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The University of Southern Mississippi

STUDENT ACHIEVEMENT IN BLOCK AND
NON-BLOCK SCHEDULE SCHOOLS

by

William Shelton Smith, Jr.

A Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

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May 2011

The University of Southern Mississippi

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ABSTRACT

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The purpose of this study was to determine if the number of minutes allocated for high school instructional periods influences student achievement. The study also examined the perceptions of principals regarding one method of instructional time allocation, block scheduling.

The study examined the differences in student achievement on a high school exit examination in the content areas of Reading and Mathematics between schools in a southern state using a four-period block schedule and schools using a non-block schedule in order to ascertain if the type of schedule has any impact on student achievement. Additionally, information pertaining to scheduling was collected to determine the perceptions of principals regarding those connections, if any, that exist between these forms of scheduling and student achievement.

A Mann-Whitney U test was calculated examining the percentage of eleventh grade high school students who pass the Mathematics and Reading sections of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

No significant difference in the percent of students passing the Mathematics or Reading test between students receiving instruction a block schedule and students receiving instruction on a non-block schedule was found.

A questionnaire was also administered to the principals of block schedule schools. The questionnaire was composed of twelve questions dealing with perceptions of block scheduling. In order to identify the attitudes of these principals toward block scheduling, principals answered questions dealing with their perceptions of the effectiveness of block scheduling in their high schools. Questions addressed their perceptions of block scheduling in the following areas: class period length of time, length of the course, principals' personal preference regarding block scheduling, the effect of block scheduling on student attendance and discipline, the effect of block scheduling on teacher attendance, discipline, and morale, the effect of block scheduling on exit exam scores, course grades, and the drop-out rate. Non-block principals did not complete the questionnaire.

The majority of respondents reported that block scheduling had a positive impact on students. Respondents reported that teacher discipline, teacher attendance, and teacher morale either remained the same or were impacted in a positive manner in block schedule schools. The majority of principals favored the time constraints of the block schedule. Implementing an adjusted school schedule to improve scores on high stakes tests in itself may not cause an increase in test scores. There are many variables that can have an effect on student achievement. It is the opinion of the researcher that making changes to the

schedule without careful consideration of all benefits and consequences would not be in the best interest of the students.

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ACKNOWLEDGMENTS

The author wishes to acknowledge the dedication and professionalism of the doctoral committee. These members included Dr. Ronald Styron, Chair, Dr. J.T. Johnson, Statistician, Dr. Michael Ward, committee member, and Dr. David Lee, committee member. These professionals gave the author their time and attention during the entire process.

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CHAPTER I

INTRODUCTION

The purpose of this study was to determine if the number of minutes allocated for high school instructional periods influences student achievement. The study also examined the perceptions of principals regarding one method of instructional time allocation, block scheduling. Scheduling is becoming a greater concern to school administrators as academic requirements for all students are increasing in order to satisfy the demands of the federal and state systems of educational accountability.

The educational system in the United States is in a constant state of evolution. Changes that have taken place in education are often a result of a national report, the passage of some type of legislation or perceived crisis of national import. The most recent legislation adopted by the United States Congress and approved by the President has caused great alarm and concern to many in the educational community. The Elementary and Secondary School Act of 2001, also known as the No Child Left Behind Act, is a comprehensive attempt to make schools and school systems accountable for student achievement (Abrams & Madaus, 2003).

The No Child Left Behind Act (NCLB) requires schools to accomplish a predetermined measure, called adequate yearly progress (AYP) in order to avoid specified sanctions. Schools not making AYP become labeled as low performing schools. Harsh consequences are applied to schools that fail to consistently achieve AYP (Fritzberg, 2003).

Most of the measurements of AYP and student achievement are rooted in high-stakes testing. High stakes tests are used to evaluate the progress of students in several grade levels. Some states use graduation exams to determine the AYP status of schools (Goldberg, 2005). Some researchers and educators have expressed concern about the negative consequences that could be realized as a result of making the results of high stakes testing so important under NCLB (Neill, 2005). The limited focus on what student achievement under NCLB has caused many educators to search for ways that student achievement may be increased. The components of AYP for high schools in some southern states are yearly goals for Mathematics and Reading, testing participation rates, and graduation rates.

Among secondary educators, a well used method to improve student achievement is manipulation of the school master schedule. Manipulation of the school schedule and the structure of the school day can be dated back to the 1950s. Some of the earliest attempts to improve the quality of educational services offered in the U. S. were rooted in modular scheduling where a day is broken into many 10-20 minute modules or “mods.” This movement was not given serious attention and soon diminished, as have many other attempts at reform. Educational reformers took another look at restructuring the school day during the 1970s and 1980s (Hackmann, 2004).

During the 1980s, educational innovator Joseph Carroll began to experiment with restructuring the master schedule of high schools. Carroll believed students would perform better if given the opportunity to take classes for an extended period of time. He based his beliefs on his observations of summer school students. Carroll studied the course grades of students in high school and found that the students attending summer

school classes made better grades than they did during the regular school year. He piloted a program in Massachusetts to determine if students would achieve similar results during the regular school term (Carroll, 1994).

Michael Rettig and Robert Cannady (1997) championed the concept of block scheduling at different levels of K-12 education. Both believed that block scheduling was desirable for the reason that the idea that scheduling using a block format would cause an increase in student achievement.

There are several perceived benefits leading researchers to postulate that increased achievement will occur in schools utilizing the block format. Rettig and Cannady (1997) believed that student performance would improve because they will be in classes longer, have additional time to cover concepts, have less of a workload, and be interrupted less frequently. Teachers will also experience benefits including fewer students and classes to teach, and increased time to cover difficult material. Researchers believe student performance will also improve because of fewer class changes. Some local school districts have placed their secondary schools on various forms of block schedule. For example, the majority of high schools in Virginia converted to and remained on some type of block schedule during the 1990s.

Several factors may have an effect on student achievement. An important factor that should be considered is the leadership style of the principal. In recent years the principals of many schools have been encouraged to become the instructional leaders of their schools. The emphasis on student achievement has created the need for a new breed of principal. Modern high school principals are faced with producing a quality graduate who is able to compete globally. A movement toward visionary leaders with those who

served as managers only no longer having a place in school leadership also being recognized (Lunenburg & Ornstein, 2000).

Because of the accountability requirements imposed on educational institutions under NCLB, educational researchers should examine ways to make sure schools are utilizing the most effective use of the resources available. Some school systems have chosen to use block scheduling to improve student achievement. Researchers Rettig and Cannady (1997) and Rikard and Banville (2005) implied that school systems may see various benefits after implementing the block schedule. Improvements in student achievement because of improved systematic structures and cultural changes may be realized. Researchers should continue to find ways to increase student achievement.

In order to graduate from a high school in the state involved in this study, a student must pass five parts an exit exam earn 24 credits. The students are given the exam several times during the year. Students may take some parts of the exam as early as grade nine. Math and Reading passing rates are used to determine adequate yearly progress of high schools in the state. A school must have 77% of the junior class pass the Math part of the exam. Reading passage must be at 86% for the junior class. A third indicator is test participation. High schools must have 95% of all students attend school on the test day, and those students must attempt the test. Students are divided into subgroups based on several factors. Each subgroup must meet the aforementioned percentages. The state in the study also has included the drop-out rate as an indicator. Schools must show a decrease in the drop-out rate in order to make AYP. This indicator changed from drop-out rate to graduation rate for the 2006-2007 school year. High

schools must have a ninety percent graduation rate or show improvement from the previous school year.

Schools failing to make AYP are placed on school improvement status. Schools failing to make AYP for more than two years in a row may face state takeover. Local school officials may be forced to reconstitute the staff of schools that remain in school improvement (Alabama Department of Education, 2006). This study provides data from high school students in a southern state to ascertain if using an extended class period instructional format will increase student achievement on the high school exit exams, thereby improving the opportunities of students and diminishing the likelihood of schools facing sanctions under federal and state systems of accountability.

Statement of the Problem

Achieving AYP is becoming increasingly difficult with the passing of each year. Educators are being compelled to make use of data to find the most efficient and effective ways to deliver instruction. All aspects of education including the basic structure of the school schedule should be examined to find the most productive way to deliver instruction.

There has been a movement during the last two decades to rejuvenate high schools by alternating the type of bell schedule that is used. The movement to use a different schedule grew out of limited experiments conducted by researchers such as Joseph Carroll (1989). Systems were quick to change with little if any research-based data to determine if changing the structure of the school day would indeed cause a change in student achievement. This study was an attempt to ascertain if student achievement

scores on exit exams were affected by the bell schedule adopted by a school. The perceptions of block schedule principals toward block scheduling were also examined.

Purpose of the Study

The purpose of this study was to investigate the difference in student achievement on a high school exit examination in the content areas of reading and math between schools in a southern state using a four period block schedule and schools using a non-block schedule to ascertain if the type of schedule has any impact on student achievement. Additionally, information pertaining to scheduling was collected to determine the perceptions of principals regarding those connections, if any, exist between these forms of scheduling and student achievement.

Schools must make AYP in order to avoid school improvement status. Officials at the state and local levels are requiring schools to research ways to improve student performance. The accountability instrument for some high schools is an exit examination. The instrument measuring student achievement is a high school exit examination for reading and math. The percentage of students passing these exit exams was used to measure student achievement.

This study enabled schools to ascertain the effectiveness of scheduling in secondary schools. School systems could use this research information to make data driven decisions to formulate policy.

Research Question

Do principals perceive the use of block scheduling as a way to improve student achievement?

Hypotheses

H₁: There is a significant difference in the percentage of eleventh grade high school students who pass the Mathematics section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

H₂: There is a significant difference in the percentage of eleventh grade high school students who pass the Reading section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

Definition of Terms

The following terms were used in the study and are defined for clarity:

Block Schedule - Any form of scheduling that uses an extended period of instructional time past the traditional 45-60 minute period of instruction. A block period is typically ninety minutes or more of instructional time for a subject area.

High School Graduation Exam - The test given to all high school students in order to fulfill the requirements for graduation. The test consists of five parts. All five parts, Mathematics, Reading, Language Arts, Science, and Social Studies, must be passed in order to fulfill the requirements for graduation.

High School Student - Any student in grades nine through twelve enrolled in a public high school.

Non-block Schedule - Any form of scheduling not considered block. Non-block schedule classes usually last fifty to fifty-five minutes and there are six to seven classes per day.

Delimitations

The following is a list of delimitations of the study:

1. The study was delimited to the passing percentages of public high school students who were tested on the High School Graduation Exam in Math during the 2007-2008 school year.
2. The study was delimited to the passing percentages of public high school students who were tested on the High School Graduation Exam in Reading during the 2007-2008 school year.
3. The study was delimited to all public high schools that instruct students during the non-block period of fifty to fifty-five minutes of instructional time.
4. The study was delimited to all public high schools that instruct students during a block period of ninety to ninety-eight minutes of instructional time.

Assumptions

The following is a list of assumptions for the study:

1. It was assumed the list provided by the a State Department of Education of public high schools that are instructing on a block schedule format during the 2007-2008 school year is accurate.
2. It was assumed that the students received the appropriate instruction on the competencies and objectives listed in the math section of the state high school course of study.
3. It was assumed that the students received the appropriate instruction on the competencies and objectives listed in the reading section of the state high school course of study.

4. It was assumed that students consistently answered test items in a manner that reflects their true knowledge.
5. It was assumed that the test data as reported by a State Department of Education's website are accurate.
6. It was assumed that the principals will answer the questionnaires candidly.

Justification

Educational researchers have been studying ways to improve student achievement by manipulation of the structure of the school day. During the late 1980s and throughout the 1990s many school systems began to experiment with block scheduling. The data on the impact of block scheduling on student achievement as measured by high stakes tests are not consistent. Data indicating that block scheduling has a positive impact on student achievement may be misleading. Some academic gains realized are merely school grades recorded by teachers. These grades may or may not be measured with a valid instrument (Queen, 2000).

Studies using high stakes tests in Texas (Hackman, 2004) have revealed little or no relationship between block scheduling and student achievement (Lawrence & McPherson, 2000). Rettig and Canady (1997), and Rikard and Banville (2005) indicated that the impact on student achievement can be attributed to the improvement in the quality of the school climate. According to the aforementioned researchers this increase in positive school climate can be attributed to the block. Data have also revealed a decrease in school problems that could be attributed to the use of block scheduling (Rikard & Banville, 2005).

Real student achievement gains must be measurable and tied to empirical research. During the mid 1990s, studies were conducted in North Carolina. These studies analyzed data consisting of course test scores. The North Carolina Department of Education reported that there was not a significant difference in test scores between block and non-block instruction (North Carolina Department of Education, 1997). Smith (2004) produced similar findings. Data gathered in Mississippi high schools indicated there was no significant difference in scores on the Mississippi Subject Area Exams. Smith analyzed test scores in two subject areas: Algebra I and Biology I. Smith noted that Algebra I mean scores were higher in non-block schools than in block schools and that more non-block students passed the Algebra I state exam. The same held true for the data collected from Biology I exams (Smith, 2004).

In order to graduate from a high school in the state involved in the study, a student must pass five parts of the graduation exam and earn 24 credits. The students are given the graduation exam several times during the year. Students may take some parts of the exam as early as grade nine. Math and reading passing rates are used to determine adequate yearly progress of high schools in the state. A school must have 77% of the junior class pass the Math part of the exam. Reading passage rates must be at least 86% for the junior class. A third indicator is test participation. High schools must have 95% of all students attend school on the test day, and those students must attempt the test. Students are divided into subgroups based on several factors. Each subgroup must meet the aforementioned percentages. The state also has included the drop out rate as an indicator. Schools must show a decrease in the drop out rate in order to make AYP. This indicator will change from drop out rate to graduation rate for the 2006-2007 school year.

High schools must have a 90% graduation rate or show improvement from the previous school year.

Schools failing to make AYP are placed on school improvement status. Schools failing to make AYP for more than two years in a row may face state takeover. Local school officials may be forced to reconstitute the staff of schools that remain in school improvement (Alabama Department of Education, 2006). This study will provide data from high school students in the state to ascertain if using an extended class period instructional format will increase student achievement on the high school exit exams, thereby improving the opportunities of students and diminishing the likelihood of schools facing sanctions under federal and state systems of accountability.

Schools must have all students proficient under NCLB by 2014. Manipulation of the school day may enable students to make academic achievement improvements by providing extended time for instruction. Being able to ascertain if students will increase achievement by increasing the length of instructional time per period will enable districts to make better decisions about the structure of the school day as it relates to instructional periods.

Summary

Government officials have attempted to improve the quality of the labor force via education for several decades. Continuous instructional improvement is a focus in most educational institutions. Manipulation of the structure of the school day is one way that some school systems have chosen to improve student achievement.

Graduation exit exam scores will be examined to ascertain if there is a relationship between school day structure and student achievement. The study will

attempt to ascertain the perspectives of the principals using the block schedule toward block scheduling.

School districts must increase student achievement on high stakes tests to meet the requirements set forth in NCLB legislation and state accountability systems. Schools failing to make AYP under NCLB will be placed under state sanctions. Some school districts have chosen to change the structure of the school day to increase period instructional time as a way to increase student achievement. Studies conducted in other states combined with results of this study will enable the researcher to ascertain if increasing the length of instructional time by using the block scheduling will increase the level of student achievement.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

The evolution of education has made accountability a necessity. Chapter II contains an explanation of policy trends related to accountability, a theoretical framework for this study, and a review of current studies as they pertain to block scheduling.

Topics discussed in Chapter II include: accountability legislation, high stakes testing, time and cognition, and finally block scheduling. The focus of the study is block scheduling as it relates to student achievement. Principals' perceptions about block scheduling will also be discussed.

Background

The last few decades have seen an increase in technology that is unparalleled in history. The United States has passed several acts and laws to increase the effectiveness of schools to keep up with the gains of other countries competing in the global economy. The earliest attempts were spawned by fear as the government attempted to create weapons of war and eventually gain the advantage in outer space. This race intensified during the Cold War. The most recent attempts to increase student achievement are rooted in the economy. Increases in technology have forced many countries to compete in a global economy. The NCLB act requires that all students be proficient by 2014.

The trend to increase accountability in education is not new. During the last several decades there have been attempts to increase the level of achievement of students in the United States. The measures of accountability that are being utilized under recent

legislation often cause great alarm, stress, and concern among local administrators and teachers.

The Soviet Union detonated a nuclear weapon in 1949 (Dupont, 2006). This alarmed the citizens of the United States. Advances in weaponry and space travel made by communist countries and communities caused alarm and concern for the free nations of the world. The launch of Sputnik in 1957 frightened Americans into a race to learn more in the areas of mathematics and science. Countries that are able to travel and operate in space have a distinct advantage, if not actual then perceived (Fullan, 2001).

The launch of Sputnik gave the government the support it needed to participate in the space race. In order to address the math and science needs that were created by the space race, the National Defense Education Act was passed. This 1958 act provided incentives for students choosing to study math and science (Mohammed & Smiley, 2003).

This race has intensified during the last few decades although the reasons for the race have changed. Statistics are available that indicate which states spend the most on education. Statistics are used to identify schools that are not performing up to the standards set forth by the government.

A Nation at Risk (National Commission on Excellence in Education {NCEE}, 1983) brought the world's attention to the need for accountability (Fullan, 2001). The report claims the United States lost most of the gains experienced after the Sputnik scare. Attention in the report was focused on literacy rates and standardized test scores in several areas and at several levels (NCEE, 1983).

A culture of laziness was a concern addressed in the *A Nation at Risk* (NCEE, 1983). Concerns about educating students at a minimum level can be recognized or noted in this report. The future looks bleak according to the findings in the report. The report lists the following statement made by analyst Paul Copperman:

Each generation of America has outstripped its parents in education, in literacy, and in economic attainment. For the first time in the history of our country, the educational skills of one generation will not surpass, will not equal, will not even approach, those of their parents. (NCEE, 1983 p. 4)

This may seem extreme in retrospect, but the effect made by the report shook the educational community. The commission found that schools and what occurs in schools is controlled by time and the way the school day is used. To summarize people are better educated as a whole, but U. S. graduates are not as well educated as they have been in the past (NCEE, 1983).

According to a recent article published in *USA Today*, the U.S. may be falling behind in the science and math race. Statistics cited by *USA Today* look grim for the U.S. economy. Some developing countries are closing the economic gap at an alarming rate. These countries are requiring more out of school age children. Academic standards are now more rigorous in the countries making the most economic progress (Vergano, 2006).

The National Science Foundation recently reported that over half of the doctoral degrees earned in the math and science fields were earned by foreign students. This progress has caused alarm and concern for many in the U.S.

government. President Bush addressed some of these concerns with the American Competitive Initiative (Vergano, 2006).

Lawmakers and the public are concerned about the quality of education, and they are demanding that educational leaders find new ways to be more efficient while producing enhanced student achievement. Some of these rigorous standards are listed in the No Child Left Behind Act (2002). This act requires schools to comply with measures to assure that each school is held accountable (Gandal & Vranek, 2001). State systems of accountability also require improvement of student achievement.

Theoretical Framework

In 1909, the Carnegie unit was adopted by the College Entrance Examination Board. Adoption of these standards helped educational leaders develop schedules that were more uniform (Hackmann, 2004). Until 1892 there was no uniformity in education. Each school was different and had different standards. A committee was formed and chaired by Charles Elliot to address uniform standards for education. The committee known as the Committee of Ten would eventually be responsible for Educational reform that continues to influence education today (Hertzberg, 1988). The recommendations of the committee eventually led to formation of the Carnegie unit. The Carnegie unit has historically made implementing changes to school structure difficult.

The Carnegie Foundation desired to create a uniform system of measurement based on the amount of time required to complete a course and get credit. The foundation devised a plan that was based on a school calendar year lasting 36-40 weeks and consisting of 120 minutes of instruction for each class meeting four or five days per week. The Carnegie unit standardized the school day, week, and year The Carnegie

system is used to measure the performance of students, faculty, and systems. The nature of the Carnegie system makes implementing flexible schedules difficult (Canady & Rettig, 1995).

John Dewey (1916) expressed his ideas about the impact of manipulation of the educational environment on educational growth and learning. The traditional educational system that was developed for the students in Dewey's era is outdated. The ideas that Dewey espoused may still be valid in some sense if they are taken in context and applied using modern thinking. Some contemporary reform ideas are based on the ideas of educational theorists.

Much of what is practiced in classrooms around the nation today is based on ideas espoused by behavior theorists. Teachers are expected to teach a skill or concept. The student is expected to practice and master the skill or concept presented by the teacher. Recently there has been a shift in thinking. A new move toward constructivism has caused many to consider restructuring the school day. Constructivism suggests that teachers guide students in finding a more complete understanding of concepts. The teacher is to act as a facilitator. Hackmann believes that constructivism is a culture that is created (Hackmann, 2004). This change in the role of the teacher may require that the school day be restructured to allow the teacher to facilitate the students in mastery of a concept or skill.

Windschitl (1999) discusses constructivism and issues surrounding it. Constructivism places an emphasis on the individual student and the ability of the student to construct meaning from what is learned. Constructivism places an emphasis on learning through an experience. Windschitl believes that constructivism can be used to

create a classroom that is more conducive to learning. The use of constructivism in the classroom allows teachers to become facilitators of learning. Teachers are able to address different learning styles. The role of the teacher changes from one of dispensing knowledge to one of creating a thinker out of the student (Windschitl, 1999).

Constructivists believe that students learn best in an environment that fosters learning using prior knowledge and experiences. This environment will be most effective if students are stimulated socially. Students learn by using metacognition to solve relevant problems. Students should be able to gain a deep understanding of concepts through varied instructional strategies advocated by constructivists. Thus, constructivists wish to produce an atmosphere that is conducive to teaching for total understanding rather than using a prescriptive and diagnostic approach to teach a concept.

Constructivism has been more readily embraced in the elementary school setting than in secondary schools. The structure of the elementary school day is conducive to the social and instructional strategies that the constructivists advocate. Most elementary schools use self contained rooms without set periods. Students are engaged in instruction for long periods of time with the same teacher and peers.

High schools tend to be different. Students change classes several times during the day. Instruction is often delivered by several different teachers during the course of the school day. High school teachers who use strategies and methods espoused by behavior theorists do so in within the constraints of a set period time for a subject. Constructivism has yet to be readily embraced by secondary schools. Using an alternate type of schedule that allows for longer periods of instructional time facilitates the use of the situational problem solving teaching strategies championed by constructivist. It is

believed by individuals advocating the use of block scheduling that using the constructivist theories in an expanded block of time will increase student achievement (Hackmann, 2004).

Cognitive Development and Time

The National Commission on Time and Learning (1994) cited the need for an increase in the number of school days per year as well as increasing the length of the school day. This was in response to the belief that everything in the school including learning was controlled by the school calendar and time restraints of the school day. The commission found that this control of time extended into the homes of the students and communities. Even though schools control so many aspects of the community, the commission reported that less than half of the time spent in schools was committed to academic areas.

The commission reported that the school day should be doubled in order for students in this country to keep pace with other developed and developing countries. Several recommendations other than lengthening the school day were recommended by the commission. Ideas for improving schools were focused around improving learning through focusing on strengthening academic programs and getting schools to prioritize academic instruction (NCEE, 1983).

Many states decided to change graduation requirements during the 1980s. As a result there was an increase in number of credits needed to meet the new requirements. Increasing the requirements caused many problems for schools and students. Students had less time to take elective classes, schools struggled to keep specialty programs that were not required for graduation. States making these changes did not increase the length

of the instructional day. Increasing the number of credits without increasing the number of hours of instruction per days forced systems to create more classes per day. The class time of each period was reduced. Having more classes with less instructional time forced many schools to abandon many effective teaching strategies (Canady & Rettig, 1995).

Recent investigations into time as it relates to high school scheduling are rooted in an experiment conducted by Joseph Carroll in Massachusetts in the 1980s. The experiment was a result of a shortfall in school funding. Carroll believed that the school class schedule could be manipulated to improve student achievement while using time more efficiently. He made these assumptions after studying the results of students attending summer school classes (Carroll, 1994). The use of instructional time has also been addressed by the National Educational Commission on Time and Learning (1994). The report listed use of school time as a challenge facing schools. Schools are on a fixed schedule with a set number of days and hours in each day. A typical school has a schedule that encompasses 180 days with 5.6 hours of instruction each day. Time needed for teachers to perform their duties and global educational standards were noted as problem areas.

The relationship between learning and time should be explored if there is a possibility that manipulating time could affect cognitive development and achievement. Some scientists believe that the mind works like a computer. Piaget held that there are four stages of cognitive development. There are sub stages within the four main stages. The four stages are not concrete but rather an approximation of development as the stages blur together. Cognitive development occurs across many different knowledge domains.

Other scientists hold similar but somewhat different beliefs about the progression of cognitive development across different domains at different rates according to domain area. Vygotsky believed that cognitive developmental stages were not concrete and learning continued long after a concept was mastered. The mastered concept is used to master other concepts as a child develops and continues to learn. Piaget believed cognitive developmental stages end after age 15. Scientist such as Vygotsky believed that the development of cognitive stages continues for much longer (Flannagan, 1999).

Robert Port and Timothy Van Gelder (1995) assert that cognitive development should be viewed as a process that involves the entire body and all systems of the body. Cognition therefore is viewed as a dynamic system. Port and Van Gelder believe that although scientists have created many theories and models to explain cognitive development, few address one of the most crucial aspects of cognition, time.

Two concerns surface when time and cognition are considered. One is whether students learn as much during concentrated blocks of time as they would if exposed to material in shorter increments of time over a longer duration. The next question deals with retention and explores whether retention varies with time. Powell (1976) asserts that information learned may be forgotten days after it is learned. The amount of material forgotten may increase as time passes. At some point the amount of material forgotten will stabilize. Powell refers to this as the “forgetting curve.” There is no evidence that there is a difference in the amount of material forgotten when considering the length of time between classes.

The National Center on Time and Learning (1994) recently discovered that increasing time in school may increase achievement. Findings indicate that lengthening the school day may increase academic achievement in some grade levels (Gewertz, 2009)

Carroll (1989) asserts that cognition and retention can be increased using block scheduling. He cites findings from behaviorists such as Skinner. Carroll's assertions are based on four characteristics of programmed instruction. According to the American Educational Research Association (1969) programmed instruction includes: focused attention on a limited amount of information, requiring a response to segmented material, rapid feedback from the instructor, and individualized instruction. Carroll believes that block scheduled instruction enables the instructor to incorporate the aforementioned characteristics of programmed instruction.

Calfee (1981) asserts that reported successes of block scheduling can be explained by examining how a curriculum is designed. He supports using instructional techniques that allow instructors to "chunk" information. Cognitive psychologists report that chunking helps students understand complicated concepts, chunking must possess a self-supporting internal coherence, students gain the greatest understanding of material by gaining a conscious understanding of the principals of a concept, and students become experts in complicated domains only after spending time in that domain. Students use short term memory, long term memory, and working memory as they engage in instruction. Instructors must consider this when designing curriculum and instructional strategies. The effectiveness of instructional strategies on long term memory depends on frequency and contiguity. Concepts are reinforced by how often they occur over time. Concepts that occur closer together in time and space are more likely to be recalled

together. Cognitive psychologists hold that learning and retention are one in the same or closely related phenomena. Carroll (1989) asserts that learning and retention can be increased by presenting students with well organized material and individualized attention. Block scheduling affords the instructor capacity to present material in a well organized manner while offering individualized instruction.

School Accountability

School systems are accountable to the federal and state governments. Each state must create a system of accountability that conforms to the requirements set forth in the No Child Left Behind Act. States often use academic indicators such as performance on standardized tests and a non academic or additional indicator such as attendance or graduation/drop out rate.

No Child Left Behind legislation requires all schools to make adequate yearly progress (AYP). Schools not meeting AYP face a myriad of consequences. These consequences can be severe. Most of the penalties are directed at the local school and the local teachers. Teachers and school staff face the possibility of losing their jobs (Abrams & Madaus, 2003).

School districts may face additional sanctions in the form of school choice options that are given to students attending schools that do not make AYP. Students in low performing schools are allowed to transfer out of the low-performing school and attend a school of choice. The district pays for transportation to the alternate school (Abrams & Madaus, 2003).

Transportation is extremely costly. School option is another problem for schools that are in academic trouble for not making AYP. Students are given the option to

transfer out of schools that do not make AYP. School option action can also be detrimental to the low performing school. Schools that do not make AYP may lose the very students that are needed to make AYP (Abrams & Madaus, 2003). The parents in schools to which such labels are applied may not understand the reasons why the school is an option school. Parents in some California schools were shocked and confused because one of the state's top middle schools was labeled as a low-performing school (Fritzberg, 2003).

Making or not making AYP does not necessarily mean a school is or is not educating students. Sub par schools may be able to make AYP, and high performing schools can fail to make AYP. There are many variables associated with making AYP. All variables must be met in order for a school to make AYP. One requirement that has kept some high performing schools from making AYP is the 95% participation component (Fritzberg, 2003). Schools are required to have 95% of students that are taking tests used to determine AYP status in attendance on the testing day. Students who have passed the test previously are included in the 95%.

Attempting to make AYP may also prove detrimental to the school curriculum. Data from all grade levels and subjects are used to determine the AYP status of a school. NCLB requires all schools to test all students in grade 3-8. Implementation of this testing was mandatory by 2005 (Winchester, 2004). Schools may concentrate more heavily on the subjects and grade levels that determine AYP. Electives and non core classes may be dissolved in order to place a greater emphasis on AYP subjects and grade levels. The Center on Education Policy has determined that the curricula of many elementary schools have been affected (Whelan, 2006).

Questions have arisen about the ability of all students to meet the requirements set forth in the NCLB legislation. Popham (2005) suggests that some states have used lax provisions in the law to make AYP obtainable for some schools. The focus for schools may be on making AYP and not improving student achievement. AYP is measured with test results.

Improving student achievement is rapidly becoming the main focus of educators in all fifty states. A large amount of energy, time, and money is devoted to improving the ways that educational institutions are evaluated. Each state has created a unique way to deal with student achievement and issues of accountability.

The state devotes three weeks of each school year and one week during the summer break to testing high school students in order to satisfy these increasing accountability measures. Meeting the increasing demands implemented by the states has forced educators to research methods to increase student achievement. School leaders at the district level are experimenting with many different methods to increase student achievement.

Increasing student achievement is not a new concept, nor is it a new priority. Educators have arguably been concerned with the achievement of students throughout the history of public education. Educational systems in the U.S. measure progress most often by testing. Measuring students with tests is an old idea. Educational icon Horace Mann instituted a standardized test in 1845 (Abrams & Madaus, 2003).

Most states have standards by which students are measured. Students moving from grade to grade often must be able to demonstrate some level of proficiency. Students graduating from high school in the state must pass all parts of the high school

graduation exam. Tests such as the graduation exam are considered high stakes tests. It is with such high-stakes tests that achievement is measured for purposes of accountability.

Testing has been used for many years for several different purposes. Testing has been instrumental as a management tool as well as a tool for improving the effectiveness of programs and the performance of students. Testing has also been used to track students into career paths. Tests have been used to determine the grades and grade levels of students (Linn, 2001). Linn (2001) also mentions that testing has been around for many years and has been a point of controversy:

Standardized testing has been an ever expanding, albeit controversial, part of education in the United States throughout the 20th century. Americans have had a love-hate relationship with educational testing. The many demands and high expectations for more testing and assessment that are prevalent today coexist with harsh criticism. (p. 29)

Some data indicate that high-stakes testing used by many states to determine AYP may not be productive. There are school systems that have experienced adverse effects as a result of high - stakes testing programs being implemented. In a Boston College study in *Education Digest*, O'Neill (2003) found that some schools are experiencing a ninth grade bulge. This bulge is created by students who are retained because of failing high-stakes tests.

Another problem noted by researchers and school officials is the number of schools that seem to be high performing schools that for some technical reason do not make AYP. During the 2002-2003 school year, almost 30% of the public schools did not make AYP. Connecticut state officials speculate that the vast majority of Connecticut

state schools will not make AYP ten years from now (Goldberg, 2005). In North Carolina, 283 schools failed to make AYP. Some of these schools missed the AYP standards by one subgroup. The majority of schools in North Carolina were proficient by state standards, but nearly half failed to make AYP (Goldberg, 2005).

Researchers are now questioning the testing process. Tests are given by schools to determine if progress is made. Some schools may be either intentionally or inadvertently changing the curriculum to match the tests that are given. Ideally, tests assess what has been taught. Some researchers and educational authorities believe that teachers may be teaching to the test. Deborah Meier, principal and educational writer, believes that high-stakes testing often leads to pedagogy that focuses on getting the correct answers (Goldberg, 2005).

Boston College's National Board on Educational Testing and Public Policy conducted a study on testing and instructional practices. The survey population was 12,000 educators. The educators represented every level of testing. Educators from schools using low, moderate, and high-stakes testing were surveyed. In schools where high-stakes testing is used, teachers reported that instruction increased. However the instruction increased only in areas that were to be tested using the high-stakes test (Olison, 2002).

Other problems with the current trend in high-stakes testing have been expressed. Concerns have been voiced about the testing scandals that have occurred throughout the country. Michigan and Texas schools have been involved in scandals involving testing irregularities, cheating, and altering dropout rates. School systems have reported false graduation rates in order to look more attractive. In 2002, the New York City schools

claimed that 51% of the seniors graduated. Only 39% actually graduated (Goldberg, 2004).

Researchers are reporting other problems that have surfaced even when the schools have been in full compliance with testing policies. The association for Supervision and Curriculum Development (ACSD) has issued a caution concerning error at all phases of the testing cycle. Large scale errors occur. In Nevada, 736 students failed the school exit exam because of an error. Georgia officials cancelled a fifth grade test administered to over 600,000 students because of mistakes contained in the test (Goldberg, 2004). Christine Jax, the education commissioner for the state of Minnesota, reported that she was not able to find a testing company that had a perfect record. Artur Golczewski is a testing scorer for a large testing firm that scores writing samples. He reported that many of the people hired to score tests by the same firm did not completely read the tests (Harkham, 2001). David Griffith, a spokesperson for the National Association of State Boards of Education, states, "I don't know if it's possible to get a 100 percent, error-free system. This country only produces something like twenty psychometricians a year. So it's definitely a problem" (Harkham, 2001, p. 46).

The pressure placed on administrators and teachers to increase student achievement is enormous. Many school systems have looked for ways to manipulate the school schedule to increase academic achievement. A popular way to improve student achievement emerged in the 1980s. Educators began to explore ways to manipulate the school schedule and implement some form of alternate scheduling.

Block Scheduling

The pressures placed on administrators and educators to improve test scores and achievement has caused many in the educational community to take a serious look into alternative scheduling. The idea to restructure the school day can be observed in the move to implement modular scheduling. Modular scheduling proposed using modules as a determinate to the length of teaching time. Schedules were adapted to meet the requirements of the module being taught. This method known as the Trump plan was developed by J. Lloyd Trump. Trump was attempting to mold instruction to the needs of the individual student. Only about 15% of high schools in the country experimented with this method. The concept became known as flexible modular scheduling. This 1950s movement became less prevalent during the 1970s, and educators began to explore other scheduling options during the 1980s (Hackmann, 2004).

A reform movement developed as systems attempted to find the best schedule for high schools. The high school scheduling reform movement had several goals. The reformers wished to reduce student movement during the school day, increase instructional efficiency, decrease the number of courses and students per teacher, reduce the academic workload of the students, create cohesion of courses, allow teachers to use different teaching strategies, allow teachers the flexibility to diversify instruction to meet the needs of the individual learners (Canady & Rettig, 1995)

Carroll (1994) developed a plan for restructuring the school schedule according to a plan he referred to as the Copernican Plan. The name of the plan has nothing to do with the field of science. The name was chosen due to the striking changes that would take

place once the plan was enacted. The public was not expected to be receptive to these new ideas.

Carroll introduced the Copernican Plan in 1983 in the Masconomet School System in Massachusetts. A key component of the plan deals with scheduling. In the Copernican plan alternative scheduling is used to restructure the school day in a way that better facilitates the needs of the students. Carroll stressed using different types of schedules. One idea was to have four hour classes that last for 30 days and two hour classes that last 60 days. The plan would allow students to earn six credits per year (Carroll, 1990). The objective of the plan was to lengthen the class periods to increase the effectiveness of the instruction in the school. The first pilot program was conducted in Massachusetts. Researchers evaluating the pilot study indicated that favorable results were obtained (Gee, 1997).

The study conducted at Masconomet used volunteer students and teachers. The schedule was manipulated to increase the amount of time a student would spend in each class. The pilot program also changed the number of days students would attend. Students attending the pilot program would attend three trimesters during the year. These students had only two classes that met for 100 minutes each. The rest of the student body remained on a traditional schedule. These students continued meeting for 46 minute classes. These classes met for 181 days (Carroll, 1994).

Researchers wondered whether the reduction of total time spent in the classroom under the pilot program would adversely affect learning. Midterm test scores were evaluated to ascertain if one program had afforded participants greater academic achievement. The results indicated that although the students in the pilot program

attended fewer hours, the results were nearly the same. The students in the pilot program were able to complete more courses with no noticeable academic disadvantages.

Researchers and government politicians began to scrutinize the school day during the 1980s. During the 1980s, the public wanted schools to be more efficient. A report issued by the National Education Commission on Time and Learning in 1994 indicated that schools in America were outdated and used antiquated methods of instruction based on older teaching models (Lawrence & McPherson, 2000). During the late 1980s and early 1990s a call for restructuring began. Researchers wanting to restructure the school day envisioned a new type of school that would better meet the needs of modern students (Queen, 2000).

Types of Block Scheduling

Block scheduling can take many forms. The four block day is often referred to as the four by four. The students following a four by four schedule would take four classes (typically 90 minutes in length) per day. Classes structured under four by four plan would end at the semester break. After the semester break a student would be enrolled in four new classes. This would enable a student to take eight classes and earn eight credits per year. Some schools used an A/B block system. The A/B format has eight classes that meet for an entire year. The A/B block system classes usually meet four per day on alternating days for the entire year. Each class would last for approximately ninety minutes. A traditional schedule consists of six or seven periods lasting forty-five to fifty-five minutes (Viadero, 2001).

The reasoning behind the block is not only to offer the ability of a student to earn more credits per year, but to enhance the level of instruction through using time more

efficiently in the classroom. Proponents of block scheduling seek to enhance the level of instruction by offering both student and teacher the time to implement different learning opportunities that emphasize more diverse skills and strategies.

The two main types of block scheduling (four by four and A/B) have advantages and disadvantages. Some of the advantages of the four by four are an increase in teacher preparation time and a decrease in student load, a chance for students to retake failed subjects during the same year, and the opportunity to gain more credits than a traditional schedule. The disadvantages include increased time between subjects taken each year (loss of retention) and loss of instructional time caused by each absence. Under the block, students taking math or a foreign language may have that subject for half of the year. Students under the block may experience a school year between subjects. Students taking a highly sequenced discipline like math or foreign language during the first semester may not be scheduled for another math class until the second semester of the following school year. Absences can be a problem for block students. Each absence from a class under the block counts as more than two under a traditional schedule. Block students have less time to make up work or assignments that are missed (Rettig & Canady, 1997).

Some researchers are finding that using the block schedule has increased desirable outcomes in some schools. Allen Queen (2000) found that over a four-year period an increase in interactive instruction took place in one of the school systems that were studied. The majority of students and teachers believed that block scheduling was successful. Over 80% of teachers reported being able to vary instruction using the longer class periods provided under block scheduling. Eighty-four percent of teachers and

students felt that using the block schedule increased school safety. The students and parents surveyed during the study believed that school discipline had improved (Queen, 2000). A study conducted by the Virginia Department of Education indicated that 63% of public high schools in Virginia were using some type of block schedule. Over 50% of the principals interviewed about block scheduling indicated that a decrease in discipline problems should be seen as a result of the implementation of block scheduling. Eighty-eight of the 141 principals questioned about block scheduling indicated that their expectations had been met. The majority of the teachers were in favor of block scheduling. Sixteen percent indicated that a traditional schedule was more desirable (Short & Thayer, 1999).

Rettig and Canady (1997) reported that block scheduling is strategically more effective than a traditional schedule. Less student movement usually lowers student discipline and teacher stress and leads to a cleaner campus. The teachers are afforded less paperwork and more time to plan.

Rikard and Banville (2005) reported similar findings. The researchers found that block scheduling can make a school strategically more effective. In a study analyzing physical education teacher perceptions about block scheduling in high schools, the researchers found that attendance, discipline management, stress level of faculty, and teacher student relationships had been affected by the implementation of a block schedule. Forty percent of the teachers reported that there had been an improvement in class attendance after the implementation of the block schedule. Five of the teachers in the study reported that they had experienced a decrease in student apathy. Six teachers

reported a decrease in the number of discipline management issues in their classes. One teacher stated:

The break [between classes] is longer [than traditional scheduling]...

When the kids have that time in the hall to relax and socialize with their friends before they go to their next class, they're not sprinting to get to class. It's helped to reduce tardies, because they have more time. So I think that's helped with the kids' demeanor and their mood. (p. 31)

All of the teachers reported a reduced stress level. Stress was reduced because teachers were not overburdened with work. Some teachers reported feeling less fatigue after teaching in the block schedule classes (Rikard & Banville, 2005). Teacher-student relationships were improved according to 40% of the teachers in the study. Block scheduling allowed teachers and students more time to interact. Only 27% of the teachers reported that there was not an increase in teacher-student relationships.

Other researchers have made similar observations about factors that effect school climate and culture. Hurley (1997) noted that teachers listed less work as a desirable feature of block scheduling. Students also made the same observation and comments about the lower workload. In the study conducted by Carroll, teachers using the block schedule reported having a higher level of excitement and satisfaction than teachers using the traditional schedule. Teachers using the block also stated that they were able to change their teaching styles and do a better job of teaching (Carroll, 1994). Veal and Flinders (2001) reported similar findings in regards to teaching methods. The researchers conducted a study on the perceptions of teachers, parents, and students in schools where block scheduling was utilized. Results indicated that teachers changed instruction as a

result of teaching in the block. Teachers reported using different and varied methods of teaching. Forty-five percent of students in block classes reported that teachers used different methods while teaching in the block.

A study conducted by Pritchard, Marrow, and Marshall (2005) indicated that school culture was connected to district culture. The research indicated that student achievement is related to the school culture. Results indicated that the relationship between school culture and student achievement was most readily identified in social areas, the curriculum, and extra curricular activities. Findings reported by Rikard and Banville (2005) suggest that the block schedule has impacted school culture in a positive manner. Teachers using the block schedule reported feeling less stress and noted an increase in positive student-teacher interactions.

Scheduling studies have not presented a specific reason for choosing block scheduling. Student achievement may be measured in a variety of ways such as course grades, course test grades, system test grades, as well as state and national test scores. Making the decision to switch to the block based on theories of the relationship of cognition to time has not been expressed by the current available research data.

Debra Viadero (2001) reports that there have been a few large scale studies that are not conclusive, relative to the impact of block scheduling on student achievement. Some researchers in the United States believe that the block has not been proven to significantly increase student achievement as measured on standardized tests. Student achievement as measured within such studies could be linked to many variables. Improved student achievement is one reason to implement a block schedule. Reasons to

implement the block may range from increasing student performance to increasing course offerings.

Student Achievement and Block Scheduling

There could be many reasons for an increase or decrease in student achievement under an alternate schedule. The research that has been completed has not given a definite answer about the relationship between student achievement and block scheduling.

Student achievement is measured in a variety of different ways. Success may be determined using standardized test scores, course test scores, and end of course grades. Dropout rates and graduation rates are other measures of achievement. Some of the earliest research conducted in schools using end of course test scores was completed in North Carolina. According to the North Carolina Department of Education (1997), seventy-seven North Carolina schools that adopted the block schedule between 1993 and 1995 experienced some gains on end of course tests. These gains, however, were not significant until adjusted for socioeconomic status (SES) and parent educational level (PEL). The scores were significantly higher for block schedule students after the adjustments for SES and PEL.

Most research on student achievement is rooted in the results of high-stakes testing generated by the states. These data have not proven the effectiveness or ineffectiveness of block scheduling as a solution to improving student achievement (Lawrence & McPherson, 2000). Hackmann (2004) points out that the Texas Education Agency found difficulty in identifying the relationship between scheduling and student achievement. Part of the report offered the following:

Available data on high school schedules in Texas public education do not systematically explain or account for variation in overall high school performance. When school context is taken into account, other factors, including how effectively students engage in the teaching-learning process, appear to matter more than the particular length of the class period. (p. 701)

Studies conducted during the 1990s and later show mixed results. Data obtained in a study conducted in Georgia revealed that the block schedule did not offer an advantage over traditional scheduling (Lawrence & McPherson, 2000). Test results indicated that block scheduling had a negative effect on test scores. In the study 4,700 students were tested. About half involved in the study were students that took block schedule classes. The other students involved in the study were students following a traditional schedule. The researchers compared the mean scores of several academic subject area standardized tests. Algebra test scores were scrutinized. The students taking block schedule classes had lower mean test scores on the algebra part of the standardized test. These lower test results were not only realized in algebra. Students taking traditional classes had higher mean scores in all areas (Lawrence & McPherson, 2000).

Gruber and Onwuegbuzie (2001) report similar results from a study conducted in Georgia. The research involved 115 students taking classes in a four by four block and 146 students taking classes in a traditional setting. Students taking traditional classes had significantly higher scores on the Georgia mathematics computation exit exams. Scores on writing exams and grade point averages reflected no significant differences between the block and traditional groups.

Students in a Colorado high school experienced different results. Students taking advanced placement (AP) exams experienced an 11% increase in the number of students scoring above 4 on the AP exams. It should be noted however that gains were not made on all of the standardized tests. The ACT verbal scores increased from 19.8 to 20.2. The verbal ACT scores were the standardized test score in which improvement was noted. The average SAT scores for the verbal and math portions declined. Verbal scores declined from 455 to 428, and the math scores declined from 493 to 482 (Schoenstein, 1996).

In a study conducted by Evans, Tokarczyk, Rice and McCray (2002) three school districts were used to analyze certain aspects of the affects of block scheduling. The researchers found that schools using the block schedule experienced an increase in the class grades of students. An increase in test scores was also noted. The SAT and High School Proficiency Test (HSPT) were analyzed, and researchers found that increases were realized on both measures of achievement. Student scores increased on average by 14 points on the SAT and by six percent on the HSPT (Evans et al., 2002).

A study in Mississippi was conducted to ascertain the relationship between block scheduling and student achievement among high school students. Smith (2004) studied test scores from 30 high schools in the state of Mississippi. The high schools were comprised of 15 block schedule schools and 15 non-block schedule schools. Smith compared Algebra I mean scores and Biology I mean scores of students taking the Mississippi Subject Area Exam (MSEA). The researchers hypothesized stated that there would be a significant difference in the mean (MSEA) scores and percentage of students passing the MSEA. The hypotheses were rejected. Although the hypotheses were

rejected, Smith noted that students enrolled in non-block classes tended to score higher on the MSEA (Smith, 2004).

A 2001 schedule study conducted in Connecticut revealed that there was no significant difference on AP and Connecticut Academic Performance Tests between students enrolled in block schedule classes and students enrolled in classes using traditional schedules (Andrews, 2003). Similar results have been cited by other researchers. Secondary math and reading scores analyzed between 1998 and 2000 in Pennsylvania by researchers at Indiana University in Pennsylvania were similar in block and non-block schools (Mobus, 2004). Similar results were noted in a 2004 study conducted at Indiana University of Pennsylvania. The state achievement math and reading achievement test scores from groups of students in block schedule classes and groups of students taking classes in schools using a traditional schedule were compared. There was no significant difference in the test scores (Hepinger, 2004).

Queen (2000) cites several studies that indicate block scheduling either has a positive impact on student achievement or no negative impact. These studies were conducted in different states under varied circumstances. Block schedule students in Virginia outperformed non-block students on standardized tests, while results from state test scores in Pennsylvania were mixed.

Viadero (2001) indicates that although research studies were conducted in a number of schools in different states the effect of block scheduling on student achievement is not clear and has not been proven. One of the largest tests on block scheduling cited by Viadero was conducted in the mid 1990s using students in North Carolina. These tests were conducted by the North Carolina Department of Public

Instruction. The earliest findings indicated that block schedule students outscored non-block students in most subject areas. This, however, changed over the course of the five-year study. Students using both schedule types experienced similar tests results. Results from a 2005 study conducted in South Carolina indicated that differences in student achievement were noted between students attending block high schools and high schools with traditional schedules (Rosenberg, 2005).

Schreiber, Veal, Flinders, & Churchill, (2001) report that studies conducted before 1999 have not conclusively found that block or traditional scheduling increases student scores on standardized tests. Much of the information gained about the effectiveness of block and traditional schedules has been collected using surveys. Thus much of the data about scheduling is based on the perceptions of high school teachers, administrators, parents, and students.

Professional Development

Changes that are made in organizations are often met with resistance. Replacing a traditional seven or eight period schedule with a block schedule requires the stakeholders in the school to embrace change (Robbin, Gregory, & Herndon, 2000). Queen and Isenhour (1998) believe that teachers become conditioned to teach in a certain way and may be reluctant to change. Teachers may continue to follow a teaching routine regardless of the effectiveness of the strategies in the routine. Professional development should provide researched based methods to improve instructional strategies and teaching methods.

Robert Cannady asserts that block scheduling is effective in creating a climate to improve student achievement. A key to the effectiveness of block scheduling is

professional development. Canady and his colleague Retigg hold that the effectiveness of the block is not due in isolation to the length of time afforded to the class. The time must be used to enhance instruction. Enhancing the instruction is accomplished through the implementation of a variety of teaching methods and strategies. To impact student achievement teachers and administrators must be trained in the implementation of instructional strategies during an extended period of time (Robbin et al., 2000).

Research indicates that an improvement in student achievement in block schedule schools may be realized when instruction is altered to meet the needs of the students. Productive interaction between teachers and students are a result of professional development that directly impacts the instructional practices of the teacher. Learning can be impacted using the block if teachers use the increase in period length to implement teaching strategies that lend to constructivist teaching styles. Teaching styles change as a result of sustained professional development that is supported by the administration and staff of the schools. The block schedule has the greatest impact on student achievement when teachers have sustained professional development that increases the use of effective teaching methods (Queen, 2009).

The National Research Council (1996) is a proponent for professional development for all stakeholders that are considering the block. Once the block has been implemented teachers and staff must be engaged in detailed intensive professional development. It is important that people involved be afforded the time and structure to engage in ongoing collaborative professional development that includes training on using the various strategies and tools to make teaching in the block productive.

Principal Perception

The role of the principal is critical to the success of the school. Several factors may have an effect on student achievement. An important factor that should be considered is the leadership style of the principal. The leadership roles for principals of many schools have changed. Some districts are encouraging principals to become the instructional leaders of their schools. The emphasis on student achievement has created the need for a principal that is able not only to understand the curriculum but to enact change that impacts student achievement. The role of the principal as chief disciplinarian may be changing to that of curriculum and data specialist. Modern high school principals are faced with producing a quality graduate who is able to compete globally. A movement toward visionary leaders is being recognized. Managers may no longer be as appealing as leaders (Lunenburg & Ornstein, 2000).

Recent data suggests that schools should focus on student performance and student learning. Richard Dufour (2002) suggests that the instructional leader should be a learning leader. The learning leader's role is to make certain that students are learning. Dufour also advocates creating a school culture that is conducive to learning. He suggests converting the school into a group of small learning communities. The shift from principals being managers to instructional leaders could have an effect on the culture of the school.

It is commonly accepted in educational circles that the principal of the school has a strong influence on the success of the school (Cross & Rice, 2000). A 2005 University of Florida study found that leadership had an impact on several areas of high school. The principals in the study had an impact on the student achievement. Le Clear (2005) found

the impact on student achievement was caused by the principal's ability to influence school culture. Prater (2004) found that the education level of the principal, socioeconomic status, and gender had an impact on student achievement.

Principals are encouraged and even directed to become instructional leaders (Dufour, 2002). Research indicates that schools without an effective leader of instruction face a decrease in student performance (Whitaker, 1997). A 2004 University of Missouri study revealed that leadership style factors had a significant impact on student achievement. The leadership factor that had the most significant impact on student achievement was the ability of the principal to create and model a vision (Prater, 2004).

Researchers have conducted numerous studies indicating that school leadership is an important factor in the success of the school (Edmonds, 1979; Levine & Lezotte, 1990; Sergiovanni, 1991). In 1994, Marshak concluded that the school leadership was the key to school reform. However there has not been research to establish a link between the way students perform and the perceptions of the principal.

There is data that suggests a link may exist between achievement, school climate, and the principal. The fidelity of the implementation of programs in the school rests with the leadership. This includes many factors that may have an effect on the climate of the school and the achievement of students (Bossert, Dwyer, Rowan, & Lee, 1982; Witziers, Bosker & Kruger, 2003).

The debate about block scheduling will continue as schools strive to find ways to increase student achievement in order to make AYP and meet the requirements of state accountability systems. More research in high schools is needed to ascertain the effectiveness of block scheduling. Several of the aforementioned studies and articles

noted that block scheduling may affect student achievement at different levels based on the amount of time the block schedule has been used in a system. A study conducted in a state with well established block schedule schools as well as traditional high schools would be useful.

Summary

Literature on block scheduling and student achievement has revealed mixed results. Zepada and Mayers (2006) cite 58 empirical studies that indicate standardized test scores are not affected significantly by implementing the block schedule. Studies indicate that some positive relationships exist between the use of a block schedule and student achievement. Researchers Rettig and Canady (1997) believe that there is not enough data to make a definitive statement about the effectiveness the block schedule in relationship to student achievement.

CHAPTER III

METHODOLOGY

Overview

The purpose of this study was to determine if the type of high school period schedule influences student achievement. The study also examined the perceptions of principals regarding block scheduling. A description of the procedures to be used in this study is discussed in this chapter.

A quantitative study was conducted to determine if the schedule type of a high school has an effect on student achievement as measured by exit exam scores. Data from high schools in a southern state were used for the study. Perspectives from principals using the block schedule were examined.

Research Question and Hypotheses

The study addressed the following research question: Do principals perceive the use of block scheduling as a way to improve student achievement?

The following hypotheses were examined within the context of this study:

H1: There is a significant difference in the percentage of eleventh grade high school students who pass the Mathematics section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

H2: There is a significant difference in the percentage of eleventh grade high school students who pass the Reading section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

Participants and Procedures

The data for the analysis associated with the hypotheses in this study were collected from a State Department of Education website and other state department resources. After obtaining IRB approval (see Appendix A), a questionnaire (see Appendix B) designed to answer the research question was mailed to principals employed in the block schedule schools involved in the study. A cover letter (see Appendix C) addressing the study was attached. A permission cover letter and questionnaire was sent to all block schedule principals involved in the study after IRB approval for the study was granted.

For the purpose of examining the hypotheses, all schools from the state were involved in the study. Data from all block and non-block schools were used. A non-block school has a school day schedule that is six to eight periods long. Each period would last from 45 to 60 minutes. All schools using the block schedule in the state were included in the study. Block schools typically have four seventy to one hundred twenty minute periods.

In order to determine if there is a difference in student achievement between schools using block scheduling and schools not using block scheduling a Mann-Whitney non-parametric test was used. The percentage of eleventh grade students passing the exit exams in schools using the block schedule was compared with the percentage of eleventh grade students passing the exit exams in schools not using the block scheduling to ascertain if there is a difference in student achievement on the math and reading sections of the exit exams. Thirteen subgroup were tested to control for factors such and socioeconomic status. Prior performance was not controlled for in this study.

The dependent variable was the mean percentage of block and non-block students passing the Mathematics section of the exit exam. The independent variable was the type of schedule used by the school. The dependent variables were the mean percentage of block and non-block students passing the Mathematics section of the exit exam. The independent variable was the type of schedule used by the school.

The dependent variable was the mean percentage of block and non-block students passing the Reading section of the exit exam. The independent variable was the type of schedule used by the school. The dependent variables were the mean percentage of block and non-block students passing the Reading section of the exit exam. The independent variable was the type of schedule used by the school.

A permission cover letter and questionnaire was sent to all block schedule principals involved in the study after IRB approval for the study was granted.

Background

The schools involved in the study are located in a southern state with a population of approximately four and a half million people. Populations are concentrated at the extreme northern and southern ends and middle of the state. Caucasians make up 72% percent of the population. African Americans rank second at 26%. The rest of the population is a mixture of Asian and other minority groups. Eighty percent of the population claim to be Christian. Six percent claim to be Catholic. Eleven percent claim no religion. The state has many industries including automobile manufacturing, steel production and fabrication, agriculture, and aerospace. Agriculture is a large part of the rural economy. Farmers in the state produce many vegetables, grains, and livestock.

Schools involved in the study were high schools. The student test data was eleventh grade exit exam data derived from the state website. Free and reduced lunch status for schools involved in the study ranges from less than five percent to ninety percent or greater. There are many subgroups that may materialize from the student body composition of each school. Subgroups are generated from factors evolving out of the student body, special education, race, language status, and free and reduced lunch status.

Instrumentation

The state high school graduation exam was used to determine the achievement level of prospective graduates. The reading and math sections of the exam were used in this study to determine the achievement level of students involved in the study.

A questionnaire (see Appendix B) was administered to the principals of the selected block schedule schools. The questionnaire is composed of twelve questions dealing with perceptions of block scheduling. The principals of schools with block schedules were asked to complete the short survey and return it in a stamped sealed envelope that was provided by the researcher.

In order to identify the attitudes of these principals toward block scheduling, principals answered questions dealing with their perceptions of the effectiveness of block scheduling in their high schools. Questions addressed principals perceptions of block scheduling in the following areas: class period length of time, length of the course, principals personal preference regarding block scheduling, the effect of block scheduling on student attendance and discipline, the effect of block scheduling on teacher attendance, discipline, and morale, the effect of block scheduling on exit exam scores,

course grades, and the dropout rate. Non-block principals did not complete the questionnaire.

Questionnaire

Items were compiled to design an initial questionnaire draft. Items for the questionnaire were chosen by a group of comprised of three administrators, two counselors, and a teacher. Every member of the group had work experience in both block and traditional schedule teaching situations. This draft was disseminated to five experts. Four of the five experts were central office administrators who have attained doctoral level credentials. The fifth expert is a data analysis specialist for a local school district. Each of the experts has a varied background in public education. The experts have been employed in a system that has used the traditional and block schedule in high school. The system has been using the block schedule system in high school for approximately ten years. Experts were asked if the questionnaire was understandable, if it was of an appropriate length, and if there were any questions that needed to be added or omitted. The panel of experts gave written and verbal feedback. The recommended changes were made to the draft. A pilot study was conducted. The draft was submitted to forty-two high school administrators in the Mobile County School System. Seventeen surveys were completed and returned. There were no significant changes suggested. There were no questions identified as being unclear.

The questionnaire (see Appendix B) was developed to ascertain the perspectives of principals regarding block scheduling and to determine whether principals have similar views regarding block scheduling. Questions address the perceptions of principals in relation to teacher and student attendance, teacher and student discipline, as well as

student achievement and teacher morale. These areas were listed as areas affected by scheduling in the research data involved in this study.

Summary

This study was conducted to ascertain if there is a relationship between school schedule type, and student achievement. The study attempts to ascertain the attitudes of the principals using the block schedule toward block scheduling. Test scores from high schools in a southern state and the responses of principals of block schedule high schools were used to complete this study.

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to investigate the difference in student achievement on a high school exit examination in the content areas of reading and math between schools in a southern state using a four-period block schedule and schools using a non-block schedule to ascertain if the type of schedule has any impact on student achievement. Additionally, information pertaining to scheduling was collected to determine the perceptions of principals regarding those connections, if any, that exist between these forms of scheduling and student achievement.

For the purpose of examining the hypotheses, schools from a southern state were involved in the study. Data from all non-block and block high schools were used. A non-block school has a school day schedule that is six to eight periods long. Each period would last from forty-five to sixty minutes. All schools using the block schedule in the state were included in the study. Block schools typically have four seventy to one hundred twenty minute periods.

Variables not considered were numerous and not limited to prior performance, school size, teacher experience, instructional methods, remediation, socioeconomic status, and intervention or remediation programs.

Data

The data used in this study were obtained from a southern state department of education. Data were derived from graduation exams from 367 high schools during the school year 2007-2008. Students in the southern state involved in the study are required to pass five parts of an exam in order to graduate. The data used in this study are comprised of all 11th grade test scores from the spring test given in the 2007-2008 school year.

H₁: There is a significant difference in the percentage of eleventh grade high school students who pass the Mathematics section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

A Mann-Whitney U test was calculated in order to examine percentage of eleventh grade high school students who passed the Mathematics section of the high school graduation exam between those who received instruction on a block schedule and those who received instruction on a non-block schedule. No significant difference in the percent of students passing the Mathematics test between students receiving instruction a block schedule and students receiving instruction on a non-block schedule was found (Block $m = 196.02$; Non-block $m = 177.79$; $U=13622$, $p=.119$; see Table 1).

Table 1

Descriptive Statistics for Math (N=367)

Schedule Type	Percentage Passed	Mean Rank	n
Block	66.58	196.02	125
Non-Block	64.90	177.79	242

H₂: There is a significant difference in the percentage of eleventh grade high school students who pass the Reading section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

A Mann-Whitney U test was calculated in order to examine percentage of eleventh grade high school students who pass the Reading section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule. No significant difference in the percent of students passing the Reading test between students receiving instruction a block schedule and students receiving instruction on a non-block schedule was found (Block $m = 187.92$; Non-Block 179.83 ; $U = 13989.5$, $p = .491$; see Table 2).

Table 2

Descriptive Statistics for Reading (N=364)

Schedule Type	Percentage Passed	Mean Rank	n
Block	64.59	187.92	120
Non-Block	63.86	179.83	244

Results of the Survey of School Principals

A questionnaire (see Appendix B) was administered to the principals of block schedule schools. The questionnaire was composed of 12 questions dealing with perceptions of block scheduling. In order to identify the attitudes of these principals toward block scheduling, principals answered questions dealing with their perceptions of the effectiveness of block scheduling in their high schools. Questions addressed principals perceptions of block scheduling in the following areas: class period length of time, length of the course, principals personal preference regarding block scheduling, the effect of block scheduling on student attendance and discipline, the effect of block scheduling on teacher attendance, discipline, and morale, the effect of block scheduling on exit exam scores, course grades, and the dropout rate. Non-block principals did not complete the questionnaire.

The questionnaire was mailed to 125 high school principals. Only high school principals of the block schools used in the study were sent questionnaires resulting in a 42.4% return rate. Responses to each of the questions were tallied to determine principals' perspectives regarding block scheduling. Fifty-three principals returned completed questionnaires. The majority of principals reported a preference for block scheduling.

Questions 1 and 4 addressed the amount of time for the block and how principals rated block scheduling. Question 1 addressed perceptions about the length of instructional time for a block of instruction. Thirty principals (56%) believe that 90 minutes is an appropriate amount of time for instruction. Question 4 required principals to rate their opinion of block scheduling. Thirteen principals (25%) chose "strongly favor" block scheduling. Twenty-one principals (40%) chose "in favor of" block scheduling. Four principals (7%) chose "indifferent." Fifteen principals (28%) chose "against." No responses for "strongly against" were reported.

Questions 2 and 3 required principals to choose the length and number of classes that they preferred. Question 2 required respondents to choose either year long or semester long classes. Twenty-two principals (42%) reported to prefer year long classes. Question 3 required respondents to choose a preference for either six to eight classes per day or four periods per day. Thirty-one principals (58%) reported a preference semester long classes. Twenty-one principals (40%) chose six to eight classes per day. Twenty-nine principals (54%) reported a preference for four periods per day. Three principals (6%) did not respond to this item.

Questions 5, 6, 9, 10, and 11 required principals to identify their perceptions about how block scheduling has affected students. Question 5 required respondents to identify whether student discipline problems have decreased, increased, or remained the same during block scheduling. Twenty-one principals (40%) reported a decrease in student discipline problems. Twenty-two principals (41%) reported that the number of discipline problems stayed the same. Eight principals (15%) reported that the number of discipline problems increased. Two principals (4%) did not respond. Question 6 required respondents to identify whether student attendance was affected by block scheduling. Nine principals (17%) reported that student attendance increased. Thirty-eight principals (72%) reported that school attendance stayed the same. Five principals (9%) reported that attendance increased. One principal (2%) did not respond. Question 9 required respondents to identify the impact of the block on student course grades. Thirteen principals (25%) responded that course grades were higher. Thirty principals (56%) reported that course grades remained the same. Seven principals (13%) reported that course grades were lower. Three principals (6%) did not respond. Question 10 required respondents to determine if the graduation exit exam scores had been affected by block scheduling. Six principals (11%) reported an increase in all subject areas of the exit exams. Twenty-one principals (40%) reported an increase in scores in some subject areas of the exit exams. Twelve principals (23%) reported that scores on the exit exams remained the same. Ten principals (19%) reported a decrease in scores in some subject areas of the exit exams. One principal (1%) reported a decrease in all subject areas on the exit exams. Three principals (6%) did not respond to this item. Question 11 required respondents to determine if the dropout rate for the school was affected by block

scheduling. Fifteen principals (28%) reported that the dropout rate decreased. Thirty principals (56%) reported that the dropout rate remained the same. Four principals (8%) reported that the dropout rate increased. Four principals (8%) did not respond.

Questions 7, 8, and 12 required principals to identify their perceptions about how block scheduling has affected teachers. Question 7 required respondents to determine whether block scheduling affected teacher discipline. Nine principals (17%) reported a decrease in teacher discipline problems. Thirty-seven principals (72%) reported that teacher discipline problems remained the same. Five principals (9%) reported an increase in teacher discipline problems. Two principals (4%) did not respond. Question 8 required respondents to determine whether block scheduling affected teacher attendance. Nine principals (17%) reported that school wide teacher attendance increased. Thirty-seven principals (72%) reported that school wide teacher attendance remained the same. Five principals (9%) reported that school wide teacher attendance decreased. Two principals (4%) did not respond. Question 12 required respondents to determine whether block scheduling affected teacher morale. Fourteen principals (30%) reported an increase in teacher morale. Thirty-one principals (58%) reported that teacher morale was not affected. Three principals (6%) reported a decrease in teacher morale. Three principals (6%) did not respond (see Table 3).

Table 3

Principal Block Scheduling Questionnaire (N=53)

Questions	N	Percent
1. A 90 minute block of time is		
Too long for one subject	22	42%
About the right amount of time for one subject	30	56%
Too short for one subject	1	1%
2. Which do you prefer?		
Year long classes	22	42%
Semester long classes	31	58%
3. Which do you prefer?		
Six to eight 55 minute periods	21	40%
Four 90 to 120 minute periods	29	54%
DNR	3	6%
4. How do you rate block scheduling?		
Strongly favor	13	25%
In favor of	21	40%
Indifferent	4	7%
Against	15	28%
Strongly against	0	0%
5. How has block scheduling affected student discipline problems?		
The number of student discipline problems decreased	21	40%
The number of student discipline problems stayed the same	22	42%
The number of student discipline problems increased	8	16%
NR	2	2%
6. How has block scheduling affected student attendance?		
School wide student attendance has increased	9	17%
School wide student attendance has stayed the same	38	72%
School wide student attendance has declined	5	9%
NR	1	1%

Table 3 (continued).

Principal Block Scheduling Questionnaire (N=53)

Questions	N	Percent
7. How has block scheduling affected teacher discipline problems?		
The number of teacher discipline problems decreased	9	17%
The number of teacher discipline problems stayed the same	37	72%
The number of teacher discipline problems increased	5	9%
NR	2	2%
8. How has block scheduling affected teacher attendance?		
School wide teacher attendance has increased	9	17%
School wide teacher attendance has stayed the same	37	72%
School wide teacher attendance has declined	5	9%
NR	2	2%
9. What impact has block scheduling had on course grades?		
Course grades are generally higher	13	25%
Course grades are the same	30	56%
Course grades are generally lower	7	13%
NR	3	6%
10. How has block scheduling affected your school's Alabama High School Graduation Exam scores?		
AHSGE scores have increased in all subject areas	6	11%
AHSGE scores have increased in some subject areas	21	40%
AHSGE scores have remained the same	12	23%
AHSGE scores have decreased in some areas	10	19%
AHSGE scores have decreased in all areas	1	1%
NR	3	6%
11. How has block scheduling affected the drop-out rate for your school?		
Drop out rate has decreased	15	28%
Drop out rate is about the same	30	56%
Drop out rate has increased	4	8%
NR	4	8%

Table 3 (continued).

Principal Block Scheduling Questionnaire (N=53)

Questions	N	Percent
12. How has block scheduling affected teacher morale?		
Teacher morale has increased	14	30%
Teacher morale is about the same	31	58%
Teacher morale has decreased	3	6%
NR	3	6%

Summary

Two hypotheses were formulated and tested. The researcher found no significant difference in the percent of students passing the reading or math tests between students receiving instruction on a block schedule and students receiving instruction on a non-block schedule. As many as 13 subgroups existed in the testing populations for this study. No significant differences were identified in the subgroups associated with minority or low socioeconomic students. The researcher issued questionnaires to all of the principals of block schedule high schools in the state. Principals responding to the questionnaire reported a preference for block scheduling. Principals reported that the time and structure of classes in block schools was preferred. The majority of principals reported that schools were affected in a positive manner or not negatively affected by block scheduling. Principals believed that grades, exam performance, student and teacher performance, and teacher morale were affected positively in block schools.

CHAPTER V

DISCUSSION

Summary

The purpose of this study was to investigate the difference in student achievement on a high school exit examination in the content areas of reading and math between schools in a southern state using a four period block schedule and schools using a non-block schedule to ascertain if the type of schedule has any impact on student achievement. Additionally, information pertaining to scheduling was collected to determine the perceptions of principals regarding those connections, if any, exist between these forms of scheduling and student achievement.

Summary of Procedures

The researcher gathered exit exam testing data from all high schools in a southern state. Reading and Mathematics exit exam passage rates for all 11th grade students testing in the spring of 2008 were compiled and analyzed. The data used were obtained from a state department of education located in the south.

In order to identify the attitudes of these principals toward block scheduling, principals answered questions dealing with their perceptions of the effectiveness of block scheduling in their high schools. Questions addressed principals' perceptions of block scheduling in the following areas: class period length of time, length of the course, principals' personal preference regarding block scheduling, the effect of block scheduling on student attendance and discipline, the effect of block scheduling on teacher attendance, discipline, and morale, the effect of block scheduling on exit exam scores,

course grades, and the drop-out rate. Non-block principals did not complete the questionnaire.

Hypothesis 1 was related to the Mathematics exit exam used by the state involved in the study. Hypothesis 2 was related to the Reading exit exam used by the state involved in the study. The questionnaire was used by the researcher answer the research question. Do principals perceive the use of block scheduling as a way to improve student achievement?

In order to determine if there is a difference in student achievement between schools using block scheduling and schools not using block scheduling a Mann-Whitney non-parametric test was used. The rejection level was set at .05.

Summary of Findings

The following hypotheses and research question were examined within the context of this study:

H₁: There is a significant difference in the percentage of eleventh grade high school students who pass the Mathematics section of the high school graduation exam between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

No significant difference in the percent of students passing the Mathematics test between students receiving instruction a block schedule and students receiving instruction on a non-block schedule was found. Hypothesis 1 was rejected.

H₂: There is a significant difference in the percentage of eleventh grade high school students who pass the Reading section of the high school graduation exam

between those who receive instruction on a block schedule and those who receive instruction on a non-block schedule.

No significant difference in the percent of students passing the Reading test between students receiving instruction a block schedule and students receiving instruction on a non-block schedule was found. Hypothesis 2 was rejected.

The data were compiled from 13 possible subgroups that were tested in each high school. They are as follows: all students, general education students, special education students, female, male, black, white, non-migrant, non-limited English proficient, free lunch, reduced lunch, non-poverty, and poverty. The hypotheses for this study were based on the subgroup results for all students.

Some research suggests low socioeconomic students may experience an increase in academic achievement in block schedule schools. One large study conducted in North Carolina indicated this. The North Carolina Department of Education (1997), reports that some North Carolina Schools that adopted the block schedule between 1993 and 1995 experienced some gains on end of course tests. These gains, however, were not significant until adjusted for socioeconomic status (SES) and parent educational level (PEL). The scores were significantly higher for block schedule students after the adjustments for SES and PEL.

The researcher analyzed results for the subgroups of poverty, free and reduced lunch, and minority students. No significant differences were found between block and non-block students in these groups. Results were scrutinized to indicate if block schedule schools tended to be more affluent and therefore score higher than the non-block schools.

There was no evidence to indicate that block schools were more affluent due to the socioeconomic status of students.

Research Question

Do principals perceive the use of block scheduling as a way to improve student achievement?

The questionnaire was mailed to 125 high school principals. Only high school principals of the block schools used in the study were sent questionnaires. Fifty-three principals returned completed questionnaires, resulting in a 42.4% return rate. The results indicate that the majority of the principals perceive that using the block schedule is conducive to improving student achievement.

Fifty-four percent reported a preference for having class periods lasting between 90 and 120 minutes. Fifty-six percent responded that 90 minutes was about the right amount of time for one subject. Forty-two percent prefer having more shorter periods of instruction. Fifty-eight percent of respondents reported a preference for semester long classes. Sixty-five percent of respondents responded that they were in favor of or strongly favored block scheduling.

The majority of respondents reported that block scheduling had a positive impact on students. Eight-one percent of respondents reported that student discipline problems had either remained the same or decrease in block schedule schools. Seventy-two percent of respondents reported that school wide attendance remained the same and 17% reported an increase in attendance in block schedule schools. Eighty-one percent of respondents reported that student course grades were the same or increase in block schedule schools.

Seventy-four percent of respondents reported that exit exam scores either remained the same or increased in block schedule schools. Eighty-four percent of respondents reported that the drop-out rate remained the same or decreased in block schedule schools. Respondents reported that teacher discipline, teacher attendance, and teacher morale either remained the same or were impacted in a positive manner in block schedule schools.

Discussion

Results from this study indicate that students performed similarly on some exit exams regardless of schedule type. Other studies on the effectiveness of block scheduling have reported varied findings. The findings of the researcher are similar to previous finding from previous studies. Differences have been noted in some specific area or subject. Evans et al. (2002) found that schools using the block scheduling experienced an increase in the class grades of students, while Smith (2004) studied test scores in Mississippi and found no significant difference in test scores. Researchers studying a Colorado high school found that the number of students scoring above 4 on the AP exams increased in some block schools, although gains were not made on all standardized tests (Schoenstein,1996). Andrews (2003) reports no difference in AP scores in a 2001 Connecticut study. Secondary math and reading scores analyzed between 1998 and 2000 in Pennsylvania by researchers at Indiana University in Pennsylvania were similar in block and non-block schools (Mobus, 2004).

The researcher found no significant difference in student achievement on specific exit exams in block schedule schools. The researcher tested 13 subgroups and noted no significant difference in any of the subgroups. There was no difference noted between

block schedule and traditional schedule schools due to socioeconomic status. The results of the questionnaire, along with the research conducted in other studies, led the researcher to believe that studies involving the effect of a positive school climate due to the implementation of the block should be conducted. A positive school climate could be linked to an increase in student achievement and teacher productivity. This improvement could be an indirect result of the type of school schedule. School climate is shaped by many factors in the school such as student discipline, student attendance, teacher morale, professional development, school leadership, instructional methods, parental/community involvement, and curriculum. Any of these factors could have an impact on student achievement.

Rikard and Banville (2005) found that attendance, discipline management, stress level of faculty, and teacher student relationships had been affected by the implementation of a block schedule. Short and Thayer (1999) found that principals and teachers in a Virginia study were in favor of block scheduling because of a positive impact on student discipline. Pritchard et al. (2005) found that student achievement is related to the school culture. The results of their study indicated that the relationship between school culture and student achievement was most readily identified in social areas, the curriculum, and extra-curricular activities. Rikard and Banville (2005) found that the block schedule has impacted school culture in a positive manner by increasing positive teacher-student interactions.

Limitations

During the course of this study the researcher discovered several limitations that need to be noted. Limitations listed make it difficult for the researcher to determine if the

performance of students can be influenced by the schedule type of the school. The following is a list of limitations of the study:

1. There was no way to control for prior performance in schools involved in the study. The measures of accountability change continually.
2. There was no way to control for the professional development level of the teachers in block schools. Professional development of teachers in block schools has been recommended in research.
3. There was no way to control for length of time that block schools have used the block.

Recommendations for Policy and Practice

The researcher has the following recommendations for school leaders who are considering changing the type of instructional schedule of any instructional institution to impact student achievement. Implementing an adjusted school schedule to improve scores on high stakes tests in itself may not cause an increase in test scores. There are many variables that can have an effect on student achievement. It is the opinion of the researcher that making changes to the schedule without careful consideration of all benefits and consequences would not be in the best interest of the students. The research concerning block scheduling and student achievement has not proven conclusively that block scheduling is more effective at improving student achievement than a six or eight-period day.

School leaders should consider a variety of measures to improve high stakes test scores before deciding to change the structure of the school instructional periods. The researcher believes that the effectiveness of the instructor would outweigh any benefit

gained by increasing instructional time. Darling-Hammond (2000) conducted a 50-state survey and found that student achievement is affected to a great degree by the quality of the instructor. Canady and Rettig (1995) contend that merely increasing the length of the class period will not change anything unless teachers are willing to use the extra time to teach. School leaders implementing a change to the current instructional schedule should provide teachers with intensive, specific, worthwhile professional development focused on improving tests scores within the confines of the desired instructional period. School leaders should hire experienced teachers that have proven to be able to effectively deliver instruction. School leaders should evaluate the effectiveness of all teachers involved in the delivery of instruction prior to making a decision to change the structure of the instructional period. Darling-Hammond (2000) found that preparation of the teacher was a significant factor in the success of the students. Teachers with more experience in the subject area being taught had students that performed better. It is reasonable to believe that ineffective teachers will not become effective because the instructional period is altered.

School leaders should focus on implementing effective instructional strategies to improve student achievement. Kaplan and Owings (2001) assert that certain teacher behaviors have a positive impact on student achievement. These behaviors foster an environment that connects the student with the curriculum. Teachers should have interesting lessons that keep students interested and motivated. Direct explicit instruction should be used to address specific skills for each student. Assessment should be formative and summative. These assessments should be used often throughout the learning period. The curriculum should be aligned to specific skills and content.

Progress of students should be measured and assessments should be scrutinized in data meetings that are aimed at identifying ways to meet the specific needs of each student.

Recommendations for Further Studies

The researcher recommends that all states conduct research to ascertain the most effective way to deliver instruction. Research indicates that the quality of instruction is related to the effectiveness of the instructor. Darling-Hammond (2000) found that the teacher was a significant factor in the success of the students. An important constant in education is the quality of the instructor. Quality instruction can be delivered in many different formats. Research examining the best way to deliver instruction should be conducted. A study examining the strategies that the most effective teachers use should be conducted.

Block scheduling could be beneficial to schools for reasons other than student achievement. Research should be conducted to ascertain if there is a link between discipline, teacher and student satisfaction, school culture, and the schedule type used in schools. These areas may have an impact on student achievement that is more readily identifiable under controlled conditions.

Furthermore, research should be confined to the traditional school model or the block school model of instruction as technology and the way information is manipulated and communicated is changing at an exponential rate. Many school systems are offering online and distance courses. A study examining the effectiveness of distance and online learner should be conducted.

Summary

This study was conducted to determine if the type of schedule a high school uses has an effect on student achievement as measured by exit exam scores. Principal perceptions regarding block scheduling were studied. The researcher found that school schedule type did not have a significant impact on exit exam scores. Principals of block schedule schools reported a preference for the time, structure, and effects of block scheduling on students and teachers.

APPENDIX A



THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

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 Hattiesburg, MS 39406-0001
 Tel: 601.266.6820
 Fax: 601.266.5509
 www.usm.edu/irb

**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE
 NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **10061403**

PROJECT TITLE: **Student Achievement in Block and Non Block Schools**

PROPOSED PROJECT DATES: **08/01/2010 to 10/31/2010**

PROJECT TYPE: **Dissertation or Thesis**

PRINCIPAL INVESTIGATORS: **William S. Smith, Jr.**

COLLEGE/DIVISION: **College of Education & Psychology**

DEPARTMENT: **Educational Leadership & School Counseling**

FUNDING AGENCY: **N/A**

HSPRC COMMITTEE ACTION: **Expedited Review Approval**

PERIOD OF APPROVAL: **06/22/2010 to 06/21/2011**

Lawrence A. Hosman
 Lawrence A. Hosman, Ph.D.
 HSPRC Chair

7-20-2010
 Date

APPENDIX B

PRINCIPAL BLOCK SCHEDULING QUESTIONNAIRE

Directions: Please answer the following questions as they relate to your school. All responses will be confidential and no individual or school will be identified. Please circle only one response for each of the twelve items.

4. A 90 minute block of time is

Too long for one subject
About the right amount of time for one subject
Too short for one subject

5. Which do you prefer?

Year long classes
Semester long classes

6. Which do you prefer?

Six to eight 55 minute periods
Four 90 to 120 minute periods

7. How do you rate block scheduling?

Strongly favor
In favor of
Indifferent
Against
Strongly against

8. How has block scheduling affected student discipline problems?

The number of student discipline problems decreased
The number of student discipline problems stayed the same
The number of student discipline problems increased

9. How has block scheduling affected student attendance?

School wide student attendance has increased
School wide student attendance has stayed the same
School wide student attendance has declined

10. How has block scheduling affected teacher discipline problems?

- The number of teacher discipline problems decreased
- The number of teacher discipline problems stayed the same
- The number of teacher discipline problems increased

11. How has block scheduling affected teacher attendance?

- School wide teacher attendance has increased
- School wide teacher attendance has stayed the same
- School wide teacher attendance has declined

12. What impact has block scheduling had on course grades?

- Course grades are generally higher
- Course grades are the same
- Course grades are generally lower

13. How has block scheduling affected your school's graduation exam scores?

- AHSGE scores have increased in all subject areas
- AHSGE scores have increased in some subject areas
- AHSGE scores have remained the same
- AHSGE scores have decreased in some areas
- AHSGE scores have decreased in all areas

14. How has block scheduling affected the drop out rate for your school?

- Drop out rate has decreased
- Drop out rate is about the same
- Drop out rate has increased

15. How has block scheduling affected teacher morale?

- Teacher morale has increased
- Teacher morale is about the same
- Teacher morale has decreased

APPENDIX C
COVER LETTER

August 22, 2010

9750 Estates Drive
Mobile, Al. 36693

To Whom It May Concern,

My name is William Smith. I am a high school principal. I am currently working toward the completion of my dissertation for my doctoral degree in educational leadership at the University of Southern Mississippi. I am conducting research on block scheduling, student achievement, and high school principals' perceptions of block scheduling. Information gathered in this study may allow us to gain greater insight into student achievement.

Your participation in this study is needed but strictly voluntary. All survey responses will be kept confidential, and participants will not be identified. After completing the survey, please mail it to me using the self addressed stamped envelope provided. It should take you less than 10 minutes to complete the survey. If you have any questions, you may contact me at the telephone numbers listed below.

This project has been reviewed by the Human Subjects Protection Review Committee which ensures research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the Institutional Review Board Office, Box 5147, Hattiesburg, MS. 39406, (601) 266-6820.

Sincerely,

William S. Smith, Jr.
Home 251-689-9041
251-709 4843

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