

## **ABSTRACT**

Title of Document:           EXPLORING THE IMPACT OF TRADITIONAL AND  
BLOCK SCHEDULING: AN EXAMINATION OF HIGH  
SCHOOL STUDENT ACHIEVEMENT (ALGEBRA,  
BIOLOGY AND ENGLISH), ATTENDANCE RATES,  
AND DISCIPLINARY INCIDENTS

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The purpose of this study was to examine the extent to which high school scheduling affects students' academic achievement, attendance, and disciplinary incidents. The study compared 2009-2013 data from high schools utilizing the A/B block schedule and high schools using a traditional schedule in a mid-Atlantic state. This study used quantitative methods to describe, analyze, and interpret algebra, biology, and English HSA scores as well as attendance rates and disciplinary incidents from 2009-2013. Correlation coefficients and independent t-tests were conducted to analyze the difference between the two schedule designs with respect to three achievement indicators: algebra, biology and English HSA scores. The findings yielded the following conclusions: (a) students experienced higher algebra scores on the A/B traditional schedule than the block schedule only in the year 2009; (b) students experienced higher biology scores on the traditional schedule than the A/B block schedule in all five years; (c) students experienced higher English scores on the traditional schedule than the A/B block schedule only in 2010; (d) student attendance rates were similar for high schools that use

A/B block schedule and those that use the traditional schedule; (e) disciplinary incidents decreased more for students under the traditional schedule than students under the A/B block schedule in the years 2011 and 2013. Recommendations for research included: recruitment and retention of quality teachers, examine the relationship between school schedules and biology courses, and research additional factors, such as FARMS, socioeconomic, urban/suburban students that may play a significant role in student academic achievement. Recommendations for policy/practice included: utilization of the traditional schedule for biology classes, using part of the teacher evaluation to monitor progress and academic achievement, and to look at students' perceptions and performances in middle and high schools. This should also include teachers' and parents perceptions.

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(ALGEBRA, BIOLOGY AND ENGLISH), ATTENDANCE RATES,  
AND DISCIPLINARY INCIDENTS

by

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## **DEDICATION**

I would like to dedicate this dissertation to my wonderful family. To my husband, Dennis, none of this would be possible without your love and support through this tumultuous educational journey.

To my parents, Arthur and Marquita, you have always told me that I can do anything that I put my mind to. Dad, I guess making me go through each math problem and showing my work paid off. Mommy, thank you for believing in me and being my biggest cheerleader. I am the person that I am today because of the way you raised me.

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Finally, I dedicate this work to God for, without Him, none of this would be possible.

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## **Chapter 1: Introduction**

In President Barack Obama's address to the Joint Session of Congress on February 24, 2009, he declared that there is an "urgent need to expand the promise of education in America," citing education as being critical to this nation's economic recovery and its ability to compete successfully in the world's marketplace. Changes in societal demographics as well as raised expectations of academic achievement require school systems all across America to find more time in the school day for instruction. Changing demographics demand that administrators deal with the challenges of increased immigration, growing minority populations, increased achievement gaps among racial groups, and students affected by poverty, abuse, and mobility (National Association of Secondary School Principals, 2007). When high school class schedules are designed and created, it involves not only the mechanics of schedules but the optimizing of time as an important instructional resource (School Scheduling Associates, 2013).

In many school systems, traditional schedules are being replaced by block schedules (Hamdy & Urich, 1998). Block scheduling is a type of academic schedule in which each student has fewer classes than in the traditional schedule and the classes are for a longer period of time. According to Gallager (2009), the amount of time spent on the process of teaching and learning is critical when contemplating the factors that affect students' retention of knowledge. Gandara and Fish (1996) maintain that teachers are in the best position to understand the variable of instructional time and the need to have more of it. For that reason, the rethinking of the school schedule makes sense.

In 2012, the National Education Association reported that the nation's schools in dramatically increasing numbers were using block or modular scheduling. The

traditional schedule consists of six to eight daily periods while a block schedule uses three or four longer periods of daily instruction. According to several studies (Adrian, 2009; Zepeda & Mayers, 2006), 50% of American high schools have considered or have already implemented some form of block scheduling. The primary purpose of this change was to maximize the use of instructional time that, in turn, would increase academic achievement for all students. Gallager (2009) posits that the amount of time that is spent on the process of teaching and learning is critical when contemplating the factors that affect students' retention of knowledge.

With more and more schools adopting block scheduling as an alternative to the traditional six-to-eight-period day, it is imperative that research determines the effectiveness of this instructional change (Barone, 2004). This study examined the effects of two different types of class schedules (traditional and A/B alternating block) on academic achievement, attendance, and disciplinary incidents in the high schools in one mid-Atlantic state.

### **Scheduling and Accountability**

The Federal Public Law 107-110, known as No Child Left Behind Act (NCLB) of 2001, has forced states and schools to be accountable to “close the achievement gap with accountability, flexibility, and choice, so that no child is left behind” (NCLB, p. 1425). Schools require measurement of student achievement through state assessments, but NCLB does not require or mandate specific programs. This particular law allows local schools and states control over implementation of program development and addressing the needs of their students for the specific purpose of creating and obtaining instruction that is aligned with the state assessments (Schott, 2008).

One area the NCLB dictates that schools address is providing more students “services that increase the amount of quality of instructional time” (NCLB, p.1440) and increase efficient use of school time for learning. Educational leaders should consider different scheduling options in order to find better remedies and solutions in order to increase academic achievement (Queen, 2008). School administrators have begun to closely look at the NCLB legislation and how instructional time could be increased. The high schools’ schedules have become a part of the conversation for improving academic achievement and school administrators are determined to give attention to changing the school day (Bonner, 2012).

The challenge for public schools is being held accountable on the academic level so that when a student enters that school to learn they are able to do so, regardless of their work ethic, ability or level (Griffin, 2004). Students come in each school year regardless of their background or ability with the goal of becoming academically successful (Irvin, Meltzer, & Dukes, 2007). In order to create relationships that are personal and productive, a schedule must be created that will help students learn different concepts and develop a learning environment that is “student centered” (Imbibo & Gilkes, 2002). School officials and administrators should look to see if scheduling, by itself, could make a difference when it comes to student achievement, which is a critical piece in education (Schott, 2008). The economy has played a huge part in reform and how it can be improved when there is such a financial constraint on school officials (The Associated Press, 2008). School administrators are now searching for advice on how to, according to Quint (2006), “fill in the missing pieces” (p. 2) in their methods to ensure fiscal responsibility when it comes to reformation of schools. “Although schedule changes

from block to traditional, or conversely from traditional to block, can be somewhat costly, the financial impact compared to many other school-wide reform initiatives is minimal” (Lare, Jablonski, & Salvaterra., 2002).

### **The Standards Movement**

In 1989, the Governor’s Commission on School Performance in the mid-Atlantic state participating in this study identified issues related to high-quality assessment and called for instrumentation to assess students in grades 3, 5, 8, and 11. The state department of education, in cooperation with local school systems, developed a set of learning outcomes for those grade levels which was adopted in May 1990. The standards movement of the 1990s brought academic achievement into focus in this state. High school graduation requirements with firmly established state-wide standards followed:

In 1992, the State Board adopted new high school graduation requirements that included more stringent math and science content....Next, the state began work on the High School Assessments (HSA), a series of end-of-course tests for high school students that would challenge students to perform at a high level in the core subjects of English, math, science, and social studies. (Maryland State Department of Education (MSDE), 2003, p. 1)

In recent years, the state has adopted stronger K-12 standards and accountability that include the HSA program, which consists of a series of end-of-course exams in various subject areas.

The state board created the HSA program to hold students, teachers, schools, and districts accountable for meeting clear academic standards, as well as to increase

the rigor of academics, strengthen the mid-Atlantic high school diploma, and solidify that graduates have skills and content knowledge. (MSDE, 2001, p. 3)

The state's HSA testing program mirrors a national trend toward “standards-based reforms” that seek to make students accountable for mastering specific skills and content knowledge through exit exams. In fact, 23 states currently require students to pass exit exams before they graduate from high school (Wikipedia, 2013). The federal government requires that all states create tests that hold high school students accountable as a requirement of the NCLB Act of 2001 and President Obama's Race to the Top (Manna, 2010).

It has taken a great deal of hard work for states to adjust their current testing program to match the new federal mandates. The states that have more experience with exit exams have difficulty with matching them with higher standards, which leads to more challenges. New York, Massachusetts, Arizona and Alaska have had high rates of failure, which is causing states to change what they are doing. States are putting on hold the consequences for not passing these exit exams. Some have even gone as far as lowering cutoff scores, changing the content, and providing a different assessment as an option for students.

This mid-Atlantic state faces the same concerns and issues that other states have experienced. Education officials have delayed implementing the HSAs as a graduation requirement because of the low pass rate in many high schools. Presently, all high school students are taking the high school assessments (algebra, biology, English, and government) with some options. If they do not pass the test the first time, they can retake

the test any number of times. This state is in the process of developing a new set of tests to meet President Obama's Race to the Top program.

### **State High School Core Learning Goals**

The HSAs were designed at the state and county level as a series of end-of-course tests for high school students to challenge them to perform at a high level. The state participating in this study created the HSA task force, steering team, coordinating team, and content teams. According to the state, “their work led to the Core Learning Goals, which served as the basis for the HSAs and as the guide to local school system curricula” (MSDE, 2005, p.1).

Since the early 2000s, state students have been receiving classroom instruction based on the core learning goals. High school assessments are a test of students' knowledge of core learning goals in important course content areas: algebra, biology, English, and government. The state has clarified expectations for student learning with the release of the state content standards. At the recommendation of the Visionary Panel for Better Schools, the state further clarified expectations with the development of the Voluntary State Curriculum. This curriculum, piloted in 2003-2004, spanned from kindergarten through high school and ensured alignment between classroom instruction and statewide tests:

With a tightly aligned curriculum and testing program, the state has prepared students well for the individual accountability of the HSA. Beginning with students who entered ninth grade in the 2005–2006 school year, passing scores on all four HSAs are required in order to earn a state high school diploma. (MSDE, 2005, p.1)



## **Statement of the Problem**

With an increased emphasis placed on students' standardized test scores, educators have been looking to address the concerns of instructional intrusions (i.e., fire drills, announcements) and maximize learning. Trying to achieve Annual Yearly Progress (AYP) is becoming increasingly difficult with the passing of each year. AYP is one aspect of the legislation and it entails one of the cornerstones of the federal NCLB legislation. AYP is a measure of year-to-year student achievement. All aspects of education, including the basic structure of the school schedule, are being examined to find the most productive way to deliver instruction (Smith, Jr., 2011). There has been a movement across the states to reevaluate high school schedules due to the pressure of end-of-course assessments. The accountability pushed many states to reassess and look at how they can increase more time during the school day by adjusting the schedule.

## **Purpose of the Study**

The purpose of this study was to use quantitative methods to examine the extent to which high school scheduling affects students' academic achievement, attendance, and disciplinary incidents. Scores on high school exit examinations for algebra, biology, and English are one way of measuring student achievement. The percentage scores of students in a high school passing these exit exams are also used to measure student achievement. Other measures of successful schools include student attendance and disciplinary incidents. Academic achievement and these other measures were examined in this study to enable schools to ascertain the effectiveness of different scheduling in high schools.

## **Research Questions**

The following research questions were developed to provide the structure for data collection and analysis.

### **Research Question 1**

Is there a statistically significant difference in the mean percentage of students passing the algebra exit exam between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 2**

Is there a statistically significant difference in the mean percentage of students passing the biology exam between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 3**

Is there a statistically significant difference in the mean percentage of students passing the English exit exam between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 4**

Is there a statistically significant difference in mean student attendance rates between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 5**

Is there a statistically significant difference in students' mean number of disciplinary incidents between high schools that use traditional scheduling and those that use block scheduling?

### **Significance of the Study**

The study contributes to the research on questions of academic achievement, attendance, and disciplinary incidents based on type of schedule. The relationship to scheduling is important to school boards and superintendents seeking to provide leadership in school improvement and to guard against expensive errors with unproven strategies (Farmer, 2005). The study examined whether a difference exists in academic achievement, attendance, and disciplinary incidents under the two different schedule types.

### **Research Design**

The study used publically available school mean percentage scores on the High School Assessment tests in three core subjects from every high school in a mid-Atlantic state. The criterion for the initial sample was any public school in the state containing at least grades 9-12 and not designated as a center for exceptionality, alternative center, or career and technical center.

### **Definition of Terms**

The following are definitions of terms used in this study. Some of the definitions are specific to the state that was studied.

*A/B Block Schedule (also known as Alternate Day Schedule)*—A form of school schedule that uses four classes, approximately 90 minutes in length, meeting every other day ("A" days) for an entire school year. This is followed by four completely different classes, each 90 minutes in length, meeting on alternate days ("B" days) for an entire year. Each class equals one credit (Baker, 2001; Kelchner, 2003).

***Allocated Time***–The number of hours a student is required to attend school each year. Allocated time can be divided into two categories: (a) instructional time, such as when the student is in the classroom, and (b) non-instructional time, such as when the student is in the cafeteria.

***Block Schedule***–A form of school schedule that uses extended blocks of time for classes. This allows students to take up to eight different classes in a school year. Class time is usually 99 to 105 minutes. The most common types of block schedules are the 4x4 block and the alternate day A/B schedule (Bowman, 2005; Queen, 2003; Snow 2001).

***Carnegie Unit***–A component of measurement representing one credit for completion of a one-year course that meets daily (Cantu, 2002).

***Copernican Plan***–A tri-semester schedule, with students attending four classes a day and completing each class in a twelve-week period (Stewart, 2003).

***Engaged Time (also known as the time-on-task)***–The portion of instructional time that students spend directly involved in learning activities (Crowley, Guetzloe & Johns, 2008).

***High School***–A secondary school composed mainly of grades 9 – 12 in the study sample (Snow, 2001).

***Student Achievement***–A level of student attainment in an academic area as demonstrated by some measure. As specifically investigated in this study, student achievement is the level of learning in an HSA-based academic area as measured by an end-of-course High School Assessment (HSA) test.

*Student Attendance*—The number of days students actually attend school during the 180-calendar-day school year during which students are required to attend school. Any days missed are either excused or unexcused absences. Students must be in class when the bell rings, and if they miss more than 30 minutes of class, they are marked absent. Attendance rates, measured by unexcused absences, are indicators for this study.

*Student Discipline*—The amount of administrative detentions, suspensions, and expulsions a student accrues. Any of these disciplinary actions are usually the result of an incident written by the teacher and followed up by the administrator. The amount of incidents written and suspensions are both indicators for this study.

*Traditional Schedule*—A form of school schedule that uses a six- or seven-period day with classes varying in length from 45 to 60 minutes. Classes meet daily for the entire year (Hart, 2000).

### **Organization of the Study**

This proposal is organized in five chapters. In Chapter 1, the significance, purpose, and statement of the problem are introduced. The definition of terms is also included in this chapter. Chapter 2 presents literature related to the history of scheduling relevant to this study. Chapter 3 describes the research design and methodology. Chapter 4 presents the results of the data analysis, and Chapter 5 includes the conclusions and recommendations for further study.

## Chapter 2: Review of Literature

For the last few decades, educational reformers have continually tried to figure out how to improve academic achievement of students (Todd, 2008). In the efforts to improve, many school districts looked at restructuring time and have experimented with block scheduling. Some argue that by increasing either the length of the school day (which now averages 5.6 to 6.0 hours) or the number of days in the academic year (typically 175 to 200 days), student achievement will be positively impacted (Education Commission of the States, 2010). It has been estimated by some researchers that only about 68% of the school day is actually available for instruction” (Brooks-Gunn, Linver, & Roth, 2003; Leonard, 2001) since the rest of a typical school day is allocated to non-instructional activities including passing time, announcements, and other non-procedural activities characteristic of the typical six- or seven-period school day. Leonard (2001) reported an even more shocking calculation of potential instructional time in a given school day to be “probably less than 47% to 50%” (p. 7). This was based on an earlier, intensive study undertaken by the Austin Independent School District that used randomly-selected observation methods and involved a much larger number of schools. The Pennsylvania Department of Education suggests that, “In a six-hour school day, you have approximately five hours of allocated time for instruction, and lose almost one hour for non-instructional activities to interruptions and distractions from student conduct and administrative processes” (2011, p.1).

There is general agreement that a lot of non-instructional time is wasted in the high school classroom (Arnett, Hallinan, & Kubitschek, 2005; Black, 2002; Cepello & Mulholland, 2006; Metzker, 2003). Many feel that the answer to remedying this problem

may lie in the physical restructuring of the typical high school day to allow for more concentrated instructional time (National High School Center, 2007) or to accommodate flexible scheduling (Farbman, 2011), extended day (Silva, 2007), or block scheduling (Freeman, 2001). Black (2002) cited a Villanova University education professor who delineated the math:

Begin with a six-period day, he tells teachers in his courses, and then subtract three minutes per period for such administrivia as taking attendance and signing passes. That's 18 minutes lost every day, which quickly compounds to 90 minutes a week, 360 minutes (six hours) a month, and 3,240 minutes (54 hours) at the end of nine months. By the time a student graduates, those three minutes each day add up to 38,880 minutes or 648 hours—more than 16 weeks of lost class time. (2002, p.2)

Since high schools use different scheduling methods, it is possible that the type of schedule might impact the amount of time spent in instruction and, ultimately, result in better student outcomes. The purpose of this study was to determine if academic achievement, attendance, and discipline are related to the two most common high school schedule models as they are currently implemented.

Since schools must make AYP in order to avoid corrective action status, officials at the state and local levels are requiring schools to research ways to improve student performance. In the mid-Atlantic state participating in this study, high school examinations measure students' academic performance in algebra, biology, English, and government. This study examined the effectiveness of scheduling in secondary schools as it affects student success on these exit exams.

## **History of Scheduling**

The Carnegie unit provides a framework for standardizing the amount of time needed to earn one course credit, typically 120 hours (The Carnegie Foundation for the Advancement of Teaching, 2007). This drive toward standardization was influenced by the scientific management era of the early twentieth century, which emphasized efficiency, mass production, and work uniformity. The practice of providing classes every day for the same amount of time was created during that time as an organizational solution to the problem of efficiently educating large numbers of students (Hackmann, Harmson, Pliska & Ziomek, 2003). The traditional high school schedule has remained unchanged for the past 70 years.

During the 1980s, the emphasis was on “restructuring” schools to make them more efficient. Rossmiller (1983) reported that observations by a number of researchers suggest that only about 60% of the school day is actually available for instruction. Gilman and Knoll (1984) calculated that “a fair estimate of the average time devoted to instruction during a school day is probably less than 30%.” Consequently, many state legislators began looking at the length of both the school day and the year. Despite this fact, during the 1980s not a lot was said about restructuring time.

During the 1990s, some theorists seriously began to think about how time was being utilized in schools. Carroll (1990) stated that “at no other time, whether at school or at work, is anyone placed in such an impersonalized, unproductive, frenetic environment as in a typical high school” (p. 365). Teachers were lecturing too much and made no attempt to connect what they were doing each day to a larger context. As the tension increased between implementing reform measures and adopting a back-to-basics



philosophy, some school leaders began thinking about what could be done to really change what was happening in the classrooms (Shortt & Thayer, 1999). Cawelti (1994), in *High School Restructuring: A National Study*, provides a broad national picture of the overall high school restructuring movement and the innovation known as block scheduling within that movement. He identified block scheduling as one of the seven primary indicators of major restructuring occurring at the high school level. Thus, scheduling became a major catalyst for change in the restructuring plans of high schools across America (Canady & Rettig, 1995).

During the 2000s, research on the block scheduling suggests advantages and disadvantages when compared to the traditional high school class schedule. Moreover, lack of conclusive evidence made it difficult to readily support one schedule over the other. Most research focuses on quantitative data to demonstrate the success of the schedule, with less focus on qualitative data in the form of perceptions, opinions, and feedback from students and teachers experiencing these schedules (Schultz, 2011).

According to Barone:

The fact that for the last 100 years the traditional high school schedule, consisting of six to seven periods per day, each period lasting 42 to 50 minutes, has remained somewhat unchanged leads to the conclusion that this schedule is appealing to educational reformers. But critics of the traditional schedule hint that it has remained unchanged because it solves administrative and institutional disputes and has little to do with making sense of the different types of learning that school students endure. (Barone, 2004, p. iii)

## **Present-Day Schedules**

A high school's educational structure is reflected in its class schedule for assigning daily instructional time and the length of the courses (Grosshans, 2006). When a school changes the way time is used, it can greatly impact the school's everyday activities. This is one reason that researchers are interested in how high school teachers use their time on a daily basis (Grosshans, 2006).

The two types of common instructional scheduling include single period (also called traditional schedule) and block scheduling. While the researcher completed her high school years and student teaching in a school which followed a traditional schedule, she is now an administrator who creates and works on block scheduling. The researcher sees the advantages and disadvantages for each type of schedule, but often questions which schedule will help ensure that students excel academically. Changes in scheduling format in neighboring states and the frequent resurfacing of this state's staff discussions demonstrate that this is an issue that is still up for debate and does not yet have a clear answer.

The question of what schedule (traditional or block) is best for students academically is an important question for discussion by both administrative teams and teachers since the perceptions and attitudes that both groups hold toward an educational method are likely to have an impact upon the efficacy of that method (Schultz, 2011). A move from traditional schedules to block schedules at the high school level is an important subject for the high school faculty to discuss. Schools must provide schedules that meet the individual needs of students during the school day in order to create successful outcomes (Metzker, 2003).

Block scheduling is not a new idea and some believe that a transition to a block format has increased in the United States (O'Brien, 2006). While school principals realize that there is no magic pill that will cure our educational challenges, some have discovered that block scheduling can be an effective educational tool when used the right way (Mowen & Mowen, 2004). According to Barone (2004), the block schedule can give even the most disorganized students a chance to do well and keep up with their assignments and projects.

One approach to scheduling classes involves manipulating class-time allotments into one of many possible schedule types. The typical high school schedule has traditionally been organized around seven 45- to 50-minute periods each day of the school week (Hackmann, Harmston, Pliska, & Ziomek, 2003). Teachers have been encouraged, by using block schedule, to rely less on direct teaching methods, such as lecturing, and more on allowing students to work in collaborative groups and in other student-directed activities. The present rigid traditional schedule has proven inadequate to facilitate these teaching methods. Therefore, many secondary schools have begun investigating alternative models of schedules typically referred to as "block-of-time or block scheduling" (Dunham, 2009).

Block scheduling is not a new phenomenon. It has been widely used in British Columbia, Ontario, and Alberta since the 1970s. In the United States, during the late 1980s, reformers attempted to make schools more efficient and effective by imposing additional graduation requirements and changed the order and delivery of curricula. From 1989 to the present, block scheduling has been seen as a centerpiece of high school restructuring efforts.

Making schools more effective was the primary purpose in the 1980s (Cobb, Gliner, Lewis, Schmidt, & Winokur, 2005). Among the topics of conversation that school reformers encouraged was how much time should be allocated for learning. Some called for longer school days and school years, and others suggested drastically changing the way instructional time is used and instruction is delivered (Fisher, Hoover & McLeod, 2003). Throughout the final two decades of the 20<sup>th</sup> century, school administrators and teachers were criticized regarding the inefficient and ineffective use of school time (Lawrence & McPherson, 2000).

According to Queen (2000), students' schedules have been based on tradition, rather than proven educational methods that work in our educational system. Untold numbers of Americans have gone through an educational program for the sole purpose of earning Carnegie units when, in fact, Carnegie units should be defined as "accumulated seat time." If students are taking several classes plus a homeroom and a lunch period, they will be in nine different locations pursuing nine very different activities during the course of approximately a 6-1/2 hour school day. This creates an impersonal atmosphere for students resulting in minimal meaningful interaction with an educator. Under this Carnegie system, teachers cannot teach effectively and some students will not learn (Cantu, 2002; Todd, 2008).

An alternative format of scheduling, the Copernican Plan, was developed by Joseph M. Carroll, former superintendent of Massachusetts Masconomet Regional School District. According to Carroll, the traditional style of schedule is limited, "it prevents teachers from teaching well and students from learning well and under this traditional schedule, teachers cannot deal meaningfully with every student every day" (Education

World, 2001). In Carroll's plan, a student has just two classes per day—each for 180 minutes. The course is accelerated and completed in just 30 school days. This method enables students to concentrate on just two classes at a time. Every 30 days, the schedule for every teacher and student changes (Stewart, 2003).

The Copernican Plan fundamentally changes the way an educator uses his or her time in the classroom. The students take fewer classes per day and have more interactions with the same teachers. This can create a classroom environment that is manageable for both the teachers and students and can result in greater academic success (Cantu, 2001; Zychowski, 2002).

In 1983, with the publication of *A Nation at Risk*, teachers, parents, and school board members finally decided that there should be a better way to educate children. Throughout this time of inquiry and change, teachers warned that the only emphasis should be on the improvement of teaching and learning and not just changing the amount of time students spend in the classroom (Queen, 2000).

Adopting block scheduling is a significant change for teachers and administrators to face and thus can prove to be a difficult concept to sell to all stakeholders involved in the process. In order for a paradigm shift to occur, the rationale for the change to block scheduling must be supported by both research and actual proof (Massachusetts Department of Education, 1995). When considering a change, one of the first problems to be addressed is the fact that America's schools run out of time in the classroom. Administrators try to force-fit too many educationally sound ideas and strategies into preset schedules which have not been changed for decades. Additionally, all involved in

the implementation of block scheduling must remember that structured learning time has to be protected at all costs (Hale & Rollins, 2006).

Principals and other school-level administrators considering changing to block scheduling must have a thorough knowledge of the processes and philosophies of this form of scheduling and be able to present a convincing argument to all stakeholders. Principals must possess the leadership that parents and students look to for answers (Snow, 2001). This is a heavy burden, but one which is assumed willingly by all school leaders in the hope of helping ease the transition of students from middle school to high school, create opportunities for teachers to collaborate and share knowledge and methods, and allow students time to learn and experiment in an unhurried atmosphere (Kerr & Letgers, 2001).

### **Models of High School Instructional Scheduling**

A properly built master schedule is essential when block scheduling is being considered. Careful planning will produce a well-constructed schedule that unites curricular objectives, student course requests, and faculty strengths and preferences in an appropriate balance (National Association of Secondary Principals, 1996). To gain the success needed, advocates propose a block master schedule that accomplishes three main intentions:

- Foster a teacher classroom and work behavior that supports greater student involvement in the learning process.
- Create better working conditions for students and teachers.
- Do not lower standards.

There is a hope that if changes are made that allow new strategies to be implemented in the structure, student achievement will improve (Pisapia & Westfall, 1997).

Although the variations of block scheduling are numerous, all forms of block scheduling carry one common feature—extended classroom periods of time beyond that traditional 50-minute class period (Arnold, 2002). The following types are examples of the different types of high school instructional schedules.

**Traditional Single Period Schedule**

The traditional single period schedule consists of six, seven, or more daily classes, varying between 40 to 60 minutes in length (Andrews, 2003). The typical traditional single-period schedule is displayed in Table 1. The advantages of the traditional single-period school include familiarity with the same schedule every day, appropriate length of time, and daily contact with students. The disadvantages of the traditional schedule are constant disruption of class changes, discipline incidents and the monotony of the same class every day.

Table 1  
*Traditional Single Period Schedule*

Period	Day 1	Day 2	Day 3	Day 4	Day 5
1	Course 1	Course 1	Course 1	Course 1	Course 1
2	Course 2	Course 2	Course 2	Course 2	Course 2
3	Course 3	Course 3	Course 3	Course 3	Course 3
4	Course 4	Course 4	Course 4	Course 4	Course 4
5	Course 5	Course 5	Course 5	Course 5	Course 5
6	Course 6	Course 6	Course 6	Course 6	Course 6
7	Course 7	Course 7	Course 7	Course 7	Course 7
8	Course 8	Course 8	Course 8	Course 8	Course 8

## **A/B Block (Alternating Day) Schedule**

In the A/B Block (alternating day) schedule, students receive instruction in one-half of their courses on rotating days and continue in these courses throughout the academic year. In this model, a student might sign up for classes 1-4 and 5-8 in an alternating day arrangement (Hackmann et al., 2003; Schott, 2008).

The A/B Block schedule shown in Table 2 includes a basic and modified schedule. In this plan, students and teachers meet in three to four 90 to 120-minute classes on alternating days (Hogan, 2005). The advantages are that teachers have the same students for each course and the longer class period provides a greater opportunity for teachers to assign, monitor, and assess homework (Dunham, 2009). The disadvantages of the A/B Block (Alternating Day) schedule stem from perceptions that there is less time to complete the required curriculum using this schedule, and that yearlong programs (i.e., band, choir) are difficult to fit in with this schedule. Additionally, the unevenness of scheduling classes that alternate each week can cause students to be confused about which classes are on Mondays and which are on Tuesdays. (Hogan, 2005).

Table 2

*A/B Block (Alternating Day) Schedule*

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Period	Day 1	Day 2
1	Course 1	Course 5
2	Course 2	Course 6
3	Course 3	Course 7
4	Course 4	Course 8

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### **Accelerated (4x4) Block Schedule**

The accelerated (4x4) Block schedule divides the school year into two semesters (Schott, 2008). The school day is divided into four instructional periods, each approximately 90 minutes long. During the first semester, students meet daily in four courses that would have been stretched out over a full school year or 180 days in the traditional schedule. In this 4x4 plan, the content of these four courses is compressed into one semester of extended time periods. At the end of the first semester, students receive full credit for each course successfully completed. They then enroll in four additional courses for the next semester (Andrews, 2003). Table 3 shows the accelerated (4x4) Block schedule.

Table 3

*Accelerated (4x4) Block Schedule*

Traditional Class	Block Scheduling	
	Semester 1	Semester 2
Period 1	Course 1	Course 5
Period 2		
Period 3	Course 2	Course 6
Period 4		
Period 5	Course 3	Course 7
Period 6		
Period 7	Course 4	Course 8
Period 8		

The advantages of the accelerated block schedule are that the teachers work longer with a group of students and they have fewer students. Teachers have fewer preparations and new students enter the class in the middle of the school year (Hogan,

2005). The disadvantages are that there is less opportunity to give homework and complete the curriculum and year-long programs are cut short (Bowman, 2005).

### **The Trimester or Other Intensive Scheduling**

The Trimester plan (or Quarter-on/Quarter-off) and the Extended-Time plan, sometimes referred to as the Reconfigured School Year Model (Schott, 2008), constitute other intensive scheduling models. For the Trimester plan, the students take two or three 120-minute classes for 60 days along with two or three traditional-length classes for the entire year. The advantage of this model is that it accommodates classes such as band, orchestra, and choir that need yearlong contact with students while maintaining a weekly 4 x 4 Semester plan for core classes (Hogan, 2005).

The Trimester plan gives the perception of less time to complete the required curriculum, and yearlong programs such as band, orchestra, and choir can be cut short. With the Extended Time plan, the school year is divided into three segments that generally include two 75-day blocks and one 30-day block. The 30-day block may appear between the 75-day blocks or at the end of the school year. During the 75-day block, students enroll in three or four 90 to 120-minute courses daily. During the 30-day segment, students can work in concentrated remediation or enrichment activities (Hogan, 2005; National Education Association, 2012). Table 4 outlines the Trimester schedule.

Table 4

*Trimester Schedule*

	60 Days	60 Days	60 Days
Period 1	Course 1	Course 6	Course 11
Period 2	Course 2	Course 7	Course 12
Period 3	Course 3	Course 8	Course 13
Period 4	Course 4	Course 9	Course 14
Period 5	Course 5	Course 10	Course 15

**Modified Block Schedule**

With the Modified Block schedule, students register for two or three 90-minute blocks and varying 45-split classes, which is known as the modified block. Table 5 outlines the Modified Block schedule. High schools that have adopted the Modified Block schedule have enhanced the academic environment by increasing the number of courses that a student can complete in a four-year period (Schott, 2008).

Table 5

*Modified Block Schedule*

	Day 1	Day 2
Period 1	Course 1	Course 1
Period 2	Course 2	Course 5
Period 3	Course 3	Course 6
Period 4	Course 4	Course 7

**Advantages of Block Scheduling**

Gallagher (2009) indicates there is a relationship between class time and learning. Longer blocks of time for teacher/student interaction are believed by some to increase both the quantity and quality of teaching (The Core Academic Learning Time Group,

2002). According to Dunham (2009), block scheduling facilitates the improved instruction because it facilitates the use of varied instructional strategies. This has helped address a range of students' learning styles as compared to the traditional lecture that is prevalent in today's high school classrooms. Canady and Rettig (2000) believe that block scheduling can also help teachers and students focus on whatever task is given at that time. In the process, Kelchner (2003) reports that graduation rates have increased, discipline incidents are lower, and dropout rates have diminished. In addition, block scheduling limits the number of classes a student may take at any given time; therefore, the opportunity to immerse oneself in a course during the extended period is particularly inviting (Queen, 2002).

At Angola High School (Indiana), the principal, Rex Bollinger, after comparing data for two years prior to and after initiating the 4x4 block schedule, concluded the following about the block schedule:

- Students' grade point averages increased in all subjects.
- Students earned higher state proficiency exam scores.
- Students made significant improvement in ACT College Board scores and the SAT scores showed no changes.
- Attendance improved for motivated students.
- Fewer disruptions in classes, because of minimal class changes (Chaika, 2006).

While change was noteworthy after the two-year practice, researchers advocate an analysis of data after a three-to-five year implementation of any schedule (Learning Point Associates, 2004). Supporting this premise are school data from Thomas Edison High

School (Fairfax County, Virginia) that showed the following after five years of 4x4 block scheduling:

- Students' SAT scores rose from a combined average of 978 to 1,029.
- The percentage of students who earned a 3 or higher on Advanced Placement exams rose from 70% to 81%.
- The dropout rate decreased from 8.5% to 5.9%.
- The percentage of students who earned an Advanced Studies Diploma increased from 51% to 60% (Canady & Rettig, 2000).

Studies examining the additional benefits of fewer blocks of longer instructional time have demonstrated, "heightened student success rates because students seem to learn more and retain it better" (Glencoe & McGraw-Hill, 2006, p. 1). In fact, research conducted by Stronge (2007) strongly suggests that instructional time may be the essential key to student performance. In addition, offering blocks of more concentrated instruction may have a positive impact on discipline problems (fewer class changes mean fewer opportunities for disruptive behavior). With block scheduling, instructional time is increased (an hour of instruction may be gained each week in a four-block class format), allowing students to take courses they normally would have taken during a traditional summer school. Additionally, other individualized, special programs may be more easily scheduled (Dunham, 2009).

Overall, the following are purported benefits of following a block schedule:

- Increases length of class periods
- Enables teachers to use a variety of instructional approaches
- Decreases the number of class changes

- Saves time
- Limits the number of preparations for teachers
- Provides the opportunity for interdisciplinary teaching
- Decreases the number of students taught each day by an educator
- Increases planning time for teachers
- Helps teachers to develop closer relationships with their students
- Provides the opportunity for project work
- Provides additional opportunities for teachers to help students

Is block scheduling the only way to achieve more available instructional time?

Some think not (Bottge & Gugerty, 2004). Ultimately, student achievement may depend less on how the school day is partitioned than on what teachers and students accomplish in the classroom (2004).

The process of making the transition from traditional to block scheduling is probably the biggest challenge for schools and administrators. Specifically, building support for altering tradition, especially established routines, and finding or creating the planning time are needed to actually make the change. According to Kelchner (2003), "Imposing a scheduling model on a school will not ensure success" (p. 1). He recommends a minimum of two years of planning time before implementation to make sure the new schedule meets the needs of all concerned.

### **Disadvantages of Block Schedule**

A review of the literature on block scheduling would not be complete without including disadvantages of the method that have been identified. Queen (2000) noted that the major problem in block scheduling is the limited use of appropriate instructional

strategies. He found that the lecture method remained the most widely used method in schools. Teachers resorted more and more to the lecture method as a way to cover curriculum in preparation for state-mandated tests. If teachers are not trained in the use of appropriate instructional strategies for use with the block schedule, they often will use the longer periods as busy time or a time for students to complete homework (Queen, 2000). Kenney (2003) also found that the extra time associated in lengthier block format classes was frequently used as busy time or study-hall-type instruction, rather than in-depth or alternative teaching strategies that benefit students.

In Banville and Rickard's study (2005), 15 physical education teachers overwhelmingly saw block scheduling as a positive curricular change. They reported that they were able to do multiple activities in the same class and felt they were able to incorporate a wider variety of the curriculum than with the traditional schedule. The teachers were able to see better skill development in their students because the block scheduling allowed more time for repetition.

Adequate staff development time is also essential for successful teaching with block scheduling (Canady & Rettig, 2000). These authors indicate that teachers who have taught for years in 35- to 50-minute time blocks need help in gaining the necessary strategies and skills to teach successfully in larger blocks of time. The researchers observe that teachers who are most successful in block scheduling typically plan lessons in three parts: explanation, application, and synthesis. Most teachers have much less experience with the latter two parts than with the first one. Teachers may also need training in cooperative learning, class building, and team formation (Canady & Rettig, 2000). There is also some evidence that student achievement may not be significantly

improved with block scheduling (Queen, 2000). Queen's data show that students in all-year high school courses consistently perform better than students in semester-long science classes.

Instruction in the classroom may not change. Although the longer periods lend themselves to more student-centered instruction, many teachers use the extra time for students to do homework or other in-class worksheets (Intervention Central, 2013). Therefore, the instruction remains passive for students and the amount of subject area content may decrease. The course content has continued to include skills that are trivial in today's world. In semester courses, teachers tend to focus on these more traditional skills, eliminating important concepts necessary for literacy in competitive economic societies. The content that is presented may be watered down. There may be the tendency to focus on simpler or lower-level skills due to the shortened course length. This may inflate grades and give a false sense that students are achieving well.

Students who transfer in or out of a block schedule school may be at a disadvantage (Lindsay, 2000). If they are coming into a school that uses block scheduling, they may miss content that was already covered in the block course because of the faster pace. Alternately, if students transfer out of a block schedule school, they may be repeating material that was already covered.

Certain courses, by nature, require year-long involvement of the students. Music courses, such as band and choir, may not have the continuity needed if students only take these courses for one semester. Sports programs can also be affected. Modifications must be made in scheduling to allow these courses to be taught throughout the school



year. This, however, may create other scheduling problems for teachers and students such as requiring a student to wait a full year for a required course (Bowman, 2005).

### **Relationship of Schedule Type to Student Achievement**

Researchers are constantly searching for ways to raise student achievement and some entertain the idea of a longer school day or a longer academic year (Gandara, 2000; Gullatt, 2006; Silva, 2007). Danielson (2002) purports that teacher collaboration and learning promote student achievement. Marzano, Pickering, and Pollock (2001) delineate the following instructional strategies for promoting student achievement:

- Summarizing and note taking,
- Assigning homework,
- Providing feedback and recognition,
- Fostering cooperative learning,
- Generating and testing hypotheses and questions, and
- Setting objectives.

Student achievement is most often measured with standardized test scores (Danielson, 2002). The research literature regarding student achievement and various scheduling models presents a mixed bag of results (Williams, Jr., 2011). A representative sample of studies on scheduling and academic instruction is included here.

Arnold (2002) compared a seven-period alternating A/B block schedule with a conventional schedule and reported no significant increases in students' test scores over time. The study author speculated that "although school leaders may find some

improvement in the initial year of implementation, improvements may be negated by decreased improvement rates in later years” (2002, p. 42).

Zhang (2003) compared traditional and block schedule models and their apparent relationship to student performance in North Carolina using a non-experimental causal-comparative approach. After the rapid adoption of block scheduling in that state, from six schools in 1992-93 to 288 schools in 2000-2001, Zhang’s study objective was to determine whether there were differences in achievement of students in traditionally scheduled high schools and students in 4x4 semester block high schools. The study measured achievement with the end of course tests required in that state. An all-schools study included 256 high schools and a matched-schools study included 68 high schools. Statistical control was exercised for pre-test scores, percentage of minorities, percentage of students with free or reduced-price lunch, and percentage of students with parents with low education levels (Zhang, 2003). It was found that the 4x4 scheduling had a significant positive impact on student achievement in algebra I and economic, legal and political systems (a section of the End-of-Course test), but did not have a significant impact on student achievement in biology or U.S. history. Zhang concluded that,

Although the findings of this study show that 4x4 scheduling had advantages over traditional scheduling for certain subjects, it does not suggest that 4x4 scheduling is generally better than traditional scheduling in all high school academic subjects and under all circumstances. (2003, p. 10)

Laitsch (2004) studied 10 Broward County, Florida, high schools that used block scheduling and 12 schools that used a traditional, seven-period day schedule and reported no significant differences in attendance and suspension data. However, one-third of the teachers using block scheduling reported that students were more prompt, paid better attention, and had better conduct. The principals said that using the block schedule resulted in fewer discipline problems because of fewer class changes. There were no significant differences on student outcomes on standardized tests (Laitsch, 2004).

A Mississippi study (Smith, 2009) of 69 schools, 34 on block and 35 on traditional schedules, found that students in schools with the block schedules had significantly higher mean scores in biology, U.S. history, and English on multiple choice tests; however, there were no significant differences on the essay portion of the algebra and English tests. For those in schools with block schedules, there was a higher passing rate on the multiple choice tests in algebra, biology, and English yet no significant difference on the essay tests in U.S. history and English (Smith, 2009).

Another study in North Carolina (Ellis III, 2004) compared algebra and biology test scores of students who were on a 4 X 4 block schedule and those on a traditional schedule during the 2001-2002 and 2002-2003 school years. It was found that there were no significant differences in student achievement regardless of the schedule (Ellis III, 2004).

Yet another study in North Carolina (Lawrence & McPherson, 2000) looked at two high schools, one on block schedule and the other on traditional schedule. The course tests scores in algebra, biology, English, and U.S. history were compared. The

mean scores for all four tests were higher for students following a block schedule than for those on the traditional schedule.

### **Relationship of Schedule Type to Attendance**

Fewer studies have addressed the relationship of the schedule type to attendance and discipline than to academic achievement and instructional methods. A study (Chaika, 2006) of the traditional schedule found that students do not fall too far behind when school is missed, teachers are less likely to water down the curriculum because they have less daily time to teach, the schedule allows for longer lunch time, students believe the day goes faster, and, due to students not being bored, the drop-out rate decreases.

According to a recent study by Bonner (2012), lack of class attendance can be an issue when considering a block schedule. When a student misses one day on block schedule, they are missing the equivalent of two class periods (Mistretta & Polansky, 1997). This makes it more difficult, because one day equates to two missed days of instruction in that subject area on the traditional system. Other problems arise with teachers' absences because finding substitute teachers to work effectively with students for a 90-minute period of a course like physics is challenging (Chion-Kenney, 2003).

Hughes (2004) found that student transfer can be a problem with block schedules, because a student can come from a traditional schedule and not be able to complete the class he or she began at the start of the school year. Missing days of school adds to the attendance challenge. Kelchner (2003), in a recent comparison of traditional, A/B alternating block, and 4x4 semester block schedules in Texas high schools, found no significant difference in attendance rates among the schools that could be attributed to schedule type.

### **Relationship of Schedule Type to Discipline**

As indicated earlier, the block schedule option has been shown to decrease disciplinary issues and provides a positive outlook for block scheduling. Deuel (1999) suggested that the school climate improved with block scheduling because there was less unsupervised movement within the school. Hughes (2009) corroborated that the reduction in unsupervised movement was attributed to the students not changing as many classes during the school day when block scheduling was used. Another study (Shortt & Thayer, 1999) found that schools running a block schedule documented a decline in disciplinary incidents referred to the administrative offices.

Queen and Isenhour (1998) concluded that there had to be a relationship between discipline and fewer class changes. In a traditional schedule, each day the students could possibly face up to eight classroom environments, eight different classroom expectations, and eight classroom rules (Cromwell, 2006). The students' schedules are crowded, leaving little room for electives. The schedule does not meet the criteria of offering higher amount of credits when on a six-period-day schedule. Throughout the school day more students are in the halls due to several class changes (Cromwell, 2006). As a result of the increased class changes, more fights occur and more students coming late to class are experienced (Bennett, 2000).

### **Relationship of Literature Review to the Study**

This review of the literature related to scheduling type establishes a relationship between different types of schedules (traditional, A/B alternating block and hybrid) and academic achievement, attendance, and discipline in the high school. It covered the historical development and the organizational structure of traditional and block

schedules. Literature was presented regarding the various schedule models in relationship to academic achievement, attendance, and discipline. A brief overview of the models of various block schedules along with the disadvantages and advantages was also included.

Design considerations for future research into schedule type and its relation to student achievement, attendance, and discipline that emerged from the literature include the following:

- attention to socio-economic status of the student body,
- attention to school size,
- inclusion of differentiated study of each type of block rather than studies aggregating types,
- use of standard measures of achievement, and
- measurement of the standard curriculum (Farmer, 2005).

### **Chapter 3: Methodology**

There has been an increase with schools experimenting with different schedules and several studies have been conducted on scheduling (Balsimo, 2005; Corley, 2003). Research on block scheduling has had mixed results (Zepada & Meyers, 2006). While other school districts still support the traditional six- to eight-day schedule (Simon, 2009), this county is also experimenting with incorporating a common core curriculum to align with the mid-Atlantic state curriculum. The common core is the name that was given for academic standards that have been adopted by 45 states and the District of Columbia (Hettleman, 2013). This will bring more standards and rigorous testing. There are many variables in this curriculum that will help counties to determine what fits best with their specific schedule. Teaching the aligned common core curriculum it is hoped will help the school improvement plan and build capacity for the staff to implement and work efficiently whether they are in a traditional or block schedule. Schools will need to try something different if they want their HSA scores to improve.

#### **Brief History of Assessments in the Mid-Atlantic State**

Standardized tests have been used for years in education and as a way for states to provide information to school systems and parents on student achievement. These tests are often assessments that compare student performance to a national norm group. They consist of multiple choice items and one of the limitations of these national tests are that they are not aligned to any state's curriculum and since the same items are administered year after year, teachers become very familiar with the test. An increased desire for accountability and the standards movement drove school systems to look for assessments

that were aligned to their curriculum, and allowed for criterion-referenced interpretation of scores (MSDE, 2005).

The mid-Atlantic state's first end-of-year exam was the Mid-Atlantic Functional Testing Program (MFTP). This test assessed in reading, mathematics, writing and citizenship. They started with grade 9 and, at the end of this program, students were passing it in grade 6. Passing the test was required for graduation. Then came along the Mid-Atlantic School Performance Assessment Program (MSPAP) that was administered to students in grades 3, 5 and 8. In 2002, the Mid-Atlantic School Assessment (MSA) was created to conform to the NCLB legislation. In 2003, the reading and mathematics was administered in grades 3, 5 and 8 and, in 2004, to students in grades 4, 6 and 7. In 2007, there was also a science test that was given annually to grades 5 and 8. The High School Assessment (HSA) was first administered in 2000 and algebra, biology, English and government was needed in order to graduate in the Class of 2009.

This research topic was chosen for two reasons. First, it was chosen to examine if a difference exists in academic achievement, attendance, and disciplinary incidents between high schools using traditional and block scheduling. Second, it was chosen because there is little research on how scheduling affects HSA scores.

### **Procedures**

Once the research committee approved the dissertation proposal, the researcher requested permission from the Institutional Review Board to conduct this study and they approved. This research was conducted by using data that is publicly available from the state agency in one mid-Atlantic state. Over 150 high schools were selected from across



this mid-Atlantic state; based on the state report card, some have passed and others have not passed state standards (AYP).

The purpose of this chapter is to describe the proposed methodology that was employed in the collection and analysis of data to address the research questions. This study was an attempt to see how differing high school class schedules affect academic achievement, attendance, and disciplinary incidents. The chapter includes a description of the sample and its selection as well as the independent variables, the dependent variables, measures, and the suggested statistical analysis that was used.

The final selection of the high schools occurred after using the sample selection established for the study. The sample was any public school in the mid-Atlantic state containing at least grades 9-12 and not designated as a center for exceptionality, alternative center, or career and technical center.

### **Research Questions**

This study was designed to address the following research questions:

#### **Research Question 1**

Is there a statistically significant difference in the mean percentage of students passing the algebra exit exam between high schools that use traditional scheduling and those that use block scheduling?

#### **Research Question 2**

Is there a statistically significant difference in the mean percentage of students passing the biology exam between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 3**

Is there a statistically significant difference in the mean percentage of students passing the English exit exam between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 4**

Is there a statistically significant difference in student attendance rates between high schools that use traditional scheduling and those that use block scheduling?

### **Research Question 5**

Is there a statistically significant difference in the rate of student disciplinary incidents between high schools that use traditional scheduling and those that use block scheduling?

### **Sample Selection**

The researcher used information that is publicly available from this mid-Atlantic state's department of education. Any public high school in the state containing at least grades 9-12 and not designated a center for exceptionality, an alternative center, or a career and technical center was identified for inclusion in the study. These criteria resulted in over 150 high schools in the sample for the 2012–2013 school year and a five year same schedule. This plan was modified once the study began. When the schools meeting these criteria were identified, the final sample selection was made using the following five steps:

1. Each high school was classified according to the scheduling type (traditional, A/B alternating day block, or other).
2. High schools not using a traditional (6-8 period) or A/B alternating day block

(6-8 periods) were eliminated from consideration for the study.

3. High schools not using the same traditional or A/B schedule model for 2010-2011, 2011-2012, and 2012-2013 school years were excluded from the study to eliminate transition effects.
4. Each remaining high school was categorized by the size of the grades 9-11 student enrollment using the mid-Atlantic Public Secondary School Athletic Association (MPSSAA) criteria for schools [small (0-682 students), medium (683-959 students), large (960-1,259 students), and extra-large (1,1010-2,130+ students)]. The MPSSAA size classification of 1A, 2A, 3A, and 4A is used throughout the state for academic and athletic competition. The MPSSAA criteria were used to classify schools into the four size categories according to total school enrollment in grades 9-11. Fall 2012 school enrollment reports from the state department of education were the final source of data for the school size classification.
5. Finally, schools within each size category were matched for schedule type.

### **Data Sets Accessed**

To investigate the research questions, data were obtained for the five school years from 2009 to 2013, the most recent years for which uniform data are available from the state department of education of the mid-Atlantic state in this study. The following data bases used in this study will be made available in Excel spreadsheet format downloaded in September, 2013, from the state department of education:

- 2009-2013—Academic achievement (HSA Test Results) for all state high schools

- 2012-2013—State high schools on traditional and A/B alternating block schedules
- 2009-2013—State Report Card on student attendance rates and disciplinary incidents
- 2012-2013—Free and Reduced Meals statistics for all state high schools

### **Instrumentation**

In 2000, the State Board of Education convened a task force that made recommendations and created a graduation exit exam. The state developed four groups: HSA task force, steering team, coordinating team and content teams. The assumption was that this assessment would cover algebra, biology, English, and government. This was based upon experience with other exams in this mid-Atlantic state such as: Mid-Atlantic Functional Test and Mid-Atlantic School Performance Assessment Program (MSPAP) (MSDE, 1995). The state's experience with MSPAP and distribution of the tests at grades 3, 5, and 8 had not produced a good support system using proposed outcomes or having hearings. Therefore, the four groups were asked to carefully create and develop recommendations, along with a stronger support system that would support the new exam.

With the cooperative effort between the state, counties, and private test corporations, the High School Assessment was created in 1996. The State Board of Education divided stakeholders into four groups: principals, local governments, teachers, and superintendents, to come together as a task force to represent their organizations during the deliberations. The state board also held public hearings, forums, and focus groups to get insight and opinions from the community. The High School Assessment

Task Force made 101 recommendations for the next steps that would be taken in order to make the HSA come to fruition. The implementation of the HSA was based on five focus areas:

1. Distribution and clear clarification of the core learning goals.
2. Exams administered at the end of the course
3. Core Learning Goals and student competency
4. Reasonable per pupil projected cost
5. Staff development for teachers and principals

The state board of education had experienced in the last state exam (MSPAP) that there was not enough information for teachers to implement the core learning goals.

There was misdirection and confusion within the counties that made the board look more closely at the clarification of the HSA and how it would be distributed to over 200 high schools. The information had to be provided to content area specialists so they could help implement and distribute to superintendents, principals and teachers. This was an important task because the high school teachers had to be knowledgeable and familiarized with the core learning goals (MSDE, 2007).

The rationale behind giving the end of course exam was to develop and administer fewer tests. That did not mean this was the most ideal or logical thing to do, due to the fact that all of the academic content could not be taught in a short amount of time. Ultimately, the more time that students have before the exam is given, the better chance they have to demonstrate that they understand and know the core learning goals (MSDE, 2005).

The purpose of this state assessment exam was for students to demonstrate that they mastered the core learning goals. Students have multiple opportunities to demonstrate this on the HSA. All students must take the HSA as part of graduation and transcript.

The state board of education wanted to make the HSA more than just passing a “state exam.” A great deal of thought and time went into the design and development of the HSA. Technical standards were used for the construction of this test that included evaluation and professional standards (Standards for Educational and Psychological Testing, 1985). This exam would include several components such as: “validity, reliability, test development, scaling, interpretation, impact on special populations, scoring and reporting results.” (MSDE, 2005). The state board of education awarded the contract to the College Board for the HSA test design, with Educational Testing Service serving as the subcontractor (MSDE, 2004).

Curricular and instructional support was clarified and implemented for the HSA in order for it to be made successful. If these strategies were not in place, then teachers could not be held accountable for graduation requirements. If teachers were unable to articulate the core learning goals, then all would be lost. That is why it was important for the state board of education to use the baseline data, in the same manner that it was utilized in the MSPAP for grades 3, 5 and 8, so that the test data could be used after a five-year implementation. According to MSDE (2005), staff development consists of a long-term, sustained effort that doesn’t happen overnight.

## **Academic Achievement**

To measure academic achievement, students' mean scores on the 2013 High School Assessment (HSA) Performance Status scores for each of the end-of-course tests in algebra, biology, English, and government were used. Scores were drawn from the state department of education's HSA database. The scores for selected schools that use the traditional class schedule were compared with study schools that use the A/B class schedule. The state board of education adopted the basis of academic assessment instruments for the four content areas used in this study. Following the adoption of the new high school graduation requirements in 1992, each year students have been tested in algebra, biology, English, and government on the core areas required for graduation. The state department of education consulted with experts in the field of tests and measurements regarding the validity and reliability of the four Core Learning Goals as a measure of student achievement for graduation from high school. Cronbach alphas, correlation coefficients, means and standard deviations, and other statistics were available from the state for these four instruments.

## **School Attendance**

To measure school attendance, rates recorded by the state department of education were used to compare schools using the traditional class schedule with those using the A/B class schedule.

## **Student Disciplinary Incidents**

In comparing schools for student discipline, data recording "fights" and "other serious incidents" posted for each school in the state School Report Card were used to

determine a disciplinary incidents rate for each school by taking the total number of incidents and dividing it by total school enrollment.

### **Statistical Analysis**

The HSA Test Performance results for the Core Learning Goals were analyzed using one-way or two-way analysis of variance based on scheduling type, size of high school, and socioeconomic status (SES). Similar analyses were conducted using attendance and disciplinary incident data.



## Chapter 4: Findings

This chapter presents the results of the data analysis. The study was designed to investigate the extent to which high school scheduling affects students' academic achievement, attendance, and disciplinary incidents. The instruments for data collection and analysis for this study included the HSAs, school county attendance, and discipline archival data. The data collected for this study remained anonymous by using schedule and school size and was retrieved from the state's Department of Education. SPSS was utilized to compute the necessary calculations. These measures were examined to ascertain the effectiveness of different scheduling matters in high schools.

The Doctoral Advisory Committee and the Institutional Review Board of the mid-Atlantic state university (see Appendix) and the state department of education approved the study's protocols in accordance with the *Federal Policy for the Protection of Human Subjects (OHRP)*. High schools were selected by the researcher who was looking for schools that used one of two types of class schedules: traditional (6-8 periods) and A/B alternating block (6-8 periods). The data included high schools utilizing the same schedule model for the schools years of 2010-2011, 2011-2012, and 2012-2013. Out of 237 high schools, 174 high schools were identified as using either traditional and block scheduling for the past five years. As noted in Table 6, 73 high schools were identified as traditional schedule schools and 101 high schools were identified as block schedule schools and school size.

Table 6

*High Schools in the State Meeting the Identifying Criterion for 2012-2013*

	Traditional	A/B Schedule	No. of Schools	% of Total
Small	13	23	36	20.7%
Medium	15	31	46	26.4%
Large	26	22	48	27.6%
Extra Large	19	25	44	25.3%
N	73	101	174	100%
% of Total	42%	58%	100%	

**Quantitative Procedures**

The data collections included the HSA test results for all high schools on traditional and A/B alternating block schedules. In addition to the data collections, the student attendance rates were taken from the state report card; an annual report generated by the state department of education for each school in the state. It compared schools for student discipline. In-school and out-of-school suspensions for each school as reported by the state were combined and divided by the school enrollment to yield a discipline incidence percentage for each school in the study. The state report card, available from the state department of education website, is an additional source of data for the attendance rates and disciplinary incidents for all state high schools for 2009-2013.

**Validity and Reliability**

The validity of the HSAs is an important part of the assessment quality. Every item designed by Educational Testing Service (ETS) was created and referenced by a specific instructional standard. Each item was reviewed by a committee of state educators and individual judgments and decisions were made to ensure that it was appropriate for the age of the students being tested. The development of each HSA

content area had been overseen by a content expert who has a wealth of knowledge and teaching experiences related to the course in which the HSA was given. Cronbach alphas were used to compute the reliability of the HAS. Cronbach alphas measure inter-item reliability and consistency of the questions that were utilized in the test.

### **Correlation Coefficients**

Pearson Product Moment correlation coefficients were computed to describe the relationship between percentile scores in algebra, biology, and English between high schools that use traditional scheduling and those that use block scheduling. Coefficients were also computed for student attendance rates and suspensions between traditional and block scheduling. Correlations vary from -1.00 to +1.00 where -1.00 indicates perfect negative correlation and +1.00 indicates a perfect positive correlation. The results are displayed in Tables 7-16. In interpreting these data, the researcher used an established set of criteria to make judgments about the significance of the correlations (Gliner, Morgan, & Leech, 2009). If a correlation was between 0.0 and .30, it was considered to be weak; if it was between .31 and .70 it was considered to have a modest; and if it was .71 or above it was considered to be a strong correlation (Gliner et al., 2009). The  $p < .05$  level was used to identify those correlations that were statistically significant (Gliner et al., 2009).

The correlation coefficient was first calculated for algebra in both block and traditional scheduling. As seen in Tables 7 and 8, the correlations for algebra in a block schedule and traditional schedule were modest to strong. All data points were statistically significant at the .001 level. For block scheduling, the correlation coefficient relationships got stronger from year to year. However, when compared to the algebra

scores of students in schools using traditional scheduling, the correlation coefficients for block scheduling were not as strong. In all years (2009 through 2013), all of the correlations for algebra were statistically significant.

Table 7

*Correlations for Algebra Block Schedule 2009-2013 (n=101)*

	ALG <sup>+</sup> -2009	ALG-2010	ALG-2011	ALG-2012	ALG-2013
ALG-2009	1.00	.707***	.688***	.692***	.669***
ALG-2010		1.00	.927***	.906***	.882***
ALG-2011			1.00	.960***	.938***
ALG-2012				1.00	.964***
ALG-2013					1.00

<sup>+</sup>ALG=algebra; \*\*\*p <.001

Table 8

*Correlations for Algebra Traditional Schedule 2009-2013 (n=73)*

	ALG <sup>+</sup> -2009	ALG-2010	ALG-2011	ALG-2012	ALG-2013
ALG-2009	1.00	.934***	.913***	.871***	.835***
ALG-2010		1.00	.955***	.952***	.934***
ALG-2011			1.00	.957***	.950***
ALG-2012				1.00	.985***
ALG-2013					1.00

<sup>+</sup>ALG=algebra; \*\*\*p <.001

In Table 9, biology in a block schedule, the correlations were somewhat higher than in algebra and all were statistically significant at the .001 level. This data can be considered useful because students taking the biology high school assessment would have needed to remember certain facts about biology versus trying to solve different equations using the same formula as needed in the algebra high school assessment. The correlation

coefficients for biology in a traditional schedule (see Table 10) are stronger than those for biology in a block schedule (see Table 9). All of the correlations for both groups are statistically strong, with scores above .71. All are statistically significant at the  $p < .001$  level.

Table 9

*Correlations for Biology Block Schedule 2009-2013 (n=101)*

	BIO <sup>+</sup> -2009	BIO-2010	BIO-2011	BIO-2012	BIO-2013
BIO-2009	1.00	.759***	.719***	.708***	.702***
BIO-2010		1.00	.593***	.929***	.932***
BIO-2011			1.00	.963***	.935***
BIO-2012				1.00	.950***
BIO-2013					1.00

<sup>+</sup>BIO=biology; \*\*\* $p < .001$

Table 10

*Correlations for Biology Traditional Schedule 2009-2013 (n=73)*

	BIO <sup>+</sup> -2009	BIO-2010	BIO-2011	BIO-2012	BIO-2013
BIO-2009	1.00	.967***	.941***	.910***	.920***
BIO-2010		1.00	.951***	.940***	.937***
BIO-2011			1.00	.974***	.952***
BIO-2012				1.00	.960***
BIO-2013					1.00

<sup>+</sup>BIO=biology; \*\*\* $p < .001$

The data displayed in Table 11 for English in a block schedule indicates that most of the correlations were weak when examined for 2009. However, the rest of the correlations for English were quite strong and all were statistically significant at the  $p < .001$  level. Why the correlations for 2009 were so much lower than those for 2010-2012 needs to be studied. The correlation coefficients presented in Table 12 for English

in a traditional schedule indicate that the correlations were in the modest range for 2009. All other correlations were in the strong range. The lower correlations for 2009, for both the block schedule schools and the traditionally scheduled schools, may be due to the fact that the students had to write brief constructed responses in English HSA. This portion was omitted in the subsequent testing years. The general conclusion from the data for correlation coefficients is that high schools using both block and traditional schedules have high correlations across the years examined.

Table 11

*Correlations for English Block Schedule 2009-2013 (n=101)*

	ENG <sup>+</sup> -2009	ENG -2010	ENG -2011	ENG -2012	ENG -2013
ENG-2009	1.00	.244*	.239*	.302**	.293**
ENG-2010		1.00	.906***	.877***	.825***
ENG-2011			1.00	.931***	.895***
ENG-2012				1.00	.950***
ENG-2013					1.00

<sup>+</sup> ENG =English; \*p= < .05; \*\*p<.01; \*\*\*p <.001

Table 12

*Correlations for English Traditional Schedule 2009-2013 (n=73)*

	ENG <sup>+</sup> -2009	ENG -2010	ENG -2011	ENG -2012	ENG -2013
ENG-2009	1.00	.406*	.408*	.406**	.947**
ENG-2010		1.00	.962***	.405***	.963***
ENG-2011			1.00	.971***	.863***
ENG-2012				1.00	.977***
ENG-2013					1.00

<sup>+</sup> ENG =English; \*p= < .05; \*\*p<.01; \*\*\*p <.001

Tables 13 and 14 present data for student attendance. The correlation coefficients for students in schools using a block schedule were all in the strong range and all are statistically significant at the .001 level. Table 14 displays the correlation coefficients for student attendance rates in a traditional schedule. All of these correlations were statistically strong, meaning they are above .71. All were statistically significant at the .001 level.

Table 13

*Correlations for Attendance Block Schedule 2009-2013 (n=101)*

	ATTEND <sup>+</sup> - 2009	ATTEND- 2010	ATTEND- 2011	ATTEND- 2012	ATEND- 2013
ATTEND-2009	1.00	.913*	.907*	.881**	.784**
ATTEND-2010		1.00	.970***	.959***	.886***
ATTEND-2011			1.00	.977***	.896***
ATTEND-2012				1.00	.904***
ATTEND-2013					1.00

<sup>+</sup> ATTEND =attendance; \*p= < .05; \*\*p<.01; \*\*\*p <.001

Table 14

*Correlations for Attendance Traditional Schedule 2009-2013 (n=73)*

	ATTEND <sup>+</sup> - 2009	ATTEND- 2010	ATTEND- 2011	ATTEND- 2012	ATTEND- 2013
ATTEND-2009	1.00	.912***	.938***	.927***	.909**
ATTEND-2010		1.00	.885***	.957***	.834***
ATTEND-2011			1.00	.929***	.843***
ATTEND-2012				1.00	.932***
ATTEND-2013					1.00

<sup>+</sup> ATTEND =attendance; \*\*\*p <.001

Table 15 displays the correlation coefficients for student disciplinary rates in a block schedule. All of the correlations are moderately strong, meaning they are between .60 and .80. All are statistically significant at the .001 level or lower. Table 16 displays the correlation coefficients for student disciplinary incidents in a traditional schedule. All of the correlations are statistically strong, meaning they are above .71.

Table 15

*Correlations for Student Disciplinary Incidents Block Schedule 2009-2013 (n=101)*

	SUSP <sup>+</sup> -2009	SUSP-2010	SUSP-2011	SUSP-2012	SUSP-2013
SUSP-2009	1.00	.702***	.672***	.668***	.558**
SUSP-2010		1.00	.809***	.805***	.692***
SUSP-2011			1.00	.820***	.636***
SUSP-2012				1.00	.806***
SUSP-2013					1.00

<sup>+</sup> SUSP=disciplinary incidents; \*\*\*p <.001



Table 16

*Correlations for Student Disciplinary Incidents Traditional Schedule 2009-2013 (n=73)*

	SUSP <sup>+</sup> -2009	SUSP-2010	SUSP-2011	SUSP-2012	SUSP-2013
SUSP-2009	1.00	.938***	.857***	.871***	.811**
SUSP-2010		1.00	.892***	.800***	.760***
SUSP-2011			1.00	.950***	.785***
SUSP-2012				1.00	.847***
SUSP-2013					1.00

<sup>+</sup> SUSP=disciplinary incidents; \*\*\*p <.001

## **Research Questions and Hypotheses**

### **Research Question 1**

Is there a statistically significant difference in the mean percentage of students passing the algebra exit exam between high schools that use traditional scheduling and those that use block scheduling?

#### ***Statistical Hypothesis 1***

*There is no statistically significant difference in the mean percentage of students passing the algebra exit exam between high schools that use traditional scheduling and those that use block scheduling.*

Table 17 displays the mean percentage of students passing the algebra HAS exit exam for high schools that use traditional scheduling and those that use block scheduling during the years 2009 to 2012. The data indicate that the statistical hypothesis was accepted in all cases for years 2010 to 2012. The statistical hypothesis was rejected for 2009 since the algebra traditional schedule had a statistically significantly higher mean than did the algebra block schedule. There was a difference in the means of 5.24 points and it favored traditional high schools.

Table 17

*Independent t-Test of Block vs. Traditional Algebra HSA Test 2009-2013*

		No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
2009	Block	101	84.23	15.99	2.43	172	.021*
	Traditional	73	89.47	12.42			
2010	Block	101	84.80	13.99	1.42	172	.158
	Traditional	73	87.74	12.89			
2011	Block	101	84.61	13.50	1.80	172	.073
	Traditional	73	88.37	13.71			
2012	Block	101	85.43	14.36	1.23	172	.221
	Traditional	73	88.22	15.36			
2013	Block	101	85.44	14.00	0.996	172	.321
	Traditional	73	87.72	16.02			

\*p= < .05; \*\*p<.01; \*\*\*p <.001

### **Research Question 2**

Is there a statistically significant difference in the mean percentage of students passing the biology exam between high schools that use traditional scheduling and those that use block scheduling?

#### ***Statistical Hypothesis 2***

*There is no statistically significant difference in the mean percentage of students passing the biology exam between high schools that use traditional scheduling and those that use block scheduling.*

Table 18 displays the mean percentage of students passing the biology HSA exit exam for high schools that use traditional scheduling and those that use block scheduling during the years 2009 to 2012. The data indicate that the statistical hypothesis was rejected for all years since there was a higher statistically significant mean in the traditional schedule versus the block schedule.

Table 18

*Independent t-Test of Biology HSA Test: Block vs. Traditional 2009-2013*

		No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
2009	Block	101	80.08	17.00	2.66	172	.01*
	Traditional	73	86.63	14.61			
2010	Block	101	80.19	14.59	2.66	172	.01*
	Traditional	73	86.10	14.33			
2011	Block	101	80.60	14.04	2.37	172	.02*
	Traditional	73	86.00	15.88			
2012	Block	101	81.29	14.23	2.41	172	.02*
	Traditional	73	86.77	15.49			
2013	Block	101	82.09	13.75	2.41	172	.02*
	Traditional	73	87.27	14.31			

\*p < .05; \*\*p < .01; \*\*\*p < .001

### **Research Question 3**

Is there a statistically significant difference in the mean percentage of students passing the English exit exam between high schools that use traditional scheduling and those that use block scheduling?

#### ***Statistical Hypothesis 3***

*There is no statistically significant difference in the mean percentage of students passing the English exit exam between high schools that use traditional scheduling and those that use block scheduling.*

Table 19 displays the mean percentage of students passing the English HSA exit exam for high schools that use traditional scheduling and those that use block scheduling during the years 2009 to 2012. The data indicate that the statistical hypothesis was rejected for 2010 since there was a statistical higher mean in the traditional schedule for English than in the block schedule in high schools. In all other years (2009 and 2011-2013) there were no significant differences between block and traditional schedules and the statistical hypothesis was accepted. The hypothesis was rejected in Table 28 for

research question 3 for 2010 because there was a statistically higher mean for English in high schools with the traditional schedule than in the schools with the block schedule.

Table 19

*Independent t-Test of English HSA Test: Block vs. Traditional 2009-2013*

		No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
2009	Block	101	74.54	24.77	1.59	172	.114
	Traditional	73	80.03	18.84			
2010	Block	101	79.61	10.98	2.24	172	.03*
	Traditional	73	83.75	13.33			
2011	Block	101	81.73	11.25	1.91	172	.058
	Traditional	73	85.34	13.67			
2012	Block	101	83.49	11.73	1.37	172	.172
	Traditional	73	86.16	13.91			
2013	Block	101	83.16	12.74	1.21	172	.229
	Traditional	73	85.68	14.75			

\*p= < .05; \*\*p<.01; \*\*\*p<.001

#### **Research Question 4**

Is there a statistically significant difference in student attendance rates between high schools that use traditional scheduling and those that use block scheduling?

##### ***Statistical Hypothesis 4***

*There is no statistically significant difference in student attendance rates between high schools that use traditional scheduling and those that use block scheduling.*

Table 20 displays the mean attendance rates of students at high schools that use traditional scheduling and at those that use block scheduling during the years 2009 to 2012. The data shows that attendance rates were similar for high schools that use block scheduling and those that use traditional scheduling and, therefore, the statistical hypothesis was rejected for all years.

Table 20

*Independent t-Test of Student Attendance Rate: Block vs. Traditional 2009-2013*

		No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
2009	Block	101	91.94	3.38	1.05	172	.271
	Traditional	73	92.63	4.77			
2010	Block	101	91.47	4.16	1.03	172	.273
	Traditional	73	92.34	6.31			
2011	Block	101	91.40	4.97	1.85	172	.068
	Traditional	73	92.76	4.64			
2012	Block	101	91.66	5.12	.827	172	.412
	Traditional	73	92.30	4.93			
2013	Block	101	92.43	4.40	.849	172	.373
	Traditional	73	93.14	6.06			

\*p= < .05; \*\*p<.01; \*\*\*p <.001

**Research Question 5**

Is there a statistically significant difference in the rate of student disciplinary incidents between high schools that use traditional scheduling and those that use block scheduling?

***Statistical Hypothesis 5***

*There is no statistically significant difference in the rate of student disciplinary incidents between high schools that use traditional scheduling and those that use block scheduling.*

Table 21 displays the mean disciplinary incidents at high schools that use traditional scheduling and at those that use block scheduling during the years 2009 to 2012. The results indicate that the statistical hypothesis was accepted in three out of five years (2009, 2010, and 2012). Results for 2011 and 2013 indicate that the hypothesis was rejected. For those years, the student disciplinary incidents in a traditional schedule had a statistically significantly lower mean than did the student disciplinary incidents in a block schedule.

Table 21

*Independent t-Test of Student Disciplinary Incidents: Block vs. Traditional 2009-2013*

		No. of Cases	Mean	S.D.	t-Value	D.F.	2-Tail Sig.
2009	Block	101	458.86	334.88	1.51	172	.119
	Traditional	73	369.44	417.30			
2010	Block	101	401.12	277.54	1.35	172	.152
	Traditional	73	325.60	412.81			
2011	Block	101	361.14	254.43	2.06	172	.033*
	Traditional	73	264.23	339.08			
2012	Block	101	307.84	204.84	1.80	172	.060
	Traditional	73	238.03	281.47			
2013	Block	101	233.36	169.51	2.05	172	.039*
	Traditional	73	177.19	184.33			

\*p= .05; \*\*p<.01; \*\*\*p<.001

### Summary

This chapter presented the findings associated with the study. Quantitative methods were used to address the five research questions. Recommendations for practice and for further study were drawn from these findings and are presented in Chapter 5 as are the conclusions reached for this study.

## **Chapter 5: Summary, Conclusions, and Recommendations**

This final chapter presents the statement of the problem, restates the methodology used in this study, and discusses the findings. The discussion of research is presented along with the implications of study. Finally, recommendations for further research and a summary are included.

### **Statement of the Problem**

With an increased emphasis placed on students' standardized test scores, educators have been looking to address the concerns of instructional intrusions (i.e., fire drills and announcements) and maximizing learning. Trying to achieve Annual Yearly Progress (AYP) is becoming increasingly difficult with the passing of each year. AYP is one aspect of NCLB, and it entails one of the cornerstones of the federal legislation. AYP is a measure of year-to-year student achievement. All aspects of education, including the basic structure of the school schedule, are being examined to find the most productive way to deliver instruction (Smith, Jr., 2011). There has been a movement across the states to reevaluate high school schedules due to the pressure of end-of-course assessments. The accountability pushed many states to reassess and look at how they can increase more time during the school day by adjusting the schedule. Statistical analysis was conducted to determine if there were any significant differences in the exit exams of algebra, biology, English and in the areas of student attendance rates and disciplinary incidents.

## **Review of Methodology**

The purpose of this study was to examine the extent to which high school scheduling affects students' academic achievement, attendance, and disciplinary incidents. Scores on high school exit examinations for algebra, biology, and English were used to measure student achievement. This study examined two groups of high schools in a mid-Atlantic state; in the 2009-2013 school years one utilized the traditional schedule and one the A/B block schedule.

There has been an increase with schools experimenting with different schedules and several studies have been conducted on scheduling (Balsimo, 2005; Corley, 2003). Research on block scheduling has had mixed results (Zepada & Meyers, 2006). While other school districts still support the traditional six- to eight-day schedule (Simon, 2009), this school district was also experimenting with incorporating a common core curriculum to align with the mid-Atlantic state curriculum. The Common Core is the name that was given for academic standards that have been adopted by 45 states and the District of Columbia (The Baltimore Sun, 2013). The use of a common core curriculum will bring more standards and rigorous testing. There are many variables in the curriculum that will help school districts to determine what fits best with their specific schedule. It is hoped that teaching the aligned common core curriculum will help a school's improvement plan and build capacity for the staff to implement and work efficiently whether they are in a traditional or block schedule. Schools will need to try something different if they want their HSA scores to improve.

With an increased emphasis placed on students' standardized test scores, educators have been looking to address the concerns of instructional intrusions (i.e., fire



drills and announcements) in order to maximize learning. Trying to achieve AYP is becoming increasingly difficult with the passing of each year due to NCLB and the phasing in of Race to the Top. As such, all aspects of education, including the basic structure of the school schedule, are being examined to find the most productive way to deliver instruction (Smith, Jr., 2011). The accountability effort pushed many states to reassess how they can increase more time during the school day by adjusting the schedule. While states are altering their school schedules in an attempt to increase academic performance, few studies have examined the impact of school scheduling on academic achievement.

### **Findings**

Overall, survey findings indicated that the survey instrument created by the Educational Testing System had a strong degree of inter-item reliability, based on the computation of the data of the five years of study. The instrument was created by ETS, which developed, analyzed and validated all content according to the HSA specifications and according to the guidelines that are based on certain standards in the field of educational measurement.

The content validity of the instrument was documented by the State Board of Education and re-documented by this researcher as the result of the review of the public data from the DOE's database. The researcher analyzed the data to establish the inter-item reliability of the survey from ETS. The researcher concluded that if a correlation was between 0.0 and .30, it was considered to be weak; if it was between .31 and .70 it was considered to have a modest; and if it was .71 or greater it was considered to be a strong correlation (Gliner et al., 2009). The .05 level was used to identify those

correlations that were statistically significant (Gliner et al., 2009). The findings for each research question are discussed.

***Finding #1:*** In 2010, 2011, 2012 and 2013, there were no statistically significant differences between the algebra scores of students who attended traditional and A/B block schedule schools. In 2009, students who attended schools with a traditional schedule had higher algebra scores than students in schools with an A/B block schedule.

***Finding #2:*** For all years, students who attended schools with a traditional schedule had higher biology scores than students in schools with an A/B block schedule.

***Finding #3:*** In 2010, students who attended schools with a traditional schedule had higher English scores than students in school with an A/B block schedule.

***Finding #4:*** For all years, there were no statistically significant differences in attendance rates between students who attended traditional and A/B block schedule schools.

***Finding #5:*** In 2009, 2010, and 2012, there were no statistically significant differences between the number of disciplinary incidents of students who attended traditional and A/B block schedule schools. In 2011 and 2013, students who attended schools with a traditional schedule had less disciplinary incidents than students in schools with an A/B block schedule.

## **Discussion of the Results**

This study examined the impact of school scheduling on students' academic achievement, attendance, and disciplinary incidents. Overall, there were few significant differences that were found between the academic achievement, attendance, and disciplinary incidents at the traditional and A/B block scheduling high schools.

### **Academic Achievement**

According to the results of this study there were no statistically significant differences between the algebra and English scores of students who attended traditional and A/B block schedule schools. These findings are in alignment with earlier studies that suggest that there is no correlation between bell schedule and standardized test scores (Arnold, 2002; Martin-Carreras, 2006). Educational researchers in support of these findings argue that other factors (i.e., teacher selection and curriculum) have a greater impact on academic achievement than school schedule.

Supporters of the traditional schedule suggest that having the same class each day affords students the opportunity to review, practice, and apply what they have learned more frequently. As such, they posit that students are better prepared for state exams. While there were no significant differences in algebra and English scores, this study found statistically significant differences in the biology scores of students in favor of those who attended schools with traditional schedules. Researchers have found that in "hard" sciences daily practice improves student's retention and academic achievement. In addition, past studies have noted that students in schools with a traditional schedule outperformed block schedule students in math and science all year (Gruber & Onwuegbuzie, 2001; Zepeda & Mayers, 2006).

While arguments can be made for both traditional and block scheduling, this study found that a significant difference in students' academic achievement existed only for biology. Hard sciences and advanced math courses have concepts that build upon each other and often require extensive practice.

### **Attendance**

With regard to attendance, the study did not show any significant results. The data showed that attendance rates were similar between high schools that use traditional scheduling and A/B block scheduling. These results support earlier findings that bell schedules has little impact on student attendance rates (Kelchner, 2003).

Supporters of the traditional schedule found that students do not fall too far behind when school is missed, teachers are less likely to water down the curriculum because they have less daily time to teach, and, due to students not being bored, the drop-out rate decreases (Chaika, 2006). Supporters of the A/B block schedule found that a lack of class attendance can be an issue when considering a block schedule. When a student misses one day on block schedule, they are missing the equivalent of two class periods (Mistretta & Polansky, 1997). This makes it more difficult, because one day equates to two missed days of instruction in that subject area on the traditional system. Other problems arise with teachers' absences because finding substitute teachers to work effectively with students for a 90-minute period of a course like physics is challenging (Chion-Kenney, 2003; Hughes, 2009).

The effects on academic achievement have been investigated primarily by studying the following: grade point average, honor roll achievement, numbers of failures, dropout rates, and students' performance on standardized tests. With the exception of

North Carolina and Canada, few large-scale studies of block scheduling have been undertaken so much of the data reported is based on individual school evaluation reports and dissertations (Canady & Rettig, 2000). The results of this data showed that the type of bell schedule has had no real impact on student attendance rates.

### **Disciplinary Incidents**

In contrast to researcher's findings, the results of this study are inconclusive as three years showed no significant difference and two years showed a difference in favor of the traditional schedule. The data that showed there is no significant difference is in conflict to what other educational researchers had written.

Educational researchers in opposition to these findings argue that other factors (i.e., multiple classroom changes and unsupervised movement) have a greater impact on the traditional school schedule. Deuel (1999) suggested that the school climate improved with block scheduling because there was less unsupervised movement within the school. Hughes (2009) corroborated that the reduction in unsupervised movement was attributed to the students not changing as many classes during the school day when block scheduling was used. Another study (Shortt & Thayer, 1999) found that schools running a block schedule documented a decline in disciplinary incidents referred to the administrative offices.

Queen and Isenhour (1998) concluded that there had to be a relationship between discipline and fewer class changes. In a traditional schedule, each day the students could possibly face up to eight classroom environments, eight different classroom expectations, and eight classroom rules (Cromwell, 2006).

## **Recommendations for Research**

Though the data provided some details and answers in regards to academic achievement, student attendance rates, and disciplinary incidents, it raised other questions for further research. The following questions for further research are recommended.

### **Recommendation #1**

In that this study found no real significant difference between the academic achievement of students in schools with traditional versus block schedule, school systems need to research additional factors, such as the recruitment and retention of quality teachers that may play a significant role in student academic achievement.

### **Recommendation #2**

Since there was a statistically significant difference between the biology scores of students in a traditional schedule and those in a block schedule, educational researchers and principals should examine the relationship between school schedules and biology courses.

### **Recommendation #3**

In that this study found no real significant difference between the academic achievement of students in schools with traditional versus block schedule, school systems need to research additional factors, such as FARMS, socioeconomic, urban/suburban students that may play a significant role in student academic achievement.

## **Recommendations for Policy/Practice**

### **Recommendation #1**

Schools using an A/B block schedule should find a way to utilize the traditional schedule for biology classes. High schools are now in the technological era and there is a

push for an increase in student access to a newly developed, rigorous and demanding STEM program of studies that needs to be given serious consideration. This is due to the developing and implementing coursework, teaching strategies and assessments structured to maximize analysis and analytical problem solving through inquiry.

### **Recommendation #2**

With Race to the Top, the government is asking the states to use the teacher evaluation as part of the accountability. School districts and superintendents should look into using part of teacher evaluations as a way to monitor progress and academic achievement.

### **Recommendation #3**

School districts should look at the students' perceptions and performances in middle and high schools. This should also include teachers' and parents perceptions.

### **Limitations of the Study**

The following list includes the limitations of this study.

- Achievement of the state high school core learning goals for algebra, biology, and English end-of-year test results were used as the sole measure of academic achievement in this study. This achievement measure does not account for student learning beyond that which is measured by the end-of-course high school assessments.
- The findings of this study were limited to the state where the study took place.
- The findings of the study were limited to populations based on the single criterion of identifying public schools that are using a traditional, A/B alternating block or hybrid schedule.

- The findings of the study were limited to population of the socioeconomic levels of the different state high schools in this study. The percentage of students receiving free and reduced-price meals was obtained through the use of published demographic background data on each high school.
- The findings of the study are limited since this study only looked at scheduling from a single criterion, adequate yearly progress determination.
- Due to Common Core, changing of teachers, and other laws that are being implemented, there are challenges to the analysis due to changing factors in education.
- School years are not independent of each other.

### **Summary**

The purpose of this study was to add to the educational research and expand the information of study in the area of school scheduling and the effects it has on student academic achievement, attendance rates, and disciplinary incidents. This study is not an answer to the question of which schedule type is better, but rather adds to the knowledge base of understanding of the effects of switching school schedules and the effects it has on high schools (Schott, 2008). Data from this study would support high schools to refrain from switching to A/B block schedules if they were utilizing traditional schedules. This study has attempted to provide information to educational researchers and leaders to better equip them to make data-based decisions and understand the process for seeking answers regarding making decisions on changing or not changing high school schedules.



## Appendix: Institutional Review Board (IRB) Approval



UNIVERSITY OF  
**MARYLAND**  
INSTITUTIONAL REVIEW BOARD

1204 Mote Mount Hall  
College Park, MD 20742-5125  
TEL 301-405-4212  
FAX 301-314-1475  
irb@umd.edu  
www.umcesearch.umd.edu/IRB

DATE: December 9, 2013

TO: Darlene Harris  
FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [540814-1] Exploring the Impact of Traditional and Block Scheduling: An Examination of High School Student Achievement, Attendance Rates, and Disciplinary Incidents

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS  
DECISION DATE: December 9, 2013

REVIEW CATEGORY: Exemption category #4

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact the IRB Office at 301-405-4212 or irb@umd.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within University of Maryland College Park (UMCP) IRB's records.

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