71	83	71	70	61	***	60	59	90.4
San Antonio ISD	Page MS	65	25	67	63	66	***	66	64	91.1
San Antonio ISD	Poe MS	72	68	72	70	72	62	73	71	92.4
San Antonio ISD	Rhodes MS	60	65	60	58	53	57	52	45	92.3
San Antonio ISD	Rogers MS	62	57	60	61	52	27	53	50	91.1
San Antonio ISD	Tafolla MS	65	71	65	63	78	***	77	75	92.9
San Antonio ISD	Twain MS	65	46	65	64	50	60	48	48	94.6
San Antonio ISD	Wheatley MS	60	59	62	60	42	41	43	42	98.8

Min Pop	T Exp	AYP?	2009-10 Acct Rat	2009-10 Enrollment	2009-10 White	2009-10 Hispanic	2009-10 Afr. Amer.	2009-10 Low SES	Low SES	High Minority	Block	Traditional
67.2	10.1	Y	R	1,455	417	841	137	561	0	0		X
95.4	8.1	N	AA	1,112	46**	1,009	52	973	1	1		X
80.5	13.3	Y	AA	1,184	182	809	145	651	0	1		X
68.4	9.3	Y	AA	1,368	378	770	165	489	0	0		X
86.3	8.5	Y	AA	1,143	130	903	84	779	1	1		X
88.6	11.4	N	AA	1,124	105	887	109	822	1	1		X
56.2	12.6	Y	R	968	355	482	62	301	0	0		X
90.4	6.9	N	AA	1,061	89	871	88	853	1	1		X
95.4	9.5	Y	AA	1,025	30**	938	40**	842	1	1		X
68.4	13.6	Y	AA	1,141	246	662	119	627	0	0		X
66.1	14.3	Y	AA	1,505	456	887	109	564	0	0		X
61.0	15.8	Y	AA	1,176	355	647	70	407	0	0		X
79.6	8.5	N	AA	1,421	237	967	163	668	0	1		X
78.6	13.9	Y	AA	1,145	212	801	99	658	0	1		X
62.5	9.5	Y	AA	773	233	334	149	416	0	0		X
72.2	11.9	Y	AA	987	218	576	136	644	1	0		X
45.1	11.2	Y	AA	878	389	227	169	406	0	0		X
30.8	11.0	Y	R	1,129	628	194	154	280	0	0		X
19.7	11.4	Y	R	875	600	104	68	127	0	0		X
24.1	10.9	Y	R	865	495	98	111	181	0	0		X
19.8	11.1	Y	R	1,491	739	110	185	139	0	0		X
19.8	12.6	Y	AA	1,240	758	104	141	147	0	0		X
8.1	11.4	Y	E	1,203	521	57	41**	46**	0	0		X
18.5	9.4	Y	R	1,085	547	99	102	120	0	0		X
13.2	9.6	Y	R	953	585	66	60	75	0	0		X
34.6	8.5	Y	AA	975	528	218	119	319	0	0		X
95.2	8.6	Y	AA	665	31**	606	27**	613	1	1		X
96.7	12.1	N	AU	641	19**	340	280	611	1	1		X
96.0	12.3	Y	AA	931	33**	879	15**	842	1	1		X
97.8	9.2	N	AA	416	8**	391	16**	379	1	1		X
98.6	10.6	Y	AA	709	9**	628	71	655	1	1		X
98.4	7.7	N	AU	697	7**	665	21**	643	1	1		X
95.1	14.4	Y	AU	574	27**	505	41**	523	1	1		X
99.1	16.3	N	AA	928	9**	910	9**	862	1	1		X
95.9	9.1	Y	AU	670	23**	624	19**	634	1	1		X
98.3	10.9	N	AU	344	6**	258	80	340	1	1		X