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## **Block and Traditional School Schedules: Comparison of Student Achievement by MSAT Scores and High School Science Teachers' Views**

Robert Decker Smith  
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The University of Southern Mississippi

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STUDENT ACHIEVEMENT BY MSAT SCORES AND HIGH SCHOOL SCIENCE  
TEACHERS' VIEWS**

by

Robert Decker Smith

**Abstract of a Dissertation  
Submitted to the Graduate Studies Office  
of the University of Southern Mississippi  
in Partial Fulfillment of the Requirements  
for the Degree of Doctor of Philosophy**

May 2009

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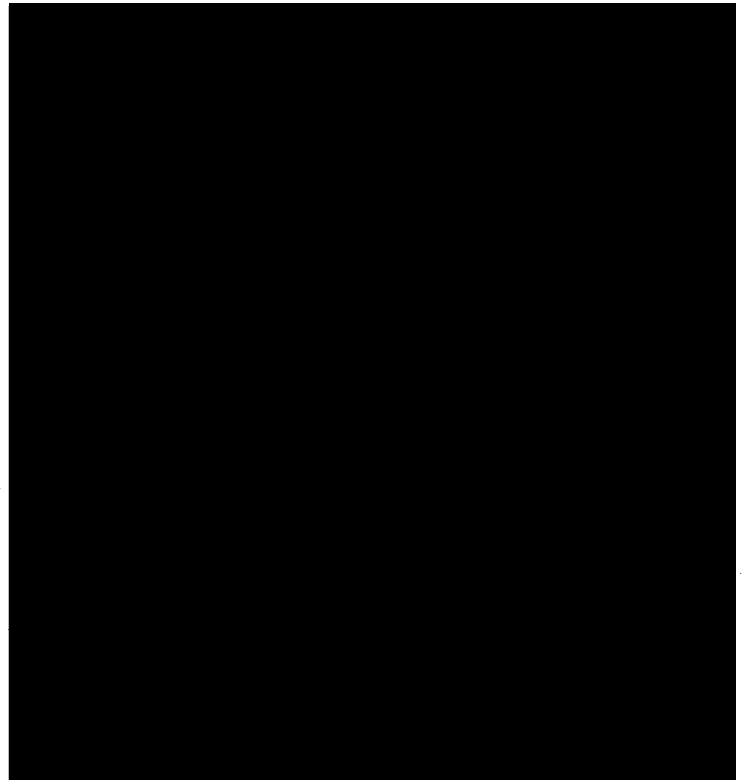
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## ABSTRACT

# BLOCK AND TRADITIONAL SCHOOL SCHEDULES: COMPARISON OF STUDENT ACHIEVEMENT BY MSAT SCORES AND HIGH SCHOOL SCIENCE TEACHERS' VIEWS

by Robert Decker Smith

May 2009

This study attempts to compare schools that are using a traditional scheduling format to a block scheduling format. Both critics and proponents acknowledge that the block schedule can provide more benefits than just student achievement. This study also attempts to address the perceptions of current Mississippi high school science teachers about the advantages and disadvantages to the block schedule as compared to the traditional schedule.

This study utilized MSAT test scores from 69 (34 block and 35 traditional) public schools throughout the state of Mississippi. This data was used to test 10 hypotheses. Student achievement was measured using both the mean scores for the school and the percentage of students that passed each subject area test. To ascertain teacher perception, data was collected using a survey and completed with 100 (50 block and 50 traditional) teachers who are currently teaching high school science at a Mississippi public high school. Teacher perceptions were gathered for five basic areas: teacher preparation, laboratory based activities, content coverage, remediation, and discipline. This data was used to test two hypotheses.

A simple t-test was conducted with the data for each hypothesis. It was found that schools utilizing a block schedule did have significantly higher mean scores than those on a traditional scheduling format on the Biology, U.S. History, and English II (multiple choice) tests, but there was no significant difference in the Algebra I and English II (essay) tests. With regard to the percentage of passing students, it was found that schools utilizing a block scheduling format did have a higher percentage of students passing than those on a traditional schedule in the areas of Algebra I, Biology, and English II (multiple choice), but there was no significant difference in the areas of U.S. History and English II (essay). While not significant, the block did yield consistent higher results. When teachers were surveyed, it was found that current Mississippi high school science teachers preferred the block schedule to a traditional schedule.

The researcher offers the following recommendations, a block scheduling format can have several positive results, but administrators should not expect higher results just because they are on the block. Schools interested in the block need to offer many support systems for teachers.

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## CHAPTER I

### INTRODUCTION

When asked to comment on problems with the current educational system teachers have reported that intrusions, such as administrative duties, remedial education and other special education programs, during instructional time was a primary concern (Hong, 2001). At the same time, to meet the spirit of the federal “No Child Left Behind” legislation, states began requiring more of their students to graduate and adjusting the curriculum so that it would fit with the new requirements (Hong, 2001). With the demands from their administration and other special interest groups compounded by classroom disruptions, how can teachers keep any type of continuity in their instruction? How can teachers meet individual student needs, while still covering content during a shortened class?

These questions have plagued administrators for years. To address the concerns of instructional intrusions, schools have resorted to an old solution for the same problems. These alternative scheduling plans, collectively referred to as block scheduling, promises longer individual instructional periods, fewer class changes, an enhanced school climate and increased student achievement (Hoffman, 1995). Block scheduling is based on the Flexible Modular Scheduling plan of the 1950’s and 1960’s (Zepada & Mayers, 2001). Weller (2000) noted that the increased instructional time can actually make the regular education classroom more inclusive for special education students. While many proponents cite reports that student achievement has increased with the implementation of block schedules, these reports have been controversial, nearly all indicate that student perceptions of their schools are more positive with those schools

that use a block schedule than those that use a traditional schedule (Marchant & Paulson, 2001).

There are some disadvantages of the block scheduling format. Critics of block scheduling point out that with the increased instructional period, teachers report that keeping their students' attention becomes progressively more difficult. Teachers felt comfortable with the traditional schedule that they were taught on, or had never been taught how to teach with an extended period. In either case, even though the class time is longer, the teacher reverted back to a traditional 45 to 55 minute instructional period, thus losing the extension of the period. The remainder of the class was used for homework or study time (Hoffman, 1995). Even when the teachers can make adjustments, while the individual class time has increased, the overall contact time in a course can decrease as much as 57 contact hours (Viadero, 2001). On a traditional schedule with class meetings of 50 minutes for 180 days, a student will have 9,000 contact hours. On a block schedule that meets for 95 minutes for 90 days, a student will have 8,550 contact hours. When teachers take advantages of the extended individual classes, math and science courses have frequently been cited as the greatest benefactors of the increased class time since more and higher level laboratory activities can be included, but Marchant and Paulson (2001) reported a decline in math and science scores at some schools on the block scheduling format.

### Statement of Problem

This study had two basic parts. The first part of the study compared differences in student achievement on the Mississippi Subject Area Exams in all four content areas (Biology, Algebra I, U.S. History, and English II) between high school students in the

state of Mississippi who are taught on a traditional scheduling format and those who are taught on a block scheduling format. The second part of the study was a survey of Mississippi high school science teachers for their perceptions of the scheduling format that they are currently using, as well as, their perceptions of the main alternative to that format.

### Purpose of Study

If schools are to make the best decisions possible for their students, administrators must continually explore new ideas about factors that might influence the performance of their students. Along with evaluating test data, administrators should also consider concerns voiced by teachers.

This study compared student achievement as measured by each of the Mississippi Subject Area Exams, between students taught using a traditional schedule and students taught using a block schedule. This information can assist administrators in decisions regarding scheduling for the most efficient use of instructional time. Further, the opinions of classroom teachers was reported regarding the scheduling formats along with their suggestions for improvements.

### Research Questions

1. Is there a statistically significant difference in student achievement on the Mississippi Subject Area Exam in Algebra I between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?
2. Is there a statistically significant difference in student achievement on the Mississippi Subject Area Exam in Biology between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

3. Is there a statistically significant difference in student achievement on the Mississippi Subject Area Exam in U.S. History between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

4. Is there a statistically significant difference in student achievement on the Mississippi Subject Area Exam in English II multiple-choice between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

5. Is there a statistically significant difference in student achievement on the Mississippi Subject Area Exam in English II essay between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

6. Is there a statistically significant difference in the percentage of students passing the Mississippi Subject Area Exam in Algebra I between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

7. Is there a statistically significant difference in the percentage of students passing the Mississippi Subject Area Exam in Biology between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

8. Is there a statistically significant difference in the percentage of students passing the Mississippi Subject Area Exam in U.S. History between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

9. Is there a statistically significant difference in the percentage of students passing the Mississippi Subject Area Exam in English II multiple-choice between those

schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

10. Is there a statistically significant difference in the percentage of students passing the Mississippi Subject Area Exam in English II essay between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format?

11. What are the perceptions of high school science teachers regarding the effectiveness of block and traditional scheduling formats?

#### Hypotheses

H<sub>1</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Algebra I between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>2</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Biology between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>3</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in U.S. History between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>4</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (multiple-choice) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.



H<sub>5</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (essay) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>6</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Algebra I between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>7</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Biology between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>8</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in U.S. History between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>9</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (multiple-choice) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>10</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (essay) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

H<sub>11</sub>: Current Mississippi high school science teachers who teach on the block scheduling format will perceive the traditional scheduling format will have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

H<sub>12</sub>: Current Mississippi high school science teachers who teach on the traditional scheduling format will perceive the block scheduling format to have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

#### Definitions of Terms

*Block scheduling format*: Any school scheduling format that utilizes 90 minute instructional periods. These are commonly referred to as 4 x 4 block, semester block, A/B block or modified block (Canady & Rettig, 1995, 1996b; Lybbert, 1998).

*Competency*: A description of the skills students need to exhibit in order to correctly answer questions on the Mississippi Subject Area Tests (MSAT) (Mississippi Department of Education, 2007).

*Current Mississippi high school science teacher*: For the purposes of this study this refers to any teacher who at the time of the survey was employed in a Mississippi public high school and who taught at least one science class.

*High school student*: For the purposes of this study this refers to any student who at the time of the study was enrolled in a Mississippi public high school in any grade 9-12.

*Mississippi Curriculum Frameworks*: A list of objectives, competencies, and strategies Mississippi teachers are to use to evaluate student achievement (MDE, 2007).

*Mississippi Subject Area Tests (MSAT)*: Mandated state tests given to all Mississippi public school students during the course of their education to ensure that certain benchmarks have been met (MDE, 2007). For the purpose of this study, the

following tests will be included: Algebra I, Biology, U.S. History, English II multiple-choice, and English II essay.

*Passing Scores:* Passing scores on MSAT in the subject areas of Algebra I, Biology, U.S. History, and English II multiple-choice is a minimum score of 300 on a scale score of 100 to 500, and the passing score on the English II essay will be a minimum score of 2 on a scale score of 0 to 4 (MDE, 2007).

*Student Achievement:* For the purpose of this study, student achievement will be measured by student scores on MSAT.

*Teacher perception:* For the purpose of this study, perception refers to the opinions of current Mississippi high school science teachers that will be obtained using the *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* instrument.

*Traditional scheduling format:* Any school scheduling format that utilizes instructional periods of 50 to 60 minutes meeting at least 6 periods a day for an entire year (DiBiase & Queen, 1999; Lybbert, 1998).

### Delimitations

The following is a list of delimitations of the study:

1. The measure of student achievement is delimited to mean scores and passing rates on the Mississippi Subject Area Tests (MSAT).
2. Mean scores of Mississippi public high schools used in this study are delimited to the Mississippi Subject Area Tests (MSAT): Algebra I, Biology, U.S. History, English II multiple-choice, and English II essay from the 2006 – 2007 school year.

3. The study will be delimited to 30 Mississippi public high schools. Fifteen utilize a block scheduling format and 15 that utilize a traditional scheduling format.

4. Participants will be delimited to teachers employed in a Mississippi public high school during the 2007 – 2008 school year who taught at least one science class.

5. The measure of teacher perception will be delimited to self-reported responses to a researcher-developed survey instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement*.

6. Scheduling formats investigated were delimited to block and traditional.

Block refers to any school scheduling format that utilizes 90 minute instructional periods. These are commonly referred to as 4 x 4 block, semester block, A/B block or modified block (Canady & Rettig, 1995, 1996b; Lybbert, 1998). Traditional refers to any school scheduling format that utilizes instructional periods of 50 to 60 minutes meeting at least 6 periods a day for an entire year (DiBiase & Queen, 1999; Lybbert, 1998).

#### Assumptions

1. It is assumed the administrator of each school will correctly identify their school's scheduling format.

2. It is assumed students received appropriate instruction on the competencies and objectives in Algebra I, Biology, U.S. History, and English II as outlined by the Mississippi Curriculum Frameworks.

3. It is assumed MSAT scores accurately reflect student achievement.

4. It is assumed test data reported on the Mississippi Department of Education's website is accurate.

5. It is assumed that participants will answer the survey honestly and their responses will reflect their true perceptions.

#### Justification for the Study

As school administrators seek the most efficient way to educate students, the issue of which scheduling format to use is almost always a heated issue. This may be due to the uncertainty of the research findings on the merits of various schedule formats. There is a wealth of research available, but no definitive answer as to the best scheduling format.

Two main sources of disagreement on the effectiveness of scheduling formats involve two series of studies. The first was a study conducted in the 1980s involving 30,000 students from across Canada (Viadero, 2001). This study concluded that block schedules did not improve student achievement, and in fact, students on block schedules actually scored lower in math and science classes than students on the traditional schedule. Even after the study was revised and replicated, similar results were obtained. Opponents of the Canadian studies are quick to point out that the teachers did not receive training in block schedules, the individual class time (60 – 80 minutes) was identical to those students with the traditional schedule in the U.S., and the final test was given only in the spring, regardless of which semester the students had the class (Viadero, 2001).

The second series of studies was conducted in North Carolina in the mid-1990s by the North Carolina Department of Education. These studies included all of the public schools in the state (Viadero, 2001). Because most of the schools using the block schedule were considered lower achieving and poor, their initial scores were adjusted to be comparable to the other schools. The results indicated that students who were on the

block schedule outscored those on the traditional schedule in every subject area tested. The study was replicated the following year and similar results were obtained in every subject area except math. However, the researchers considered this an anomaly because many of the block schools had modified their schedules so that the math classes were actually being taught on a traditional format (Viadero, 2001).

Interestingly, when teachers and administrators were questioned, almost all were concerned with the timing of block classes and the Advanced Placement (AP) tests. State tests and other exit exams have been adjusted so that they are given at the end of a term (block or traditional). However, AP tests are only given once a year, at the end of the spring semester. The assumption was that those who took the AP classes in the fall semester might forget the information over the next semester, and those who took AP classes on a block schedule might not be able to cover the same amount of material due to less overall contact time (Viadero, 2001). A current argument that block schedules may require teachers to cover less material but that material is covered better may be invalid because the AP test typically evaluates information from a variety of sources. This means that students on a block schedule may be at a disadvantage because of lack of exposure (Hansen, Gutman, & Smith, 2000). Most schools that are using the block schedule and offering AP classes have reverted to either a modified schedule for their AP classes or only offer them during the spring semester. In a New York study involving AP classes on block and traditional schedules, it was found that there was no difference in AP scores between traditional schedules and fall block classes. The only difference was found between those two groups and students who took AP classes in the spring. Not surprisingly, students on the block schedule who had already completed the AP courses

scored higher than those on the traditional schedule who were still taking courses (Viadero, 2001).

Robert Canady asserts that limiting evaluation of scheduling impacts strictly to student achievement is too narrow of an evaluation (Viadero, 2001). However, looking at the impact on other areas of education is difficult. Data on perception may be vague and hard to classify. There is also a reluctance to change (Rettig & Canady, 1997). Even when a district is doing the proper background research, many studies may be unreliable because these studies are conducted within the individual schools. The administrators of these schools tend to be reluctant to report any negative information on their schools (Ricken, 1991).

In today's schools, scheduling is a valuable resource. With proper scheduling, issues such as continuity, discipline, attendance, and even student understanding can be substantially improved (Lewis, 1999). However, to make the most of school schedules, administrators must put several safeguards in place. First, they need to realistically determine what their ultimate goal is and how they can achieve it (Viadero, 2001). Second, they need to put infrastructure in place to support teachers. This includes supporting first year teachers and having departmentalized staff development (Rettig & Canady, 1997). Third, they need to look at all changes from a financial standpoint (Lewis, 1999). Finally, they need to have the support of all involved parties. This includes the faculty, students, parents, school board, and community. This is especially important when evaluating the effectiveness of the program (Lonardi, 1998).

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### Introduction

George Bear in a 1998 article discussing discipline in public schools stated:

When public education was established in America our founding fathers agreed that responsible citizenship was to be a primary goal. This was reflected in Thomas Jefferson's philosophy that democracy could be protected only by establishing a nation of independently minded self-governing learners who understood that virtuous behavior is critical for democracy's survival. Schools were to imbue students with a moral sense of developing reasoning linked to just and caring behavior. Radically different from the practices of other nations at that time, religion was to play no direct role in this mission and the role of the federal government, if any, would be minimal. For sure "habits of virtue" were directly taught at home, at church, and in the community, as well as in the school. (p. 14)

While teaching its citizens to be responsible has remained a central goal of public education in the United States, for the most part the education system has had a hard time evolving with the times. William Gee (1997) cited many problems with the current system of education. In most cases the system is just antiquated. It was designed to meet the needs of an agrarian society. Today's schools have assumed more parental responsibilities and a reliance on Carnegie units, social promotion, and a summer vacation (Gee, 1997).



## History of Education

The first American schools funded with taxes were established in 1647 in colonial Massachusetts, more than 100 years before the formation of the United States of America. These schools were open to all free citizens of the community. While the Constitutional Convention did not address public education, congress did set aside the sixteenth section of every township for the community school in 1787 (Burlingame, Coombs, Sergiovanni, & Thurston, 1992). During the 1800s schools revolved around an agricultural society, and this is still evident in today's calendar with the inclusion of spring break and summer vacations (Ballinger, 1988).

At the beginning of the 1900's, Americans began moving from the farms to the cities. This move was away from the agricultural society and toward an industrial society. As a result instead of farmers, society needed schools to prepare a workforce for factory production. The school system was redesigned to resemble an assembly line set up with students moving from class to class at the sound of a bell. The school was designed for maximum efficiency to educate as many people as possible all with the same basic skills (Carroll, 1990).

The traditional schedule of individual class meetings of 50 minutes, or shorter, is based on the recommendations of the National Education Association's Committee of Ten in 1893. They recommended that the school schedule should include several classes per day with relatively short instructional periods. This recommendation was based on the belief that schools should consist of a great amount of memorization with lecture as the primary teaching method (Powell, 1976). Based on the Committee of Ten's recommendation, the Carnegie unit was developed in 1909 and became the uniform

system of accreditation for high school graduates. The Carnegie unit awards attendance as opposed to content, however it provided a very convenient measure of academic progress (Boyer, 1983).

The lecture based system of education remained virtually unchanged until 1959 when J. Lloyd Trump introduced a flexible modular schedule. The main theme of the Trump plan was that each course had varying lengths of instructional time to better meet the needs of individual students. Trump also encouraged teachers to use varying teaching strategies to meet student needs. These lessons allowed for teachers to modify the classes to address the interests of the students and still cover the curriculum. The Trump Plan gained its greatest acceptance during the late 1960's and early 1970's when an estimated 15 percent of high schools were using it (Canady & Rettig, 1995).

#### Case for Change

Joseph Carroll wrote that there is nothing wrong with the traditional schedule, "except that it prevents teachers from teaching well and students from learning well" (Education World, 2001, p. 3). When asked what their primary concern of education was, teachers reported intrusions into their class instructional time. Hong (2001) reported that teachers are continually asked to have higher expectations of their students, which requires higher problem solving skills, detailed discussions, and more individualized instructions. At the same time the school modifies the curriculum in ways that actually tend to take away from the basic classes. Add-on programs such as gifted, special education, and English as a Second Language, removes students away from their core classes thus breaking any continuity with their teachers (Hong, 2001).

When parents are asked about their concerns for education, they often cite discipline and safety. In his 1981 report, Nighswander (1981) asserted that classroom discipline problems affect several groups. When teachers have to address discipline problems in the classroom students miss instructional time that can never be recovered. This includes the students who are causing the discipline problems, as well as those who are not. Teachers, and ultimately administrators, who are supposed to be educating students, are losing instructional time to deal with discipline problems. The overall school is perceived to be less effective. Lastly, society as a whole is affected because its members are not educated to the fullest (Nighswander, 1981).

With an ever increasing call for change, who is responsible and what should be done? When evaluating mandated change from local, state, national, and private entities, Snowden and Gorton (2002) reported that multiple studies have found that mandated changes largely fail. They stated that for change to occur educational change itself must change. Most educational reforms have tried to make the curriculum so easy enough to follow that even the teacher was not necessary, but when implemented, most of these reforms were modified to fit local needs, thereby reducing the effectiveness of the reform (Snowden & Gorton, 2002).

### Assessment

A common thread in educational reform movements is an increased emphasis on student achievement. DeCesare (2002) reported that numerous types of assessments have been used in the last 50 years to measure student achievement. One method was to use tests as an indicator of personal talents. Students were then placed in an educational track that either led to vocational training or college preparatory classes. Education saw a shift

in the 1970s and 1980s that moved from tracks to establishing a minimum standard for all students (DeCesare, 2002).

### *History*

With increasing pressure from the American public to hold educators accountable for student achievement, it is necessary to find better methods for educating students and getting the most out of the time they are in the classroom (Jones, Jones, Hardin, Chapman, Yarbrough, & Davis, 1999). Tests and assessments have been the key element of educational reform for the last 50 years because they are inexpensive, can be externally mandated and implemented, and the results are visible to both educators and the general public (Linn, 2000).

Beginning in the 1950s large scale standardized testing gained popularity as a means to identify students for placement in higher education and special education programs. This “tracking” mentality was based on James Conant’s writings that rationalized “universal elementary education, comprehensive secondary education, and a highly meritocratic higher education” (Linn, 2000, p. 5). Conant was very adamant about the need of the public education system preserving the quality of education for the academically talented (Linn, 2000).

During the civil rights movements of the 1960s, the federal government began to address the issues of educational opportunities and student achievement. In 1965, congress passed The Elementary and Secondary Education Act. Title I of this act provided funding for compensatory education programs. With these funds came an accountability factor to ensure the funds were being adequately utilized. This further increased the need for national standardized testing. In order to meet the congressional

demands for accountability led to an increase of standardized testing. Under the Title I Evaluation and Reporting System (TIERS), instead of one test in selected grades, schools were encouraged to administer the tests in both semesters of the year. While the results were not really used, just their administration seemed to relieve the accountability worries. The results of TIERS were utilized to develop the Normal Curve Equipment (NCE). This NCE ushered in the National Percentile ranks that are still referred to today in some tests (Linn, 2000).

The 1970s and 1980s saw a shift in standardized testing to emphasize basic skills or minimum competency. The idea was to ensure that all high school graduates had the same basic skills to offer employers. These tests came under more scrutiny as parents and the general public began to question their validity (Linn, 2000).

The late 1980s and early 1990s saw a reemphasis on using standardized tests as an accountability tool for local teachers, administrators, education programs, and schools in general. However, schools and administrators began reporting that most of their students were above the national norm. This reporting, named the “Lake Woebegone Effect,” gave a widely inflated impression of student achievement (Linn, 2000).

#### *Characteristics for Good Assessment*

The current trend in educational assessment continues to emphasize accountability, but also emphasizes: a) the need to develop content standards on the basis of assessments and accountability, b) dual emphasis on high standards of student achievement and the inclusion of all students, and c) accountability measures for schools, students, teachers, and administrators (Linn, 2000).

Teachers base instructional decisions on a wide variety of both formal and informal assessment strategies (Gronlund & Linn 1990). Formal tests and other evaluative procedures are not intended to replace, but compliment and reinforce a teacher's judgment. These tests "provide more comprehensive, systematic, and objective evidence on which to base instructional decisions" (p. 4). Gronlund and Linn define a test as, "an instrument or systematic procedure for measuring a sample of behavior" (p. 5). Measurement is "the process of obtaining a numerical description of the particular degree to which an individual possesses a particular characteristic" (p. 5). Classroom evaluation is "the systematic process of collecting, analyzing, and interpreting information to determine the extent to which pupils are achieving instructional objectives" (Gronlund & Linn, 1990, p. 5).

In order for an evaluation process to be effective, the process needs to satisfy five basic needs (Gronlund & Linn, 1990). First, there needs to be a careful description of what is to be tested. This should be done with clear objectives, not vague topics. Second, the evaluation technique should be selected based on the relevance of the "characteristics or performances that are to be measure" (p. 8) and not on the convenience to the evaluator. Third, "no single type of instrument can assess the vast array of learning," (p. 8) so schools would either have to offer multiple tests for multiple situations, or redesign the test to have multiple parts. Fourth, the limits of each evaluation technique needs to be considered and adjusted for as much as possible. If a school is interested in higher order thinking, multiple choice tests usually can not adequately evaluate student responses. Fifth, the evaluation process is a means to an end, not the end. "To blindly gather data about pupils and then file the information away in

the hope that it will some day prove useful is a waste of both time and effort” (Gronlund & Linn, 1990, p.8).

### *Accountability Movement*

Linn (2001) states in his article *A Century of Standardized Testing: Controversies and Pendulum Swings* that the U.S. has had a “love-hate” relationship with testing throughout the 20th century. Criticism from government, parents, public, and even educators seems to drive the demand for high expectations and more testing. In the early 1900s testing was used to “manage the growth of students” (Linn, 2001).

Testing has also been used as exit exams. For example, in the early part of the 20th century the New York Regents Examination, high school diplomas were awarded based on performance on an exit exam with their diplomas holding more “prestige” than those of the local or vocational diplomas (Linn, 2001). Accountability tests, or exit exams, have been used for many different causes in the name of education. In the 1970s and 1980s schools used minimum competence tests as exit exams for grade level progression and even graduation. Teachers were required to pass exit exams for certification and eventually recertification. Most of these initiatives were pushed from a national level to generate a degree of accountability for federally sponsored programs, and ultimately to compare states. The mid-1970s saw the largest push for minimum competency testing prior to the *No Child Left Behind* legislation. Between 1975 and 1978, 26 states enacted laws requiring minimum competency testing for promotion to certain grades and even graduation. However, each state, and in most cases, each district, was allowed to set their own standards for minimum competency. Students who failed

were given remedial programs. Those who repeatedly failed were eventually given certificates of attendance or some other special diploma (Gronlund & Linn, 1990).

Accountability standards, while getting more press since the passage of the No Child Left Behind legislation, have been nationally mandated since Title I of The Elementary and Secondary Education Act passed in 1965. This act was further amended with The Improving America's Schools Act of 1994 (State Education Accountability Systems, 1999). The two basic areas of accountability involve student achievement and financial decisions. Seder (2000) reported that as of 2000, 22 states had passed academic and financial bankruptcy laws that would hold school districts directly accountable for student achievement. These states were: Alabama, Arkansas, Connecticut, Georgia, Illinois, Iowa, Kentucky, Maryland, Massachusetts, Mississippi, Missouri, New Jersey, New Mexico, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, and West Virginia. Several of these states, including Mississippi, took control of school districts that failed to provide for student achievement or who had serious financial problems (Seder, 2000).

#### *Concerns and Criticisms of Accountability*

A 1999 study of 16 elementary schools across five school districts in North Carolina was conducted to assess the impact of North Carolina's accountability program on student achievement in the core subjects (reading, writing, and mathematics), instructional practices, teacher attitudes, and student attitudes (Jones et al., 1999). The authors reported that the increased assessment did drive teacher instruction. Teachers reported an increase in preparation time, and a decrease in morale. The authors found that 77% of respondents reported lower morale, while 67% reported that they did not



believe the accountability program would improve student achievement. Teachers also noted that the accountability program would negatively impact the students' basic drive to learn (Jones et al., 1999).

Exit exams can have both positive and negative impacts on student achievement. McColskey and McNunn (2000) reported that exit exams tend to standardize schools across a state by making educators pay more attention to the state curriculum and increasing the expectations of students. These exit exams could also result in more support for low performing students and schools (McColskey & McNunn, 2000). In their 2000 study, Paris and McEvoy concluded that, "better testing or more testing will not improve the quality of teachers attracted to the profession" (p. 3) and may actually discourage some highly capable individuals from pursuing teaching as a career. When looking at student achievement over a 30 year period, Madaus and Clarke (2001) concluded that exit exams did not have a positive effect on teaching.

Critics argue that such high stakes testing limits the creativity of both students and teachers, and question the effect these tests will have on the self-esteem of students. Another key concern is that the dropout rate may increase because of students failing these high stakes tests (Main, 2000).

Critic C.W. Odell expressed similar views when he commented on high stakes testing in 1928 (as cited in Linn, 2001). He believed that testing could actually be more harmful to students than helpful. He wrote that high stakes tests were unfair to students because the tests themselves could be invalid or unreliable and too often the tests become objectives. Teachers begin to teach the test (Linn, 2001).

With information regarding high stakes testing, when schools, administrators, and teachers have the scores and the scores are not good, what happens? When the importance of a single test is increased, students may resort to cheating (Linn, 2001). Students are not the only ones who cheat. Kevin Bushweller (1997) reported that teachers and administrators had resorted to cheating in order to get desired results. Even the threat of suspension and termination was not enough to deter some from cheating. Incidences of teachers and administrators cheating have been discovered in California, Florida, Illinois, Louisiana, and Virginia (Million, 2000). Robert Schaeffer on the National Center for Fair and Open Testing issued the following statement to the NAESP Communicator (2000), "In today's environment, this type of cheating will continue. When test scores are all that matter, teachers, principals, and students get results by hook or crook" (p. 2).

While the debate on testing has been thorough, there have been few legal challenges. The premier challenge came in 1978 with *Debra P. v. Turlington* (Taylor, 2001). The plaintiff challenged that the Florida functional literacy test, as mandated in a 1978 state constitutional amendment, was discriminatory. The litigants asserted that the high stakes test was unfairly infringing on the 14th amendment of equal protection and violating their due process rights. Upon appeal from the Fifth Circuit of Appeals, the court in its ruling stated that the state could not deprive students the economic and educational benefits of a high school education until it validated the test with what was taught in the classroom, and that the discriminatory impact is not due to educational deprivation (Taylor, 2001).

In his article, "Let's Not Forget the Children", Robert Maher (2001) stated that standards are necessary to challenge students, but only when implemented with reasonable timelines, resources, and fair assessments. Resources must be made available to every student, but what happens when schools can not offer the same resources? The debate as to what minimum, equitable funding continues every year in the state budget talks with no clear-cut answer, yet the minimum standard for high stakes tests is assigned for every student. If every student is required to meet the same basic standards, then every school should be required to offer the same resources (Maher, 2001).

In 2003 the National Association of Secondary School Principals developed the following philosophy on testing:

The focus of holding students, educators, and schools accountable for achievement is on the rise. Moreover, there has been a growing tendency to rely upon single criterion referenced tests as assessments of student performance.

Heavy emphasis placed on testing results encourages teaching to the test and narrowing down the curriculum. (NASSP, 2003, p. 1)

Along with the philosophy, the NASSP also developed a set of considerations for testing. Testing should only be one part of a total assessment; it should be diagnostic, and it should not be the final factor in recommendations for promotion or retention. Finally, all tests should be both reliable and valid (NASSP, 2003).

The National Research Council reported that exit exams could potentially have broad and "powerful" influences in how curriculum is developed and taught (Cavanagh, 2005). For example science tests are often built around a series of facts. Instead, tests should be designed to test the "big ideas" of science. The test instruments need to utilize

a variety of test questions, such as multiple choice and written response. A single test is an “imperfect measure” of a student’s ability. If tests are written correctly, teachers will have to be retaught how to teach these skills. Lawrence Lerner, after reviewing state science standards across the country, found that content standards were more rigorous in the elementary levels, but became progressively ‘watered down’ at the middle-school and high school levels (Cavanagh, 2005).

### *Mississippi State Assessment*

Mississippi’s first attempt at establishing a minimum competency for student achievement and graduation came with the Mississippi Education Reform Act of 1982 (MDE, 2007). Through this act all students were required to pass the Functional Literacy Exam (FLE) as part of statewide graduation requirements. This was developed to be a test of basic skills. In 1995, the Mississippi Department of Education (MDE) developed subject area tests designed to replace the FLE. The subject area tests included tests in Biology I, English II, U.S. History, and Algebra I (MDE, 2007).

The Subject Area Testing Program (SATP) began in 2001 and was phased in over a five year period. In the 2000- 2001 school year, MDE began administering the History portion of SATP, but it was not made a graduation requirement until 2001-2002. English II, Biology I and Algebra I were added respectively at one year increments. The FLE was phased out and dropped as a graduation requirement during the 2000-2001 school year. By the 2002-2003 school year, all entering ninth graders were required to pass the SATP as a graduation requirement (MDE, 2007). The Mississippi SATP is contracted through Harcourt Assessment (MDE, 2007). Harcourt Assessment developed and scores the subject area tests for Mississippi as well as 16 other states, the Association of

Christian Schools International, and the Department of Defense (Harcourt Assessment, 2007).

In 2002 Reed attempted to independently verify that grades teachers assigned a student correlated with that student's achievement as measured by the Mississippi Subject Area Tests. Reed found a significant correlation between course grades and performance on the subject area tests; "however, they were somewhat lacking in magnitude" (p. 47). With regard to gender, there was no difference in "concurrent validity based on gender" (Reed, 2002, p. 47).

#### Educational Reform

The National Council of Excellence in Education stated that "if an unfriendly power had attempted to impose on America the mediocre educational system that exists today, we might have well viewed that as an act of war" (Goldberg & Harvey, 1983). In 1983, the report, *A Nation at Risk*, was released that highlighted the problems associated with education. The report stated that educators needed to look beyond the details of schooling to three big issues: time, content, and expectations. As a result, across the country curriculums were reevaluated. Content standards were rewritten. Educators were forced to reevaluate their own methods of educating students, and were conscious that they were to be held accountable (National Education Commission on Time and Learning, 1994).

#### *Time*

In 1991, the U. S. Congress established the National Education Commission on Time and Learning (NECTL). The NECTL (1994) conducted a 24-month study on the actual time an average student spends in the classroom. It reported that an average

student spends 5 ½ hours in 6 classes every day in a traditionally scheduled school. About half of that time is spent in elective and physical education classes. Schools in Japan, Germany, and France spend almost 5 ½ hours in just academic classes. At the end of 4 years of high school, U.S. students have completed only 1,460 hours on academic classes. Students in Japan spent 3,170 hours, France spent 3,280 hours, and Germany spent 3,528 hours in academic subjects. The commission reported that most school functions are governed by time and calendar rather than student learning. Nationally, the norm for required school attendance is 180 days. Time in the classroom determines how administrators administrate, teachers teach, and learners (students) learn (NECTL, 1994). The NECTL recommended that the American school be reorganized to focus 5 ½ hours on academic course work.

#### *Science Education - Content*

Howe and Jones (1993) define science as both knowledge and the process of finding out that knowledge. Science is not a finished product, rather it is ever evolving. To this end, students must also be able to understand the theories and research that led to a discovery, and then adapt that 'new' knowledge to fit their new world (Howe & Jones, 1993).

The first nationally mandated science education reform movement came in 1984 in response to the National Commission on Excellence in Education (NCEE) published report, *A Nation at Risk*. The NCEE attempted to show how the nation's public schools had stagnated and asserted, "Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world" (Goldberg & Harvey, 1983, p. 8). The NCEE reported that the nation's high

schools had not undergone any serious change during the 20th century including the area of science education, and that the 1984 graduates were not as educated as graduates from the prior 25 years (Goldberg & Harvey, 1983).

The American Association for the Advancement of Science released *Project 2061: Science for All Americans* in 1989. *Project 2061* was built on five panel reports in biology and health sciences, math, technology, physical science, information sciences and engineering, and social and behavioral sciences. A key recommendation in *Project 2061* was that overall content knowledge needed to be reduced. Core learning of central themes and concepts was stressed over memorization (Krajcik, Czerniak, & Berger, 1999).

Just one year later, in 1990, the National Education Goals Panel (NEGP) was created from a bipartisan body of republicans and democrats from both the national and state levels of government. The NEGP had eight basic goals that were to be implemented by the year 2000. Among these goals were children starting school ready to learn, increasing the high school graduation rate by 90 percent, students mastering specific content areas every four years, and enhancement of teacher education and staff development with content knowledge geared for the 21st century. Other lofty goals included the U.S. ranking #1 in the world in math and science education, and for all schools to be, “safe, disciplined, and free of drugs and alcohol” (Snowden & Gorton, 2002).

The last major science education reform prior to the *No Child Left Behind* legislation came in 1996. In that year, the National Research Council developed the *National Science Education Standards (NSE Standards)*. These standards had three basic

goals, to educate students, to have students engage intelligently in public debate, and to increase their economic production. The NSE Standards stresses inquiry based learning that can be adapted to engage the personal interests of each student (Krajcik et al., 1999).

### Schedule Options

In addition to reforming educational standards, reform has occurred in scheduling formats. Bloom in 1968 (as cited by Lybbert, 1998) stated that, “whatever the amount of time allowed by the school and the curriculum for particular subjects and tasks is likely to be too much for some students and not enough for others” (Lybbert, 1998, p. 1). Most schools are faced with choosing a traditional day, six or seven class meetings of 50 to 60 minutes, or a block-style schedule with 4 class meetings of 90 minutes (Lybbert, 1998).

#### *Traditional Schedule Advantages*

DiBiase and Queen (1999) described the traditional school schedule as composed of six to eight classes that meet every day for around 50 minutes each. Teachers at the secondary level are usually required to teach anywhere from five to seven classes a day with one planning period. Students have six to eight classes which includes both elective and required courses. (DiBiase & Queen, 1999). Students receive credit by the use of Carnegie units. A Carnegie unit is a credit unit for college preparatory coursework representing the completion of high school courses. Each unit is equal to a year’s course in the subject which equals about 130 hours of instruction (Carnegie Foundation, 2000).

#### *Traditional Schedule Disadvantages*

Schools in general face three basic areas of concern. First, schools must ensure that all students are provided with quality time. Unfortunately, today’s schools face fragmented instruction due to special education programs, arts and music programs, or



the general curriculum schedule itself, which may provide a rounded curriculum, but it divides the instructional time into smaller sections (Canady, 1995). The traditional schedule of six to seven periods a day has five to six class changes which results in a loss of instructional time and requires more preparation for teachers (Cawelti, 1994). The second area of concern is a positive school climate. Short instructional periods, class changes, and a lack of team teaching has led to higher discipline referrals, which has led to a more stressful school climate. The third area of concern is the lack of individualized instruction. This strict division of instructional time has virtually eliminated the ability of the student to work at their own pace (either slowing down for remediation, or accelerating for gifted), which can also lead to lower student morale. The result is the production of passive learners, rather than active learners (Canady, 1995).

DiBiase and Queen (1999) noted the following inadequacies in the traditional schedule. Teachers emphasize course content rather than the learning needs of the students, and they are limited in the instructional methods they can utilize. As a result, teachers often revert to lecture-dominated instruction. Teachers may also be isolated from each other and lose the advantage of team teaching. The short instructional periods provide limited time for teachers to get to know their students as individuals. On a five, six, or seven period schedule, teachers have many students in a single day and can get bogged down with the administrative duties, i.e., paperwork, associated with each student. Students may be overwhelmed with the large number of classes in a given day. As a result they have to learn a different set of expectations for each class, have increased amounts of homework, a larger number of books and other material, and an increased number of tests to prepare for. Students are forced to learn material in small fragments,

with many classes, which results in little time for content reflection and mastery (DiBiase & Queen, 1999).

### *Block Schedule Advantages*

The largest single advantage of the block schedule seems to be the flexibility associated with it: "To educate every student to compete in today's global economy, high schools need the efficiency and flexibility of a four-period day and semester-length courses" (Edwards, 1995, p. 25). The resurgence of the block schedule came in 1983 with the publication of *The Copernican Plan: Restructuring the American High School* by Joseph Carroll (Carroll, 1990). Under this plan, Carroll advocated increasing the length of the class period to allow for more varied instruction. This would mean that students would have to take longer individual classes, but fewer classes during a single day, thus allowing for the opportunity to take more classes during the year. At about the same time the total number of Carnegie units required for graduation increased in many states. Administrators that supported the ideals of the Copernican Plan liked the added advantage of being able to offer more Carnegie Units in a year (Carroll, 1990).

With fewer periods in the school day, teachers should see fewer students per day. With fewer students, teachers have more time to get to know their students, and with a longer instructional period have a greater opportunity to individualize their instruction while still addressing the course content (Canady & Rettig, 1995). The movement away from teacher-dominated lectures toward student-centered learning forces the students to take more responsibility for his or her own learning. Longer instructional periods and appropriate instruction leads to a depth of understanding that does not happen with

predominately lecture-style instruction typical in a traditional schedule (Canady & Rettig, 1993).

Block Scheduling has its roots in Trump's Flexible Modular Scheduling Design (Zepada & Mayers, 2001). Proponents of block scheduling claim that utilizing a block schedule format will allow for extended classroom experiences, reduce discipline problems and failure rates, and increase student attendance. Teachers gain increased planning times and reduced teaching load, and can vary teaching methods within an instructional period (Zepada & Mayers, 2001). Bowman (1998) reported that because teachers on the block schedule work with a smaller number of classes and students in a given semester, they have more time for developing lessons, conferencing with parents and providing remediation for students (Bowman, 1998). Businesses benefit from schools that utilize the block schedule because of its flexibility. Students can visit local businesses, which promotes mentoring, job shadowing, and cooperative education. Teachers have the increased class time to help students develop specific skills and technical competencies in the classroom that can transfer to occupational skills (Schlieffer, Crisp, & Held, 1996). There is also be more time for guided practice and skill enhancement in music, art, and vocational classes. Short field trips can also be taken during a single class period (Canady & Rettig, 1999a). Studies have shown that students who are taught under a block schedule are generally more active learners, which leads to increased student engagement, and improved school climate (Stokes & Wilson, 2000).

### *Block Schedule Types*

Canady and Rettig (1999b) estimated that almost 30% of high schools in the U.S. are organized in some form of block schedule. The 4 x 4 block, or accelerated block,

requires that students take four subjects in a semester with individual classes being approximately 90 minutes in length. The idea is that students could complete a traditional year-long course in one semester. This plan allows students to earn eight Carnegie units in a single year as opposed to a maximum of 6 or 7 on a traditional schedule (Canady & Rettig, 1995).

The intensive block requires that students take one or two subjects per day. This plan is mostly associated with schools using a trimester schedule. Students can complete two traditional year-long courses in only 60 days. The student load for any given teacher is drastically reduced, and students only have to focus on one or two courses in a given day (Canady & Rettig, 1995). A main advantage of this plan is that a student has additional opportunities to retake a failed course in a single year (Steadman, 1997).

Another common form of block scheduling is the alternate day schedule, or A/B schedule. Other titles are odd/even, day 1 / day 2, and week 1 / week 2 schedules (Canady & Rettig, 1996b). Instead of completing a course in one semester, as with the 4x4 block, students meet 8 classes in a year, but only meet 4 per day. Typically, these courses meet on alternating days, or weeks. Each individual instructional period is still approximately 90 minutes. These schedules are also easier for student transfers, because the content is delivered at a similar pace as a traditional schedule (Canady & Rettig, 1995).

Recently, modified forms of the block schedule have risen in prominence. The 3x2 model utilizes a combination of classes that meet every day and classes that meet every other day. These classes meet either in extended blocks of time for a semester, or shortened blocks of time for an entire year. Students in this plan generally take five or

six classes per day and teachers teach either four or five classes a day. This schedule can accommodate the learning needs of individual students and can allow schools to offer more class choices (DiBiase & Queen, 1999).

### *Block Schedule Disadvantages*

Canady and Rettig (1992) cite concerns with block scheduling including difficulties with keeping student interest for 90 minutes or longer, and difficulties arising from a shorter calendar than teachers are used to (Canady & Rettig, 1992). Scheduling classes during a semester becomes even more important in the block schedules.

Counselors have to pay more attention to the types of classes that are being scheduled during a single semester. Student attendance becomes more critical because a single absence from a course on a block schedule equals twice the amount of instructional time missed had the course been taught in a traditional format (Canady & Rettig, 1996a).

Zepada and Mayers (2001) when studying first year teachers found that many of these teachers were overwhelmed with the block schedule. They felt that new teachers had a limited amount of training in instructional methods and little training in classroom management for extended amounts of time. After a period of adjustment, these first year teachers fell into a routine that mimicked that of their college experiences. Even with the increased class time, these teachers continued to stress lecture-based activities over lab-based learning. When these same teachers were asked about assessment many said that traditional tests could not assess gains in learning, but performance-based tests were not used because they were afraid of losing control of the classroom (Zepada & Mayers, 2001).

Highman and Johnson (1996) in an Oregon Department of Education study cited some districts that had problems with considerations including extra-curricular programs. Transfers of students from schools utilizing the traditional schedule to one that utilizes a block schedule, may result in that student not meeting academic eligibility or extensive make-up work (Highman & Johnson, 1996).

Block scheduling may not be equally beneficial for all content areas. Canady and Rettig (1992) cited concerns that student retention would decrease from a block course as opposed to the traditional year course. Foreign language teachers reported concerns that a long lapse between the first and second course could be detrimental for their students. It has been recommended that sequenced classes be taken as soon as possible (Shortt & Thayer, 1998-1999). Music teachers reported similar concerns about content retention, and many band instructors reported improved quality when students enrolled in a year round music program (Canady & Rettig, 1996a).

Lindsay (2000) cited three basic concerns with implementing a block schedule. First is the individual student's attention span. Doubling class time does not double student attention span. This problem is especially evident with special education students and those with attention disorders. To maintain attention, many teachers actually provide less instruction and more "fun" activities, which seems to translate to less lecture, more lab, more demonstrations, and more cooperative learning. In reality there may be a decrease in content mastery. The second concern is student retention. Students take a year-long course in one semester, and while they may pass subject area tests, do they retain the information when they take college entrance exams such as the ACT/SAT? The third concern is that a single block class with a 90-minute instructional period has 10

percent less overall class time than two 50-minute classes. When this happens, there are increased opportunities for electives, but in the core subjects, there may be a deduction in content (Lindsay, 2000).

### Comparisons of Block to Traditional Schedules

Queen and Gaskey (1997), from the University of North Carolina at Charlotte, found that schools on the block schedule reported a significant reduction in absences and overall discipline incidences. They concluded that students enjoyed the increased scheduling opportunities and the different teaching methods they experienced with the block schedule (Queen & Gaskey, 1997).

When teachers and their teaching methods were evaluated, most students felt that teachers who were teaching with the block, or hybrid schedule modified their teaching styles. Students also reported that the teachers who were using the block schedule were more open to new ideas. Teachers seemed to be influenced by individual class time and this allowed them to try a variety of methodologies. A math teacher who was on the block schedule reported using more real-life situations that required more higher level thinking and problem-solving. Additionally, these new problems, required research from a variety of new, outside materials, instead of relying solely on the textbook. An English teacher reported that with the full hour, the class was able to more thoroughly discuss a topic in order to address misconceptions (Veal & Flinders, 2001).

Einder and Bishop (1997) reported that after switching to a block schedule, schools saw nearly universal improvement in cumulative grade point average, increased frequency of honor roll attainment, improved teacher methodology, and enhanced student-teacher relationships. Teachers reported that they used more cooperative learning

activities, and saw an improvement in student discipline. They also reported a reduction in the dropout rate and an increase in the attendance rate among their students.

Griffin and Nicholson (2002) reporting on Cleveland High school in Mississippi, sought to determine if classes on the block schedule could have the same content coverage as classes on the traditional schedule and to ascertain teacher perception with respect to the overall classroom atmosphere. It was determined that there was no difference between the content coverage in either schedule format. However, administrators and teachers reported that there were fewer discipline problems on the block schedule (Griffin & Nicholson, 2002).

When investigating perceptions of student achievement in math and science, Crosby (2002) reported that most teachers believed there was some improvement in the quality of student work, depth of subject matter covered, student retention of content, and an increase in enrollment in advanced classes. However, upon further investigation, he reported that a majority of the schools included in the study had abandoned the block format and transferred back to a traditional schedule (Crosby, 2002).

Jackson (1998) studied the relationship of teachers' perceptions of block schedule and student achievement on two Mississippi high schools. Teachers reported that with the block schedule they had more time to try different strategies and more time to meet the needs of students. Teachers were not covering as much content information, but they were covering the content in more depth. Teachers also found that their overall relationship with students had positively improved. Along with this finding, teachers also reported less overall stress because of having fewer groups of students to work with in a single day (Jackson, 1998).



Other studies have surveyed teachers, students, and administrators on their perceptions of the advantages of block schedules. According to their findings, teachers and administrators felt the school day was smoother because less time was spent in class changes and with fewer class changes the individual classes had fewer transitions. Teachers also reported that with the increased time, they could have more remediation during class (Black, 1998; Canady & Rettig, 1999b; Shore, 1995).

Even with a greater variety of teaching methods, teachers on a block schedule reported that the general pace of the class had to increase. Some teachers even reported that while the block was supposed to reduce the importance of lecture, they found that lecture actually became more important to make sure the each objective was covered. Students reported that they felt some teachers were rushed in their classes. While teachers reported the increased pace and stress to cover materials, none of the teachers reported sacrificing any of the objectives (Veal & Flinders, 2001). Three other studies have shown that block scheduling could result in increased academic engagement, and a positive affect on overall student GPA and graduation rates (Canady & Rettig, 1999b; Khazzaka, 1998; Salvaterra & Adams, 1995). Students reported that the class seemed “less boring” because the teachers used more group work and class discussions with block scheduling as opposed to traditional schedules (Thomas & O’Connell, 1997).

In separate studies, Lindsey (2000) and Schoentien (1995) reported that not all faculties prefer the block schedule format. Teachers who have not been adequately trained reported having a harder time adapting to the increased class period. Instead of utilizing the time to try new teaching methodology, many teachers revert to an extended lecture or increase busy work. Schools have reported that initially there are problems

with scheduling classes and even more problems when a student transferred to their school from one that was not on the block schedule. With regard to the students, there is a concern over how much content is actually retained, and the increased pace of the class (Lindsey, 2000; Schoenstien, 1995).

Thomas and O'Connell (1997) reported on student perceptions of the block schedule. Students saw little difference in the amount of homework that was assigned between traditional and block schedules. Daily work was increased to compensate for the longer class periods. They felt that the amount of field and lab experiences actually decreased. Attendance was of increased importance because students felt that they would have more make-up assignments on the block schedule (Thomas & O'Connell, 1997).

When studying the effects of four different models of block schedules compared to the traditional schedule, Pisapia and Westfall (1997) found that both the alternating and semester block schedules improved overall student discipline. There was no effect of block schedule on attendance. Grades did show improvement on the block schedule; however the authors attributed that improvement with the increased number of electives. Advanced Placement classes had the hardest time adjusting to the increased pace of the block schedule, while other classes saw no significant difference (Pisapia & Westfall, 1997).

### Student Achievement

Lawrence and McPherson (2000) conducted a systematic analysis of both traditional and block schedule schools in North Carolina to see which, if either, had a higher success rate in four core subjects. They found that the mean scores of students on the traditional schedule were consistently higher than those on the block schedule. Test

data analyzed in this study were obtained from the years before and after a school changed from traditional to block scheduling. Test scores from schools in the study were obtained for the two years prior to the school switching to the block schedule (1992-93, and 1993-94), and test scores were obtained over the next year and a half (1994-95 and one semester of 1995-96) that the schools were on a block schedule. Lawrence and McPherson (2000) suggested that the block scores were lower, because those scores were taken in the initial year of block scheduling and may not be an accurate measure of the affects of block scheduling.

In a study comparing ACT scores for schools over a period of time, Harmston, Pliska, and Ziomek (2003) found that the traditional schedule schools had a consistent increase in ACT scores across all content areas. The block schedule did not generate a consistent rate for any content areas (Harmston et al., 2003).

Even among proponents of block scheduling formats there are questions as to which format is more effective. McCreary and Hausman (2001) conducted a study that compared the effectiveness of an alternate block schedule: semester block, A/B block, and trimester block. They found that students on the semester schedule had a significantly higher GPA than those on the A/B block who had a significantly higher GPA than those on the trimester schedule. "However, students in the block (A/B) and trimester schedules have the opportunity to earn more credits each year than students under the semester schedule. Consequently, students in the semester schedule must pass a higher percentage of courses to graduate on time." Students on the semester block had significantly higher average scores on the SAT than those on either the A/B block or trimester block. However, on the science portion of the SAT, students under the A/B

block and trimester block both had a significantly higher average than those on the semester block (McCreary & Hausman, 2001).

Bateson (1990) reported that students in a school utilizing a traditional schedule significantly outperformed students in a school utilizing a block schedule in science. Bateson further stated that those students who had a first semester block science class had forgotten a significant amount of content and thus scored lower when they took the test at the end of the year, negating the claim that retention is not a problem.

Raphael, Wahlstrom, and McLean (1986) reported that students who were taught under a block schedule scored significantly lower in math. They also cited either adverse effects or no benefits in student attitudes toward mathematics. The authors found that block scheduling classes actually resulted in fewer instructional hours than the traditional scheduled classes. In the areas of biology and chemistry, students on a traditional schedule scored significantly higher than those on a block schedule; there was no difference scores in physics classes.

In the Gore Study (1997), the authors compared student achievement of British Columbia students that were taught under block and traditional schedules. In the areas of English, mathematics, biology, chemistry, physics, French, history, geography, and literature, traditional students outperformed block students in every subject.

Smith and Associates (1998) conducted a comparison study of schools that were utilizing a block schedule and those that were utilizing a traditional schedule. They reported that those utilizing the block schedule had significantly higher differences in academic achievement than those who were utilizing the traditional schedule. In a study comparing student achievement on the Indiana Statewide Testing for Educational

Progress among schools utilizing the block schedule and those that were utilizing the traditional schedule, Veal and Schreiber (1999) found no statistically significant differences in scores in the areas of reading and language. There was a significant difference in the area of mathematics. Students attending schools on a traditional schedule scored significantly higher than those who were on the block schedule.

Gusky and Kifer (1995) reported student achievement in five areas at a Maryland high school after 1 ½ years of implementation of a block schedule. Student achievement in four of the areas increased, but not at a significant level. The fifth area, Advanced Placement (AP), showed a significant increase in the number of tests taken, an increase in the number of students taking the tests, and an increase in student scores.

On the issue of graduation rates, Rettig and Canady (2001) reported that there was no significant difference by schedule type. Schools that utilize a block schedule of instruction tend to have a slightly higher graduation rate, but the difference was not statistically significant (Rettig & Canady, 2001). In a longitudinal study at six Midwest high schools, Nichols (2000) reported that overall student attendance remained stable, student graduation rates fluctuated, and grade point averages remained stable for both traditional and block.

Stanley and Gifford (1998) reported that in their research, students on block schedules do have higher student achievement; however, they were not exposed to the same amount of material. They also noted that the key factor of student success was not schedule type, but student motivation. Schroth and Dixon (1995) reported that low-achieving students who attended math class more frequently and for longer periods of time did not score significantly higher than low-achieving students in the traditionally

scheduled math class. Hackman (1999) reported that Iowa high schools on the traditional schedule placed third in the nation on the Academic College Test (ACT), but schools switched to block schedules not for student achievement, but to improve school climate and discipline problems.

#### Alternatives to Block and Traditional Schedules

If there are advantages and disadvantages to both block and traditional schedules, then why are schools limited to just one format? Childers and Ireland (2005) in the September issue of *Principal Leadership* reported on a school that has attempted to blend both the traditional and block forms of scheduling. The initial problem was with scheduling conflicts. The curriculum had to be set up with enough vertical and horizontal variations to balance every student's schedule. Once the schedules were set, students reported they had less homework on the composite schedule because they had a "lighter" course load. At-risk students were helped by having only two academic blocks within a semester. After the initial year, the composite schedule was reevaluated. Students and teachers favored the idea of the composite, but the scheduling was very hectic. Teachers' opinions were split as to which schedule was best, a block or traditional schedule. The administration decided to continue with the composite schedule. On a five year review, only four of the 130 teachers stated they wanted to return to either an all block or an all traditional schedule (Childers & Ireland 2005).

## CHAPTER III

### METHODOLOGY

#### Overview

The purpose of this study is to examine the relationship of scheduling format and student achievement as measured by the Mississippi Subject Area tests, and the perceptions of high school science teachers relative to scheduling formats. This chapter presents the participant selection process, data collection methods, instruments, and methods of analysis. This chapter will be divided into two parts. The first part will discuss the methodology for comparing student achievement of students using the block schedule format and traditional schedule format. The second part will discuss the methodology for obtaining the perceptions of high school science teachers.

#### *Student Achievement*

With approval of the Human Subjects Review Board (Appendix A) a comparative study will be conducted to determine the relationship of block and traditional schedules on group mean scores from the Mississippi Subject Area Exams in Algebra I, Biology, English II, and U.S. History. A comparison of the group mean scores from public schools in Mississippi utilizing the block schedule format and those using the traditional schedule format will be analyzed using SPSS.

#### *Teacher Perception*

The second part of the study will involve gathering information to determine the perceptions of high school science teachers about their current schedule and the perceived advantages and disadvantages of an alternate scheduling format.

## Subjects

### *Student Achievement*

The researcher randomly selected at least 60 high schools from across the state of Mississippi based on size and scheduling format. Of these 60, 30 were utilizing a traditional scheduling format while the remaining 30 were utilizing a block scheduling format. Each of the 30 was then divided based on school size as determined by the Mississippi High School Activities Association. This classification is based on overall student population. Small schools consisted of 10 schools that are classified as either 1A or 2A. Medium schools consisted of 10 schools that are classified as either 3A or 4A. Large schools consisted of 10 schools that are classified as 5A.

### *Teacher Perception*

The subjects for this part of the study consisted of high school science teachers who agree to voluntarily respond to the survey. The researcher chose teachers using email addresses that have been listed on the schools' websites. This list identifies teachers and the schools that they are employed with. The researcher will e-mail survey packets to individual teachers at the teacher's listed e-mail address. This e-mail will contain both the cover letter (appendix B) that explains the purpose of the study and the survey instrument (appendix C) that is to be sent back. The researcher contacted 100 high school teachers consisting of 50 who teach on a block schedule and 50 who teach on a traditional schedule.



## Research Design

### *Student Achievement*

To test hypotheses 1 - 10, independent *t*-tests will be conducted using a Bonferroni alpha of 0.01 level of significance. The independent and dependent variables of each hypothesis are as follows:

H<sub>1</sub>: There is a significant difference in the mean scores of Mississippi high schools on the Mississippi Subject Area Exam in Algebra I between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the Algebra I mean scores. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>2</sub>: There is a significant difference in the mean scores of Mississippi high schools on the Mississippi Subject Area Exam in Biology between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the Biology mean scores. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>3</sub>: There is a significant difference in the mean scores of Mississippi high schools on the Mississippi Subject Area Exam in U.S. History between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the U.S. History mean scores. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>4</sub>: There is a significant difference in the mean scores of Mississippi high schools on the Mississippi Subject Area Exam in English II (multiple-choice) between

schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the English II (multiple-choice) mean scores. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>5</sub>: There is a significant difference in the mean scores of Mississippi high schools on the Mississippi Subject Area Exam in English II (essay) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the English II (essay) mean scores. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>6</sub>: There is a significant difference in the percentage of Mississippi high school students passing the Mississippi Subject Area Exam in Algebra I between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the mean percentage of students passing the Algebra I exam. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>7</sub>: There is a significant difference in the percentage of Mississippi high school students passing the Mississippi Subject Area Exam in Biology between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the mean percentage of students passing the Biology exam. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>8</sub>: There is a significant difference in the percentage of Mississippi high school students passing the Mississippi Subject Area Exam in U.S. History between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variables will be the mean percentage of students passing the U.S. History exam in schools. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>9</sub>: There is a significant difference in the percentage of Mississippi high school students passing the Mississippi Subject Area Exam in English II (multiple-choice) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the mean percentage of students passing the English II (multiple-choice) exam. The independent variable will be the scheduling format of the school as either block or traditional.

H<sub>10</sub>: There is a significant difference in the percentage of Mississippi high school students passing the Mississippi Subject Area Exam in English II (essay) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

The dependent variable will be the mean percentage of students passing the English II (essay) exam. The independent variables will be the scheduling format of the school as either block or traditional.

### *Teacher Perception*

To test hypotheses 11 and 12, the researcher will design an instrument to measure the perceptions of current science teachers on the effectiveness of their current scheduling format and the effectiveness of the alternative scheduling format. The surveys will be analyzed using an Independent *t*-test with a Bonferroni alpha of 0.01 significance level. The independent and dependent variables of this hypothesis will be as follows:

H<sub>11</sub>: Current Mississippi high school science teachers who teach on the block scheduling format will perceive the traditional scheduling format will have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

The dependent variable will be the reported perceptions of Mississippi high school science teachers who are currently teaching under a block scheduling format of the effectiveness of the block scheduling format on student achievement on the Mississippi Subject Area Tests. The independent variable will be the reported perception of the effectiveness of the traditional scheduling format on student achievement on the Mississippi Subject Area Tests.

H<sub>12</sub>: Current Mississippi high school science teachers who teach on the traditional scheduling format will perceive the block scheduling format to have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

The dependent variable will be the reported perceptions of Mississippi high school science teachers who are currently teaching under a traditional scheduling format of the effectiveness of the traditional scheduling format on student achievement on the Mississippi Subject Area Tests. The independent variable will be the reported perception of the effectiveness of the block scheduling format on student achievement on the Mississippi Subject Area Tests.

*Survey attributes.* A review of literature revealed that there were 5 basic considerations for scheduling decisions, specifically in science classes. These were content coverage, remediation, lab time, discipline, and teacher preparation time (DeCesare, 2002; Hong, 2001; Nighswander, 1981; Zepada and Mayers, 2001;). The survey, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C), was developed to specifically address these issues in a variety of items.

Content coverage involves how well teachers feel they have covered the objectives of the course, specifically in Biology which is part of the Mississippi SATP. Block schedule proponents have cited that with an extended period there is less time spent on administrative duties (attendance, announcements, etc.) and more time devoted to instruction in a given period (Bowman, 1998). Traditional proponents cited that students can be exposed to more information in smaller doses over the entire year as opposed to one semester on the block schedule (DiBiase & Queen, 1999). The basic question teachers will be asked is, did I have enough time to cover the material adequately? Content coverage is measured by questions 8, 11, 12, 13 on the survey

instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C).

Remediation is of special importance, particularly with the increased emphasis for special education students being included in regular education classes. Biology teachers must also work with students who have previously taken and failed the course and/or failed the Biology state test. This involves reviewing the student's past history to determine why they failed and identifying and providing appropriate remediation in preparation for a retake (MDE, 2007). The basic question is do I have enough time to adequately devote to remediation? Remediation is measured by questions 6, 7, 16, 26 on the survey instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C).

One advantage that block schedule proponents have cited especially for science teachers is that it gives them extended time for labs. One disadvantage is that there is half the number of contact periods to cover the same material as the traditional schedule (Howe & Jones, 1993). The basic question is do I feel that I have adequate time to devote to lab based activities? Lab time is measured by questions 10, 14, 15, 21, 22, 23, 24, 25 on the survey instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C).

Discipline is a constant factor in all education settings. With the extended period, teachers must develop a more varied teaching strategy to keep students from having extended periods of idle time (Canady & Rettig, 1995) which can lead to discipline problems. With the traditional schedule, there are more class changes which can lead to

more discipline problems (Cawelti, 1994). The basic question is do I have to devote more time and resources to discipline activities? Discipline is measured by questions 9, 27, 28, 29 on the survey instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C).

Teacher preparation refers to the time and resources teachers must devote to preparing for their classes each day. This includes preparing lesson plans and class handouts, grading students' work, setting up or cleaning up lab activities, and other administrative duties associated with their classes. Block schedule proponents have cited fewer overall students and classes in a single day and an extended preparation period for administrative duties and remediation. Traditional schedule proponents have cited fewer overall activities were needed in a single day and an extended calendar year to address those issues (Canady & Rettig, 1995). The basic question is do I have enough time to adequately prepare for my classes? Teacher preparation time is measured by questions 5, 9, 17, 18, 19, 20 on the survey instrument, *High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C).

*Survey instrument.* When the survey is sent to each teacher, the instrument will be coded with a T for traditional scheduling format and a B for block scheduling format. The appropriate packet will then be e-mailed to each teacher based on their current scheduling format as reported by the Mississippi Department of Education.

The survey is divided into three sections. Part I of the survey consists of demographic information including teacher experience, educational background, and

years of experience in either or both traditional scheduling formats and block scheduling formats. This will be done with three short answer questions and one multiple choice question.

Part II of the survey gathers teacher perceptions of their current scheduling format. The instrument utilizes both a Likert-type scale and some open-ended response questions. The subjects will be given a series of statements and then asked to indicate their level of agreement on a 1 – 6 scale (1-strongly disagree, 2 – disagree, 3 – somewhat disagree, 4 –somewhat agree, 5 – agree, and 6 – strongly agree). The statements will be designed to measure the perceptions of teachers on their preparation time, lab time, student achievement on content mastery, student remediation, and discipline issues. The open-ended response questions will solicit perceptions of advantages and disadvantages of the participant’s current scheduling format, and the administrator’s role in teacher and student success.

Part III is identical to part II with only one exception. The only difference is that Part II responses are based on the participant’s current teaching schedule. Part III responses are based on the participant’s perception of the alternative scheduling format.

### Procedures

#### *Student Achievement*

As a requirement of the “No Child Left Behind Act” of 2001, the mean scores of individual schools are public record, therefore permission does not need to be granted from the individual schools to use the data. Schools will not be identified by name in the research nor will individual students. Identification of each school’s scheduling format was obtained from the Mississippi Department of Education and confirmed with a verbal



telephone conversation from a representative of each school. School size will be determined based on the Mississippi High School Activities Association classification. Small schools will be schools that have been classified as 1A and 2A. Medium schools will be schools that have been classified as 3A and 4A. Large schools are schools that have been classified as 5A.

The test data necessary to conduct this study will be collected from the Mississippi Department of Education's web site (<http://www.mde.k12.ms.us>). Mean scores and mean percentage of students passing from the 2006 – 2007 Mississippi Subject Area Exams in Algebra I, Biology, English II (multiple-choice), English II (essay), and U.S. History will be utilized to conduct the study in conjunction with the data identifying schools as either block or traditional.

#### Validity and Reliability

##### *Student Achievement*

This research will ensure validity and reliability by using quantitative data consisting of norm-referenced test results as reported by the Mississippi Department of Education. These norm-referenced tests were initially developed through choosing a statistically representative group of students for the control group (MDE, 2007).

Mississippi teachers and educators were involved in all aspects of the development of the Mississippi Curriculum Framework, which was used as the guide for creating the criterion-referenced tests. The Mississippi Department of Education requires all schools to base their instruction from this framework and all schools administer the same tests with the same testing procedures in place.

The Mississippi Subject Area Exam in Algebra I measures a student's knowledge and skill level as applied in algebra (MDE, 2007). The test consists of 53 multiple-choice items and one open-ended response question. The Algebra I exam is scored on a scale of 100 to 500 with a passing score of 300.

The Mississippi Subject Area Exam in Biology measures a student's knowledge of basic biological concepts and laboratory skills and the application of biology (MDE, 2007). The test consists of 87 multiple-choice questions and two open-ended response questions. The Biology exam is scored on a scale of 100 to 500 with a passing score of 300.

The Mississippi Subject Area Exam in U.S. History measures historical knowledge and also real-world skills by having student read and interpret statistical data, maps, charts, and tables (MDE, 2007). The test consists of 89 multiple-choice questions. The U.S. History exam is scored on a scale of 100 to 500 with a passing score of 300.

The Mississippi Subject Area Exam in English II measures knowledge of language conventions, reading comprehension, and effective writing skills (MDE, 2007). The English II exam consists of two separate exams: a multiple-choice basic knowledge exam and an essay writing exam. The multiple-choice test consists of 85 questions. This part of the English II exam is scored on a scale of 100 to 500 with a passing score of 300. The English II writing test consists of two writing prompts. The students select one and prepare a finished essay. This essay is scored with a set rubric with a scale range of 0 to 4 with a passing score of 2.

### *Teacher Perception*

Content validation for the High School Science Teachers' Perceptions on the *Effectiveness of Block and Traditional Scheduling Formats on Student Achievement* (Appendix C) survey was established. The researcher secured a panel of three experts, two within the field of education and one from the field of research. These experts were asked to establish face and content validity of the survey. The specific questions that were asked were: Is the format clear? Are the questions clear? Have the five areas (content coverage, remediation, lab time, discipline, and teacher preparation time) been adequately covered? How can the survey be improved? All suggestions were considered and the survey was revised as needed and resubmitted for the panel's approval.

The two experts within the field of education include a science educator and a school administrator with first-hand knowledge of both block and traditional scheduling formats. The first is an educator who has taught several science classes at the high school level with over 30 years of classroom experience. He has a Master's degree in science education. The second is an educator who has over 40 years of experience in education as a classroom teacher, special education coordinator, state department of education official, grant reviewer, and superintendent. She has a Doctorate in Educational Administration. The third expert has first-hand knowledge of research methodology. She has over 20 years of research experience including over a hundred published studies and is knowledgeable in survey instrument development. She is currently employed by the United States Department of Agriculture.

### *Pilot Study*

A pilot study will be conducted to establish reliability. The High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats

on Student Achievement Survey will be administered to current Mississippi high school science teachers and administrators that have first-hand knowledge of both traditional and block schedules. Their responses will be analyzed to establish reliability using a Cronbach's alpha test for internal consistency. Those participating in the pilot study will not participate in the final survey.

#### Data Analysis

The following data analysis will be utilized for each of the following hypotheses in the study: Hypotheses 1 – 10 will use an independent *t*-test. Hypotheses 11 will use MANOVA. The .05 level of significance will be used. The statistical program SPSS will be used to compute each of these tests.

## CHAPTER IV

### RESULTS

#### Introduction

The primary purpose of this study was to determine if significant differences existed in mean test scores and percentage of students passing on the Mississippi Subject Area Tests in Algebra I, Biology I, U.S. History, English II Multiple Choice, and English II Writing between block and traditional high schools in the state of Mississippi. A secondary purpose of this study was to determine the perceptions of public high school science teachers as to the effectiveness of block and traditional scheduling formats.

Data from 69 (34 block and 35 traditional) high schools throughout the state of Mississippi were utilized to test the first 10 hypotheses. Mean test scores and the percentage passing data from the 2006-2007 test administration of the MSAT in Algebra I, Biology I, U.S. History, English II Multiple Choice, and English II Writing were collected from each school participating in this study.

To ensure variability, variables considered as part of this study included student enrollment and scheduling format. Variables that were not considered included, but were not limited to, class size, teacher certification, teacher experience, instructional methods, parental contacts, and remedial programs utilized by the schools for test preparation.

The purpose for the second part of the study was to determine the perceptions of current Mississippi public high school science teachers as to the effectiveness of block and traditional scheduling in five domains. These five domains were teacher preparation, lab time, content coverage, remediation, and discipline.

## Descriptive Data

In the 2002 – 2003 school year, the Mississippi Department of Education identified 469 block schools and 1,568 traditional schools in the state of Mississippi. All students in the state of Mississippi are required to pass subject area tests to be eligible for graduation. Tested areas include algebra I, Biology I, U.S. History, and English II. The English II test is divided into two parts; multiple choice and a writing prompt. During the 2006-2007 school year 29,273 students took the algebra I test with a state mean score of 354.6 and 90.8% passing rate 27,521 students took the U.S. History test with a state mean score of 365.2 and 93.9% passing rate 30,216 students took the Biology I test with a state mean score of 363.6 and 92.2% passing rate 30,593 students took the English II multiple choice test with a state mean score of 326.5 and 77.2% passing rate and 31,037 students took the English II writing test with a state mean score of 2.2 and 98.8% passing rate.

To evaluate the perceptions of Mississippi public high school science teachers, a survey was either hand delivered (local schools) or emailed to 300 teachers. Participation was completely voluntary, and only the first 100 (50 block and 50 traditional) returned surveys were used. To ensure variability the researcher compared the demographics of the returned survey against the demographics of teachers as reported by the Mississippi Department of Education to ensure a representative sample. Questions 1 – 4 were demographic information. Of the 50 teachers that were currently teaching on the block schedule 27 (54%) had a bachelor's degree and 23 (46%) had a master's degree with an average of 13.55 years of experience. Of the 50 teachers that were currently teaching on a traditional schedule 31 (62%) had a bachelor's degree, 18 (36%) had a master's degree, and 1 (2%) had a specialist's degree with an average of 10.19 years of experience. Of the

100 total teachers surveyed 58 (58%) had a bachelor's degree, 41 (41%) had a master's degree, and 1 (1%) had a specialist's degree. MDE reported in the 2006-2007 school year, of the 32,184 total classroom teachers in the state of Mississippi, 61.5% had a bachelor's degree, 36.18% had a master's degree, 1.94% had a specialist's degree, and 0.38% had a doctorate degree.

Table 1

*Mississippi Teacher Demographics*

Survey Respondents	total	bachelor's %	master's %	specialist's %	doctorate %
Teaching on Block	50	54.00	46.00	0.00	0.00
Teaching on Traditional	50	62.00	36.00	2.00	0.00
Total Respondents	100	58.00	41.00	1.00	0.00
Mississippi average	32,184	61.50	36.18	1.94	0.38

Questions 2 and 3 dealt specifically with the amount of time each of the respondents had spent teaching science and had taught at their present schools. Of the 50 teachers that were currently teaching on the block schedule, the average years of experience was 13.55 years. The average number of years of experience in teaching at least one science class was 13.38, and 11.42 average years of experience at their current school. Of the 50 teachers that were currently teaching on a traditional schedule, the average years of experience was 10.19 years, with 9.92 years teaching at least one science class, and 7.72 years teaching at their current school.

The second part of the survey instrument consisted of 25 pairs of questions that were designed to be answered using a Likert type scale ranging from 1 (strongly disagree) to 6 (strongly agree). These questions would be answered twice, once to obtain their opinions of their current scheduling format and once to obtain their opinions of the alternative to their current scheduling format.

The first criterion to be measured was the perceptions of teacher preparation time. This domain was measured using questions 5, 9, 17, 18, 19, and 20. The second criterion was lab time which was measured with questions 10, 14, 15, 21, 22, 23, 24, and 25. The third criterion was student achievement and content mastery which was measured with questions 8, 11, 12, and 13. The fourth criterion was student remediation which was measured with questions 6, 7, and 16. The final criterion was discipline which was measured with questions 9, 27, 28, and 29. The final four questions were narratives designed to ascertain, in their own words, both the strengths and the weaknesses of each scheduling format. A Cronbach Alpha test for reliability was conducted on the survey to verify its reliability in the five domains (Table 2). While most of the domains did have suitable reliability results, there were concerns with remediation and the block schedule (Cronbach alpha = 0.378) and a slight concern with discipline and the traditional schedule (Cronbach alpha = 0.676). All other domains had Cronbach alpha results that were greater than 0.70.



Table 2

*Reliability Results of Pilot Study for Survey*

Domain Tested	Cronbach alpha (traditional)	Cronbach alpha (block)
Teacher Preparation	0.861	0.772
Laboratory Activities	0.928	0.887
Content Coverage	0.895	0.945
Student Remediation	0.902	0.378
Discipline	0.676	0.813

## Test of Hypotheses

An independent *t*-test at a Bonferroni alpha of 0.01 was used to test each of the first 10 hypotheses for this study.

Hypotheses 1 – 5 deal with a direct comparison of block schools to traditional schools with regard to the mean score on the five MSAT given in Mississippi public high schools. Means are given in Table 2.

H<sub>1</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Algebra I between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the mean scores on the Algebra I MSAT. There was not a significant difference  $t(67) = 2.02, p = 0.048$  (Table 3). Schools instructing on the block schedule did not score significantly higher than those that used a traditional schedule. Hypothesis 1 is rejected.

H<sub>2</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Biology between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the mean scores on the Biology MSAT. There was a significant difference  $t(67) = 2.84, p = .006$  (Table 3). Schools instructing on the block schedule ( $M = 368.12, SD = 22.95$ ) scored significantly higher than those that used a traditional schedule ( $M = 352.36, SD = 23.20$ ). Hypothesis 2 is accepted.

H<sub>3</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in U.S. History between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the mean scores on the U.S. History MSAT. There was a significant difference  $t(67) = 2.67, p = .010$  (Table 3). Schools instructing on the block schedule ( $M = 369.50, SD = 19.67$ ) scored significantly higher than those that used a traditional schedule ( $M = 356.95, SD = 19.45$ ). Hypothesis 3 is accepted.

H<sub>4</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (multiple-choice) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the mean scores on the English II (multiple-choice) MSAT. There was a significant difference  $t(67) = 3.10, p = .003$  (Table 3). Schools instructing on the block

schedule ( $M = 328.42$ ,  $SD = 11.87$ ) scored significantly higher than those that used a traditional schedule ( $M = 318.80$ ,  $SD = 13.83$ ). Hypothesis 4 is accepted.

H<sub>5</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (essay) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the mean scores on the English II (essay) MSAT. There was not a significant difference  $t(67) = 1.95$ ,  $p = .055$  (Table 3). Schools instructing on the block schedule did not score significantly higher than those that used a traditional schedule. Hypothesis 5 is rejected.

Hypotheses 6 – 10 compare the passing percentage of block schools to traditional schools in each of the MSAT given in public Mississippi high schools. Means are given in Table 4.

H<sub>6</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Algebra I between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the passing percentage of students on the Algebra I MSAT. There was a significant difference  $t(67) = 2.78$ ,  $p = .007$  (Table 4). Schools instructing on the block schedule ( $M = 92.62$ ,  $SD = 6.12$ ) had a higher percentage of students that passed than those that used a traditional schedule ( $M = 85.91$ ,  $SD = 12.70$ ). Hypothesis 6 is accepted.

Table 3

*Descriptive Statistics for Mean Scores of Block and Traditional Schools*

MSAT Score	Schedule Type	Mean	Std. Deviation	<i>n</i>
Algebra I	Block	352.08	28.82	34
	Traditional	339.98	20.41	35
	Total	345.94	25.46	69
Biology*	Block	368.12	22.95	34
	Traditional	352.36	23.20	35
	Total	360.12	24.24	69
U.S. History*	Block	369.50	19.66	34
	Traditional	356.95	19.45	35
	Total	363.13	20.42	69
English II m/c*	Block	328.42	11.87	34
	Traditional	318.79	13.83	35
	Total	323.54	13.69	69
English II essay	Block	2.20	0.10	34
	Traditional	2.14	0.14	35
	Total	2.17	0.12	69

\*  $p < .05$

H<sub>7</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Biology between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the passing percentage of students on the Biology MSAT. There was a significant difference  $t(67), p = .002$  (Table 4). Schools instructing on the block schedule ( $M = 94.05, SD = 5.88$ ) scored significantly higher than those that used a traditional schedule ( $M = 87.90, SD = 9.82$ ). Hypothesis 7 is accepted.

H<sub>8</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in U.S. History between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the passing percentage of students on the U.S. History MSAT. There was not a significant difference  $t(67) = 2.63, p = .011$  (Table 4). Schools instructing on the block schedule did not score significantly higher than those that used a traditional schedule. Hypothesis 8 is rejected.

H<sub>9</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (multiple-choice) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the passing percentage of students on the English II (multiple-choice) MSAT. There was a significant difference  $t(67) = 3.27, p = .002$  (Table 4). Schools

instructing on the block schedule ( $M = 79.526$ ,  $SD = 9.73$ ) scored significantly higher than those that used a traditional schedule ( $M = 70.563$ ,  $SD = 12.81$ ). Hypothesis 9 is accepted.

H<sub>10</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (essay) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

An independent *t*-test was conducted to evaluate the hypothesis that there would be a difference in the passing percentage of students on the English II (essay) MSAT. There was not a significant difference  $t(67) = 2.57$ ,  $p = .013$  (Table 4). Schools instructing on the block schedule did not score significantly higher than those that used a traditional schedule. Hypothesis 10 is rejected.

H<sub>11</sub>: Current Mississippi high school science teachers who teach on the block scheduling format will perceive the traditional scheduling format will have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

Independent *t*-tests were conducted to evaluate the hypothesis that current Mississippi science teachers who teach on a block schedule would perceive that the traditional scheduling format would have a greater positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities. Means are reported in Table 5. Independent *t*-test results are reported in Table 6.

Table 4

*Descriptive Statistics for Percentage of Students Passing the MSAT*

MSAT	Schedule type	Mean	Std. Deviation	<i>n</i>
Algebra I*	Block	92.62	6.12	34
	Traditional	85.91	12.70	35
	Total	89.22	10.50	69
Biology*	Block	94.05	5.88	34
	Traditional	87.90	9.82	35
	Total	90.93	8.63	69
U.S. History	Block	95.30	5.27	34
	Traditional	91.15	7.60	35
	Total	93.20	6.83	69
English II m/c*	Block	79.53	9.73	34
	Traditional	70.54	12.81	35
	Total	74.98	12.18	69
English II essay	Block	99.13	1.55	34
	Traditional	97.65	2.97	35
	Total	98.38	2.48	69

\* $p < .05$

For the first domain, teacher preparation, there was a significant difference  $t(47) = 9.28, p < .001$ . Teachers favored the block format ( $M = 4.47, SD = .61, n = 48$ ) to the traditional format ( $M = 3.30, SD = .70, n = 48$ ). For the second domain, laboratory activities, there was a significant difference of  $t(47) = 14.39, p < .001$ . Teachers favored the block format ( $M = 4.70, SD = .53, n = 48$ ) to the traditional format ( $M = 2.87, SD = .75, n = 48$ ). For the third domain, student achievement, there was not a significant difference of  $t(47) = 2.54, p > .001$ . For the fourth domain, remediation, there was a significant difference of  $t(47) = 8.70, p < .001$ . Teachers favored the block format ( $M = 4.55, SD = .78, n = 48$ ) to the traditional format ( $M = 2.90, SD = .89, n = 48$ ). For the fifth domain, discipline, there was not a significant difference of  $t(47) = -0.17, p > .001$ . While there was a significant difference with three of the five domains tested, teachers who were currently teaching on a block schedule perceived that the block schedule was more effective than the traditional schedule. Hypothesis 11 is not accepted.

H<sub>12</sub>: Current Mississippi high school science teachers who teach on the traditional scheduling format will perceive the block scheduling format to have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

Independent  $t$ -tests were conducted to evaluate the hypothesis that current Mississippi science teachers who teach on a traditional schedule would perceive that the block scheduling format would have a greater positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities. Means are reported in Table 7. Independent  $t$ -test results are reported in Table 8.



Table 5

*Teacher Perceptions - Block Teacher Perceptions of Both Block and Traditional Scheduling Formats*

Domains	Schedule	mean	std. deviation	n
	Format			
preparation*	block	4.47	0.61	48
	traditional	3.30	0.70	48
lab activities*	block	4.70	0.53	48
	traditional	2.87	0.75	48
content coverage*	block	4.39	0.93	48
	traditional	3.81	1.07	48
remediation*	block	4.55	0.78	48
	traditional	2.90	0.89	48
discipline	block	4.08	0.76	48
	traditional	4.10	0.64	48

\*  $p < .01$

Scale:

1 = strongly disagree

2 = disagree

3 = somewhat disagree

4 = somewhat agree

5 = agree

6 = strongly agree

Table 6

*Teacher Perceptions – Block Teacher Perceptions of Both Block and Traditional Scheduling Formats – Independent t-test Results*

Domains	Schedule Format	<i>t</i>	<i>df</i>	sig (2-tailed)
preparation	block	9.28	47	0.00
	traditional			
lab activities	block	14.39	47	0.00
	traditional			
content coverage	block	2.54	47	0.01
	traditional			
remediation	block	8.70	47	0.00
	traditional			
discipline	block	-0.11	47	0.91
	traditional			

For the first domain, teacher preparation, there was a significant difference  $t(49) = 8.81, p < .001$ . Teachers favored the block format ( $M = 4.49, SD = .55, n = 50$ ) to the traditional format ( $M = 3.21, SD = .80, n = 50$ ). For the second domain, laboratory activities, there was a significant difference of  $t(49) = 12.54, p < .001$ . Teachers favored the block format ( $M = 4.91, SD = .66, n = 50$ ) to the traditional format ( $M = 2.67, SD = .85, n = 50$ ). For the third domain, student achievement, there was a significant difference of  $t(49) = 5.01, p < .001$ . Teachers favored the block format ( $M = 4.53, SD = .68, n = 50$ ) to the traditional format ( $M = 3.71, SD = .88, n = 50$ ). For the fourth domain,

remediation, there was a significant difference of  $t(49) = 12.09, p < .001$ . Teachers favored the block format ( $M = 4.63, SD = .66, n = 50$ ) to the traditional format ( $M = 2.74, SD = .80, n = 50$ ). For the fifth domain, discipline, there was not a significant difference of  $t(49) = -2.12, p > .039$ . There was a significant difference with four of the five domains tested. Teachers who were currently teaching on a traditional schedule perceived that the block schedule was more effective than the traditional schedule in teacher preparation, lab activities, student achievement, and remediation. Hypothesis 12 is accepted.

For the first five hypotheses (dealing with the mean scores for each school), the data indicated that while there was a significant differences between block and traditional schools in Biology, U.S. History, and English II multiple-choice MSAT. There was no significant difference between block and traditional schools in Algebra I and English II essay MSAT. Hypotheses 1 and 5 are rejected. Hypotheses 2, 3, and 4 are accepted. For the next five hypotheses (dealing with the percentage of students who passed the MSAT), the data indicated there was a significant differences between block and traditional schools in Algebra I, Biology, and English II multiple-choice MSAT. There was no significant difference between block and traditional schools in the percentage of students who passed the U.S. History and English II essay MSAT. Hypotheses 8 and 10 are rejected. Hypotheses 6, 7, and 9 are accepted.

The last two hypotheses showed that current Mississippi science teachers, regardless of schedule type, tend to prefer the block schedule to the traditional schedule with regard to teacher preparation, lab activities, student achievement and remediation,

but these same teachers prefer the traditional schedule over the block schedule with regard to discipline. Hypothesis 11 is rejected. Hypothesis 12 is accepted.

Table 7

*Teacher Perceptions – Traditional Teacher Perceptions of Both Block and Traditional Scheduling Formats*

Domains	Schedule Format	Mean	std. deviation	<i>n</i>
preparation*	Block	4.49	0.55	50
	traditional	3.21	0.80	50
lab activities*	Block	4.91	0.66	50
	traditional	2.67	0.85	50
content coverage*	Block	4.53	0.67	50
	traditional	3.71	0.88	50
remediation*	Block	4.63	0.66	50
	traditional	2.74	0.80	50
discipline	Block	3.84	0.54	50
	traditional	4.08	0.60	50

\* $p < .05$

Scale:

1 = strongly disagree

2 = disagree

3 = somewhat disagree

4 = somewhat agree

5 = agree

6 = strongly agree

Table 8

*Teacher Perceptions – Traditional Teacher Perceptions of Both Block and Traditional Scheduling Formats – Independent t-test Results*

Domains	Schedule Format	<i>T</i>	<i>df</i>	sig (2-tailed)
preparation	Block	8.81	49	0.00
	Traditional			
lab activities	Block	12.54	49	0.00
	Traditional			
content coverage	Block	5.06	49	0.00
	Traditional			
remediation	Block	12.09	49	0.00
	Traditional			
discipline	Block	-2.12	49	0.04
	Traditional			

#### Additional Findings

In addition to the Likert scale responses of the survey, the respondents were also asked to respond to four open ended responses. Their responses are summarized below.

Question 30 asked the respondents to list what they considered to be the greatest two advantages to the traditional schedule. The greatest frequency of responses regarded the shortened period as the greatest advantage. One respondent reported that the traditional schedule allows for less idle time in the classroom. They continued by saying that the material doesn't get quite as stale because the monotony of the classroom would

be broken into more, smaller sections. Another theme revolved around classroom discipline. One respondent reported that students with ADD actually benefit from the shorter class periods because, with less idle time, they have less time become 'discipline problems'. The third most common theme was the concept of having the entire year to prepare for state exams or to cover the curriculum. One respondent reported the shortened class periods are an advantage when teaching or learning a foreign language, or a physically demanding course like band, because the repetition can build endurance. The final theme revolved around relationships, both student-teacher and student-student. One respondent reported that the traditional schedule gives the teachers a break after 50 minutes with the students and the students a break after 50 minutes with the teacher.

Question 31 asked the respondents to report on the two disadvantages of the traditional schedule. While the greatest advantage of the traditional schedule was listed as the shortened period, it was also regarded as its greatest disadvantage. The almost unanimous response was with the shortened period, it was very difficult to complete higher level lab activities and demonstrations. One respondent reported that there was no time for most labs, and you have to rush through pre-lab and have no time for post-lab discussions, as a result lessons are scattered over several days. Teachers who were currently teaching on the traditional schedule also reported that there it was harder to cover the curriculum, because lessons had to be split over many days for one concept. The third most common theme revolved around student remediation. With the shorter class periods, there was a concern that student remediation, varied teaching strategies, and meeting at-risk needs would not be addressed. The fourth theme was the class load for students. Students would have more class changes, thus more time for discipline

problems. Students would have more classes to prepare and review for in any single day, thus not providing the intent focus needed for success.

Question 32 asked the respondents for their opinions for the two advantages to a block schedule. Like with questions 30 and 31 the greatest advantages of the block schedule revolved around the length of the individual period. Again almost unanimously, the respondents reported the length of time allowed for longer and more complex lab activities. One respondent reported that with the longer planning period, teachers can have an easier time to get lessons/labs ready and work through with the students during the day. The next concept that emerged was that of student remediation. The same respondent that was just noted also stated that the longer teaching periods allows an instructor enough time to use several different strategies to teach the lessons. Another respondent stated that with the extended planning time, they had more successful parent conferences. They further stated that they only had access to one phone for teacher use and that is was tough to arrange calls and conferences. The longer period alleviated this.

Question 34 asked the respondents for two disadvantages to the block schedule. Unlike the previous three questions, this one did not revolve around the length of the class period, but more on the curriculum sequence. One respondent reported that they noticed students had gaps in time, and memory, from one course to the next. Another reported that because students were not in every subject continuously, they had lost most of their fundamental skills. Still another respondent reported that the actual number of contact hours is reduced over the course of a year which can cause problems in contact heavy classes like AP Physics. The next concern was that of content coverage. With the one semester set up, the state exams come very quickly. As a result, teachers reported

that they had to spend greater amounts of time and energy to prepare for a class so that the curriculum would be covered. The length of the individual class period did emerge as a consistent response, but not a major one. The major concern involved the students' attention spans. The longer class periods made it harder to keep their attention. One respondent also noted that is very difficult for students who transfer into the school from a school that uses the traditional schedule to make the transition.



## CHAPTER V

### SUMMARY, FINDINGS, AND CONCLUSIONS

#### Summary of the Study

The purpose of this study was to determine the comparison of scheduling type (block schedule vs. traditional schedule) on student achievement as measured by the Mississippi Subject Area Test and to obtain the views of current Mississippi public high school science teachers on the effectiveness of scheduling type in five domains: teacher preparation time, student achievement, laboratory activities, remediation, and discipline.

The study consisted of two parts. The first part of the study dealt with student achievement. The data were collected from 69 public schools across Mississippi. This sample included 35 schools that were currently using the traditional scheduling format and 34 schools that were currently using the block scheduling format. Comparisons were made in each of four subject area tests for both average mean score and passing percentage for the 2006 – 2007 school year. The second part of the study dealt with the views of current Mississippi public high school science teachers on the impact of scheduling type. Data for this part of the study were collected from 100 current Mississippi public high school teachers using a survey instrument developed by the researcher to measure the views of teachers for both block scheduling and traditional scheduling formats in five domains: teacher preparation time, student achievement, laboratory activities, remediation, and discipline. The descriptive analysis was reported in Chapter IV. An independent *t*-test at a Bonferroni alpha of 0.01 was used to test each hypothesis in the study.

## Summary of Major Findings

A summary of the major findings as tested is as follows:

H<sub>1</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Algebra I between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was not found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student mean scores on the MSAT in Algebra I. Hypothesis 1 was rejected.

H<sub>2</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in Biology between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student mean scores on the MSAT in Biology. The block schools scored significantly higher than the traditional schools. Hypothesis 2 was accepted.

H<sub>3</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in U.S. History between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student mean scores on the MSAT in U.S. History. The block schools scored significantly higher than the traditional schools. Hypothesis 3 was accepted.

H<sub>4</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (multiple-choice) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student mean scores on the MSAT in English II (multiple-choice). The block schools scored significantly higher than the traditional schools. Hypothesis 4 was accepted.

H<sub>5</sub>: There is a statistically significant difference in the mean scores of Mississippi high schools on the MSAT in English II (essay) between schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was not found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student mean scores on the MSAT in English II (essay). Hypothesis 5 was rejected.

H<sub>6</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Algebra I between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student percentage of passing scores on the MSAT in Algebra I. The block schools scored significantly higher than the traditional schools. Hypothesis 6 was accepted.

H<sub>7</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in Biology between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student percentage of passing scores on the MSAT in Biology. The block schools scored significantly higher than the traditional schools. Hypothesis 7 was accepted.

H<sub>8</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in U.S. History between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was not found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student percentage of passing scores on the MSAT in U.S. History. Hypothesis 8 was rejected.

H<sub>9</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (multiple-choice) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student percentage of passing scores on the MSAT in English II (multiple-choice). The block schools scored significantly higher than the traditional schools. Hypothesis 9 was accepted.

H<sub>10</sub>: There is a statistically significant difference in the percentage of Mississippi high school students passing the MSAT in English II (essay) between those schools who utilize a block scheduling format versus those who utilize a traditional scheduling format.

A significant difference was not found to exist between schools using the block scheduling format and those using the traditional scheduling format with regard to the student percentage of passing scores on the MSAT in English II (essay). The block schools scored significantly higher than the traditional schools. Hypothesis 10 was rejected.

H<sub>11</sub>: Current Mississippi high school science teachers who teach on the block scheduling format will perceive the traditional scheduling format will have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

A significant difference was found to exist in the perceptions of current Mississippi high school teachers who are utilizing the block schedule of the effectiveness of the block scheduling format to the traditional scheduling format. Of the five domains tested, the teachers significantly preferred the block scheduling to the traditional schedule in four of the domains. The fifth domain, discipline was not significantly different, but teachers preferred the traditional format to the block format. Hypothesis 11 was rejected.

H<sub>12</sub>: Current Mississippi high school science teachers who teach on the traditional scheduling format will perceive the block scheduling format to have a greater, positive effect on student achievement, student remediation, student discipline, teacher preparation time, and laboratory activities.

A significant difference was found to exist in the perceptions of current Mississippi high school teachers who are utilizing the traditional schedule of the effectiveness of the block scheduling format to the traditional scheduling format. Of the five domains tested, the teachers significantly preferred the block scheduling to the

traditional schedule in four of the domains. The fifth domain, discipline was significantly different, but teachers preferred the traditional format to the block format. Hypothesis 12 was accepted.

## Discussion

### *Student Achievement*

A recent review of literature regarding student achievement on the MSAT in various areas has shown that there was no significant benefit for an extended amount of time in the classroom (Handley, 1997; Lawrence & McPherson, 2000; Marchette, 2002; Smith, 2004). The Handley study (1997) included a single high school from Mississippi. Handley reported that based on Algebra I scores from this one school for the year prior to implementing a block schedule to the following year after implementation there was no significant difference between the traditional schedule and the block schedule. The Marchette study (2002) focused on the benefits of extending the class period in Biology and found that the extended time did not result in significant differences in student achievement. The Smith study (2004) focused on both the mean test scores and the percentage of students passing in 30 schools from across the state of Mississippi in Algebra I and Biology. Smith found that there were no significant differences in either mean score or percentage passing scores on either test. Each study concluded that extending instructional time did not necessarily positively impact student achievement.

Yet, other studies that show that the block schedule should result in greater student achievement (George, 1997; Hamdy & Urich, 1998; Stokes & Wilson, 2000). These studies have concluded that because block scheduling results in an extended class

period, the teacher is allowed more flexibility to implement a variety of teaching strategies that should result in greater student achievement.

When comparing scheduling format to student achievement on standardized tests, Andrews (2002) found that for each of the AP exams and the Connecticut Academic Performance Test (CAPT) there was no difference in student mean scores. However, she did find that when comparing students who attained a Level 4 on each area of the CAPT, those who were taught with a block scheduling format significantly outscored those who were taught using the traditional schedule. The same trend was found when looking at students who failed to meet the Level 1 (intervention) standard.

Even between the block scheduling formats there is debate as to which is better for student achievement. Martin-Carreras (2006) found that there were significant differences between the three most common block scheduling formats: 4 X 4, A/B, and Modified block. Martin-Carreras found that the 4 X 4 block significantly outscored the A/B block which significantly outscored the Modified block when comparing the mean scores of 9th grade students on the reading comprehension section of the 2001 FCAT NRT. In the areas of 9th grade math comprehension, and 10th grade writing comprehension sections of the same test, the modified block schedule outscored the 4 X 4 block schedule which outscored the A/B block schedules. When comparing the absentee rate and out of school suspension rates for each school prior to implementing the block schedule each school showed a significant decrease, with the only exception coming from the A/B block schedule format which actually increased over the same time period.

The current study found that the block scheduling format does positively impact student achievement as measured both by the overall mean scores and the percentage of

students passing. This trend was evident in each of the four subject area tests that Mississippi currently tests at the secondary level.

### *Teacher Perceptions*

Smith (2004) concludes his study by stating that while there may be no difference in student achievement with regard to scheduling type, there were other positive benefits to implementing the block. Several proponents of the block schedule concede that for the block schedule to be effective there are several conditions that must be met. The promises of block scheduling sound impressive. By extending the block of instructional time, teachers can implement certain strategy changes that can allow students to become more engaged in the lesson and thus have greater ownership of the own education (Canady & Rettig, 2003, 1996; Carney, 2005; Stokes & Wilson, 2000). Teachers can also accommodate a greater variety of student learning styles and can offer more remediation. All of which can lead to greater student achievement. In implementing a change to the block schedule it is more the teachers' abilities to adapt to the longer class periods and the school's willingness to provide adequate resources that lead to success, not the schedule itself (Canady & Rettig, 2003). In addition Canady and Rettig (1995) suggest that to encourage more interdisciplinary lessons, administrators must provide more, common planning times.

Williamson (2003) surveyed students at several Tennessee high schools in the Nashville area to obtain the students perceptions of the block schedule. When comparing the opinions of students who said they planned on a future career in college, the military, or a vocational track, there were no differences in opinions. There was also no difference in the opinions of male and female students. She did find significant differences when



she compared grade levels and races. Students in grades 10 and 12 preferred the block schedule to the traditional, but students in 11th grade preferred the traditional schedule. She concluded that the 11th grade curriculum could have been more stressful and included more state tested courses. This could have led to the students favoring a year long course. With regard to race, Caucasian students preferred the traditional schedule to the block while African-American students preferred the block schedule. She concluded that these differences could be attributed to the family background of the students. Caucasian students tended to have had more family history with the traditional schedule (parents, siblings, grandparents, etc.). They then would prefer what they felt was 'traditional'. The researcher found it interesting that Williamson did not offer a reason that African-American students preferred the block schedule.

Grosshans (2006) conducted an extensive interview and observation study of three science teachers in Virginia and their teaching styles on the block schedule. In an initial interview, all teachers reported that they were using a variety of teaching strategies. Grosshans found that in practice the teachers only varied the number of teaching strategies, not the type of strategy. Most of the teachers' activities included teacher-centered activities. These included the basic lecture, textbook worksheets, activities given by the teacher, and even teacher led solutions. Each teacher reported that more holistic approaches, including cooperative learning and inquiry based activities, were the most effective teaching strategies. Upon observation, the teachers actually used more 'traditional' strategies that reflected the teachers' own military background.

The same teachers also seemed to revert to mostly textbook activities. When asked, one teacher reported that since the textbook publisher, also developed the state

test, that he felt confident that he was better preparing his students than if he were to use another textbook. When asked why they do not utilize more inquiry based activities, the teachers responded that there was simply too much material to cover to expend the time to adequately use inquiry based activities. They all responded that they preferred the block schedule primarily because it did lend itself to completely covering a lesson, so students aren't strung out over the course of several days. Grosshan (2006) further concluded that many teachers liked the textbook activities because they are designed to work within the 90 minute block as a result few outside resources are used.

Grosshan's results are supported by a series of studies that were designed to obtain the teachers' perceptions. The majority of teachers' actions within the classroom are influenced by their own personal philosophies and beliefs (Keys & Bryan, 2001). However, Powell (1994) and Lawrenz (1990) point out that many times a teacher's personal beliefs about education may conflict with their own action. This is evidenced by the fact that most science teachers admit that a constructivist style of education is, and should be, the best way to teach science. But when stressed with the ideas of an exit exam and increased accountability, teachers often revert to a lecture first style of teaching, because it covers the most material in the most efficient amount of time. Bacon (1995) takes this argument one more step saying that there is another conflict when a teacher and curriculum stresses inquiry based activities, but the test stresses traditional recall. Grosshan (2006) even used the example that one states Chemistry curriculum stressed scientific calculator use, but then the exit exam banned the same calculators.

Robinson (2005) investigated the use of time with regard to instructional strategies. Teachers reported that most of the instructional time was devoted to active

student-centered instructional activities. Across all disciplines, the single most utilized instruction was lecture or direct instruction. Student-centered active instruction varied across all disciplines. Social studies teachers were more apt to use group instruction, while math and elective teachers used individual instruction, and English teachers opted for cooperatively learning. The elective teachers were the first to embrace technology.

Carney (2005) reported that overall teachers seem to prefer the block schedule, but there are some concerns. Teachers reported that the block schedule provides a flexibility that allows teachers to be more creative in their instruction, but they also felt that content coverage actually suffers. The main culprit seems to be the state exam. The teachers reported that the state exams have extensive curriculum content, but only measure the breadth of a student's knowledge, not their depth. Surprisingly, science teachers actually reported a decrease in the amount of lab based activities implemented with the block schedule. Carney (2005) concluded this was because on the traditional schedule, science was given an extra period for lab activities, and with the block schedule, there actual class room time decreases. Overall, 86% of the teachers Carney (2005) surveyed preferred the block schedule, 13% favored the traditional schedule and 1% had no opinion. Those that preferred the block schedule cited flexibility of instruction, time, relaxed teaching and learning environments, less stress, and more preparation time as the main reasons for preferring the block.

As reported in Chapter IV, the researcher obtained similar results from their survey. Of the five domains tested, all teachers, regardless of current scheduling content preferred the block schedule to the traditional schedule in four of the five. With regard to teacher preparation, lab activities, student achievement, and remediation, all teachers

preferred the block scheduling format to the traditional format. The only exception was in the area of discipline where teachers preferred the traditional format to the block format. In the four open ended responses, the most common theme revolved around time. Either the abundance of time to complete assignments, preparation time, and lab times with regard to the block schedule or the lack of time with the traditional schedule. As mentioned earlier, those teachers that were on the block schedule seemed to be more aware of classroom time and days before the state exam than those teachers on the traditional schedule. The fears about content coverage seems to be a motivating factor that actually eliminates any detrimental effect that may come from the block schedule, as evidenced by the results of the student achievement data.

#### Recommendations

The results of this study agree with other similar studies (Carney, 2005; George, 1997; Hamdy & Urich, 1998; Robinson, 2005; Stokes & Wilson, 2000). While the benefits to student achievement may not be conclusive, there are other benefits to the block schedule that seem to appeal to teachers, students, and even administrators. This study has found that the individual extended class time can positively benefit the students, thus also benefiting the school in a time of increased accountability. Teachers also seem to enjoy the flexibility that is associated with the block schedule.

The researcher recommends the use of a block scheduling format too positively influence a school's atmosphere. Students do not feel rushed in their 'education' and can learn at their own pace. Teachers have the ability to do more than just lecture and can even offer remediation during their class time. It is worth noting that while similar studies have shown that discipline issues tend to decrease with the implementation of a

block schedule, the respondents of this study actually preferred the traditional schedule to the block schedule (Carney, 2005; Robinson, 2005). This issue could be addressed with future studies.

Some studies have stated that with the increased importance of days in the classroom, a block schedule actually increases attendance rates (Canady & Rettig, 1995, 2003). This study did not address attendance, but the researcher concedes that it could be an important factor in student achievement and can be addressed with future studies.

Many studies, including this one, have recommended block scheduling as a means to increase student achievement and student / faculty morale, but the researcher concedes that there are for more factors that may be of more importance to the success of students than just the scheduling format that they happen to be using (Canady & Rettig, 2003; Carney, 2005; Robinson, 2005). Smith (2004) states that socio-economics, teacher training, curriculum alignment, and parental influences can have significant roles in student achievement. The block schedule is an important tool in the education of our students, but the researcher does not concede that it is the most important.

#### Limitations

The following limitations were used for this study:

1. The study was limited to the mean scores of Mississippi public high school students who took the Mississippi Subject Area Test in Algebra I, Biology, U.S. History, English II (multiple choice), and English II (essay) in the 2007 – 2008 school year.
2. The study was limited to the passing percentage of Mississippi public high school students who took the Mississippi Subject Area Test in Algebra I, Biology, U.S.

History, English II (multiple choice), and English II (essay) in the 2007 – 2008 school year.

3. The study was limited to the Algebra I, Biology, U.S. History, English II (multiple choice), and English II (essay) mean scores of 34 block and 35 traditional public high schools in the state of Mississippi.

4. The study was limited to the passing percentage in Algebra I, Biology, U.S. History, English II (multiple choice), and English II (essay) of 34 block and 35 traditional public high schools in the state of Mississippi.

5. The study was limited only to the variables block and traditional. Other variables that might impact student achievement were not utilized.

6. The study was limited to current Mississippi high school science teachers that responded to this survey.

7. The study was limited to the perceptions of current Mississippi high school science teachers in the areas of teacher preparation time, lab time, student achievement, remediation, and discipline,

8. The study was limited to the teachers' perceptions of the effectiveness of the schedule to the five domains.

9. The study was limited to only the responses reported on the survey. No actual observations or interviews were conducted.

#### Recommendations for School Administrators

Based on the findings of this study, the researcher offers the following recommendations for school leaders that are considering a change in their scheduling options.

1. Just implementing a block schedule will not guarantee improvements in student achievement. While the results of this study revealed a pattern that suggests the block scheduling format outperformed the traditional scheduling format in every test, and was statistically significant in most, districts must also remember that there are other studies that have found no significant difference in either format. Before introducing such a drastic change to a district, school leaders must also consider other variables.

2. A schedule that incorporates an extended instructional time (block schedule) can potentially have positive impacts on the school environment. Teachers, parents, and students seem to respond to the extra time that is available in each individual class meeting. Teachers appreciate the time that they can now use to go in-depth into class discussions, as well as being able to set-up class demonstrations, without sacrificing the lecture component. Parents will appreciate the extra time that is now available for in-class remediation. Students will appreciate the change of instructional methodology. They (students and teachers) do not feel rushed in a single setting. The teachers that responded to the survey in this study also indicated that the block schedule forced them to be more conscious of the calendar and covered the curriculum more efficiently.

3. The block schedule does allow more flexibility and more course choices for students. This can be both a benefit as well as an obstacle to school administrators. By offering more curriculum choices students and parents feel like they have more control over their educational choices. For high schools, this presents more of a college type atmosphere, thus possibly easing the transition into college. Students who are taking courses that they are interested in tend to be more successful than those who are forced into a course that they are not interested. With these extra course offerings, students can

be exposed to fields that they may want to continue in, thus helping them make better decisions for later college and vocational opportunities.

These same course offerings can also be a unique obstacle for schools. Each new offering may require a specialized teacher or resources. This teacher may be currently on staff or may need to be recruited. The resources will either need to be purchased, or reallocated from other programs. At the same time, with each new course, an old course may either be phased out or overloaded. The block scheduling format can require more teachers than the traditional scheduling format. Also, the new master schedule will need more attention to make sure potential conflicts are addressed.

4. Teachers do perceive that students respond more positively in a block schedule format than the traditional format. Any employee in any industry has a higher degree of productivity when they feel that what they are doing is productive. The teachers that responded to this survey seemed to indicate that they felt the block schedule was more effective than the traditional schedule. Teachers that buy into the system are more willing to work harder to ensure its success. Remedial programs that some teachers view as a waste of time, now can take a higher priority. Students and parents that see teachers that are enthusiastic about a program, tend to react more positively. In most cases, a positive attitude is more effective than any remedial intervention.

5. Teachers do perceive that students have fewer discipline issues on the traditional schedule than the block schedule. According to the teachers that responded to this survey, they perceived the traditional schedule to be more effective with regard to discipline issues than the block schedule. While there is more class changes on the traditional schedule, it is the traditional way of school. Students have been trained since



kindergarten that everything happens in 30 minute or 1 hour blocks. Most teachers were taught on a traditional schedule, although with each new class of teachers this statement is reduced. People feel comfortable with hour blocks.

The block schedule contradicts this unit of time. It is harder to become comfortable with a block of time being 93 minutes as opposed to 50. When the clock changes hours, the class should change. When we do anything to disrupt this internal clock, students and teachers become uneasy. This conflict forces more work onto the teacher. The success of the block schedule depends directly on the teacher's ability to regulate this internal clock. The advantage of the traditional schedule is that it regulates the internal clock for everyone. Discipline issues can be viewed as tolerance levels. Reported discipline issues come from the teachers who just can't tolerate this student anymore, in this class setting. Students make a game out of pushing peoples' buttons, be it either other students' or the teacher's. The traditional schedule gives them a tie and the block schedule gives them overtime.

6. Administrators should always evaluate teachers' instructional practices before making any changes. These evaluations could reveal that some teachers may benefit from additional training on alternative strategies. As stated earlier the success of any schedule is directly attributed to the teachers. More experienced teachers tend to be engrained in a single, comfortable methodology. If an administrator, especially a new administrator to the district, demands that a radical change be made, the teacher may refuse only out of spite. But, if the same administrator were to meet with their teachers and acknowledge their accomplishments before requesting a methodology modification, the same teachers would be more open to change. This also means more work for the

administration and district in general. Change should be gradual. Allow teachers to prove themselves, and give them ample training with the new system, before slashing everything they knew about education.

7. Remedial, or gifted, programs tend to be more effective in the classroom with the regular teacher. The extended instructional period allows the individual teachers more opportunities to offer these services to all of their students, not just a select group. The new buzz word in education today is intervention. Districts today have to show where they have offered some random amount of intervention hours to at-risk students. Some districts have attempted to meet this requirement by assigning random teachers at-risk students to be tutored during their planning period. While this is meeting the letter of the requirement, it is not meeting the spirit. The only person who truly knows what is going to be tested, is the person who wrote the test. Likewise, the only person who is the expert in the method that the teacher is using, are the teachers themselves. Outside tutors can be effective, but they may use different terminology that the students are not comfortable or familiar with. Teachers make the best tutors for their classes. The block schedule does allow for the teacher to conduct in-class remediation, without singling out any individual. At the same time, the teacher can gauge the class's problems when they see a reoccurrence of the similar misconceptions.

#### Recommendations for Future Studies

The researcher offers the following recommendations for future research within this topic:

1. Similar research can be done across states to evaluate the effectiveness of scheduling format beyond the state of Mississippi. This study was limited to just the

MSAT of Mississippi high schools. With the No Child Left Behind Act, every state in the U.S. is required to test students at various stages in their education and within certain core areas. This study can easily be modified to look for similar patterns within other states. The availability of block scheduling in primary schools is very limited, so there may be problems with trying to extend the research to younger students.

2. The state of Mississippi is currently validating a new version of the Subject Area Tests. As each new test is validated and implemented, the research can, and should periodically, be redone to see if the results are consistent. It may also be interesting to track districts over a period of years to see which scheduling format sees a consistent improvement.

3. Similar research could be done on other standardized tests, such as the SAT, ACT, AP, and even ASVAB. While this study was focusing on just the MSAT, there are other valuable standardized tests that districts are evaluated on. Organizations, such as the College Board and each testing company, also currently track success rates on different scheduling formats to constantly reevaluate their programs.

4. Teachers can be interviewed directly and have their teaching practices observed to validate their statements. One of the primary limitations of this study was that the teacher responses were recorded using only the survey and were not confirmed. Teachers tend to exaggerate their use of alternative methodologies, or can give the researcher the responses that they believe the researcher is expecting. A follow-up interview or observation could be performed to validate their responses.

5. Teachers could be allowed to teach the same basic curricula on both the block and traditional schedule to better ascertain their personal perceptions. Another limitation

of this study was that teacher perceptions were not limited to just those teachers that had experience on both scheduling formats. As a result, some of these perceptions may change if the same teachers were allowed to teach on both formats. This would also strengthen the perceptions. However, this could also be a problem. Depending on when they taught on each format, their perceptions may be altered. For example, teachers that taught on the traditional schedule before MSAT and have taught on the block schedule with MSAT, may have a more favorable rating of the traditional schedule because of a perceived low level of stress.

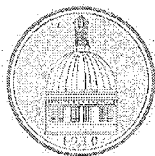
6. Parental involvement is one of the largest variables that were not investigated within this study. A survey can be done within a school, or district, to ascertain the perceptions of the parents and general community members. In a student's life, the single greatest influence is that of the parents. As such, parental involvement with a student's education can be a greater predictor of student achievement than the scheduling format. Also, community access, and involvement in educational and remediation programs could be indicators of student achievement. Some indicators that might be influential are, but not limited to educational level of parents, educational level of community, local industry, access to local university programs, and community relations.

7. Teacher training and experience may also be significant factors for student achievement. While this study did not investigate these factors, the necessary demographics were collected and could be compiled at a future date. I have stated earlier that the greatest indicator of success of either scheduling format is that of the teachers that are asked to implement it. As such, a future study could be done to compare the student achievement of students within a school using teacher certification as a variable

however this can be potentially a violation of personnel confidentiality. This may be something the school's lead administrator may be interested in, but for any publication a great deal of emphasis needs to be placed on the personnel's interest.

## APPENDIX A

## IRB SIGNATURE FORM




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 THE UNIVERSITY OF SOUTHERN MISSISSIPPI
 

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Institutional Review Board

 118 College Drive #5147  
 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: **28042102**

 PROJECT TITLE: **High School Science Teachers' Perceptions on the Effectiveness of Block and Traditional Scheduling Formats on Student Achievement**

 PROPOSED PROJECT DATES: **02/13/08 to 07/31/08**

 PROJECT TYPE: **Dissertation or Thesis**

 PRINCIPAL INVESTIGATORS: **Robert Decker Smith**

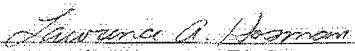
 COLLEGE/DIVISION: **College of Education & Psychology**

 DEPARTMENT: **Educational Leadership & Research**

 FUNDING AGENCY: **N/A**

 HSPRC COMMITTEE ACTION: **Expedited Review Approval**

 PERIOD OF APPROVAL: **05/15/08 to 05/14/09**

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

\_\_\_\_\_  
 5-19-08  
 Date

## APPENDIX B

## COVER LETTER TO TEACHER PARTICIPANTS

## Cover Letter to Teacher Participants

Robert D. Smith  
17729 Hwy 613  
Moss Point, MS 39562  
Telephone: 228-588-3202

Date:

RE: HIGH SCHOOL SCIENCE TEACHERS' PERCEPTIONS ON THE EFFECTIVENESS OF BLOCK  
AND TRADITIONAL SCHEDULING FORMATS ON STUDENT ACHIEVEMENT

Dear Fellow Science Teacher,

I am a graduate student in the Educational Leadership doctoral program at the University of Southern Mississippi as well as a high school science teacher at George County High School in Lucedale, MS. Presently I am collecting data for my dissertation and would greatly appreciate your help.

My research project is to compare block and traditional schedules and their impact on student achievement. I will obtain student achievement data used in Mississippi high schools from your district's website. However, this data does not provide a complete story. To help complete the story, I need individual teachers' opinions. You can help me by completing the enclosed survey and giving me your opinion. You should be able to complete the survey in about 10 minutes. All demographic information will be kept confidential. All of your responses will be kept anonymous. Please return the completed survey in the self-addressed stamped envelope by \_\_\_\_\_. Returning the surveys also indicates your permission for me to include your opinions in the study. These opinions will be reported in the form of results from a Likert-scale response. Selective representative open-ended responses will be reported for descriptive purposes. Returned surveys will only be reviewed by me and will be destroyed at the conclusion of the study.

Thank you in advance for your participation. A follow-up reminder may be sent in a few weeks.

Sincerely,



Robert D. Smith,  
Science teacher

Enclosures: SASE, Survey instrument

This project has been reviewed by the Human Subjects Protection Review Committee, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research subject should be directed to the chair of Institutional Review Board, The University of Southern Mississippi, 118 College Drive, #5147, Hattiesburg, MS 39406-0001, (601) 266-6820.

## APPENDIX C

HIGH SCHOOL SCIENCE TEACHERS' PERCEPTIONS ON THE EFFECTIVENESS  
OF BLOCK AND TRADITIONAL SCHEDULING FORMATS ON STUDENT  
ACHIEVEMENT

<b>Part I Demographic Information</b>		
<b>Write in your answers to questions 1-3. Circle response for 4.</b>		
1. Including this year, how many years have you taught?		
2. Including this year, how many years have you taught at least one science course per year?		
3. Including this year, how many years have you taught at your present school?		
4. What is your highest degree obtained? (circle one)		
Bachelors    Masters    Specialist    PhD/EdD		
<b>Part II Perceptions of Block and Traditional Scheduling Formats</b>		
<b>Block scheduling format</b> is defined as any school scheduling format that utilizes 90-minute instructional periods. These are commonly referred to as 4X4 block, semester block, A/B block or modified block.		
<b>Traditional scheduling format</b> is defined as a scheduling format that utilizes at least 6 instructional periods per day of 50-60 minutes in length for the entire school year.		
<b>You are currently teaching on either a block or traditional scheduling format. You are asked to provide your opinion on <u>both</u> your current scheduling format and an alternative format. Based on the definitions provided above and your knowledge of scheduling formats respond to each of the following statements using the following key. Columns are labeled Traditional and Block.</b>		
<b>1=strongly disagree 2= disagree 3= somewhat disagree 4=somewhat agree 5=agree 6=strongly agree</b>		
<b><i>This scheduling format provides / would provide me...</i></b>	<b><i>Traditional</i></b>	<b><i>Block</i></b>
5. Adequate time for planning (instructional preparation)	1 2 3 4 5 6	1 2 3 4 5 6



6. Adequate time to provide student tutoring	1 2 3 4 5 6	1 2 3 4 5 6
7. Adequate time to provide for student remediation	1 2 3 4 5 6	1 2 3 4 5 6
8. Adequate time to develop students' higher-order thinking and problem-solving skills	1 2 3 4 5 6	1 2 3 4 5 6
9. An environment where discipline is not a major issue	1 2 3 4 5 6	1 2 3 4 5 6
10. Adequate time for a single class meeting.	1 2 3 4 5 6	1 2 3 4 5 6
11. The opportunity for my course to move at a good pace	1 2 3 4 5 6	1 2 3 4 5 6
12. Adequate time to teach the curriculum	1 2 3 4 5 6	1 2 3 4 5 6
13. Adequate time to prepare for state testing	1 2 3 4 5 6	1 2 3 4 5 6
14. Adequate time for independent student research projects	1 2 3 4 5 6	1 2 3 4 5 6
<b><i>This scheduling format provides / would provide me...</i></b>	<b><i>Traditional</i></b>	<b><i>Block</i></b>
15. Adequate time to effectively use lab based activities in my lessons	1 2 3 4 5 6	1 2 3 4 5 6
16. Adequate time to adapt my lessons when students have more questions and/or problems than anticipated	1 2 3 4 5 6	1 2 3 4 5 6
17. Adequate time for making parental contacts	1 2 3 4 5 6	1 2 3 4 5 6
18. Creates low levels of stress at the end of the day	1 2 3 4 5 6	1 2 3 4 5 6
19. Adequate time for administrative duties (attendance, grading, etc.)	1 2 3 4 5 6	1 2 3 4 5 6
20. Adequate time to review current events to relate to classes.	1 2 3 4 5 6	1 2 3 4 5 6
21. Adequate time to review proper lab safety procedures.	1 2 3 4 5 6	1 2 3 4 5 6
22. Adequate time for proper chemical / specimen storage and disposal.	1 2 3 4 5 6	1 2 3 4 5 6
23. Adequate time for lab preparation.	1 2 3 4 5 6	1 2 3 4 5 6
24. Adequate time to review labs. (pre-lab and post-lab activities)	1 2 3 4 5 6	1 2 3 4 5 6
25. Adequate time to complete higher level labs.	1 2 3 4 5 6	1 2 3 4 5 6

		6
26. Adequate time to work with advanced students.	1 2 3 4 5 6	1 2 3 4 5 6
27. An environment where students do not too much idle time.	1 2 3 4 5 6	1 2 3 4 5 6
28. An environment where students are not frustrated with too much busy work.	1 2 3 4 5 6	1 2 3 4 5 6
29. An environment where there are fewer discipline issues stemming from class changes.	1 2 3 4 5 6	1 2 3 4 5 6
<b>The following items are open-response. Please write-in an answer for each item.</b>		
30. What are 2 <i>advantages</i> of the <b><u>traditional</u></b> scheduling format?		
31. What are 2 <i>disadvantages</i> of the <b><u>traditional</u></b> scheduling format?		
32. What are 2 <i>advantages</i> of the <b><u>block</u></b> scheduling format?		
33. What are 2 <i>disadvantages</i> of the <b><u>block</u></b> scheduling format?		

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